



PRINCE MAHIDOL AWARD CONFERENCE



A World United Against Infectious Diseases:
**CROSS-SECTORAL
SOLUTIONS**

Jan 28th - Feb 2nd, 2013 | Bangkok, Thailand

PRINCE MAHIDOL
AWARD CONFERENCE
2013

1st GLOBAL CONFERENCE
ON REGIONAL SURVEILLANCE NETWORKS

2nd INTERNATIONAL
ONE HEALTH CONGRESS

CENTENNIAL COMMEMORATION
of the Rockefeller Foundation

humans | animals | the environment

CENTARA GRAND & BANGKOK CONVENTION CENTRE
AT CENTRALWORLD, BANGKOK, THAILAND

*True success is not in the learning
but in its application to the benefit of mankind*

His Royal Highness Prince Mahidol of Songkla

PRINCE MAHIDOL AWARD

The Prince Mahidol Award was established in 1992 to commemorate the 100th birthday anniversary of Prince of Mahidol of Songkla, who is recognized by the Thais as ‘The Father of Modern Medicine and Public Health of Thailand’.

His Royal Highness Prince Mahidol of Songkla was born on January 1, 1892, a royal son of Their Majesties King Rama V and Queen Savang Vadhana of Siam. He received his education in England and Germany and earned a commission as a lieutenant in the Imperial German Navy in 1912. In that same year, His Majesty King Rama VI also commissioned him as a lieutenant in the Royal Thai Navy.

Prince Mahidol of Songkla had noted, while serving in the Royal Thai Navy, the serious need for improvement in the standards of medical practitioners and public health in Thailand. In undertaking such mission, he decided to study public health at M.I.T. and medicine at Harvard University, U.S.A. Prince Mahidol set in motion a whole range of activities in accordance with his conviction that human resources development at the national level was of utmost importance and his belief that improvement of public health constituted an essential factor in national development. During the first period of his residence at Harvard, Prince Mahidol negotiated and concluded, on behalf of the Royal Thai Government, an agreement with the Rockefeller Foundation on assistance for medical and nursing education in Thailand. One of his primary tasks was to lay a solid foundation for teaching basic sciences which Prince Mahidol pursued through all necessary measures. These included the provision of a considerable sum of his own money as scholarships for talented students to study abroad.

After he returned home with his well-earned M.D. and C.P.H. in 1928, Prince Mahidol taught preventive and social medicine to final year medical students at Siriraj Medical School. He also worked as a resident

doctor at McCormick Hospital in Chiang Mai and performed operations alongside Dr. E.C. Cord, Director of the hospital. As ever, Prince Mahidol did much more than was required in attending his patients, taking care of needy patients at all hours of the day and night, and even, according to records, donating his own blood for them.

Prince Mahidol’s initiatives and efforts produced a most remarkable and lasting impact on the advancement of modern medicine and public health in Thailand such that he was subsequently honoured with the title of “Father of Modern Medicine and Public Health in Thailand”.

In commemoration of the Centenary of the Birthday of His Royal Highness Prince Mahidol of Songkla on January 1, 1992, the Prince Mahidol Award Foundation was established under the Royal Patronage of His Majesty King Bhumibol Adulyadej to bestow international awards upon individuals or institutions that have made outstanding and exemplary contributions to the advancement of medical, and public health and human services in the world.

The Prince Mahidol Award will be conferred on an annual basis with prizes worth a total of approximately USD 100,000. A Committee, consisting of world-renowned scientists and public health experts, will recommend selection of awardees whose nominations should be submitted to the Secretary-General of the Foundation before May 31st of each year. The committee will also decide on the number of prizes to be awarded annually, which shall not exceed two in anyone year. The prizes will be given to outstanding performance and/or research in the field of medicine for the benefit of mankind and for outstanding contribution in the field of health for the sake of the well-being of the people. These two categories were established in commemoration of His Royal Highness Mahidol’s graduation with Doctor of Medicine (Cum Laude) and Certificate of Public Health and in respect to his speech that:

***“True success is not in the learning,
but in its application to the benefit of mankind.”***

The Prince Mahidol Award ceremony will be held in Bangkok in January each year and presided over by His Majesty the King of Thailand.

MESSAGE FROM THE CHAIRS

of the International Organizing Committee

The theme of this year's Prince Mahidol Awards Conference "A world united against infectious diseases: cross-sectoral solutions" highlights how infectious diseases continue to threaten the well-being of the world, and the opportunity we have to more successfully counter these threats in the future through a more strategic approach to global health preparedness. The continuing threat from infections such as H5N1 (avian) influenza, Rift Valley fever, rabies, SARSCoV, Ebola virus, the H1N1 2009 pandemic influenza, and, most recently the novel coronavirus and other urgent issues such as increasing global trends in antimicrobial drug resistance has raised awareness of the global interdependence of human health, animal health, and economic security, and the need for more systematic and cross-sectoral approaches to identifying and responding to global public health emergencies and other health threats arising at the human-animal-ecosystems interface.

The "One Health" paradigm arose from the recognition that the well-being of humans, animals, and the ecosystems in which we all live are interdependent. Maintaining this well-being will affect not only our physical health, but also the economic health of societies. Recent studies forecast that the toll on the world's economy of a pandemic with impact similar to the 1918 influenza pandemic would exceed \$4 trillion. We have seen that even short-lived and geographically focused outbreaks of recent zoonotic diseases can be devastating; SARS cost the economies of East Asia an estimated \$50 billion. Many other zoonotic diseases regularly entail economic losses - Rift Valley fever, anthrax, and brucellosis are but a few examples. Early detection and rapid response will be central to minimizing their impact on our social and economic stability.


Preventing disease at the human-animal-ecosystems interface requires a strategic approach that (1) builds on the understanding that the health and well-being of humans, animals and the environment are

inextricably linked, (2) promotes cross-sectoral collaboration that spans a variety of sectors, including but not limited to the animal health, public health, environmental and conservations communities, including academia and the private sector (3) targets promotion of those policies, systems and processes and the strengthening of those skills and capacities critical for minimizing health risks and limiting their social, economic and public health impact, (4) uses a "risk" based approach to target investments and capacity building to those places, populations, times and situations where need is greatest.

This year's Prince Mahidol Award Conference is a unique opportunity to consider recent progress, remaining challenges, and the collaborative solutions required for the future. This Conference provides us with a forum to assess the investments required to reduce economic, societal, and health impacts. Threats to health are too complex for any country or organization to be successful on its own; collaboration among international, regional, national, non-governmental, academic and private sector players will be essential.

This underscores the need for the global community to act systematically to improve individual countries' abilities to identify and mitigate the severity of health threats arising within their borders. However, this readiness for action cannot be the preserve of the human health sector alone. Comprehensive disease detection and response capacities that span the traditional domains of animal health, public health, ecology and conservation are required for effective control.

We need strong collaboration across sectors to make "health" united as "One".



Dr. Vicharn PANICH
Chair
Prince Mahidol
Award Conference



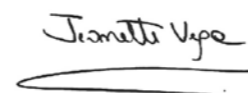
Dr. Keiji FUKUDA
Co-Chair
World Health Organization



Dr. Ariel PABLOS-MENDEZ
Co-Chair
U.S. Agency for
International Development



Mr. Kiyoshi KODERA
Co-Chair
Japan International
Cooperation Agency



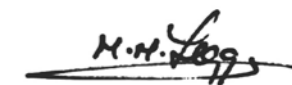
Dr. Jeanette VEGA
Co-Chair
The Rockefeller Foundation



Dr. Silvia BINO
Co-Chair
Connecting Organizations for
Regional Disease Surveillance



Dr. Fiona GODLEE
Co-Chair
BMJ



Dr. Martyn JEGGO
Co-Chair
One Health Congress

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PRINCE MAHIDOL

AWARD CONFERENCE
2013

A World United Against Infectious Diseases: CROSS-SECTORAL SOLUTIONS

BACKGROUND

The Prince Mahidol Award Conference is an annual international conference hosted by the Royal Thai Government, the Prince Mahidol Award Foundation, and other relevant International Organizations, Foundations and Civil Society Organizations. The Conference serves as an international forum for sharing evidence for health related policies and strengthens social commitments for health development. This conference is linked to the annual Prince Mahidol Award for public health and medicines, one of the most prestigious international health awards.

The Conference in 2013 is jointly organized for the **Prince Mahidol Award Conference 2013**, the **1st Global Conference on Regional Disease Surveillance Networks**, the **2nd International One Health Congress**, and the **Centennial Commemoration of the Rockefeller Foundation**. The 2013 Conference with the theme ***“A World United Against Infectious Diseases: Cross-Sectoral Solutions”*** is dedicated to transparent and progressive resolve to reduce the threat of infectious diseases through cross-sectoral and international cooperation and communication.

The 2013 Conference will prove to be one of the most significant assemblages of infectious disease experts in the world, who will meet to advance the “One Health” agenda beyond the theoretical to the practical, and bring much-needed attention to the policy and operational issues that ultimately determine the impact and success of these cross-sectoral efforts.

We expect vanguard moments with a positive impact on global solidarity for a world united against infectious disease.

OBJECTIVES

- To foster cooperation and communication across sectors and across borders to mitigate the threat of infectious diseases, existing or emerging, at the human-animal ecosystems interface.
- To review and share experiences among low, middle and high-income countries with different degrees of health system capacity as defined within the International Health Regulations and the OIE PVS pathway, leading to knowledge sharing, strengthening of health systems, establishment of sound policies, and positive social action.
- To identify the human suffering and economic cost if we fail to build appropriate human and institutional capacities and fail to exploit available technologic innovations in countering health threats.
- To provide opportunities for a group of experts - utilizing multidiscipline country teams - to dialogue, learn, create solutions, and provide leadership in applied one-health concepts.
- To provide a platform for international, regional, and national disease surveillance systems and networks to demonstrate best practices, forward-looking concepts, management of political challenges, and cross-border cooperation in response to health threats at the human-animal-ecosystem interface.
- To identify those policies and other higher-level factors that either constrain or enable effective cross-sectoral collaboration at the country, regional and global level and the formulation of an action agenda that draws on these insights to promote successful cross-sectoral solutions to infectious disease threats.

STRUCTURE OF THE CONFERENCE

The conference will be convened during
28 January – 2 February 2013.

PRE-CONFERENCE ACTIVITIES

Monday 28 – Tuesday 29 January 2013

Morning and afternoon:
Conference Special Events (side meetings)
convened by interested co-hosts and all concerned partners.

Wednesday 30 January 2013

Morning and afternoon:
Field visits to expose to Thai experiences on One Health

MAIN CONFERENCE

Thursday 31 January – Saturday 2 February 2013

The main conference consists of 5 plenary sessions (PL)
and 21 parallel sessions (PS).

VENUE

The conference will be held at the

**CENTARA GRAND & BANGKOK CONVENTION CENTER
AT CENTRALWORLD, BANGKOK, THAILAND.**

CONFERENCE PARTNERS

The conference is co-hosted by 8 organizations, namely the Prince Mahidol Award Conference, the World Health Organization (WHO), Connecting Organizations for Regional Disease Surveillance (CORDS), One Health Congress, U.S. Agency for International Development (USAID), the Rockefeller Foundation, the Japan International Cooperation Agency (JICA), and the British Medical Journal (BMJ) with the support from other key related partners.



PRE- CONFERENCE ACTIVITIES

SPECIAL EVENTS

MONDAY 28 JANUARY 2013

TUESDAY 29 JANUARY 2013

FIELD TRIP

WEDNESDAY 30 JANUARY 2013

SPECIAL EVENTS

(Side Meetings)

MONDAY 28 JANUARY 2013

TIME	MEETING TITLE	ORGANIZER	ROOM
09:00-12:30 hrs	Reducing Risks at the Animal-Human-Environment Interface: Lessons for Framing our Future Approach. A workshop and a debate with Country Officials, International Partners, and World Bank Managers and staff from the South Asia and East Asia and Pacific Regions	The World Bank	Lotus Suite 3 Level 22
09:00-12:30 hrs	Optimising health care in the UK National Health Service: Balancing quality and efficiency	Health Intervention and Technology Assessment Program (HITAP)	Lotus Suite 7 Level 22
09:00-12:30 hrs	PMAC 2013 One Health World Art Contest, Award Ceremony	Prince Mahidol Award Conference	Lotus Suite 5-6 Level 22
09:00-17:30 hrs	Consultative meeting of the epidemiology consortium for emerging zoonotic and transboundary animal disease control in Asia	FAO Regional Office for Asia and the Pacific (FAO-RAP)	Lotus Suite 9 Level 22
09:00-17:30 hrs	Promoting Global Solidarity of One Health Approaches	University of Minnesota	Lotus Suite 1-2 Level 22

TIME	MEETING TITLE	ORGANIZER	ROOM
09:00 -17:30 hrs	APEIR Steering Committee	Asia Partnership on Emerging Infectious Disease Research (APEIR)	Lotus Suite 10 Level 22
09:00 -17:30 hrs	PHM Steering Council Meeting	People's Health Movement	Lotus Suite 4
09:00 -17:30 hrs	Regional Network on Global Health	Mahidol University Global Health	Lotus Suite 11 Level 22
09:00 - 17:30 hrs	Asia-Pacific Network for Health Education Reform (ANHER)	Prince Mahidol Award Conference	Board Room Level 23
13:30 - 17:30 hrs	Lower Mekong Initiative Meeting	USAID/RDMA	Lotus Suite 12 Level 22

SPECIAL EVENTS

(Side Meetings)

TUESDAY 29 JANUARY 2013

TIME	MEETING TITLE	ORGANIZER	ROOM
08:00 - 12:30 hrs	Prince Mahidol Award Youth Program Conference 2013	Prince Mahidol Award Foundation	Ballroom C Level 23
09:00 - 12:30 hrs	“Infectious Diseases in the Asia Pacific: Peril and Promise” A Conversation with regional leaders in health	Bill and Melinda Gates Foundation	Lotus Suite 7 Level 22
09:00 - 12:30 hrs	MBDS: Celebrating 12 Years of Accomplishments and Looking to Future Challenges	Mekong Basin Disease Surveillance (MBDS)	Lotus Suite 11 Level 22
09:00 - 12:30 hrs	Neglected Zoonotic Diseases (NZD) in a One Health context: exchanging experiences between continents	FAO and EC-Projects	Lotus Suite 9 Level 22
09:00 -12:30 hrs	Canadian Participants One Health Meeting	Public Health Agency of Canada	Lotus Suite 1 Level 22
09:00-15:30 hrs	The 3rd Steering Committee Meeting of ASEAN Plus Three Field Epidemiology Training Network (FETN) : United Against Emerging Infectious Diseases Through Field Epidemiology Training	ASEAN+3 FETN Association of Southeast Asian Nations (ASEAN) Plus Three Countries formed a network	World Ballroom A Level 23
09:00 - 17:30 hrs	Collaborative One Health Projects by Epidemiological Teams at the Provincial & District Level in Thailand: Learning from field experiences	Field Epidemiologist Association of Thailand (FEAT)	World Ballroom B Level 23

TIME	MEETING TITLE	ORGANIZER	ROOM
09:00 - 17:30 hrs	Second Meeting of the Scientific Task Force on Wildlife and Ecosystem Health and Multilateral Environmental Agreements Coordination Meeting	The Scientific Task Force on Wildlife and Ecosystem Health	Lotus Suite 3 Level 22
09:00 - 17:30 hrs	Two Networks - One Goal - One Health OHCEA/SEAOHUN Summit	USAID/RESPOND	Lotus Suite 5-6 Level 22
09:00 - 17:30 hrs	The establishment and evolution of health technology assessment organisations in low- and middle-income countries	Health Intervention and Technology Assessment Program (HITAP)	Lotus Suite 12 Level 22
09:00 -17:30 hrs	Health in the Post-2015 Development Agenda	People’s Health Movement	Lotus Suite 4 Level 22
09:00 - 17:00 hrs	Regional Training in Animal and Human Health Epidemiology in South Asia: One Health Hub and Collaborative Project updates and strategic planning	Massey University	Lotus Suite 13 Level 23
09:00 - 17:30 hrs	Asia-Pacific Network for Health Education Reform (ANHER)	Prince Mahidol Award Conference	Board Room Level 23
10:00 - 17:00 hrs	One Health Alliance of South Asia	EcoHealth Alliance	Lotus Suite 10 Level 22
13:30 - 17:30 hrs	Lower Mekong Initiative Meeting	USAID/RDMA	Lotus Suite 11 Level 22

TIME	MEETING TITLE	ORGANIZER	ROOM
13:30 - 18:00 hrs	APO Working Group on Guidelines on Steering Committee Working Methods	Asia Pacific Observatory on Health Systems and Policies (APO)	Lotus Suite 14 Level 23
14:00-16:00 hrs	Prince Mahidol Award Youth Program Conference 2013 Lessons learned from scholars	Prince Mahidol Award Foundation	Lotus Suite 1 Level 22
14:00-16:00 hrs	Prince Mahidol Award Youth Program Conference 2013 Acknowledgement and network enhancement for Thai and International Mentors	Prince Mahidol Award Foundation	Lotus Suite 2 Level 22
14:00 - 17:30 hrs	Official launch of CORDS	Connecting Organizations for Regional Disease Surveillance (CORDS)	World Ballroom C Level 23
14:00 - 17:30 hrs	3rd International One Health Congress 2015: Outlook and Scope	Immuno Valley The Netherlands	Lotus Suite 9 Level 22
14:00 - 18:00 hrs	Cross-sectoral collaboration for health and sustainability : a new agenda for generating and assessing research impact in the face of complexity.	International Development Research Centre (IDRC)	Lotus Suite 7 Level 22

FIELD TRIP

WEDNESDAY 30 JANUARY 2013

06:30-18:00 hrs

1. System strengthening in the context of tourist attraction areas
2. Managing the information system for disease surveillance in livestock farms
3. Proactive SRRT response
4. Surveillance system in migrant workers
5. Multi-sectoral collaboration at the district level
6. Strong SRRT at the subdistrict level
7. Self reliance by the civil society at the community level
8. Disease control in a metropolis: the variety of the urban community
9. Roles of a university hospital in disease control



LIST OF

SPEAKERS

PANELISTS

MODERATORS

RAPPORTEURS

SPEAKERS | PANELISTS | MODERATORS | RAPORTEURS**KEYNOTE SESSION**

Uche Veronica Amazigo
Michael David Rawlins
David Rockefeller, Jr.
Punchawee Sukbut
Bernard Vallat

Suladda Pongutta
Wachara Riewpaiboon
Iyarit Thaipisuthikul

PLENARY SESSION 1**One Health: Meeting the Challenge of “A World United Against Infectious Diseases”**

Larry Brilliant
David Nabarro
David M. Serwadda

Dennis Carroll

Tomokazu Tamura
Phanthanee Thitichai
Sylvia Irene Wanzala
Yuttapong Wongswadiwat

PLENARY SESSION 2**National to Regional to Global Surveillance – A Path to One Health**

Bruno Garin-Bastuji
Yoshihiro Sakoda

Elizabeth Mumford

Nao Naganori
Jaruayporn Srisasalux
Patcharin Tantiworrawit

PARALLEL SESSION 2.1**Achievements and Gaps in One Health Surveillance**

Armando Gonzalez
Justin Masumu
Julio Pinto
Daniela von Blumröder

Peter Black

Duangjai Denkesineelam
Irene Marete
Junki Maruyama
Decha Tamdee

PARALLEL SESSION 2.2**Ecosystems, Wildlife and One Health**

David Coates
Ruth Cromie
Borja Heredia
William Karesh
Juan Lubroth
Scott Perkin

Scott Newman

Ruchirada Changkwanyeun
Kyle Taylor
Kanokwaroon Watananirun

SPEAKERS | PANELISTS | MODERATORS | RAPORTEURS**PARALLEL SESSION 2.3****Making Regional Networks Work**

Silvia Bino
Louise Gresham
Martyn Jeggo
Pongpisut Jongudomsuk
Dominic Kambarage
Alex Leventhal
Christophe Longuet
Pierre Nabeth
Bounlay Phommasack
Stanley Sonoiya
Kumnuan Ungchusak

Nigel Lightfoot
Mark Rweynemamu

Parunyou Julayanont
Kellen Karimi
Phathai Singkham

PARALLEL SESSION 2.4**Measuring the Impact of Cross-sectoral Collaboration on Disease Prevention and Control at the Human-Animal-Ecosystems Interface**

Nitish Debnath
Penelope Mavor
Wilhelm von Trott
Frans van Knapen
Paul Williams

Katinka de Balogh
Debra Olson

Stephanie Burniston
Manasigan Kanchanachitra
Chanwit Tribuddharat

PARALLEL SESSION 2.5**Innovations Advancing Health Surveillance at the Human-Animal Interface**

Teerasak Chuxnum
Tracey Goldstein
Clement Meseke
Maurice Ope
Vivek Singh
Rafael Villa-Angulo

Charlanne Burke

Rosnah Ismail
Sumalee Lirtmunlikaporn
Pennapa Kaweewongprasert

PARALLEL SESSION 2.6**Transforming the Global Workforce for One Health Approaches**

William Bazeyo
Sopon Iamsirithaworn
Malika Kachani
Narin Romlumduan
Willem Daan Vink

William Hueston

Ronald Enrique Morales Vargas
Hirunwut Praekunatham
Angkana Sommanustweechai

SPEAKERS	PANELISTS	MODERATORS	RAPORTEURS
PARALLEL SESSION 2.7			
Preparedness for Nipah Virus Outbreaks in At-Risk Countries			
Hume Field		Jonathan Epstein	Aphaluck Bhatiasevi
Stephen Luby			Viravarn Luvira
Ramalan bin Mohamed			Kevin Olival
Supaporn Wacharapluesadee			
PLENARY SESSION 3			
Policies and Strategies to Meet the Challenge of Emerging Disease Threat through Prevention, Preparedness and Response			
Pierre Formenty	Ximena Aguilera		Naruchorn Kijpaisalratana
David Heymann			Stevens M.B Kisaka
John Mackenzie			Daniel-Laurent Nkamba Mukadi
Dilys Morgan			
Mark Rweynemamu			
PARALLEL SESSION 3.1			
Cross-sectoral Solutions: Challenges and Best Practices from Country and Regional Experiences			
Annette Dixon	Masato Mugitani		Stephanie Burniston
Baizid Khorshid Riaz			Calvin Sindato
James Kile			Rochana Wutthanarungsan
Bounlay Phommasack			
Suvichai Rojanasthien			
PARALLEL SESSION 3.2			
Managing Pandemic Disease Threats in the International Extraction Industry			
Marta Cabrera	Steven Phillips		Rosnah Ismail
Frank Fox			Kevin Olival
William Karesh			Sirinya Phulkerd
PARALLEL SESSION 3.3			
People, Practices and Policies –Designing and Implementing Effective Multisectoral, Trans-disciplinary Interventions to Reduce Risk and Mitigate the Negative Impact of Infectious Diseases under One Health			
Petra Dickmann	Kama Garrison		Manasigan Kanchanachitra
Asiya Odugleh-Kolev			Masumi Okamoto
John Parrish-Sprowl			Jaruayporn Srisasalux
Daniel Siegel			
Bill Smith			
Duc J. Vugia			

SPEAKERS	PANELISTS	MODERATORS	RAPORTEURS
PARALLEL SESSION 3.4			
Successful Collaboration: Trust and Transparent Data Sharing and Communication			
Soheir Abdelkader		Wantanee Kalpravidh	Kanjana Changkaew
Peter Black			Kellen Karimi
Hume Field			Phathai Singkham
I Nyoman Kandun			
Pudjiatmoko			
PARALLEL SESSION : 3.5			
Identify Gaps/Barriers that Impede Effective Cross Border Preparedness and Response Planning and Execution for Infectious Diseases			
Ferdinal M. Fernando	Subhash Morzaria		Charamporn Holumyong
Jan Hinrichs			Irene Marete
James Hopkins			Phanthanee Thitichai
Vincent Martin			
Moe Ko Oo			
Mahmudur Rahman			
Jonathan Rushton			
PARALLEL SESSION : 3.6			
Contribution of the One Health Paradigm to Food Security			
Francois Le Gall	David Nabarro		Sumalee Lirtmunlikaporn
Lany Rebagay			Orratai Waleewong
Pathom Sawanpanyalert			Chadia Wannous
Craig Stephen			Sylvia Irene Wanzala
Berhe Tekola			
PARALLEL SESSION : 3.7			
Is Technology or Failure of the Imagination the Bigger Challenge for Disease Detection?			
Karl Brown	Mark Smolinski		Dibesh Karmacharya
John Brownstein			Siritree Suttajit
Peter Daszak			Decha Tamdee
Dionisio Jose Herrera Guibert			Tao Zhang
Dennis M. Israelski			
Eron Karimuribo			
Ann Marie Kimball			
Carl Koppeschaar			

SPEAKERS | PANELISTS | MODERATORS | RAPORTEURS

Juan Lubroth
 Larry Madoff
 Stephen S. Morse
 Rosanna Peeling
 Patipat Susumpow
 Channe Suy

PLENARY SESSION 4**The Paradigm Shift Towards Cross-Sectoral Collaboration: Policy, Tools and Empowering Factors for Health Systems Strengthening**

Borja Heredia	Maged Younes	Chalermpol Chamchan
Peter Maina Ithondeka		Quoc Toan Luu
William Karesh		Hirunwut Praekunatham
Dilys Morgan		
Elizabeth Mumford		

PARALLEL SESSION 4.1**Stories from the Ground**

Syed Abbas	Yojiro Ishii	Aphaluck Bhatiasevi
Bernadette ABELA-RIDDER	Tessa Richards	Aya Kagota
Jeanne Coffin		Wachara Riewpaiboon
Rungrueng Kitphati		Angkana Sommanustweechai
Kota Yoshioka		

PARALLEL SESSION 4.2**The Evolutionary Process of Risk Determination to Define Surveillance Strategies and Target Resources for Efficient Prevention and Control**

Peter Daszak	Jonna Mazet	Wiranpat Kittitharaphan
Pierre Formenty		Smathorn Thakolwiboon
Marius Gilbert		Sanigan Thongsawad
Dirk Pfeiffer		

PARALLEL SESSION 4.3**Unprecedented Move toward a More Coherent Approach Among Sectors for the Strengthening of National Human-Animal-Ecosystem Health Capacities**

Simeon S. Amurao Jr.	Maged Younes	Saiful Islam
Stephane de La Rocque		Chosita Pavasuthipaisit
Stela Gheorghita		Kanokwaroon Watananirun
Francois Le Gall		

SPEAKERS | PANELISTS | MODERATORS | RAPORTEURS

Severin Loul
 Scott Newman
 Herbert Schneider
 Rajesh Sreedharan
 Alejandro Thiermann

PARALLEL SESSION 4.4**Going Viral #Strategic Public Communication to Affect Practices and Livelihoods: <http://PMAC>**

Dee Bennett	Anton Schneider	Pennapa Kaweewongprasert
Ljubica Latinovic		Yue Ma
Keri Lubell		Kanitsorn Sumriddetchkajorn
Monika Gehner		

PARALLEL SESSION 4.5**Controlling Antibiotic Resistance through the One Health Approach**

Maria Virginia Guzman-Ala	David Legge	Trassanee Chatmethakul
Li Yang Hsu		Mac Farnham
Andri Jatikusumah		Pojjana Hunchangsith
Carmem Pessoa-Silva		Viravarn Luvira
Mira Shiva		
David Wallinga		

PARALLEL SESSION 4.6**Enabling Policy Environments for a One Health Approach**

Gervais Andze Ondobo	Joseph Anelli	Ngamnetr Eiamnakha
Santanu Bandyopadhyay	Marguerite Pappaioanou	Karn Lekagul
Ruben Donis		Cha-aim Pachanee
Steven Phillips		
Theerapat Prayurasiddhi		
Michael Robach		

PARALLEL SESSION 4.7**Enhancing One Health: To Cultures, Add Culture**

Cynthia Hunter	Stephen Luby	Chiraporn Khitdee
Saiful Islam	Susan Zimicki	Vittavat Termglinchan
Jeffrey Mariner		Thitikorn Topothai
Julienne Ngoundoung Anoko		
Lertrak Srikitjakarn		

SPEAKERS | PANELISTS | MODERATORS | RAPPORTEURS

PLENARY SESSION 5
Sustainable Effective Cross-sectoral Collaboration for Bio-secured World

Keiji Fukuda	Mark Smolinski	Wilawan Auewongkul
Om Kim Sir		Passisd Laoveeravat
Hasan Mahmud		Chompoonut Thaichinda
Ali Ghufron Mukti		
Ariel Pablos-Mendez		
Mark Rweynemamu		

LEAD RAPPORTEUR TEAM

- Supamit Chunsuttiwat
- Jeff John
- Jonna Mazet
- Viroj Tangcharoensathien

RAPPORTEUR COORDINATOR

- Walaiporn Patcharanarumol

MAIN CONFERENCE

THURSDAY 31 JANUARY 2013
FRIDAY 1 FEBRUARY 2013
SATURDAY 2 FEBRUARY 2013

THURSDAY

31 JANUARY 2013

TIME	PROGRAM	ROOM
09:00-10:30	Opening Session by HRH Princess Maha Chakri Sirindhorn & Keynote Address	Bangkok Convention A2 Fl. 22
10:30-11:00	Break	Bangkok Convention Centre B2
11:00-12:30	PL1 One Health: Meeting the Challenge of "A World United Against Infectious Diseases"	Bangkok Convention A2 Fl. 22
12:30-14:00	Lunch	Bangkok Convention Centre B2
14:00-15:00	PL2 National to Regional to Global Surveillance – A Path to One Health	Bangkok Convention A2 Fl. 22
15:00-15:30	Break	Delegates Café & Bar
15:30-17:30	PS2.1 Achievements and Gaps in One Health Surveillance	Lotus 1-2, Fl. 22
	PS2.2 Ecosystems, Wildlife and One Health	Lotus 3-4, Fl. 22
	PS2.3 Making Regional Networks Work	World Ballroom A Fl. 23
	PS2.4 Measuring the Impact of Cross-sectoral Collaboration on Disease Prevention and Control at the Human-Animal-Ecosystems Interface	World Ballroom C Fl. 23
	PS2.5 Innovations Advancing Health Surveillance at the Human-Animal Interface	Lotus 7, Fl. 22
	PS2.6 Transforming the Global Workforce for One Health Approaches	World Ballroom B Fl. 23
	PS2.7 Preparedness for Nipah Virus Outbreaks in At-Risk Countries	Lotus 5-6, Fl. 22
17:45-18:30	Reception and Opening for Poster Exhibition Foyer in front of Bangkok Convention Centre	
18:30-20:30	Welcome Dinner Bangkok Convention Centre A2	

FRIDAY

1 FEBRUARY 2013

MORNING SESSIONS

TIME	PROGRAM	ROOM
09:00-10:00	PL3 Policies and Strategies to Meet the Challenge of Emerging Disease Threat through Prevention, Preparedness and Response	Bangkok Convention Fl. 22
10:00-10:30	Break	Delegates Café & Bar
10:30-12:30	PS3.1 Cross-sectoral Solutions: Challenges and Best Practices from Country and Regional Experiences	Lotus 1-2, Fl. 22
	PS3.2 Managing Pandemic Disease Threats in the International Extraction Industry	World Ballroom A Fl. 23
	PS3.3 People, Practices and Policies –Designing and Implementing Effective Multisectoral, Trans-disciplinary Interventions to Reduce Risk and Mitigate the Negative Impact of Infectious Diseases under One Health	Lotus 3-4, Fl. 22
	PS3.4 Successful Collaboration: Trust and Transparent Data Sharing and Communication	Lotus 5-6, Fl. 22
	PS3.5 Identify Gaps/Barriers that Impede Effective Cross Border Preparedness and Response Planning and Execution for Infectious Diseases	Lotus 7, Fl. 22
	PS3.6 Contribution of the One Health Paradigm to Food Security	World Ballroom C Fl. 23
	PS3.7 Is Technology or Failure of the Imagination the Bigger Challenge for Disease Detection?	World Ballroom B Fl. 23
12:30-14:00	Lunch	Bangkok Convention Centre B2

FRIDAY

1 FEBRUARY 2013

AFTERNOON SESSIONS

TIME	PROGRAM	ROOM
14:00-15:00	PL4 The Paradigm Shift Towards Cross-Sectoral Collaboration: Policy, Tools and Empowering Factors for Health Systems Strengthening	Bangkok Convention A2 Fl. 22
15:00-15:30	Break Delegates Café & Bar	
15:30-17:30	PS4.1 Stories from the Ground	Lotus 1-2, Fl. 22
	PS4.2 The Evolutionary Process of Risk Determination to Define Surveillance Strategies and Target Resources for Efficient Prevention and Control	Lotus 3-4, Fl. 22
	PS4.3 Unprecedented Move toward a More Coherent Approach Among Sectors for the Strengthening of National Human-Animal-Ecosystem Health Capacities	World Ballroom A Fl. 23
	PS4.4 Going Viral #Strategic Public Communication To Affect Practices and Livelihoods: http://PMAC	Lotus 7, Fl. 22
	PS4.5 Controlling Antibiotic Resistance through the One Health Approach	Lotus 5-6, Fl. 22
	PS4.6 Enabling Policy Environments for a One Health Approach	World Ballroom B Fl. 23
	PS4.7 Enhancing One Health: To Cultures, Add Culture	World Ballroom C Fl. 23

SATURDAY

2 FEBRUARY 2013

TIME	PROGRAM	ROOM
09:00-10:00	Synthesis: Summary, Conclusion & Recommendations	Bangkok Convention Fl. 22
10:00-10:30	Break Delegates Café & Bar	
10:30-12:00	PL5 Sustainable Effective Cross-sectoral Collaboration for Bio-secured World	Bangkok Convention Fl. 22
12:00-13:00	Closing Session	Bangkok Convention Fl. 22
13:00-14:00	Lunch Bangkok Convention Centre B2	
14:00-16:30	International Organizing Committee (IOC) Meeting for PMAC 2013/2014	Lotus 5-7, Fl. 22

Opening Session by

**Her Royal Highness Princess
Maha Chakri Sirindhorn**

KEYNOTE ADDRESS

- **Sir Michael David Rawlins**, Prince Mahidol Award Laureate 2012 and Founding Chairman, National Institute for Health and Clinical Excellence, United Kingdom
- **Uche Veronica Amazigo**, Prince Mahidol Award Laureate 2012 and Former Director, African Program for Onchocerciasis Control, World Health Organization, Federal Republic of Nigeria
- **Bernard Vallat**, Director General, World Organization for Animal Health (OIE), France
- **Punchawee Sukbut**, Epidemiologist and Technical Health Officer, Mukdahan Provincial Health Office, Thailand
- **David Rockefeller, Jr.**, Board Chair, The Rockefeller Foundation, USA



Dr. Uche Veronica Amazigo is internationally recognized as a leading figure in the introduction and application of the innovative Community-Directed Treatment mechanism and control of neglected tropical diseases. Working with remote rural communities in her native Nigeria, who had been plagued for centuries by Onchocerciasis (River blindness), she discovered the previously unrecognized importance of onchocercal skin lesions, severe itching, depigmentation and resultant devastating social stigma. This landmark research led to the expansion of Onchocerciasis control efforts to 19 countries in Africa. She was instrumental in the development and scaling-up of a novel model that made it possible for community members to play a determining role in distributing medicine to affected villagers. Dr. Amazigo played a pivotal part in the success of Onchocerciasis control by strengthening community health systems and helping to engage and empower 500,000 communities across all countries covered by the African Programme on Onchocerciasis (APOC), especially while she was Director of the Programme from 2005-2011. This unique, approach, ideally suited to African conditions, is cost-effective and tremendously increases the coverage of eligible persons being treated by the safe and highly-effective drug donated specifically for the purpose. Furthermore, it proved that trained drug distributors selected by the community from among their peers, no matter their resources or skills, can adopt the role normally played by trained healthcare specialists - and will do so voluntarily if provided with the opportunity. The concept of community-directed treatment has, since 1997, been implemented in many African nations and around the world. In 2015, an estimated 90 million people will be regularly receiving treatment for Onchocerciasis and 40,000 people annually will be prevented from losing their sight. It is envisaged that Onchocerciasis may well be eliminated as a public health problem in many areas in Africa by 2025.

UCHE VERONICA AMAZIGO

Prince Mahidol Award
Laureate 2012 and
Former Director

*African Program for
Onchocerciasis Control
World Health Organization,
Federal Republic of Nigeria*

The success of the community-directed approach results from linking research and management strategies and by empowering communities to fully participate in distributing medicines to the affected population.

Although community-directed treatment was introduced as a strategy to increase coverage and access to a drug for Onchocerciasis, it went on to have impact on the control of several other major diseases and essential healthcare services in Africa as it can easily be adapted to deliver a variety of cost-effective health interventions to the remotest of communities and difficult to access locations. It is estimated that, in addition to protecting 120 million Africans from Onchocerciasis, the community-directed treatment system benefited a further 40 million Africans in 2011 by delivering products and interventions to combat malaria and a variety of intestinal parasites, along with vaccines, nutritional supplements and health education. Dr. Amazigo received her Ph.D. in Biology and Medical Parasitology from the University of Vienna in Austria, a Diploma in Tropical Medicine and Parasitology from the Bernhard-Nocht Institute of Tropical Medicine in Hamburg, Germany and a Fellowship in International Health from Harvard School of Public Health, U.S.A. After retiring from WHO in 2011, she has launched an NGO to apply the community-directed approach in school health and feeding programmes in Nigeria.



Chairman, National Institute for Health and Clinical Excellence (NICE)
 President, Royal Society of Medicine, London
 Honorary Professor, London School of Hygiene and Tropical Medicine
 Emeritus Professor, University of Newcastle, Newcastle upon Tyne
 President, Royal Society of Medicine, United Kingdom

Sir Michael David Rawlins is an academic physician specializing in clinical pharmacology and general (internal) medicine. He has been passionate about basing decisions on the use of diagnostic and therapeutic interventions on evidence whether from randomised controlled trials or observational studies. Moreover he believes that the evidence base should encompass both clinical and cost effectiveness. He established the National Institute for Health and Clinical Excellence (NICE) in 1999 in order to give advice to healthcare professionals, working in the British health service, measures to provide patients with the highest attainable standards of care. The institute appraises the cost effectiveness of both new and established interventions as well as publishing clinical guidelines that encompass the pathway of care for people with specific conditions.

The global interest in NICE's approach to developing evidence-based advice for healthcare professionals and healthcare systems prompted the Institute, in 2007, to establish an international division. This offers assistance, particularly to lower and middle income countries, in developing healthcare programmes informed by evidence. The Institute's international division has led missions to over 40 countries (including Thailand) and provided assistance in developing national health technology assessment programmes, in developing clinical guidelines and – in some instances – establishing their own institutes.

Sir Michael graduated in medicine from obtained his medical degree from St. Thomas's Hospital, University of London. He undertook postgraduate training in general medicine and clinical pharmacology at the Royal Postgraduate Medical School in London, and at the Karolinska Institute in Stockholm.

SIR MICHAEL DAVID RAWLINS

Prince Mahidol Award
 Laureate 2012 and
 Founding Chairman

*National Institute for
 Health and Clinical
 Excellence,
 United Kingdom*



David Rockefeller, Jr. was elected Board Chair of the Rockefeller Foundation in 2010. As the twelfth board chair, he is at the helm of the Foundation as it celebrates its centennial in 2013. Mr. Rockefeller has been an active trustee of the Foundation since 2006

Mr. Rockefeller is a director and former chairman of Rockefeller Financial and is an active participant in the nonprofit arena, especially in the areas of environment, the arts, public education and philanthropy.

Mr. Rockefeller is a past vice chair of the National Park Foundation, where he reported directly to the Secretary of the Interior. He served as a member of the Pew Oceans Commission that issued a comprehensive report on the health of U.S. marine waters in June 2003. His commitment to the recommendations of the Pew Commission —and his passion for sailing and the sea—fueled the formation of Sailors for the Sea, a “new voice for ocean conservation.” As a sailor, he has raced and cruised for more than 40 years in waters throughout the world.

Mr. Rockefeller is an advisor and former vice chair of the Alaska Conservation Foundation, and a founder of the Alaska Fund for the Future, an organization dedicated to preserving the Alaskan natural environment and its native cultures.

Mr. Rockefeller is the former chair of the North American Nominating Committee for the Praemium Imperiale, the Japanese prize for outstanding international achievement in the arts. In addition, he is a trustee of the Museum of Modern Art, the Asian Cultural Council, and a fellow of the American Academy of Arts and Sciences. He chaired Arts, Education and Americans, which produced the book, *Coming to Our Senses: The Significance of the Arts for American Education*. He is also a founding trustee of The Cantata Singers in Boston and performed with them as a chorister for four decades.

Mr. Rockefeller is a member of the Council on Foreign Relations. His former foundation affiliations have included service as Trustee and Chairman of the Rockefeller Brothers Fund, President of the Rockefeller Family Fund, and a Trustee of the Boston Foundation.

He is a graduate of Harvard College and Harvard Law School.

DAVID ROCKEFELLER, JR.

Board Chair

*The Rockefeller
 Foundation
 USA*



Dr Bernard Vallat was elected Director General of the World Organisation for Animal Health (OIE) in May 2000 by the World Assembly, which brings together the national Delegates of all OIE Member Countries. His first five-year term of office began on 1 January 2001 and his second term on 1 January 2005. In May 2010, the Organisation's 178 Member Countries elected Dr Vallat for a third term of office.

Bernard Vallat graduated from the National Veterinary School in Toulouse (France) in 1971, qualifying as a Doctor of Veterinary Medicine. He then took two postgraduate courses, first in tropical veterinary medicine (1972) and then in animal nutrition at the Institut National Agronomique in Paris (1973). In addition to this scientific training he studied economics and management at Paris X University, where he obtained an advanced graduate diploma in 1983.

He joined the French civil service in 1973, having passed the national competitive examination for a post as public Veterinary Inspector.

The first seventeen years of his professional career were spent outside France, working on multilateral or bilateral overseas cooperation schemes in a number of countries in Central Africa and the Indian Ocean.

This work involved managing programmes on livestock health and production and training for farmers/livestock producers. He ran these programmes at the field level for six years before going on to supervise them at a national level in various developing countries.

In 1990, Dr Vallat was recalled to France by the Ministry of Foreign Affairs and Overseas Cooperation. His new responsibilities included the management of international negotiations for the establishment and follow-up of development projects and technical assistance arrangements in developing countries, in most cases co-financed by specialist international organisations.

His activities within the Ministry were then broadened from livestock production and health matters to include the supervision of phytosanitary issues, agricultural production and markets, agronomic research, agricultural and industrial policies and the promotion of North-South trade.

In 1994, he returned to the Ministry of Agriculture, Fisheries and Food to manage the Mission for International Sanitary Co-ordination within the General Directorate for Food, and was promoted a year later to the post of Chief Veterinary Officer for France, with the title of Deputy Director General for Food (in charge of animal and plant health and food safety and quality at national level). In this capacity he was closely involved in the national and European Community management of major health crises, such as those involving BSE and dioxin.

Dr Vallat was elected President of the OIE International Animal Health Code Commission from 1997 to 2000. The work accomplished under his presidency, within the framework of the priorities and requirements decided by the World Assembly of Delegates of the OIE led to numerous normative texts being adopted within the space of three years.

In 2008 he received in Philadelphia the Penn Vet World Award at the University of Pennsylvania, an award that is seen in the profession as the major Prize for Veterinary Medicine worldwide.

During the past few years the OIE's activities and influence in the world have grown to an extent unprecedented in the history of this Organisation, which was created in 1924 before the United Nations and has its Headquarters in Paris.

Bernard Vallat was born in 1947 and is the father of three children. He has received several French decorations: Officier de la Légion d'honneur and Chevalier de l'Ordre National du Mérite français; he is also Officier du Mérite Agricole in France and holds equivalent awards in several other countries. He is a member of a number of scientific and/or veterinary academies in France and in several other countries around the world.

BERNARD VALLAT

Director General

*World Organization for
Animal Health (OIE)
France*



Punchawee Sukbut is a trained epidemiologist and technical health officer at Mukdahan Provincial Health Office in a border province of Thailand. She received a Degree in Nursing Science in Advanced Midwifery from Boromarajonani College of Nursing in Ubon Ratchathani province in 1988 and has worked in the field of epidemiology and border health for 23 years. She has received numerous training in epidemiology, including Pre-service Training in Field Epidemiology, Community Epidemiology, and “International Training Course in Partnership Building for Healthy Border” under the Mekong Basin Disease Surveillance project (MBDS) supported by the Rockefeller Foundation.

Her work has been recognized with many national awards such as Outstanding Officer in SARS Control and First Place for the project entitled “Development of Surveillance System in Mukdahan – Suvannakhet and Development of Geographic Information System (GIS) for Poultry Farms for Avian Influenza Prevention and Control” at the “Network Development for Zoonotic Outbreaks Preparedness and Response” Contest. In addition, Punchawee Sukbut was awarded “Outstanding and Dedicated Epidemiologist” in 2009 from the Bureau of Epidemiology and Society for Strengthening Epidemiology, Thailand. She was selected by the Thai Ministry of Public Health to be the Thai-Lao Border Coordinator and member of the working group to draft the Second Master Plan for Thai Border Health, 2012-2016. Punchawee Sukbut has been invited to speak on epidemiology, surveillance and disease control, and cross-border collaboration and communication for border health at many conferences.

PUNCHAWEE SUKBUT

Epidemiologist and
Technical Health Officer

*Mukdahan Provincial
Health Office
Thailand*

PLENARY | 1 SESSION

ONE HEALTH:
MEETING THE CHALLENGE OF
“A WORLD UNITED AGAINST
INFECTIOUS DISEASES”

ONE HEALTH: Meeting the Challenge of “A World United Against Infectious Diseases”

BACKGROUND

We are now in an era of new, re-emerging and recurring global health threats that argue for a longer-term, more strategic approach to global health preparedness. Underlying the increase in new infectious diseases has been the growing interaction between human and animal populations driven by growth in human population, new trends in animal production practices, changing patterns of wildlife populations, human intrusion on new ecosystems, and trans-border mobility of humans, animals, food and feed products. The speed with which these diseases can surface and spread, as illustrated by the recent H1N1 pandemic virus, presents serious public health, economic, security and development concerns. It also underscores the global interdependence of human and economic security and the need for a more systematic effort to identify and respond to sudden global public health emergencies.

Reducing the threat posed by new emergent infectious diseases requires a “One Health” strategic approach that (1) builds on the understanding that the future well-being of humans, animals and the environment are inextricably linked, (2) promotes cross-sectoral coordination that spans the animal health, public health, educational, environmental and conservations communities, (3) targets promotion of those policies and the strengthening of those skills and capacities critical for both minimizing the risk of new disease emergence and the ability to limit their social, economic and health impact, (4) uses a “risk” based approach to target investments to those places, populations, times and situations where the likelihood of disease emergence is greatest.

MODERATOR

Dennis CARROLL

Director

*Pandemic Influenza
and other Threats
U.S. Agency for
International
Development
USA*

OBJECTIVES

Contribute to better understanding of:

- Emerging disease dynamics in the 21st century
- What is “One Health” and its role in addressing emerging disease threats
- Challenges faced in the “institutionalizing” One Health
- The way forward towards meeting these challenges.

TOPICS TO BE DISCUSSED

This session will provide a broad overview of definitions and support for One Health (OH); paradigms and interventions, policy framework and policy constraints; intimate connectivity between sectors and institutions; how to translate an OH vision to address infectious disease threat and human resources for the 21st century.

SPEAKERS

Ending Pandemics in Our Lifetime Requires a One Health Approach

- **Larry Brilliant**, President, Skoll Global Threats Fund, USA

Health, Food and Nutrition Security: Reinforcing Resilience at Interfaces

- **David Nabarro**, Senior Coordinator for Avian and Pandemic Influenza, United Nations/UNSIC, Switzerland

Challenges in implementations of one Health Strategies from a country and regional; African perspective.

- **David M. Serwadda**, Professor, Department of Disease Control & Environmental Health, School of Public Health, Makerere University, Uganda



Larry Brilliant, MD MPH, is the President and CEO of the Skoll Global Threats Fund. He heads a team whose mission is to confront global threats imperiling humanity like: Pandemics, Climate Change, Water, Nuclear Proliferation and the Middle East Conflict.

Prior to joining Skoll, Larry was Vice President of Google and Executive Director of Google.org. Larry is board certified in preventive medicine and public health and was the founder of The Seva Foundation, an international NGO whose programs have given back sight to more than 3 million blind people in 20 countries. Larry lived in India for more than a decade while working as a United Nations medical officer where he helped run the successful World Health Organization (WHO) smallpox eradication program in South Asia.

He recently worked for the WHO polio eradication effort as well. He was Associate Professor of epidemiology, global health planning and economic development at the University of Michigan and chairman of the National Biosurveillance Advisory Committee, created by Presidential Directive; a member of the World Economic Forum's agenda council on catastrophic risk; and a "first responder" for CDC's bio-terrorism response effort. He has worked at many levels, from villages to global policy, on smallpox, polio, blindness, disease surveillance and disasters -- and worked as a volunteer physician in Sri Lanka in the refugee camps following the tsunami. He is an international member of the Health Minister of India's rural health program. He was a senior technical advisor to the movie Contagion, and also conceived the Oscar-nominated documentary "The Final Inch" about polio eradication in India.

LARRY BRILLIANT

President

*Skoll Global Threats Fund
USA*

He is also a "techie" and holds an early patent in advanced telephone systems and was a co-founder of the Well, a pioneering digital community and has been CEO of many venture backed and public companies. His recent awards include the "TED Prize", Time Magazine's "100 Most Influential People", "International Public Health Hero" and two honorary doctorates. He is the author of two books and dozens of articles on infectious diseases, epidemiology and global health policy.



Dr. Dennis Carroll currently serves as the Director of the U.S. Agency for International Development's (USAID) Pandemic Influenza and other Emerging Threats Unit. In this position Dr. Carroll is responsible for providing strategic and operational leadership for the Agency's programs addressing new and emerging disease threats, which has included leading the Agency's response to the H5N1 avian influenza and H1N1 pandemic viral threats. He is presently coordinating the roll-out of USAID's new Emerging Pandemic Threats program -- a global effort to combat new disease threats before they can become significant threats to human health.

Dr. Carroll was initially detailed to USAID from the U.S. Centers for Disease Control and Prevention as a senior public health advisor in 1991. In 1995 he was named the Agency's Senior Infectious Diseases advisor, responsible for overseeing the Agency's programs in malaria, tuberculosis, antimicrobial resistance, disease surveillance, as well as neglected and emerging infectious diseases. In this capacity Dr. Carroll was directly involved in the development and introduction of a range of new technologies for disease prevention and control, including: community-based delivery of treatment of onchocerciasis, rapid diagnostics for malaria, new treatment therapies for drug resistant malaria, intermittent therapy for pregnant women and "long-lasting" insecticide treated bednets for prevention of malaria. He was responsible for the initial design and development of the President's Malaria Initiative. Dr. Carroll officially left CDC and joined USAID in 2005 when he assumed responsibility for leading the USAID response to the spread of avian influenza.

DENNIS CARROLL

Director
Pandemic Influenza
and other Threats

*U.S. Agency for
International
Development
USA*

Dr. Carroll has a doctorate in biomedical research with a special focus in tropical infectious diseases from the University of Massachusetts at Amherst. He was a Research Scientist at Cold Spring Harbor Laboratory where he studied the molecular mechanics of viral infection. Dr. Carroll has received awards from both CDC and USAID, including the 2006 USAID Science and Technology Award for his work on malaria and avian influenza, and the 2008 Administrator's Management Innovation Award for his management of the Agency's Avian and Pandemic Influenza program.



David Nabarro trained as medical doctor, worked for six years in South Asia, East Africa and Iraq and taught for six years at the London and Liverpool Schools of Tropical Medicine.

In 1990 he served as Chief Health and Population Adviser in UK Overseas Development Administration (ODA) then in 1997 he became Director for Human Development in the UK Government's Department for International Development (DFID).

In 1999 joined the World Health Organization (WHO) to lead Roll Back Malaria: he moved to Health Action in Crises in 2002.

In September 2005 he joined the UN Secretary-General as Senior Coordinator for Avian and Pandemic Influenza. In January 2009 he also became Coordinator of the UN system's High Level Task Force on Global Food Security; in October 2009 he was nominated as the Secretary General's Special Representative for Food Security and Nutrition and – in December 2011 – he was appointed Coordinator of the Scale Up Nutrition (SUN) Movement.

DAVID NABARRO

Senior Coordinator
Avian and Pandemic
Influenza

*United Nations/UNSCIC
Switzerland*



Professor Serwadda, infectious disease epidemiologist, is Professor, Disease control and the former Dean of the School of Public Health at Makerere University in Kampala. He received his medical degree, M.B.Ch.B and Masters in internal medicine M.Med from Makerere University and an MPH and honorary doctorate from Johns Hopkins Bloomberg School of Public Health. Dr. Serwadda was among the first researchers to report on the presence of AIDS/HIV in Uganda (Lancet, 1985) and has worked continuously on HIV-related research and prevention since the mid-1980s. He has been a senior investigator on the Rakai Program since its inception in 1988, and is the Ugandan principal investigator on the ongoing NIH-funded "Trial of Male Circumcision for HIV Prevention".

Professor Serwadda is a recipient of numerous awards. This include the Johns Hopkins Bloomberg school of Public Health Alumni Knowledge of the World Award-October 2010, Significant Contribution Award, British Council-2008, Pioneer in Behavior based HIV prevention, Harvard University May 2006. In recognition of his work Professor Serwadda has been inducted as a Johns Hopkins University society of scholars, May 2006, A member of the Institute of Medicine, IOM, Washington, D.C October 2011. Fellow of the Uganda National Academy of Science - 2012

DAVID M. SERWADDA

Professor

*Department of Disease
Control & Environmental
Health, School of Public
Health, Makerere University
Uganda*

CHALLENGES IN IMPLEMENTATIONS

of One Health Strategies from a Country and Regional; African Perspective.

David SERWADDA

Makerere University School of Public Health

The one Health strategy is intended to control the Public Health threat that arise from zoonotic infections, antimicrobial resistant pathogens or emergence of novel strain. The strategy involves a) early detection, b) Identification and c) management and control of the threat. Regional effort in the control of these epidemics is necessary to prevent spread both locally and internationally. Political leadership is critical. There are challenges and opportunities experienced in Africa in the course of implementing the one Health strategy.

Early detection: 80% of the African population reside in rural populations. However there is an increasing dynamic movement of individuals between rural and the ever expanding urban population. Zoonotic epidemic, particularly Viral Hemorrhagic fever, VHF, usually start in rural population. Lack of community awareness/ education and in many cases this includes the local Health worker, is a major challenge in early detection of something unusual going on. Improving local road network facilitate infected individuals to rapidly move on to towns and thus spread the disease. However with the ever increasing penetration of mobile phone network there exist the opportunity to rapidly communicate the emergence of unusual illness from community members and health workers to regional hospital or established surveillance networks.

Identification: Highly trained health and laboratory staff are a challenge to find in Africa. Further specialised laboratory that are need to handle highly infectious specimen are very expensive to build and maintain. Identification still remains one of the most significant challenge managing particularly zoonotic disease threats. In the recent Ebola and Marburg epidemics that have occurred in Uganda. Blood samples still had to be sent to CDC, Atlanta for identification. DNA based technologies have completely changes the feasibilities of undertaking surveillance of microorganisms that were deemed too expensive to study in rural populations in Africa. Further they have enabled us to take specimens from household without invasive procedures. Inexpensive, reliable and easy to use technology of identification will significantly improve our abilities to rapidly indentify microorganisms at a more rural or primarily health setting

Management. At the local and country level the biggest constraint is the lack of well trained health personnel. In addition there are few or no proper treatment facilities to take care of infected individuals. Sadly in every Ebola epidemic experience in Uganda this year, health workers have died as a result of contracting the disease often due to a lack of proper protective gear. Further the cost of managing these epidemics is high. Although

Uganda has witnessed a regular occurrence of VHF epidemics in the last three years, there is no systematic budgeting for management these epidemics. Often there is a need for emergency budgeting/ reallocation of funds or donor partners supplement. Significant process has been made in some countries i.e Uganda to set up and maintain a good surveillance system for zoonotic infection however many countries either lack or have a dysfunctional system. Further there is lack of coordination between the veterinary, wild life and the health services

Regional Control. The emergency of rapid movement of diseases makes it imperative to have regional effort to coordinate, support and help manage disease control effort. This would involve having a collaborative effort in training a wide range of health and veterinary staff from monitoring and investigation of epidemic to managing and identification or diseases. Addition establishing regional centres of excellence in diagnostics will further help to leverage both financial and human resources. There are regional political / economic zone that can act as entry points to promote and coordinate one Health activities. For example there is the East Africa Community, EAC, that includes five countries; Uganda, Tanzania, Kenya, Rwanda and Burundi with a Health secretariat in Arusha. The leadership in this region have not yet demonstrated that one health is a priority which is a challenge. However the South African Development Countries, SADC countries, which include 15 states South African countries, are now served by the National Institute for Communicable Disease, NICD. This centre based in South Africa serves as a regional resource for early detection, identification of infectious microorganism in the region. The African Field Epidemiology Network, AFENET, based in Kampala has done an excellent

job of ensuring that several Africa countries a facilitated in training health and veterinary workers in the investigation of epidemics and their control

Opportunity for University Leadership – the role of One Health networks in Africa in transforming the educational experience of future leaders in public health, animal health and the environment. One Health Central and Eastern Africa, OHCEA, is recent efforts by 14 school of Public Health and veterinary science in six countries in East and Central Africa , funded by USAID through the Respond program, to bring together Health and veterinary professionals to increase awareness, state of preparedness, monitor and evaluate disease threats in this region, which is considered a ‘hotspot’ for emerging and re-emerging diseases

One Health Policy Dialogue – mainstreaming OH in the Africa region requires significant review of current policy frameworks that largely stove-pipe the sectoral roles of key ministries likely to be involved in any OH agenda. Recent efforts by WHO, along with FAO and AU-IBAR to promote cross ministerial dialogue at a forum in Libreville, Gabon on 12-14 November 2012 opens up opportunities for higher level policy dialogue on the role of OH in Africa and its implications for cross-sectoral partnerships involving health, environment and agriculture. Key points for consideration the need for inter-sectoral partnerships, between Public health, animal health and the environmental sectors, reinforcing laboratory capacity in the African region and to build capacity for surveillance, preparation and response to outbreaks Emphasis was made on the participation of communities in support of preparedness to zoonotic outbreaks.

HEALTH, FOOD AND NUTRITION SECURITY:

Reinforcing Resilience at Interfaces

DAVID NABARRO

INTERFACE WORKING IN PRACTICE

1 Collaborative work on the health of humans, animals and ecosystems reinforces the resilience of societies in the face of disease risk, reduced access to food or the threat of malnutrition. It means focusing on the interfaces between disciplines and systems in ways that give greater priority to people's needs than to professional boundaries or organizational simplicity. Descriptions of this work often use terms like One Health or Food and Nutrition Security. The multi-disciplinary approach is supported by many visionaries from community organizations, Governments, the UN system, development banks and academic institutions. It has been described for nearly 10 years and is proving increasingly popular with policymakers. Implementation – in relation to the prevention and control of zoonotic diseases, the promotion of food safety and enabling people to realize their rights to food and nutrition - has gained momentum in the past four years.

2 The one health approach builds on work done on avian and pandemic influenza preparedness and response, forging strong linkages between non-traditional partners from different sectors— agriculture, animal health, public health, military,

and the humanitarian community— increased “whole-of-society” capacity for pandemic preparedness and response. It called for (a) building trust amongst the diverse community of actors that is needed in a major crisis; (b) bringing stakeholders together to agree on their roles and responsibilities; (c) building constructive relationships through collaborative planning; (d) testing the effectiveness of collaboration through immersion in simulations.

3 The one health approach was proposed by representatives of communities and governments at a range of events within nations, in regions (eg in the Mekong delta) and at the global level. Important milestones include the development of the “Manhattan Principles” for “One World One Health” in 2004, and the succession of International Ministerial Conferences on Avian and Pandemic Influenza between 2005 and 2011.

4 The meeting series and their output declarations and road maps have served as the platform for the start of broader One Health discussions. In 2007, the concept of “One World, One Health ” was highlighted as contributing to pandemic preparedness and human health security. In 2008, an Interagency Strategic Framework “Contributing

to One World, One Health – A strategic framework for reducing risks of infectious diseases at the animal–human–ecosystems interface” was developed and officially released. The 2010 Hanoi meeting was a key landmark for One Health, as it represented a more global shift toward, and acceptance of, cross-sectorial policy and coordination to deal with serious threats at the human–animal–ecosystem interface.

5 The Hanoi conference was also the venue for the release of both the FAO–OIE–WHO Tripartite Concept Note on “ Collaboration – Sharing responsibilities and coordinating global activities to address health risks at the animal–human–ecosystems interfaces” and the Global Progress Report Framework for Sustaining Momentum on Animal and Pandemic Influenza.

6 In the following year, an international High Level Technical Meeting on the One Health approach took place in Mexico City. Participants in the meeting identified both “supporting” elements that enable collaborative work on One Health approaches and “operational” elements that reflect the attributes of successful collaborations. Participants also identified impediments to success and considered how they can best be overcome.

7 Priority actions for advancing the One Health agenda were proposed: 1) policy and technical messages of relevance to Ministers 2) actions that can usefully be implemented at national and regional levels, 3) clear plans for building cross-sectorial approaches into existing protocols, and 4) systems that are both efficient and effective in delivering vital services.

8 Working Groups, One Health Commissions, academic programmes and training activities were established to accelerate the positive international momentum of the One Health vision.

INTERFACE BETWEEN ONE HEALTH AND FOOD SECURITY

9 The demand for food, and especially for meat products, grows at nearly 2% per year. Livestock production is increasing rapidly (poultry in all continents, bovines in South and East Asia, and pigs in sub-Saharan Africa).

10 Livestock production systems benefit many of the world's poorest people, with at least 1 billion of them (75% of rural people, and 25% of urban people) depending either directly or indirectly on livestock for their nourishment, their income and their livelihoods.

11 Sustainable livestock systems play a major role in alleviating food insecurity and poverty. Livestock contribute up to 33% of household income and up to 36% of dietary protein intake. In many developing countries, especially in sub-Saharan Africa, livestock contribute almost 40% of agricultural GDP. The livestock sector is a critical element of food and nutrition security.

12 Concerns about the increasing levels of livestock production are linked to the potential for movement of pathogens between wildlife

and domestic animals, concerns about the lack of biosecurity and antimicrobial resistance as livestock production is intensified, the potential adverse environmental impact of livestock production, consumer demand for livestock products produced in a humane way and continued threats posed by human consumption of unsafe food.

13

The potential threat posed by livestock to public health – via agriculture-associated diseases – is played out at the intersection between human health, animal health and agro-ecosystems. It includes neglected zoonoses (like TB, brucellosis), emerging infectious diseases (like SARS and Avian Influenza), and food-borne diseases. They are all best addressed through the One Health (OH) approach.

14

The one-health approach is particularly relevant when efforts are made to reduce threats in settings where resources are limited. Applying the approach depends on people being able to access and apply relevant information in ways that enable them to reinforce their resilience in the face of multiple threats. They can only do this effectively when empowered through incentives and a positive regulatory environment. Hence the increasing interest at policy level in options for improved livestock sector governance, together with appropriate investment in veterinary and other services appropriate for securing livelihood and environmental well-being.

REINFORCING RESILIENCE THROUGH COMPREHENSIVE APPROACHES

15

Societies affected by recurring crises have established resilient systems for ensuring livelihood and food security. Governments increasingly appreciate the particular challenges associated with supporting people's resilience in the face of recurrent and often unpredictable risks: indeed, it is emerging as an important element of development strategy.

16

In practice resilient societies are able to anticipate threats, adjust local and national strategies to mitigate them and act to put both immediate and longer term programs in place to build resilience to repeated shocks. They respond quickly when the lives of individuals are threatened, provide a range of viable livelihood options, and maintain the functioning of essential services, and the capacity of institutions. They enable rapid recovery after periods of insecurity and make medium- and long term investments in more robust systems.

17

Governments and development partners are exploring options for flexible and imaginative support to the new narrative. They respond to the growing perception - at community and national level, among governments and civil society - that early responses to crisis are vital to prevent catastrophic decline in assets, agricultural output, food availability and livelihood security. This is essential when peoples' capacity to cope has been weakened by repeated crisis. It is vital in societies challenged by the combination of a potential doubling of their population in less than 30 years and increasing frequency of adverse climatic events. This is especially true

in arid lands, as pressure on range land increases and more marginal land is taken for agricultural production.

ONE HEALTH AS AN INVESTMENT IN RESILIENCE

18

The One Health approach is an example of investing in resilience: it combines a focus on the long term security of our planet's natural resources, the security of people's access to nutritious food at all times, human security in the face of threats to their health, and the links between them that define people's resilience in the face of stresses or shocks. Such novel approaches are best pursued as multi-actor movements - by youth groups, business leaders, government leaders, civil society at local regional and global levels.

19

The focus on Risk Reduction is an essential element of all these areas of work: It is about reducing underlying risk factors and strengthening response capacity through preparedness.

The emphasis on open and self-perpetuating movements is key when multiple actors from different disciplines are working together on an issue. The Movements achieve direction and impact through an emphasis on common goals, shared skills among key practitioners and on mutual accountability.

20

Inter-sectorial thinking leads to a growing consensus that what happens at interfaces – between people, species, systems, professions and cultures - does matter. This means that work which cuts across boundaries and focuses on interfaces

needs more attention despite the continuing pressure for greater emphasis and prioritization on the “core activities” of different groups. Given the constraints on organizations, interface working is often NOT prioritized. Movements are most useful as a means to address interfaces between species, cultures, livelihood groups, ethnicities, and geographical areas, sectors of government, professional groups and nations.

21

Such working calls for systems that make the vision come to life and the careful investment of time to make the systems work. The time must be used well – to build trust, to innovate and learn lessons and establish sustainable ways of working. It will require collective commitment to building trust with agreed ways to react at times of difficulty as well as retaining the ability to respond when crisis strikes and people's lives are endangered.

22

Adequate resources are needed to make this happen: if the funds needed for close working together are not available, there won't be collaboration. Funding should be efficient and flexible. Cross-sectorial work is not easy to sustain within institutions but individuals committed to such working are increasingly linked in Movements or Networks of practitioners: the One Health Approach and Towards a Safer World are examples of action that has been sustained through individuals working within movements.

ADVANCING THE ONE HEALTH APPROACH

23

The One Health approach is an example of a

vibrant movement with soft governance - no new institutions or new laws are needed to make it happen. Instead, it relies on existing institutions and capacities to create new ways of dealing with threats at the interfaces. The direction provided by governments for One Health issues is critical to the success of prevention, management and preparedness strategies for diseases at the animal-human-ecosystem interface.

The heart of this effort is professional training – ensuring that practitioners are skilled in the One Health approach and their skills are tested within their professional examinations.

24

Here are ten practical lessons of experience in the One Health approach to risk management and reinforcing resilience:

1. Start with experience of both rural and urban communities: listen, absorb, respond: seek concurrence of communities if new ideas are to be introduced; avoid divisive involvement and coercion; build on local practice and strengthen institutions: be extremely wary of “external takeover”.
2. Bring livestock, food security and nutrition into all policies related to poverty and equity, climate change, value chains and risk management.
3. Focus on resilience in face of risks to health and livelihoods at Interfaces between species, cultures, livelihood groups, ethnicities, geographical areas, sectors of government, professional groups and nations as – given the way in which organizations work the interfaces are often NOT prioritized and may be a source of risk.
4. Engage the Whole of Society in work on risk

management – analysis, preparedness, threat response, lesson-learning: more likely to cover the interfaces.

5. Nurture practitioner networks that span interfaces: people, through their interpersonal relationships, may be better able to do this than institutions, government sectors or even political leaders: select the extraordinary people who have demonstrated inter-sectoral and whole-of-society working.
6. Back up this work with evidence ensuring that this is converted into normative guidance and standard setting.
7. Stimulate innovative actions through alliances that link people (civil society, youth groups and consumers), businesses (entrepreneurs, farmers and processors), and government (legislators, sectors, institutions, research bodies) in principled and mutually accountable relationships.
8. Establish and maintain frameworks for action as a basis for investment [frameworks that cover livelihood resilience, healthy livestock rearing, long-term food security, and optimal nutrition] ensuring that they have a strong legislative and regulatory basis.
9. Seek innovative financing that reflects the benefits of interface working as an individual, commercial and public good.
10. Encourage countries to be in the lead on work for One Health and Livelihood Resilience; that the international system offers responsive guidance and backing; that the business sector, international NGOs and research community offer consistent support within the context of this national leadership.

ENDING PANDEMICS IN OUR LIFETIME REQUIRES

a One Health Approach

LARRY BRILLIANT

INTRODUCTION

Despite our best efforts, diseases jump from monkeys, pigs, birds and bats to humans. About three dozen such zoonotic diseases have newly infected humans in the past three decades: SARS, HIV/AIDS, ebola, lassa fever, West Nile, highly pathogenic avian influenza H5N1 (bird flu) and the 2009 pandemic H1N1 ‘swine’ flu to name a handful.

In addition, insects still carry malaria, dengue, and leptospirosis. Rodents harbor the next hantavirus or plague. We live amidst pandemic potential. We can’t stop this – it’s nature at work.

What we can do is find every novel organism that has the potential to become a pandemic early enough to limit its spread. Digital disease detection – automated web scrubbers, infobots, self-reporting systems and social networks – together with the power of mobile phones, computers, tablets and innovative communication networks, can help us find new pandemic threats earlier than ever before.

The stakes are high. Population growth, development and human encroachment into new ecological zones increase the likelihood of viral jumps to humans. Air travel accelerates the rate of potential spread. We must build the missing links

in a worldwide network of tools and practices to make it possible to eliminate pandemics.

SURVEILLANCE IS A CRITICAL TOOL

Eliminating pandemics will require intensive, coordinated action across many groups in and between countries. But one activity ranks above all others: early detection and response. In a word: surveillance. Surveillance includes detecting the threat and verifying its authenticity, identifying the causative infectious agent, and sharing information for effective first response.

While technology and improved communications help us detect disease threats faster, verifying that threat is often challenging. Accuracy is critical. False reports breed skepticism in publics and governments. Often, the capacity to rapidly verify emerging disease threats is insufficient given shortages of trained medical professionals in areas where outbreaks occur. But, in truth, we have not thought enough about how to engage those who can help and give them the tools they need. Innovative community-based models can tap into existing local know-how and networks, which often know of outbreaks before the formal health system. Conversely, local health communities are often unaware of the larger picture in which unusual or high local levels of syndromes of illness might fit.

Beyond the challenge of detecting and verifying disease outbreaks lies the third element of surveillance: a response that works. Effective prevention and control measures include having the capacity to develop, distribute and administer vaccines and other medical countermeasures. Effective response might also require social distancing, including isolation and quarantine. It certainly demands diplomacy, trans-boundary cooperation, and trust. Surveillance that includes the sharing of real time data to inform public health action is essential.

DIGITAL TOOLS OF SURVEILLANCE

Leveraging technology, the global community has significantly reduced the time it takes to detect an emerging disease outbreak. We owe much to early pioneers in the field of digital disease detection —which, of course, did not have this name 20 years ago. Event-based biosurveillance, as it is also referred to, is a scientific discipline in which diverse sources of data, many Internet-based, are tapped to prospectively provide information about infectious disease events .

Digital disease surveillance was born with the 1994 creation of the Program for Monitoring Emerging Diseases, ProMED-mail, an Internet-based reporting system that disseminates information on outbreaks of infectious diseases and acute exposures to toxins that affect human, animal and plant health. This was followed by the Global Public Health Intelligence Network (GPHIN), an infectious disease web crawler that gathers preliminary reports of public health significance in seven languages in real-time, 24 hours a day, 7 days a week. In 2006, HealthMap (an initiative of Boston Children's Hospital) introduced a visual platform for current global infectious diseases and

their effect on human and animal health. And in 2008, engineers at Google expanded the field of digital disease detection to include automated analysis of search terms for detection of influenza in communities. By aggregating all search terms that correlated with the annual influenza season, we built a system that could monitor influenza activity continually . This became Google FluTrends, which surfaces influenza outbreaks some two weeks before official public health data.

Researchers at Children's Hospital in Boston found that, in 1996, it took up to 167 days from the start of an infectious disease outbreak until its discovery by health authorities. By 2009, the comparative number had been reduced to 23 days . Different countries show great variance, but the overall improvement is clear and impressive.

But can we do better? Can we find infectious disease outbreaks soon enough to prevent their global spread?

Today, social media promises to expand digital disease detection. Twitter is a natural candidate, with its open data and built-in geo-location. SMS, blogs and Facebook are other potential sources of data signals for disease outbreaks. Leveraging these tools will require new techniques to allow anonymity and/or privacy of individual data. Public/private partnerships must develop clear rules for capturing and sharing the data needed to manage public health as a common public good.

ENGAGING THE PUBLIC DIRECTLY

New communications tools also allow us to

directly engage the general public in surveillance. Some early projects show promise. Australia's Flutracking system has been working since 2006 to engage volunteers to submit weekly reports on symptoms related to influenza , with over 10,000 people participating each week. In a similar vein, Influenzanet tracks self-reported influenza in twelve countries in Europe .

In 2011, our organization, the Skoll Global Threats Fund, partnered with HealthMap as technical experts and the American Public Health Association as a trusted public health community to build a self-reported surveillance system, Flu Near You, to track symptoms of influenza in the United States. It is easy to participate, requiring only five to ten seconds once each week to complete the email survey. Flu Near You participants report if they have any of ten symptoms related to influenza and if they've had a flu shot. As important, the system allows participants to report they did not have any symptoms of the flu, potentially giving us information about the level of wellness in communities; numerator and denominator data is coming from the same geo-location. The system is new but shows promise.

ONE HEALTH SURVEILLANCE - THE NEXT STEP

Today, technology allows us to cost-effectively apply research to drive innovation on all fronts in the battle against disease. We can monitor everything on our planet, including our atmosphere, on an ongoing basis. One Health surveillance is detecting, verifying and reporting information on the health of humans, animals and the environment in which they live, work and recreate. It means monitoring wild birds, rodents, bats and insects for infectious agents capable of spreading to livestock, humans or food. It means diligent health monitoring in

humans and domesticated animals, and protecting against the introduction of new pathogens by banning illegal wildlife trade and discouraging bush meat hunting in response to the growing global demand for animal meat as protein.

On the environmental front, local tracking of weather patterns can be merged with regional data to better understand the impact of climate and weather on disease emergence and spread. The same is true with water security and its impact on health. Adding factors related to global travel patterns, mass gatherings, migratory patterns of birds and animals, and shipping of goods will help us better predict and prevent the spread of disease.

In the not too distant future, people, animal and environmental health information will be a public good shared in emails, SMS, blogs and almost any online activity will be scraped to find its public health value (with the aforementioned privacy protections in place!).

BUILDING THE INFRASTRUCTURE

So how do we move forward? How do we ensure accuracy of the systems we are building for tomorrow? Are we collecting the right data? What sort of institutions do we need to make all this happen?

We have the technology we need. But we're lacking systems and decision-support mechanisms that ensure the information gets where it needs to be. Despite better bird flu surveillance in recent years, the WHO reports it still takes, on average, two weeks after the onset of symptoms for human cases to be identified

and notification sent to the WHO. Laboratory confirmation of suspect cases can add several days to weeks more to verify the threat. We need a better system, across the globe, with institutions designed from the ground up for this approach.

Ending pandemics will require trust-based regional public health governance models that are innovative, multi-sectoral and leading the charge for faster detection and verification through cooperation and data sharing. Connecting Organizations for Regional Disease Surveillance (CORDS) is a move in this direction through shared practices and trust. In cooperation with WHO, the World Organization for Animal Health (OIE), and the Food and Agricultural Organization (FAO), CORDS is bringing regional networks together for knowledge sharing and training to implement best practices for early detection, verification and reporting on emerging infectious diseases.

CONCLUSION

Can we end pandemics in our lifetime? Yes, we can. The global public health community eradicated smallpox, beat polio back to a handful of niches,

and has made dramatic progress against river blindness and Guinea worm. Nature – including the bugs that bring us infectious disease – has an inexorable imperative to evolve to survive. So theoretical pandemic risk will never disappear. But we have reached a point in the evolution of technology and medical advances that we can realistically aspire to prevent actual pandemics. We now need to develop the infrastructure to support early detection and verification, and to ensure that the information needed to combat threats is shared rapidly and accurately. Stopping smallpox required millions of feet on the street and billions of house calls. Today, clues from, and the tools of, the information cloud mean we can move faster, more efficiently and more cheaply than ever before. Engaging the public in this public health challenge will accelerate the process. It's in our power to sideline infectious disease as a pandemic threat and reduce the overall burden of suffering from infectious diseases across the globe.

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PLENARY | 2 SESSION

**NATIONAL TO REGIONAL
TO GLOBAL SURVEILLANCE –
A PATH TO ONE HEALTH**

NATIONAL TO REGIONAL TO GLOBAL SURVEILLANCE – A Path to One Health

GOAL

Advance global solidarity on surveillance by illuminating challenges, solutions and promoting policies that lead to actions and a way forward to build a world united against infectious disease.

OBJECTIVES

- Introduce the overarching theme of infectious disease surveillance from a national, regional and global perspective
- Build global solidarity around effective actions to promote cross sectoral and cross border surveillance
- Present concrete examples of knowledge, policies and innovation and action that can be taken based upon successes at the national, regional and global level.
- Identify and define policies that promote cross sectoral and cross border work
- State recommendations to overcome barriers to effective OH surveillance

MODERATOR

Elizabeth MUMFORD

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1.CURRENT STATE OF GLOBAL SURVEILLANCE

WHO global event based surveillance /OIE/FAO formal and informal systems

Elizabeth Mumford, Human-Animal Interface,
Department of Food Safety and Zoonoses,
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2.TWO REAL IMPLEMENTATION CASES PANEL

These two zoonotic disease case events are good example of the interface of human-animal (wildlife/domestic)-ecosystems and will provoke discussion of cross-sectoral and cross border surveillance. Lessons learnt from these case studies will facilitate us to establish effective OH surveillance systems for other diseases.

CASE #1 HPAI

(Global and national surveillance of animal influenza)
Yoshihiro SAKODA, Associate Professor,
Graduate School of Veterinary Medicine,
Hokkaido University, Japan

CASE #2 BRUCELLOSIS

Bruno GARIN-BASTUJI, Head of the Bacterial Zoonoses Unit
French Agency for Food, Environmental and Occupational Health
Safety (ANSES), France



The Unit headed by Dr. GARIN-BASTUJI is dealing with the bacterial diseases of animals with a high level of risk for (human) public health and with a high economical incidence in livestock (Anthrax, Brucellosis, Chlamydiosis, Glanders, Mycobacteria and Tularemia). The Unit's task is to give a scientific and technical support to national (DGAL, COFRAC, AFNOR, InVS), European (EU, EDQM) and international (OIE, FAO, WHO, IAEA) bodies for the implementation and evaluation of relevant regulations and standards. The Unit is the NRL for all these diseases and OIE Ref. Lab./ FAO Collaborating Centre for Brucella and Mycobacteria..

Dr. GARIN-BASTUJI has been expert or consultant for several national and international (OIE, WHO, FAO, IAEA, European Commission) organisations for the diagnosis and control of animal and human brucellosis. He has been consultant for that purpose in several countries of Europe, Northern Africa, South America, Middle East, Asia and Oceania.

In terms of technical support and expertise, the tasks of the Unit are essentially those of a reference laboratory: scientific and technical expertise, identification of bacterial strains, confirmation of cases or outbreaks, organisation of proficiency ring-trials, control of diagnostic reagents and vaccines, serological expertises, training and information.

In terms of research and development, the work of the Unit concerns:

- The development of molecular tools for studying the epidemiology of bacterial strains,
- The development, assessment and validation of direct (molecular biology) or indirect (immunology) diagnostic tools and their insertion in a sanitary decision system validated at the epidemiological level.

Dr. GARIN-BASTUJI has attended more than 30 national/international seminars/congresses in France and abroad, and has been co-author of ca. 50 scientific and technical communications in scientific and technical meetings. He has collaborated to ca. 50 original scientific publications in peer-reviewed journals or textbooks and ca. 50 popularisation publications or reviews. He is also the author or co-author of several national or international standard operating procedures (EU, OIE) for the diagnosis of animal brucellosis.

BRUNO GARIN-BASTUJI

Head of the Bacterial
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Elizabeth Mumford trained as a veterinarian in the USA. After completing a post-graduate degree and working in equine practice, she returned to academia to work on field epidemiology projects in equine influenza and other equine respiratory diseases, vesicular stomatitis, and food-borne zoonoses including BSE. From 2002, Dr Mumford moved to Switzerland and engaged in international disease issues with the Swiss Federal Veterinary Office, and led national capacity building projects in countries including Viet Nam, Egypt, and Serbia.

Since 2006, Dr Mumford has been working at the World Health Organization in Geneva, initially with the Global Influenza Programme as the project lead for human-animal interface influenza activities and liaison with the international agencies in WHO's influenza work. Her current activities include the integrated assessment of influenza risks at the human animal interface and rapid risk assessment for zoonotic diseases generally, the facilitation of cross-institutional collaborations and networks, and development and implementation of cross-sectoral approaches to address health risks at the human-animal interface.

ELIZABETH MUMFORD

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Dr. Yoshihiro Sakoda is an Associate Professor in the Laboratory of Microbiology, Graduate School of Veterinary Medicine, Hokkaido University, Japan. After his graduation from the Faculty of Veterinary Medicine, Hokkaido University in 1994, he began his career as a researcher in the Exotic Disease Division of the National Institute of Animal Health, Japan. Subsequently, he moved to Hokkaido University as a Lecturer in 2001 and became an Associate Professor in 2007. He is an active member of the OIE Reference Laboratory for Highly Pathogenic Avian Influenza, headed by Professor Hiroshi Kida.

His main fields of interest are molecular epidemiology and pathogenesis and interspecies transmission of influenza viruses; he has been extensively involved in research in these areas. In addition, he is interested in the pathogenesis of classical swine fever and bovine viral diarrhoea viruses, as his PhD thesis was on the development of novel diagnostic methods for classical swine fever. He has contributed to the eradication of classical swine fever in Japan. Dr. Sakoda has published more than 100 peer-reviewed scientific papers in international journals.

In 2006, he was awarded the Asian Veterinary Science Prize by The Asian Association of Veterinary Schools for his research regarding highly pathogenic avian influenza. In 2008, he received the Award for Young Agricultural Researchers for the development of new diagnosis and vaccine for H5N1 highly pathogenic avian influenza from the Ministry of Agriculture, Forestry and Fisheries, Japan. In addition, it was decided that he will receive the award of the Japanese Society of Veterinary Science in 2013 for his continuous research on classical swine fever and bovine viral diarrhoea viruses.

As a member of the OIE Reference Laboratory for Highly Pathogenic Avian Influenza, he is continuously bringing tremendous zeal to the international collaboration for the control of avian influenza. He supports the diagnosis and surveillance of reference laboratories in Russia, Taiwan, Korea, Mongolia, Vietnam, Thailand, and other countries for the control of avian influenza under the umbrella of the One World, One Health concept.

YOSHIHIRO SAKODA

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CURRENT STATE OF GLOBAL SURVEILLANCE :

Public Health, Animal Health and the Interface

The Food and Agriculture Organization (FAO), the World Organisation for Animal Health (OIE), and the World Health Organization (WHO)

Elizabeth MUMFORD

Why do global surveillance?

Inherent in the ability of The Food and Agriculture Organization (FAO), the World Organisation for Animal Health (OIE), and the World Health Organization (WHO) - and the world - to prepare for, manage, and respond to threats to human and animal health in an appropriate way is the ability to identify and assess acute animal and public health events as they emerge and evolve. Therefore, having quality and timely animal and human event-based information, as well as information on the disease itself and context in which the event is occurring, are important, not only for health stakeholders but also for the general public worldwide. This information is the key component required by animal health and public health officials to assess risks of a potential health threat.

When faced with acute animal and public health events identified through event-based as well as routine or indicator-based surveillance systems in both humans and animals, the agencies must appropriately gauge their international responses, devise practical options to mitigate risks, advise countries on best options for local response and provide technical assistance as requested, and

effectively communicate risks to stakeholders and the public. To do this, the agencies must know what kind of threats to health are ongoing in the world and continually assess the likelihood of occurrence and potential animal health and public health impact of these events.

Therefore, event-based surveillance at the global level is considered to be the systematic collection, analysis, and interpretation of data and information for guiding institutional action as opposed to collecting information for its own sake, or for research.

Focusing capacity building on surveillance systems strengthening and focusing health research agendas based on international surveillance gaps can also be seen as a surveillance-based action.

Key questions to guide improvement of global level surveillance systems include:

- How do we identify what information is important?
- How do we actively and efficiently engage national and regional systems and incentives for countries to improve transparency and timely disease reporting

- How do we do we incorporate information from routine/indicator based national surveillance systems?
- How can we share information with those who need it, and with the public in the most appropriate and impactful way?

Event-based surveillance at WHO

As mentioned above, WHO can only mount an appropriate and timely response to acute public health events if it can identify events early and rapidly respond to the public health risks associated with the events. WHO's global event alert and response to acute public health events is built on national capacities in the detection, investigation and response to disease outbreaks and other events that put human health at risk. Timely identification and management of risks allows a better and more efficient impact.

Under the International Health Regulations (2005; <http://www.who.int/ihr/en/>), WHO member countries must report acute public health events of potential international concern to WHO IHR Regional Contact Points after conducting assessments. These events include not just infectious disease outbreaks, but also other acute public health events caused by food-borne, chemical, and radionuclear agents. In addition, WHO is mandated under the IHR (2005) to conduct event-based surveillance activities which includes seeking verification of rumours and unofficial reports through the IHR National Focal Point, an established national centre designated by member countries for the implementation of the IHR (2005). Unlike routine and indicator-based

surveillance, the WHO event-based surveillance system uses unstructured descriptions and reports rather than routinely collected data and response thresholds. The WHO event-based surveillance system does not directly capture acute public health events identified through routine national surveillance; instead, this information is reported by the countries as appropriate. The public health risks associated with both formal reports and verified unofficial reports are then assessed and a management plan developed and implemented.

The WHO Event Management System (EMS) is a global online system developed by and for WHO employees that allows for all three levels of the WHO (headquarters, country and regional offices) to share real-time critical information on ongoing acute public health events as they are evolving. EMS is a "one-stop shop" for event-based surveillance, risk assessment and operations information. In addition, the information within EMS supports critical decision in the management of acute public health events.

Information on events occurring globally, including an assessment of the risk to public health, is disseminated to the member countries through, the Event Information Site, a secure website accessible to the IHR National Focal Points and intergovernmental organizations including IAEA, OIE and FAO, to allow countries and agencies to prepare and potentially respond in case of cross-border spread of public health threats. As well, information is continuously disseminated to the public through the posting of updates on the WHO website (<http://www.who.int/csr/don/en/index.html>).

Event-based surveillance at OIE

Since its creation in 1924, the World Organization for Animal Health (OIE) has played an active role in sharing disease information among countries and in the prevention and control of animal and zoonotic disease spread. Special attention is paid to the detection and listing of emerging infectious animal diseases. Early warning of emerging animal diseases is essential for prompt precautionary measures to be taken, at national and international levels, to protect both animal and human health.

The OIE disease notification system has two components: 1) an early warning system, providing alert messages for major exceptional epidemiological events, through immediate notification reports, and 2) a monitoring system, providing data on the general animal health situation in countries with regards to OIE-listed diseases, through six-monthly reports. Countries also submit annual reports, which mainly serve to collect information on veterinary human resources, animal population statistics, zoonoses in humans and laboratory and diagnostic tests capabilities.

Active search for non-official information and rumours related to animal and public health has been implemented in 2002. The relevance of this non-official information is evaluated by the OIE's Animal Health Information Department according to the animal health and epidemiology situation of the country or region concerned and, if appropriate, the information is verified by contacting the Delegate for confirmation and potential notification. Furthermore, OIE Reference Laboratories undertake as part of their mandate to inform both the OIE Delegate of the country concerned and the OIE Headquarters of any

positive result indicating the presence of an OIE-listed disease. Information only becomes official once it has been confirmed as being correct by the Delegate. Indeed the OIE considers the information validation process by national Veterinary Authorities to be a precondition for official notification. Furthermore, the use of standardized report forms is vital to ensure the homogeneity of information coming from all over the world and published through WAHID.

Event-based surveillance at FAO

The Emergency Prevention System for Transboundary Animal and Plant Pests and Diseases (EMPRES) Global Animal Disease Information System (EMPRES-i) is a specialized Web-based application first publicly released in 2009 to support veterinary services and related organizations by providing access to regional and global disease information to facilitate analysis. Timely and reliable disease information enhances early warning and response to transboundary animal diseases (TADs), including emergent zoonoses, and supports their progressive control and eradication.

Global surveillance of animal diseases is a strategic area of AGAH/EMPRES - Animal Health to support disease intelligence and early warning. EMPRES-i (i being for information, intelligence and intervention) is the FAO's global animal disease information system, compile and collects information on disease outbreaks and

field surveillance implemented at national and regional level and linking with genetic databases on animal pathogens in order to support disease analysis, early warning and providing analyzed information to be used by decision makers at national, regional and global level. EMPRES-i promotes data sharing and inter-operability to integrate data and information for analysis at all levels. Through specific official agreements with key partners, further integration is being developed with databases of other systems, such as the FMD BIOPORTAL at the University of California at Davis, the Swiss Institute of Bioinformatics (SIB) and FAO reference centers on diagnosis, disease surveillance and veterinary epidemiology. Additional plans include integrating agricultural economic data from FAO's statistical database, FAOSTAT, such as trade volumes and price indices into EMPRES.

Communication among the systems = GLEWS

The Tripartite partnership of FAO, WHO, and OIE have been working collaboratively together since 2006. The Tripartite's work together is to identify, assess, and mitigate impacts from existing and emerging threats to health at the human-animal-ecosystems interface where they overlap among the agencies' respective mandates, and where the agencies need to work together in order to effectively address the problem in order to support global health security. In 2010, the tripartite made a Director General-level commitment to jointly address health risks at the animal-human-ecosystem interface, including food safety issues. Important components to this collaboration are surveillance and risk assessment.

It is recognized that information from the human and animal health sectors, as well as from other relevant sectors such as food, wildlife, land use and agriculture is most efficiently and appropriately collected by each sector according to its mandate. Specifically for the human health and animal health sectors, established mechanisms are available to collect and verify important health event information from the field. However the result is that the information often remains within that sector and is not available to other important stakeholders.

Since 2006, the joint FAO, OIE, WHO Global Early Warning System Addressing Health Threats and Emerging Risks at the Human-Animal-Ecosystems Interface (GLEWS; <http://www.glews.net>) has been the agreed tripartite mechanism to share information on health threats. Over the last six years, it has become clear that GLEWS is a powerful mechanism that could be further enhanced by including more systematic, cross-sectoral, iterative risk assessment and risk communication. These additions would significantly strengthen GLEWS' ability to support and direct the management of identified risks. In 2012, in response to better meet the needs of the tripartite and the global community, a revised concept has been developed called GLEWS+ (presented in Parallel Session 4.1 on Stories from the Ground on Friday 1 February 2013 from 15.30 – 17.30). GLEWS+ is informed through the existing global, regional or national surveillance and reporting systems which detect and prioritize health events of international concern.

As mentioned above, GLEWS+ also includes a risk assessment component to allow characterisation of the health threats identified under GLEWS and provide options for management and

communication. The risk assessment outputs would provide agencies and their member states a mechanism to translate information into action in an aligned, collaborative, cross-sectoral way. This allows the tripartite to take advantage of the depth and breadth of technical expertise and experience available throughout the tripartite agencies and their collaborating partners.

Conclusions

Event-based surveillance at the international level is conducted within each sector, and is shared through mechanisms such as the tripartite GLEWS+ in order to allow risk to be assessed and to inform appropriate responses both within each sector and among the sectors in an aligned way. Strong and effective regional and national surveillance systems within each sector are important to be able to collaborate cross-sectorally to address health threats at the human-animal-ecosystems interface. Mechanisms should be in place to effectively communicate important information to other stakeholders who may need it, and to the public, to be able to respond effectively to health threats of regional and global concern.

¹ (Ben Jebara K. & Shimshony A., 2006, International monitoring and surveillance of animal, *Vet Ital.*, 42(4), 431-441)

² Ben Jebara K., Cáceres P., Berlingieri F. & Weber-Vintzel L., 2012, Ten years' work on the World Organisation for Animal Health (OIE) Worldwide Animal Disease Notification System, *Prev Vet Med.*, 1;107 (3-4):149-59

³ Pinto J, Larfaoui, F. Launch of the new EMPRES-i public interface: an integrated tool for global animal disease surveillance, early warning and disease control, *FAO EMPRES Bulletin*. N039.2011. <http://empres-i.fao.org/eipws3g/>, <http://www.fao.org/docrep/015/i2530e/i2530e00.pdf>

⁴ FAO, OIE, and WHO Tripartite Concept Note "Sharing responsibilities and coordinating global activities to address health risks at the animal-human-ecosystems interface" http://www.who.int/influenza/resources/documents/tripartite_concept_note_hanoi_042011_en.pdf

GLOBAL AND NATIONAL SURVEILLANCE

of Animal Influenza to Control Highly Pathogenic Avian Influenza

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Avian influenza caused by infection with H5N1 highly pathogenic avian influenza virus (HPAIV) has spread in poultry in more than 60 countries in Eurasia and Africa since 1996, when the first outbreak occurred at a goose farm in Guangdong province in China. H5N1 HPAIV infections have become endemic in several countries and cause accidental transmissions to humans. H5N1 viruses are thus now recognized as one of the most likely candidates for the next pandemic. The widespread presence of H5N1 HPAIVs in poultry, especially in domestic ducks reared in free range, has inevitably resulted in the water-borne transmission of viruses to wild bird populations since domestic ducks and geese infected with HPAIV shed progeny viruses with feces into ponds at farms, where migratory water birds visit. In the past, such infections had been restricted to wild birds found dead in the vicinity of infected poultry farms, but it is now a concern that infections in wild birds in which HPAIV has caused mild clinical signs (e.g., ducks) could result in the spread of viruses to large areas. Infection with HPAIVs in many wild bird species at 2 water bird parks in Hong Kong was reported in 2002 and further, more significant outbreaks in wild water birds occurred at Lake Qinghai in Western China, and Khunt and Erkhel Lakes in Mongolia in 2005. H5N1 HPAIV infections in poultry and wild birds have now spread in Asia, Europe, and Africa, and it has been suggested that the H5N1 virus could spread by migratory water birds to the west and south, since genetically closely related H5N1 viruses have been isolated in several countries since 2005. To monitor whether these HPAI viruses perpetuate in nature, virological surveillance of avian influenza has been carried out in the lakes in Japan, Mongolia, Russia, where ducks congregate on their migration path from Siberia to the south since 2001.

H5N1 highly pathogenic avian influenza virus (HPAIV) was reintroduced and caused outbreaks in chickens in 2010-2011 winter season in Japan, that had been free from highly pathogenic avian influenza (HPAI) since 2007 when HPAI outbreaks occurred and were controlled. On October 14,

2010 at Lake Ohnuma, Wakkanai, the northernmost part of Hokkaido, Japan, H5N1 HPAIVs were isolated from fecal samples of ducks flying from their nesting lakes in Siberia. Since then, in Japan, H5N1 HPAIVs have been isolated from 63 wild birds in 17 prefectures and caused HPAI outbreaks in 24 chicken farms in 9 prefectures by the end of March in 2011. Each of these isolates was genetically closely related to the HPAIV isolates at Lake Ohnuma, and those in China, Mongolia, Russia, and Korea, belonging to genetic clade 2.3.2.1. Wild water birds start migration from their nesting lakes in the northern territory to the south in the middle of August. The migratory routes of water birds are from Siberia to northern Japan via the Kamchatka Peninsula or Sakhalin Island, and to southern Japan via the Korean Peninsula or the coast of northeastern China. Our results indicate that the viruses circulating in different populations of wild migratory birds at their nesting lakes in Siberia in summer were transmitted through at least 3 different routes via China, Korea or Russia to Japan in the 2010-2011 winter season. Then, further virus spread occurred in wild birds at the resting lakes of birds in Japan by water-borne transmission or predation of carcass. Taken together, our results raise the possibility that H5N1 HPAIVs perpetuated at the nesting lakes in Siberia before the migration of water birds to Japan.

The other serious concern is that 592 people have been infected with the H5N1 virus, 60% of whom died in 15 countries since 2004 (as of 5 March 2012). Most of the human cases (87%) are in China, Viet Nam, Indonesia, and Egypt where bird flu vaccines are used. In Egypt, 152 human cases have been reported since 1996 when vaccination to poultry started. In Thailand, 25 human cases had been reported until 2006, when the government decided to concentrate to stamping out policy without the use of vaccine for the control of avian influenza, and no human case has been reported thereafter. Unless the H5N1 HPAIVs should be eradicated from poultry in Asia, the viruses must perpetuate in the lakes where migratory water birds nest in summer in Siberia and disastrous outbreaks of HPAI must occur in each Asian country every year. We, thus, strongly propose to minimize the outbreak based on the results of global and national surveillance and eradicate immediately the H5N1 HPAIVs from Asia by stamping-out without misuse of vaccine through international collaboration under the umbrella of One World, One Health concept.

BRUCELLOSIS DIAGNOSIS AND CONTROL IN ASIA-PACIFIC REGION:

A Joint FAO-APHCA and OIE initiative

Bruno GARIN-BASTUJI¹, Antoine DRAPEAU¹, Vishnu SONGKITTI², Kenji SAKURAI³, Teruhide FUJITA³, Reka KANITPUN⁴ and Monaya EKGATAT⁴

Brucellosis, in particular due to *Brucella melitensis*, is an old disease with minimal mortality but it is recognized as a significant public health challenge, of major economic and financial importance, in countries where the disease remains endemic. Yet human brucellosis remains the commonest zoonotic disease worldwide, with over 500 000 new cases annually, is associated with substantial residual disability, and is an important cause of travel-associated morbidity. It is still common in the Mediterranean region, Middle East, Central Asia and Latin America. Over the last 10 years, the infection has re-emerged in other countries, and in particular in Eastern Europe and Western, Central and Northern Asia [El Idrissi, 2009]¹. Economic losses from *B. melitensis* infections are significant and include decreased productivity (abortion, weak offspring, decreased milk production) as well as lost trade opportunities. *B. melitensis* is very contagious for humans and the disease, unless diagnosed and treated both promptly and effectively, can become chronic

thus affecting multiple body systems. Infection is acquired following ingestion of unpasteurised dairy foods, and from occupational exposure to infected live animals or carcasses. While sheep and goats are the major reservoir of infection, there is increasing evidence of *B. melitensis* emergence in cattle and camels.

For several decades, FAO and OIE have been joining forces to combat animal diseases on a global scale, in particular those with an epidemic or zoonotic impact. As far as brucellosis is concerned, while OIE has adopted relevant standards and guidelines to assist countries with the improvement of governance for disease control as well as with the facilitation of trade in animals and their products, FAO has been responsible for assisting in developing sound strategies for sustainable control programmes in countries where brucellosis impacts significantly on both human health and livestock on which households depend for their income and food security.

In the case of a zoonotic disease such as brucellosis, both organisations believe that protection of human health must be achieved through the control of the disease in animals. Some key international recommendations for brucellosis control within a country include:

- programmes are to be properly planned, coordinated and well-resourced;
- control and prevention require effective collaboration within and between sectors;
- eradication can only be achieved by test-and-slaughter, animal movement control and preventive measures but vaccination with an effective vaccine and a proper strategy is a key component of both control and prevention;
- development of a coordinated surveillance programme to measure progress;
- need for flock/herd management, food/occupation hygiene and education/awareness programmes.

Other considerations at the national and regional levels include:

- programmes must be adapted to local specific conditions;
- brucellosis must be a national/regional priority and capacities must be available;
- national legislation must be developed and implemented;
- as animals, their products, and pathogens ignore borders, collaboration between neighbouring countries and regions is desirable.

Some of the generic disease control and eradication policies that are applicable to brucellosis include:

- use of standardized definitions and concepts to promote harmonization;
- surveillance to establish the status quo;
- transparency in cases/outbreaks notifications;
- minimum standards for diagnostic techniques and vaccines (OIE/WHO);
- scientifically based criteria for disease control;
- zoning/compartimentalization with a biosecurity border where appropriate within a country;
- import risk analysis and evaluation of veterinary services [Knopf, 2009]¹.

Livestock contributes for 40% of the global value of agricultural output, and supports the livelihood and food security of almost a billion people [FAO]². Livestock production in developing countries has rapidly increased over the past 30 years³. This has resulted from increased numbers of animals and yields, in Asia by 3-4% per year, with lower prices for livestock products and a rapidly growing demand among urban consumers. But it has contributed to the spread of several animal diseases and the increase in meat and milk product consumption has increased the risk of exposure of human populations (both professionals and consumers).

The consequence is a worsening situation of both animal and human brucellosis in Asia: Available data in Armenia, Azerbaijan, Georgia, Kazakhstan, Kyrgyzstan, Mongolia, Tajikistan, Turkmenistan and Uzbekistan show a steady incidence pattern. While the disease remains

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endemic in India, Iran and Pakistan, as well as in several regions of Thailand, an increase of prevalence has been reported in China [Pappas et al., 2006]⁴.

Taking into account this evolution, FAO and OIE placed brucellosis, in 2007, as one of the top priorities for their future joint-actions in the Region. Since protection of human health can only be achieved through the control of the disease in animals, they decided to focus their actions on this sector. Since the control programmes implemented by the veterinary services are usually based on the advice of vet. laboratory scientists, this was the target population for advancing the regional practical knowledge on the disease, its diagnosis and its control in animals. Three successive annual workshops (2008-2010) open to all FAO-APHCA and OIE Asia-Pacific Office's member countries were organised in collaboration with DLD and Anses. The objectives were to update on brucellosis situation in the Asia-Pacific region; to update protocol development for the control of brucellosis; to provide hands-on training on standard diagnostic tests; and to promote collaboration on diagnosis and control of brucellosis in the region.

The workshops were attended by participants from 20 member countries: Bangladesh, Bhutan, Brunei, Cambodia, India, Indonesia, Iran, Laos, Malaysia, Mongolia, Myanmar, Nepal, Papua New Guinea, Pakistan, Philippines, Samoa, Singapore, Sri Lanka, Thailand and Vietnam.

They included technical lectures on diagnosis of brucellosis in animals and control/eradication strategies; review of laboratory diagnosis and standardization; and laboratory practices based on

standard operating procedures for serological and bacteriological diagnosis. Participants were also invited to report on the livestock population, brucellosis situation and national surveillance/control programmes, laboratory organization focusing on brucellosis diagnosis and country plan/policy in their own country.

Each workshop was finalized by a round-table discussion where conclusions/recommendations were made and are summarised as follows:

- brucellosis, in particular in sheep and goats, is still one of the significant animal and public health concerns in the region and important efforts are still needed to improve the situation in some countries.
- laboratory testing and a good epidemiological information are the key elements for the application of appropriate control measures.
- Rose Bengal and Complement Fixation tests are so far the most widely used and effective methods for the serological diagnosis of Brucellosis in ruminants. For all susceptible animal species, diagnostic techniques including procedures and diagnostic reagents should be in compliance with the OIE standards. However, no single test can confirm the infection or certify the free status. Relevant tests should be conducted repeatedly.
- key elements to design and adopt adequate control measures are: actual epidemiological situation; technical capacity of veterinary services, adequate facilities and long term financial support (budget availability) for implementing disease control and laboratory diagnosis.

- in countries where prevalence is low to moderate and there are constraints/limitations in undertaking appropriate eradication measures, long-term vaccination is the main tool to control the disease; where the infection is endemic, the long-term mass vaccination is the best option to be considered; where the disease has never been reported, an appropriate surveillance should be implemented to detect possible introduction of the disease.
- progress was made in some countries in terms of laboratory diagnostic capacity such as quality assurance including standardization of testing procedures and reagents. However, continuous efforts are still needed to utilise the knowledge and techniques acquired from the workshops. Each participant should take active action to transfer the know-how and technology gained in the workshops to other laboratory staff in his/her respective country.
- member countries should actively share information on the disease situation and laboratory diagnostic data amongst themselves to strengthen the regional (laboratory) networking and collaboration to improve the disease situation in the region.
- FAO-APHCA and OIE Asia-Pacific should continue providing financial and technical supports to strengthen brucellosis diagnostic capacity in national laboratories in the region through assisting the NIAH relevant activities. Anses should continue assisting the member countries to improve diagnostic capacity and study brucellosis epidemiology in the region. Close collaboration between Anses and NIAH should be further facilitated.

In the meantime, both Anses and NIAH have decided to apply jointly for an OIE twinning programme. The objective was to enable NIAH to fulfil the requirements in order to apply for a future recognition as an OIE Reference Laboratory. The aim was first to complete the level of expertise already existing in the lab. as far as brucellosis serological and bacteriological diagnosis is concerned, and then to assist the NIAH in acquiring the expertise in the control of diagnostic reagents and vaccines and in the organization of Regional serology proficiency ring-trials as well as in Brucella typing and molecular detection and identification, according to the methods and standards described in the OIE Manual. All procedures to be implemented fulfil the requirements of ISO/CEI 17025 Standard. The duration of the twinning project is 3 years (2010-2013 – budget: 99,300 €). The project included 3 annual training sessions for senior lab. technicians/veterinarians in Anses and 3 visits of Anses experts in NIAH 6 months after each training sessions in order to assist the NIAH in improving the organisation and the quality management of brucellosis activities as far as the topic of the previous training session was concerned. The project included also:

- The participation of NIAH to the International proficiency ring-trials in order to monitor the progress in the quality of serological testing in NIAH
- The collection of large volumes of serum from positive cattle, buffaloes, sheep and goats in order to establish a common serum collection for the establishment of regional secondary standard sera, further

organisation of regional ring-trials, and quality assurance and test validation controls.

- The establishment of a NIAH collection of Brucella strains, including reference and field strains from infected animals at the regional level.
- Assistance in completing the quality assurance system in place (acc. 17025 ISO/CEI std.)
- Assistance in designing research activities as studies on the distribution, both, geographical and by animal species, of Brucella species in the region.

In 2013, a complementary action is supported by both FAO-APHCA and OIE Asia-Pacific Office in order to organize a regional proficiency ring-trial regarding the serological diagnosis of brucellosis.

This project included also an adequate re-organisation of the NIAH laboratory with the acquisition of the necessary equipment and materials for the improvement of Brucella bacteriology (NIAH budget).

In conclusion, the FAO-APHCA and OIE Asia-Pacific's joint initiative for improving the diagnosis and control of brucellosis in the Region clearly contributed to:

- An increased and shared knowledge of the epidemiological situation of brucellosis as well as regarding the control programmes in place in the Region;
- An increased level of scientific and technical skills regarding the international recommendations for implementing control strategies as well as the standard protocols for the diagnosis of the disease;

- The establishment of a regional network of animal brucellosis laboratories, with a Regional coordinator in Thailand, soon in position to apply as an OIE Regional Reference Laboratory.

These should be the first steps to convince authorities of the member countries to:

- Implement proper studies for investigating the situation of the disease in both animal and human populations and, when necessary, to implement sound and appropriate surveillance and/or control programmes in animal population, including selective or mass vaccination programmes where it is required;
- Improve trans-boundary collaboration for limiting the spread of the disease regionally;
- Take appropriate measures for limiting the transmission of brucellosis from animal to humans through education and awareness programmes as well as, when necessary, the pasteurisation of dairy products.
- Encourage and contribute to maintain an active regional network of brucellosis laboratories.

¹ <http://www.fao.org/docrep/012/i1402e/i1402e00.pdf>

² <http://www.fao.org/docrep/012/i0680e/i0680e.pdf>

³ <http://www.ifad.org/rpr2011/index.htm>

⁴ Pappas G, Papadimitriou P, Akritidis N, Christou L, Tsianos EV. The new global map of human brucellosis. *Lancet Infect Dis* 2006;6:91–9.

2.1

ACHIEVEMENTS AND GAPS

in One Health Surveillance

BACKGROUND

One Health - is a collaborative, international, cross-sectoral, multidisciplinary approach (or concept) to address threats and reduce risks of detrimental infectious diseases at the animal-human-ecosystem interface. Surveillance systems are designed to reduce disease burden and poverty at the animal/human/ecosystem interface. Encouraging communication among users of those systems is vital, so that they see the impact, knowledge, power and benefits that the analysis of surveillance data can provide.

Defining and adopting compelling incentives and understanding disincentives should be integral to participation at every level of the surveillance systems. Surveillance is a key way of making use of the "One Health" (OH) concept to provide more efficient and effective health outcomes for human and animal populations.

MODERATOR

Peter BLACK

Director, Emergency
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OBJECTIVES

- Understand what is meant by One Health surveillance, and options of conducting surveillance and sharing surveillance data or information that achieve early detection and One Health outcomes: assist in prevention and rapid response
- Understand benefits from conducting joint surveillance and sharing surveillance data or information, and review diseases/situations where such surveillance could be maximally beneficial to human and animal populations
- Highlight existing reporting and notification systems at global level (WHO-IHR, OIE-WAHIS/WAHID, INFOSAN) for countries, encourage

transparency and notification of outbreaks and emerging events and Global Surveillance and Early Warning initiatives such as the Joint FAO/OIE/WHO Global Early Warning System (GLEWS).

- Learn from success histories of OH surveillance at the animal/human/ecosystem interface
- Identify gaps or challenges in implementing OH surveillance programs (at national regional and global levels)

TWO PRESENTATIONS ON EXPERIENCES ON OH SURVEILLANCE

Surveillance of the viral hemorrhagic fevers in the Democratic Republic of Congo

Justin MASUMU, Researcher, Southern African Centre for Infectious Disease Surveillance (SACIDS), Democratic Republic of the Congo

Innovation to fill the gaps in disease surveillance:

Participatory surveillance, applied technologies for better understanding and reporting

Julio PINTO, Veterinary Epidemiologist / Animal Production and Health Division, FAO, Italy

PANEL DISCUSSION

- **Armando Gonzalez**, Professor, Faculty of Veterinary Sciences, National University of San Marcos, Peru
- **Daniela von Blumröder**, Veterinary Officer, Federal Ministry of Food, Agriculture and Consumer Protection, Germany



Peter has a special interest in the use of strategic foresight within government with a particular focus on the investigation of the underlying drivers of disease emergence. Peter graduated from the University of Queensland in 1982 and worked for seventeen years for the Queensland Department of Primary Industries (QDPI) as a field veterinarian and policy officer. In 1992-3, he completed a Masters of Preventive Veterinary Medicine (MPVM) at the University of California, Davis and was subsequently the project leader for animal health surveillance in Queensland. Peter's involvement in the first two detections of Hendra virus in Queensland in 1994 and 1995 and the first human case of Australian bat lyssavirus in 1996 stimulated his initial curiosity in emerging infectious diseases. In 1997, Peter worked in a policy role in Brisbane where he was instrumental in introducing a formal risk management approach to animal and plant health activities within QDPI and developed a particular interest in risk perception and risk communication. It was this interest coupled with strategic planning activities that encouraged him to undertake a Masters of Science in Strategic Foresight at Swinburne University of Technology, Melbourne, which he completed in 2005.

The application of foresight perspectives to veterinary epidemiology and more particularly to emerging infectious diseases, led Peter to adopt and promote more cross-sectoral and interdisciplinary approaches. Accordingly, he is a strong supporter of the One Health movement and EcoHealth approaches. Peter is the Director of Emergency Animal Disease Preparedness in the Animal Health Policy Branch within the Department of Agriculture, Fisheries and Forestry (DAFF) where he has introduced strategic foresight approaches and thinking to his work colleagues. Peter is a member of the Epidemiology Chapter of the Australian College of Veterinary Scientists as well as being a member of the broader EcoHealth and foresight communities in Australia.

PETER BLACK

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Professor Gonzalez has a Master degree in Microbiology from San Marcos and a PhD in Veterinary Epidemiology and Economics from the University of Reading. He used to be the Dean of the Veterinary School and now is the head of the Veterinary Epidemiology and Economics office.

Most of his research has been devoted to *Taenia solium*, specifically in diagnosis, treatment, prevention and control. He was part of the board of the Cysticercosis Working Group in Peru, responsible of eliminating *T. solium* in an area with 100,000 inhabitants.

Currently he is working in the transmission dynamics of zoonotic cestodes and the role of invertebrates in egg dispersion and endemic stability for *T. solium* and other zoonotic cestodes. Likewise he is investigating the possibility of using a set of drugs and interventions for the prevention, control and elimination of multiple diseases in a given area. Armando Gonzalez has an Associate appointment at Bloomberg School of Public Health (Johns Hopkins University) and is the current president of the Peruvian Academy of Veterinary Sciences and a correspondent member of the Spanish Royal Academy of Veterinary Sciences. He has over 150 indexed papers in scientific journals in Disease control and surveillance, *T. solium*, *Echinococcus*, Avian Influenza virus and Parasites of camelids.

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I graduated at the faculty of Veterinary Medicine, University of Lubumbashi/DRC. I hold an MSc degree from the Institute of Tropical Medicine of Antwerp/Belgium and a PhD degree from the University of Ghent/Belgium. After my PhD program, I got a first postdoc position at the University of Pretoria in South Africa, at the faculty of Veterinary Science (Department of Veterinary Tropical Diseases). During this postdoc I conducted several projects involving a number of MSc et PhD students on the epidemiology of animal trypanosomiasis. Current I'm on my second postdoc position at SACIDS (Southern African Center for Infectious Disease Surveillance) where I'm involved in several research projects particularly emerging infectious diseases with focus on Ebola and Marburg diseases. I'm involved in the supervision/co-supervision of several PhD and Msc students in various projects under these themes. My current research interest is the understanding of the epidemiology and ecology of emerging (e.i. Ebola and Marburg) and re-emerging (Trypanosomiasis, Malaria and Tuberculosis) infectious diseases, and the design of adequate prevention and disease response strategies. I have a sound expertise on the use of molecular approaches to control complex diseases. I have been awarded a price as a winner of the Competition 2007, Section of Natural and Medical Sciences, Royal Academy for Overseas Sciences (RAOS), Bruxelles/Belgium for my studies on "Molecular epidemiology and integrated control of bovine trypanosomiasis in sub-Saharan Africa". I also won several grants among which the recent one from AUF (Alliance Universitaire francophone) for a new approach developed to analyze complex infectious diseases and where several students (PhD and MSc) are involved. The project is named "AIAPIC" (Approche intégrée d'analyse des pathologies infectieuses complexes = Intergrated approach for the analysis of complex infectious pathologies: IAACIP). Research remains my passion and my main activity although I also lecture undergraduate and postgraduate students particularly at the "Université Pédagogique Nationale" in DRC. Most of my research activities are conducted in collaboration with local and overseas academic and research institutions (UNIKIN, UPN, INRB, LABOVET, NICD/NHLS). My research field (DRC) engorges quite a lot of research opportunities as located in the Congo basin. Collaborating with other researchers across the world keeps my main research door widely open.

JUSTIN MASUMU

Researcher

*Southern African Centre
for Infectious Disease
Surveillance (SACIDS)
Democratic Republic of
the Congo*



Julio Pinto (DVM, PhD) joined the EMPRES group of the Animal Health Service in May 2006. Having graduated in Veterinary Science in the University of Chile in 1994, he completed his PhD studies in Veterinary Epidemiology and Economics at the University of Reading, United Kingdom, in 2000 completing his thesis on "Hazard analysis of classical swine fever (CSF) reintroduction in Chile". Dr Pinto joined the World Organisation for Animal Health (OIE) in Paris where he worked as deputy head of the animal health information department between February 2003 and May 2006.

Dr Pinto is currently member of the EMPRES/GLEWS task force (joint FAO/OIE/WHO Global Early Warning System), being responsible for epidemiological projects on animal disease surveillance and risk assessment and technical leader of the FAO global animal health information system for transboundary animal diseases (EMPRES-i). He is providing technical assistance to countries or regions through: the design and implementation of disease prevention and control programmes and projects; joint research on co-ordination of activities with other organisations or national governments by participating in task forces, field investigations, project formulation and appraisal teams, evaluation and monitoring exercises, and providing regular technical backstopping to veterinary services worldwide.

JULIO PINTO

Veterinary Epidemiologist

*Animal Production and
Health Division
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Italy*



Daniela von Blumröder is a veterinarian with a PhD in Veterinary Physiology from the University of Berlin. She conducted research within the Working Group “Prenatal Development” including a study stay at the University of North Texas.

Since 2004, she has been working for the German Veterinary Services at federal level at the Ministry of Food, Agriculture and Consumer Protection. She is mainly in charge of animal health issues dealing with exports. Since 2010, she has been responsible for International Animal Health Policy, especially for One Health. She represented Germany in European and international fora.

From 2002-2004, she worked as a scientist at the Friedrich-Loeffler-Institut, Federal Research Institute for Animal Health. She conducted research on the epidemiology of Neosporosis within a project funded by the European Union and published several papers.

DANIELA VON BLUMRÖDER

Veterinary Officer

*Federal Ministry of Food
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Protection
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INNOVATION TO FILL THE GAPS IN DISEASE SURVEILLANCE:

Participatory Surveillance, Applied Technologies
for Better Understanding and Reporting

Julio PINTO / Juan LUBROTH (FAO)

Traditional surveillance tools for collecting information about animal health at national, regional and global levels have made significant contributions to the timely reporting of animal disease events, and to analyze animal disease drivers and patterns of transmission and spread. However, ongoing challenges relate to the sensitivity of surveillance systems for capturing information about new pathogens or old pathogen emergence, spread and persistence. The proliferation in recent years of official and non-official systems, such as ProMED, Health map and the Global Public Health Intelligence Network (GPHIN) and the use of new technologies, data requirements and standards. Overlaps between national, regional and global information systems are evident in some regions and most data relating to animal disease outbreaks are entered and processed at national, regional and global levels with serious delays and lack of appropriate analysis. The development and the growing use of new technologies for data collection or disease reporting is filling an important gap for reporting and respond effectively to diseases risks.

FAO is supporting Bangladesh to conduct syndromic surveillance for poultry diseases and to detect

particularly Highly Pathogenic Avian Influenza (HPAI) surveillance in 260 out of 487 subdistricts as part of an USAID funded FAO project. A total of 780 Community Animal Health Workers (CAHW), 88 Additional Veterinary Surgeons (AVS) and 260 Upazilla Livestock Officers (ULOs) are using the Short Message Service (SMS) for sending and receiving SMS messages between computers and mobile phone to collect data and report on disease and death in poultry. The results of the use of this SMS technology indicate that since October 2008, almost 80% of all HPAI outbreaks have been detected and reported through this active surveillance programme. At the end of the working day, each CAHW sends a SMS message with the total number of all investigated poultry (chickens, ducks and other birds) and their health status. This data is used to; a) monitor trends in disease and mortality in poultry, and b) monitor who is working that day. The system automatically contacts the ULO who initiates an investigation by sending an AVS to conduct visits to outbreaks and collect samples that require further diagnostic tests. Initially a Gateway server receiving these messages was located at the Department of Livestock Services in the capital, Dhaka. The SMS Gateway is internet based. On average 20,000

messages are received every month. Specialized staff monitor the change in mortality and morbidity rates and perform spatial and temporal analysis against concurrent HPAI outbreaks and monitor the number of suspect cases and the results of the ULOs and AVS investigations. The result of the analysis is submitted to the Chief Veterinary Officer. This real-time reporting using SMS has been contributing to effective HPAI outbreak response and control. Information is shared in near real time with human health services.

In Egypt, as part of its effort to strengthen the national capacity for H5N1 surveillance in Egypt, FAO, in close collaboration with ILRI started a participatory disease surveillance (PDS) program in 2008. The program was modified to widen its scope to include HPAI outbreak investigation and communication functions. Currently some 108 veterinarians operate as CAHO practitioners in 15 governorates. Since its inception, the CAHO program was proved to be a robust surveillance wing for the veterinary services in Egypt (GOVS). It has contributed a significant proportion of the reported HPAI cases. As of 2010, the program is fully integrated into the national veterinary services and shares findings with the other Ministries. In 2011-2012, when the overall surveillance system was slowed down due to the socio-political situation ('Arab Spring'), the CAHO program proved to be an important tool contributing to over 50% of the reported HPAI outbreaks cases. In recent months of 2012, CAHO practitioners were mobilized to assist in the containment of the FMD epidemics in Egypt due to a new SAT2 strain. GOVS has expressed its desire to replicate the CAHO program for the control of other high impact diseases in the country. FAO, ILRI and GOVS published 'A manual

for practitioners in community - based animal health outreach (CAHO) for highly pathogenic avian influenza and is available both in English and Arabic (<http://www.fao.org/docrep/014/i1799e/i1799e00.pdf>).

In Indonesia, teams trained PDSR method use a two-step process to diagnose HPAI. PDSR teams randomly selected an area of household chickens for investigation each working day, and perform investigations in response to notifications by farmers of chicken deaths. Clinical and epidemiologic information are gathered from poultry farmers by the team using semi-structured interviews in order to determine whether a disease situation fits the clinical case definition (CD) for sudden death in chickens. When surveillance team identify a household flock with a positive CD, results from a rapid antigen detection test for Type A avian influenza (Anigen[®] AIV Ag Test, Animal Genetics Inc., Kyonggi-do, Korea) on oropharyngeal or cloacal swabs taken from sick or recently dead chickens are used for confirmation. The advantage of this methodology is rapid field diagnosis to enable timely outbreak response. If positive diagnostic following a positive CD, then the village is declared as "HPAI infected" and outbreak control activities are immediately initiated. Outbreak control activities include focus culling of the infected household flock with safe disposal of dead and culled carcasses, containment of surrounding flocks and movement restrictions for 14 days, cleaning and disinfection of affected premises, and communication and awareness-raising activities with the affected community. All control activities are conducted voluntarily upon agreement

of the village leaders and affected households. Following detection of a village HPAI outbreak, PDSR teams also immediately contact their local government human health counterpart, known as a District Surveillance Officer, responsible for conducting an investigation in the infected village to identify humans with influenza-like illness who should be examined, tested, and treated.

In 2006 FAO introduced the Digital Pen Technology (DPT) into southern Africa as an innovative way of collecting and sending animal disease surveillance data from remote areas in the field to the Central Epidemiology Units for analysis and decision making. The DPT is essentially a forms processing technology that allows for rapid collection, transmission and processing of data. Information is written, using a digital pen, on a custom made form and transmitted from the pen, via Bluetooth technology, to a central database over the internet. The DPT therefore essentially employs four primary components: (1) A paper form (disease surveillance form) which has been programmed with a special dot pattern to capture instructions in prescribed areas; (2) A digital pen, which captures hand written strokes on the paper form through a micro-camera and stores the information on a 1.3 MB memory stick; (3) A mobile phone with Bluetooth technology and an installed router application that allows for transmission of data via GPRS/EDGE/3G to a server and (4) A server which hosts the database and is equipped with hand recognition and interpretation software. Users are able to interact with the data at different user-levels (password protected) through a web application, ensuring secure access to data from anywhere in the world. The DPT has since been deployed in remote veterinary districts of

Angola, Malawi, Mozambique, Tanzania and Zambia. Through use of this technology, the overall rate of reporting has greatly improved and animal disease surveillance data is now able to reach decision makers based at central epidemiology units within minutes of diseases being reported to field veterinarians. Data quality check mechanisms (editing, validation and confirmation) inbuilt into the system have allowed supervising officers to monitor field activities with subsequent production of good quality disease data. An important advantage of this technology is the low technical training required as it is based on the conventional pen to paper reporting, with the added advantage in data transmission. The export functionality, inbuilt into the system, allows for ease of data sharing with other information management systems.

In response to the challenges that face animal health services in providing timely field surveillance and reporting, FAO has been exploring ways of using the expanding array of personal electronic devices to report data from animal disease events in the field. Smartphones have been used for FAO users and partners to report confidential and non confidential information from to a database server, and FAO has been examining the possibilities of using this technology to report emergency disease information to the FAO Global Animal Disease Information System (EMPRES-i). As part of these efforts, an application (app) called the EMPRES-i Event Mobile Application (EMA) has been developed to enable smart phones to deliver disease information directly to the EMPRES-i database. The rationale for EMA is that in some

developing countries access to the Internet can be difficult, especially away from main population centers, while telephone networks have good signal coverage over wider areas, so rapid connection is possible while in the field. EMPRES-i EMA has been designed to facilitate FAO officers and partners in providing disease information from the field. The application allows the user to enter key epidemiological data directly from the field, or to save the data on the device for transmission later. All the data entered are automatically geo-referenced, so key field data are captured in EMPRES-i when uploaded. Once a report is submitted to the EMPRES-i database using EMPRES-i EMA, data are verified and validated, and the submitter can be contacted if necessary. Validated information is either published on the EMPRES-i public Web site or kept in the EMPRES-i internal database as confidential or sensitive, as appropriate.

EMPRES-i EMA allows direct access to the database through a “near me” mapping function, which provides users with a map based on geo-referenced data on nearby outbreaks that are recorded in the EMPRES-i database. EMPRES-i EMA is currently available for Blackberry™ devices and smart phones using Android™ technology. The ‘app’ will allow users to contribute to FAO’s early warning activities and forecasting (which can feed into FAO/OIE/WHO GLEWS platform). FAO plans to develop guidelines and undertake field trials through FAO projects, to validate the approach and improve functionalities to meet beneficiary needs. EMPRES-i is available at <http://empres-i.fao.org>

Disease reporting systems suffer from a level of underreporting which affect appropriate data analysis, monitoring and the understanding of disease emergence or spread. New technologies can speed up disease reporting, effective disease response and risk management. The use of new technologies improve the capacity of surveillance systems to process high quantity of information and data and flow of communication when diseases or syndromes are reported from local to central services. These technologies are used to enhance traditional passive and active surveillance systems based on the priorities and objectives of disease control programs. The main challenge with disease surveillance systems and reporting systems remain to ensure that cases of animal disease are timely communicated from farmers, local veterinarians to central veterinary services, with the farmer and field services often representing weak points in this communication chain. Cost effectiveness of surveillance systems and acceptance of stakeholders need to be assessed regularly to compare and justify the introduction of new technologies for disease surveillance and reporting.

(a) SMS in Bangladesh (Loth L², Mahabub AM³, Hannan ASMA³, Kalam MA³, Yamage M³)

(b) Community Participatory networks in Indonesia and Egypt (McGrane J⁵, E Brum⁵, Lubis AS⁵, Azhar M⁵, Jobre Y⁶, Ihab E⁶, Hendrickx S⁷)

(c) Hand held applications (Pinto J¹, Mokopasetso M⁸, Larfaoui F¹, De Maio E¹)

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⁵ Food and Agriculture Organization of the United Nations, Emergency Centre for Transboundary Animal Diseases, Jakarta, Indonesia

⁶ Food and Agriculture Organization of the United Nations, Emergency Centre for Transboundary Animal Diseases, Cairo, Egypt

⁷ International Livestock Research Institute, Nairobi, Kenya

⁸ Food and Agriculture Organization of the United Nations, Emergency Centre for Transboundary Animal Diseases, Gaborone, Botswana

SURVEILLANCE OF THE VIRAL HEMORRHAGIC FEVERS

in the Democratic Republic of Congo

Justin MASUMU ET AL.

Background

Filovirus hemorrhagic fevers (FHF) comprise two related diseases, Ebola (EHF) and Marburg (MHF) hemorrhagic fevers. The first occurrence of MHF was in 1967 simultaneously in Marburg and Serbia. Ebola appeared for the first time in Sudan and DRC (former Zaire) in 1976. Natural occurrence of these diseases is restricted to Africa mainly the Congo and Nile basins. The Democratic Republic of Congo is one of the countries with a high number of FHF occurrences. In 2012, the DRC experienced its sixth known filovirus outbreak in Oriental province, in Isiro. This was the fifth time Ebola virus appeared in DRC after Yambuku (1976), Tandala (1979), Kikwit (1995) and Mweka (2007-2009). These four outbreaks were caused by the Zaire Ebola strain while the Isiro outbreak was caused by Ebola Bundibudyo strain. The single MHF outbreak so far observed occurred between 1998 and 2000 in the same province. Although EHF and MHF are two different diseases, they share the same prevention and control strategies. In DRC, FHF are controlled by the Ministry of Health through the 4th direction. Within this direction a program has been established to control Monkey Pox and viral hemorrhagic fevers including FHF. This program is well established at different levels of the health system across the country and is highly experienced in the control of FHF. An evaluation of strategies developed to prevent and control these disease revealed that appreciate progress have been achieved. However the system needs more improvements in order to achieve a good level of disease prevention and early outbreak detection.

CYSTICERCOSIS WORKING GROUP IN PERU

Armando GONZALEZ

The Cysticercosis Working Group in Peru (CWPG) is an international multi-institution organization devoted to study and control *Taenia solium*. CWGP leadership comprised Robert Gilman from Johns Hopkins University, Armando Gonzalez from San Marcos University, Hugo Garcia from Universidad Peruana Cayetano Heredia and Victor Tsang from Georgia State University. The CWGP produces, collect and collates data from a wide range of government and nongovernment programs to provide an overview of human and animal health, disease surveillance and disease control. The CWGP successfully eliminated *T. solium* from an area with 100,000 inhabitants.

Information Sources:

1. Peruvian Ministry of Health, that centralizes data from the primary health centers to the main specialized hospitals at regional and national levels
 - Neurocysticercosis cases
 - Taeniasis diagnosis
2. Peruvian Agriculture Ministry and Peruvian Veterinary Services (SENASA) centralizes the information on animal health at the regional and national levels
 - Animal diseases
 - Livestock numbers and slaughter statistics by production type
 - Abattoir statistics
 - Key animal contacts, producer organization, researchers, consumer associations
3. Disease surveillance programs
4. Universities, research results, undergraduate and postgraduate thesis, national and regional meetings

Potential solutions include evaluation of single drugs for the treatment of human and porcine cysticercosis, hydatid disease, liver fluke, filarial parasites, gastrointestinal nematodes. Likewise, the use of invertebrates to ascertain environmental contamination with parasites eggs is currently being evaluated.

2.2

ECOSYSTEMS, WILDLIFE

and One Health

The ultimate challenge of the 21st century is to protect biodiversity and ecological services through proper resource management while meeting the needs of people and safeguarding their health; this is a significant global challenge in light of the increasing global demographics, resource consumption, and the proposal to provide food security and nutrition through further expansion, intensification and increased efficiencies of farming systems. Other areas of importance and relevance, also associated with driving disease emergence and spread include communities and settlements encroaching on natural habitats, development, construction, extractive industries, water management (dams, inland and coastal-run-off, etc), deforestation, habitat fragmentation, loss of biodiversity, waste and garbage management, climate change, to name a few. Unless human activities are carefully planned and managed, valuable ecosystems will continue to be impaired or destroyed and disease will continue to jump species, expand geographically, or become entrenched in animal populations which have significant implications to the health and survival of all creatures on the planet, including humans.

MODERATOR

Scott NEWMAN

Wildlife Health & Ecology Unit Coordinator and Co-Convener of the Scientific Task Force on Wildlife & Ecosystem Health

Food and Agriculture Organization of the United Nations (FAO)
Italy

To date, among the global community, One Health efforts to combat infectious diseases has primarily engaged medics and veterinarians with limited inputs from the wildlife and ecology experts, and limited discussion of biodiversity conservation and ecosystem services. This gap in the One Health approach can be attributed to multiple factors that include, but are not limited to: 1) a platform not being in place to encourage and facilitate exchange of information across disciplines; 2) a lack of understanding the mutual benefits of collaborating on health and disease issues; 3) and a lack of understanding what each discipline needs from the other. Further to this is a basic training and “language” issue. Biomedically trained people

refer to health and disease when referring to patients or populations of animals while natural resource managers refer to services and function when referring to ecosystems. In the One Health context, we often refer to healthy livestock, wildlife, people and ecosystems and in general, ecologists and natural resource managers would not use the terminology “healthy ecosystem” but instead, “ecosystem resiliency” or ecosystems providing optimal services.

Ecosystem services are the processes by which the environment produces resources that we often take for granted such as clean water and air, pollination of crops, fruits, and native plants, production of medicinal plants, regulating disease carrying organisms, and timber production. Whether people live in urban, rural, agricultural, or natural places, the ecosystems in which humans live provide goods and services that are essential to their health.

This session will be dedicated to broadening the discussion around One Health and creating an opportunity to hear perspectives from ecologists, biologists, and the conservation or natural resource management community, as well as gaining further insights from the food security and biomedical perspective. The session will serve as an opportunity for the biomedical One Health community to share with ecologists and the natural resource community, how their contributions can significantly improve efforts to address infectious disease management and prevention.

OBJECTIVES

- Provide a better understanding to biologists, ecologists, and natural resource managers on how they can contribute to One Health efforts focused on infectious diseases;
- Provide a better understanding to medics and veterinarians on how biodiversity conservation and ecosystem services ensure human health & contribute to One Health;
- Develop a statement that can be included in the definition of One Health, reflecting the interests and perspectives of biologists, ecologists, and natural resource managers.

PANELISTS

- United Nations Environmental Program - Convention on Migratory Species**
Borja Heredia, Head of the Scientific and Technical Unit, Secretariat of the Convention on Migratory Species, United Nations Environment Program, Germany
- The Convention on Biological Diversity**
David Coates, Environmental Affairs Officer, Inland Waters, Secretariat of the Convention on Biological Diversity, Canada
- The Convention on Wetlands (Ramsar)**
Ruth Cromie, Head of Wildlife Health, Wildfowl & Wetlands Trust, United Kingdom
- The International Union for Conservation of Nature (IUCN)**
Scott Perkin, Head, Regional Biodiversity Conservation Programme, Asia, IUCN Asia Regional Office, Thailand
- Biomedical and Veterinary Perspective**
William Karesh, Executive Vice President for Health, EcoHealth Alliance, USA
- The Food & Agriculture Organization of the United Nations**
Juan Lubroth, Chief Veterinary Officer, Food and Agriculture Organization of the United Nations, Italy



Immediately after completing a biology degree, and subsequent Masters in tropical marine ecology, in the U.K., David embarked on a long career overseas involving teaching, research and development project management. Interests in coral-reefs continued but were gradually overtaken by involvement in freshwater-related issues. This started with work on the biological control of vectors of water-borne diseases in the Sudan, leading into inland fisheries related work in Papua New Guinea. After 6 years working for the PNG Government, culminating a position as Chief Fisheries Scientist, he joined the FAO, remaining in PNG, where he spent 11 years as working on the management of large river fisheries. By this time emphasis shifted to managing the environment upon which fisheries depend.

He spent four years as Chief Technical Adviser for the Mekong River Commission, working in Cambodia, Laos, Thailand and Viet Nam, assessing the regional impacts of water management on fisheries. This was followed by a period working in the Lower Ganges River Basin (Bangladesh) as manager of a project mainstreaming biodiversity into the fisheries, agriculture and water resources sectors. He earned his PhD in 1986 as an external student of the Open University, UK, based on field work on the applied biology of tropical freshwater fish faunas in Africa and Oceania.

David joined the Secretariat of the Convention on Biological Diversity, based in Montreal, in August 2003. He is currently responsible for freshwater biodiversity, water resources and agriculture.

His interests remain broad but centre on the role of biodiversity and ecosystems in water resources management.

DAVID COATES

Environmental Affairs
Officer, Inland Waters

*Secretariat of the
Convention on Biological
Diversity
Canada*



Dr. Ruth Cromie, Head of Wildlife Health for the Wildfowl & Wetlands Trust (WWT), began her career in wildlife health by gaining a PhD for vaccine development in wildfowl from University College, London, in 1991. Since then she has worked on various aspects of disease control from diagnostic technologies to environmental management in both wild and captive animals. She has worked on numerous health and welfare projects of primarily birds and marsupials in a number of organisations including Smithsonian Institution's National Zoological Park, Washington DC, USA; Hong Kong University; National Birds of Prey Centre, Gloucestershire; UK, and Durrell Institute of Conservation and Ecology, Canterbury, Kent, UK.

Ruth is responsible for WWT's Wildlife Health programme which includes surveillance, research, advocacy, capacity building and policy work, as well as health management as part of WWT's species recovery programmes. Ruth has played a key role in the formation and implementation of WWT's Animal Welfare and Ethics Committee to ensure high welfare standards in all WWT's animal-related operations. Ruth regularly teaches wildlife health and conservation biology on a number of post-graduate programmes and co-directed Durrell Wildlife Conservation Trust's Summer School in Endangered Species Conservation and Management. She is also external examiner for the Royal Veterinary College and Zoological Society of London's M.Sc. programmes in Wild Animal Health and Wild Animal Biology.

Ruth has worked extensively on issues such as tuberculosis, lead poisoning and avian influenza. With respect to H5N1 HPAI she has experience of national and international surveillance programmes and projects, organisational preparation and resilience, working with public and veterinary health sectors, policy, public relations and the media.

In recent times she has worked extensively on integrating wildlife health into multilateral environmental agreements for, amongst others, the Convention of Migratory Species (CMS) and the Ramsar Convention, being involved, most recently, in writing a resolution on ecosystem approaches to health in wetlands together with production of the recently launched substantive animal disease management resource for wetland habitats: the Ramsar Wetland Disease Manual.

Ruth also sits on the UN Scientific Task Force on Avian Influenza and Wild Birds and the Scientific Task Force on Wildlife and Ecosystem Health, both CMS and FAO co-convened entities.

RUTH CROMIE

Head of Wildlife Health

*Wildfowl & Wetlands Trust
United Kingdom*



Dr Borja Heredia was appointed Scientific and Technical Officer at the Secretariat of the Convention on Migratory Species (CMS) in January 2010. Borja is well known to many in CMS circles as he has been Spain's representative on the Scientific Council, and has participated in several CMS COPs and MOU meetings, as well as being involved in other MEAs such as CBD and CITES.

Borja is a biologist with a PhD in Ecology from the University of Madrid. Since 1986 he has worked at the Spanish Ministry of Environment focussing on the conservation of threatened species, planning research, drawing up strategies and organising projects in the field. He has been involved in the conservation of several CMS Appendix I species including the Spanish Imperial Eagle, the White-headed Duck and the Mediterranean Monk Seal. The recovery of the Iberian Lynx has also been one of his main occupations in recent years, with a special emphasis on diseases that affect the Lynx and its main prey, the Mediterranean Rabbit. He also has experience of conflict resolution among different interest groups and has addressed many other factors affecting migratory species such as electrocution and invasive alien species.

From 1992 to 1995 he worked for BirdLife International in Cambridge, developing action plans for globally threatened birds in Europe.

At the CMS Secretariat Borja is responsible of the Science Unit where he deals with a number of cross cutting issues that affect migratory species, including climate change. Together with FAO he is co-convenor of the Task Force on Wildlife and Ecosystem Health that was created at the CMS Conference of the Parties in 2010, as an extension of the very successful Scientific Task Force on Avian Influenza that CMS and other partners established in 2005.

BORJA HEREDIA

Head of the Scientific
and Technical Unit

*Secretariat of the
Convention on
Migratory Species
United Nations
Environment Program
Germany*



Dr. William Karesh is the Executive Vice President for Health and Policy for EcoHealth Alliance. He serves as the President of the World Organisation for Animal Health (OIE) Working Group on Wildlife Diseases and also chairs the International Union for the Conservation of Nature (IUCN) Species Survival Commission's Wildlife Health Specialist Group, a network of hundreds of wildlife and health experts around the world. Currently, Dr. Karesh is the Technical Director for the USAID Emerging Pandemic Threats PREDICT program, a \$75 million effort focused on predicting and preventing pandemic diseases.

Dr. Karesh has pioneered initiatives focusing attention and resources on solving problems created by the interactions among wildlife, people, and their animals and created the "One World – One Health" initiative linking public health, agriculture and environmental health agencies and organizations around the world. International programs under his direction have covered terrain from Argentina to Zambia and include efforts in the Congo Basin to reduce the impact of diseases such as Ebola, measles, and tuberculosis on humans and endangered species such as gorillas and chimpanzees, to global surveillance systems for emerging diseases. In addition to his work in the private sector, Dr. Karesh has also worked for the USDA, DOD, DOI and the Food and Agriculture Organization of the U.N. Dr. Karesh is internationally recognized as an authority on the subject of animal and human health linkages and wildlife. He has published over one hundred and fifty scientific papers and numerous book chapters, and written for journals such as Foreign Affairs.

WILLIAM KARESH

Executive Vice President
for Health

EcoHealth Alliance
USA



JUAN LUBROTH

Chief Veterinary Officer

*Food and Agriculture
Organization of the
United Nations (FAO)*
Italy

Dr Juan Lubroth is the Chief of the Animal Health Service and Chief Veterinary Officer of the Food and Agriculture Organization of the United Nations (FAO). Dr Lubroth previously served for seven years as the senior officer of FAO's Animal Health Service and head of the Infectious Diseases Group/ Emergency Prevention System in charge of worldwide surveillance, capacity building, and progressive control of transboundary animal diseases (2002-2009).

Born and raised in Spain, Dr Lubroth received his bachelor's degree (biology) from Whitman College in Washington State and worked as a wildlife biologist before continuing studies at the University of Georgia, where he earned both a master's degree in medical microbiology and DVM in 1985. After a stint with the Southeastern Cooperative Wildlife Disease Study, Dr Lubroth joined the diagnostic services section of the Foreign Animal Disease Diagnostic Laboratory, Plum Island Animal Disease Center, USDA. In Mexico he served as a technical officer for the Mexico-US Commission for the Prevention of Foot-and-Mouth Disease and other Foreign Animal Diseases, returning for advanced studies in the United States. In 1995, he received both a M Phil (arbovirology) and PhD (epidemiology and public health) from the School of Epidemiology and Public Health at the Yale University, School of Medicine. Dr Lubroth returned to USDA and was posted at the Panatosa Center in Brazil as research epidemiologist before being named head of Diagnostic Services at Plum Island, where among other duties managed the North American Foot-and-Mouth Disease Bank.

In 2002, Dr Lubroth joined the Animal Health Service of FAO. He has worked extensively throughout Latin America, North Africa and the Middle East. He has initiated several major initiatives for the control of transboundary animal diseases in Central Asia, South Asia, southern Africa, and served on the Pan African Programme for the Control of Epizootics Advisory Committee. He was the driving force behind several key cooperative initiatives of FAO with the World Health Organization (WHO) and World Organisation for Animal Health (OIE), including the Global Framework for the Progressive Control of Transboundary Animal Diseases, the Global Early Warning System for major animal diseases including zoonoses (GLEWS), and the establishment of the Crisis Management Centre for Animal Health. As an expert on animal health and infectious disease transmission, Dr Lubroth is often called to assist in bringing animal production and health perspectives to the work of the WHO on issues related to "One Health" zoonoses, biological safety of laboratories, and matters regarding bioterrorism and agroterrorism.

On 1 October 2009, Dr Lubroth was appointed as Chief of the Animal Health Service and Chief Veterinary Officer of FAO, headquartered in Rome, Italy, where he now resides with his wife, Adriana, a journalist, and a coterie of dogs and cats of all sizes.



Scott Newman recently took up the position as the Food and Agriculture Organization of the United Nations (FAO) Senior Technical Coordinator for the Emergency Center for Transboundary Animal Diseases (ECTAD) in Vietnam.

Scott is a veterinarian, wildlife epidemiologist and biologist receiving his Doctor of Veterinary Medicine from Cummings School of Veterinary Medicine at Tufts University (Massachusetts) in 1992, and his PhD from the University of California Davis in 1998 where he studied disease ecology, ecotoxicology and comparative pathology. Between 1998 and 2007 Scott has worked at the Wildlife Health Center and Oiled Wildlife Care Network in California, Wildlife Trust (now called Ecohealth Alliance) in New York as Senior Conservation Medicine Scientist, and as the Liaison to the United Nations and Wildlife Health Specialist for the Wildlife Conservation Society. Since 2007, Scott has worked as an Animal Health Officer in the Animal Production & Health Division where he developed and led the EMPRES Animal Health - Wildlife Health & Ecology Unit. Scott has extensive international experience working on more than 40 countries focused on One Health, disease ecology and disease management at the livestock-wildlife-human-environment interfaces.

Scott will lead the FAO Country ECTAD Team in Vietnam supporting the HPAI and other zoonotic and non-zoonotic diseases, and facilitate a One Health approach to agriculture, public health, forestry, fisheries and natural resource management issues, as well as supporting broader mandates of FAO including food safety, food security, and sustainable development.

SCOTT NEWMAN

Wildlife Health & Ecology Unit Coordinator and Co-Convener of the Scientific Task Force on Wildlife & Ecosystem Health

Food and Agriculture Organization of the United Nations (FAO) Italy



SCOTT PERKIN

Head

Regional Biodiversity Conservation Programme, Asia, IUCN Asia Regional Office Thailand

Scott Perkin has been engaged in biodiversity conservation for nearly 30 years. He has worked in the field, in programme management and development, and in strategic planning. His different postings have given him the opportunity to engage at regional, national and local levels and have included East Africa, South Asia, South-east Asia and Europe.

Scott started his career in 1983 with the WWF/IUCN Eastern Africa Regional Office in Nairobi, where he handled project design and management. He then moved into a field-based position in Tanzania, where he worked with the Government to develop a new management strategy for the Ngorongoro Conservation Area (a World Heritage Site), aimed at reconciling the interests of resident Maasai pastoralists and conservation.

In 1994, having completed his PhD, he moved to Asia, taking up the post of Director of IUCN-Pakistan's Programme Support Unit in Karachi. Three years later, he became the Co-ordinator of IUCN's first Regional Biodiversity Programme for Asia, before taking on the role of Acting Country Representative for IUCN-Lao PDR, based in Vientiane.

From 2005 to 2011, Scott gained experience of working at the local level in Europe, serving as the Co-ordinator of the Norfolk Biodiversity Partnership in the UK, a unique consortium of 21 government agencies and NGOs established to deliver the Norfolk Biodiversity Action Plan. During this period, he also played a central role in developing and launching the Norfolk Non-native Species Initiative, one of the first county-level programmes in England aimed at preventing, controlling and eradicating invasive alien species.

In 2012, Scott returned to Asia, where he is currently the Head of IUCN's Regional Biodiversity Conservation Programme, based in Bangkok. The programme spans 24 countries in Asia, and addresses protected areas, species and implementation of the Convention on Biological Diversity. Recent assignments have included work on the development of the South Asia Vulture Recovery Programme, which is seeking to rebuild the populations of three, Critically Endangered vulture species following their precipitous decline over the last two decades (brought about by the use of diclofenac, a non-steroidal anti-inflammatory drug used in the treatment of livestock).

Scott Perkin has dual Canadian and British citizenship. He holds a Bachelor's degree in biology and environmental studies from Dartmouth College, USA, and a PhD in international development from the University of East Anglia, UK. He is married to Mary Pipes, a British counselor and psychotherapist.

2.3

Making

REGIONAL NETWORKS WORK

Less formal non-treaty non-regulation trust based disease surveillance networks represent the “art of the possible” with respect to responding in diverse ways to real needs and challenges. However, the networks are not yet fully developed in their expertise and also face the challenges of synergizing with the more formal systems such as the WHO International Health Regulations (IHR) framework and those by OIE and FAO for animal health. Nevertheless there are clear advantages of this less-formal approach and opportunities for systematization, building on the achievements of Regional Disease Surveillance networks; Middle East; Mekong Basin; Southern Africa; Southeastern Europe and East Africa. The balancing act is to maintain the nimble less formal nature of this distributed network resource while harmonizing and synchronizing efforts with the formal mechanism so that a robust response to globalized infectious disease is present anywhere and everywhere always.

This is what the modern world requires for population security; it will require work to accomplish. Part of the systematizing and synergizing of all these newly emerging less-formal trust based networks involves building multi sectoral and cross network connections; CORDS is doing that. By linking regional disease surveillance networks and intergovernmental agencies in various sectors, CORDS exemplifies the shifting patterns of international collaboration that will be needed to prevent, detect, and fight all types of biological dangers. CORDS combines informal trust based bottom-up and top-down solutions-oriented approaches, which together are re-shaping the global disease surveillance landscape. By pursuing a common vision where disease no longer threatens the well being of communities and prosperity of nations, CORDS is revitalizing international efforts against biological threats and helping to build ‘A World United Against Infectious Disease’.

MODERATOR**Nigel LIGHTFOOT**

Executive Director

*CORDS
France***GOAL**

To strengthen regional disease surveillance networks and CORDS by illuminating the concept of trust and providing solutions to promote global policies to build solidarity for cross border cooperation and a world united against infectious disease.

OBJECTIVES

- Introduce the evolution and varying models of regional disease surveillance networks that compliment the existing global surveillance architecture
- Present innovations of cross border cooperation in surveillance using examples of regional networks and CORDS
- Identify political influences faced by regional surveillance systems that challenge and promote cross sectoral / cross border work
- Discuss forward thinking concepts to strengthen applied OH concepts on a global level using the example of CORDS and laboratory networks
- Record recommendations to expand regional and global cooperation

PANEL

Critical analysis of Networks and creation of trust using some material from Emerging Health Threats Journal Supplement. How they started cooperation, what policies were created, reality of working across conflicted borders; what is needed to sustain, how they add value to surveillance and to IHR, models of networks.

PANELISTS

- **Nigel Lightfoot**, Executive Director, CORDS, France
- **Alex Leventhal**, Chairman, MECIDS, Israel
- **Bounlay, Phommasack**, Chair of MBDS and Director General, Department of Disease Control, Ministry of Health, Lao PDR
- **Dominic Kambarage**, Deputy Director (Animal Health), SACIDS, Tanzania
- **Stanley Sonoiya**, Principal Health Officer, EAIDSNet, Tanzania
- **Silvia Bino**, SEEHN and Head, Control of Infectious Diseases Department, Institute of Public Health, Albania
- **Pongpisut Jongudomsuk**, Chairman, APEIR and Director, Health Systems Research Institute, Ministry of Public Health, Thailand
- **Christophe Longuet**, Medical Director, Fondation Merieux, France

AUDIENCE DISCUSSION

ANALYSES AND RECOMMENDATIONS.

Other networks will be given the opportunity to share their experiences by contributions from the audience. Identify the actions to increase global cooperation and overcome the barriers to effective cross border/ cross sectoral disease surveillance. How and where do we build the next regional networks of CORDS?

MOVING FORWARDS

Reflections. How can regional networks move forward, financing, getting governments involved in sustainability and new networks.

PANELISTS

- **Pierre Nabeth**, Team leader, World Health Organization, France
- **Louise Gresham**, CEO, Fondation Merieux, USA
- **Kumnuan Ungchusak**, ASEAN+3 Field Epidemiology Training Network and Senior Expert Preventive Medicine, Department of Disease Control, Ministry of Public Health, Thailand
- **Martyn Jeggo**, Director, CSIRO Animal, Food and Health Sciences, Australia
- **Nigel Lightfoot**, Executive Director, CORDS, France

MODERATOR

Mark RWEYEMAMU

Executive Director

*Southern African Centre
for Infectious Disease
Surveillance (SACIDS)
Tanzania*

SUMMATION



Dr Silvia Bino, Associate Professor of Infectious Diseases, Head, Control of Infectious Diseases Department, Institute of Public Health, Tirana, Albania

Silva Bino, MD, Ph.D, is the Head of the Control of Infectious Diseases Department of the Institute of Public Health and an Associate Professor of Infectious Diseases at the Faculty of Medicine, Tirana University, Albania. She was the Director of National Public Health Institute from 2000-2006, and has devoted her career to novel strategies to control infectious diseases and strengthen surveillance systems in resource poor countries.

Dr Bino coordinated surveillance, diagnostic, and response activities for pandemic influenza A (H1N1) 2009 in Albania. She is also in the national group for IHR implementation, and has been involved in IHR implementation in Southeastern Europe.

Dr.Bino has been the Regional Coordinator of the network to strengthen surveillance and control of communicable diseases in South-eastern Europe, which has fostered strengthening of early warning systems, policy development, preparedness and response, applied epidemiology training and expert and institutional collaboration in IHR implementation.

Since 2000 she has been coordinating the Immunization program and helped to establish a syndromic Early Warning System in Albania.

She has served as consultant to WHO and other UN agencies and until April 2009 was a member of Strategic Advisory Group of Experts on Immunization and later on serving in Review Committee on the Functioning of the International Health Regulations (2005) in relation to Pandemic (H1N1) 2009.

She earned her medical and doctoral degrees from Tirana University and followed with postgraduate training on infectious diseases, microbiology, epidemiology and public health in Switzerland, Belgium, the United Kingdom and the USA.

SILVIA BINO

Head

*Control of Infectious
Diseases Department
Institute of Public Health
Albania*



Formerly Senior Director at the Nuclear Threat Initiative in Washington DC, Gresham has expertise in national and international disease surveillance systems in the Middle East, Southern Africa, and SE Asia, in particular managing the intersection of public health, international policy and global security.

Dr. Gresham participated in the development of the first modern tuberculosis laboratory in the Democratic People's Republic of Korea.

She earlier served as the senior epidemiologist San Diego County Health and Human Services Agency and is an adjunct associate professor with the Graduate School of Public Health, San Diego State University.

LOUISE GRESHAM

CEO

*Fondation Merieux
USA*



Prof Martyn Jeggo is the Director of CSIRO's Australian Animal Health Laboratory (AAHL) and has headed AAHL since September 2002.

Prof Jeggo brings a wealth of experience in controlling and detecting exotic and emerging animal disease to his role of Director.

In his time at the facility, some A\$55 million has been brought in to improve and upgrade the facility.

Prior to joining AAHL from 1996-2002, Prof Jeggo was the Head of the Animal Production and Health Science Section of the Joint Food and Agricultural Organisation/ International Atomic Energy Agency (FAO/ IAEA) Division of Agriculture, in Vienna, Austria.

In that role, he managed a range of FAO/IAEA Coordinated Research Programs involving more than 200 research contracts relating to animal production and health. These were operational in some 130 countries.

Among other international activities, Prof Jeggo also developed an international external quality-assurance program for veterinary laboratories.

For more than 15 years, Prof Jeggo oversaw the management of laboratory networks dealing with, rinderpest and contagious bovine pleuropneumonia in Africa, foot and mouth disease in Asia and brucellosis worldwide.

Prof Jeggo has visited more than 150 national veterinary laboratories in Africa, Asia and the Americas. He has held the positions of Director of the Veterinary Diagnostic Laboratories in the Yemen Arab Republic and Head of the Department of Immunology at the United Kingdom's Institute of Animal Health Pirbright Laboratories.

MARTYN JEGGO

Director

*CSIRO Animal
Food and Health Sciences
Australia*

Prof Jeggo has a:

- Bachelor of Veterinary Medicine from the Royal Veterinary College, London, in the United Kingdom (UK)
- Master of Tropical Veterinary Science from the Centre for Tropical Veterinary Medicine, Edinburgh University, UK
- Doctor of Philosophy from Surrey University, UK.

Prof Jeggo's is also a leading member of the Foot and Mouth Disease (FMD) Global Research Alliance.



Pongpisut Jongudomsuk, MD degree at the Faculty of Medicine, Ramathibodi Hospital, Mahidol University, Master of Public Health at the Institute of Tropical Medicine Antwerp, Certificate of Preventive and Family Medicine of the Thai Medical Council.

After ten years working in rural district hospital in northeastern of Thailand, he changed his career to work in the Ministry of Public Health as Deputy Director of Health Insurance Office, National Project Director of the (EU-supported) Health Care Reform Project, Director of the Bureau of Policy and Planning at the National Health Security Office, and Head of the Technical Support Team of the Thai Minister of Public Health.

Currently he is the director of the Health Systems Research Institute. His main areas of interest are health financing, health care reform, primary care and health policy and systems research.

PONGPISUT JONGUDOMSUK

Chairman
APEIR

Director
*Health Systems Research
Institute
Ministry of Public Health
Thailand*



Prof. Leventhal is the director of the Department of International Relations in the Ministry of Health of Israel. Previously he served for almost 16 years as the head of the Public Health Services in the Ministry and prior to that the position of district medical officer of Jerusalem in the Ministry of Health.

Prof. Leventhal is a physician who received his M.D. and M.P.H. degrees at Hadassah Hebrew University Schools of Medicine and Public Health in Jerusalem; and a Master in Public Administration from Harvard's Kennedy School of Government. He holds diplomas in Surgical Urology, Public Health and Health Administration. He is an adjunct clinical professor lecturer in the Hebrew University and Hadassah School of Public Health. He has published more than 120 articles in his research interest fields of public health policy, infectious disease surveillance and international and global health.

Prof. Leventhal is involved in various Public Health projects, seminars and steering committees in the European region of World health organization and serves as a member of its Standing Committee. He believes in public health as a bridge between nations and people. He is one of the founders and chairman of the Executive Board of the Middle East Consortium of Infectious Disease Surveillance (MECIDS). He is a member of the Executive Committee of SEEHN (South East European Health Network), CORDS (Connecting Organizations for Regional Disease Surveillance) and EpiSouth (network of Communicable Disease Control in Southern European and Mediterranean Countries).

ALEX LEVENTHAL

Chairman

*MECIDS
Israel*



Professor Nigel Lightfoot CBE has a long and distinguished career in public health and global health security and is now the Chief Executive Officer of CORDS (Connecting Organisations for Regional Disease Surveillance). He is an Associate Fellow of Chatham House and a Member of the Kangaroo Group in the European parliament.

2012

Professor Lightfoot was until very recently the Chief Advisor for Emergency Response at the Health Protection Agency, leading on pandemic influenza, emerging health threats, CBRN response strategies and international relations in these areas. He continued this expert advisory work as consultant to the Department of Health, the Home Office and the Drinking Water Inspectorate. He is also Senior Advisor to Emergent Biosolutions.

Trained originally as a consultant medical microbiologist, Nigel served for several years in the Royal Navy. He was a Director in the Public Health Laboratory Service from 1982-2002 and appointed to the Department of Health as Head of CBRN Training and Scenario Development. He developed cutting edge multi-agency exercises for CBRN preparedness, and as Director of Emergency Response he set up the Emergency Response Division of the Health Protection Agency from its inception in 2003 until 2010. He was also a non-executive Director of the Centre for Applied Microbiology and Research, Porton Down, from 1994 to 2003.

Professor Lightfoot has enormous experience in public health microbiology. He was responsible for the development of medical countermeasures policy in the Royal Navy, becoming the Navy's consultant medical microbiologist in 1979, and on leaving continued in this role as consultant advisor. During the Gulf War in 1991 he developed methods for the detection of BW agents in water and thereafter directed a research project to develop rapid methods, now available to the water industry. This work built upon his wide experience in water and public health where he has published many papers and co-ordinated 4 important EU projects. He has carried out research into anthrax and tularaemia and in 1995 he joined a DH working group to develop guidance on responding to the deliberate release of chemical

and biological agents. He later implemented the PHLS Deliberate Release Team - a multi agency group that went on to produce the leading public health guidance on biological terrorism agents.

He is a past member of the Defence Service Advisory Council (CBRN Board), examining and informing MOD research in this area. He was appointed by Secretary of State for Defence to the Advisory Group on Medical Countermeasures - a body that advises on defence against chemical and biological weapons. As expert advisor to the Chief Medical Officer, he has made significant contributions to the Global Health Security Network of the G7 where he is co-chair of the Risk Management and Coordination Working Group. Nigel's breadth of work is a testament to his talent and expertise - he leads the Early Alerting and Reporting project, he is expert adviser to the FCO Arms Control Department and contributes to policy in the control of terrorist threats, he was a member of the Royal Society's Working group on Detection and Decontamination of Chemical and Biological Agents, and he has sat on Government Expert Inquiries into anthrax vaccine, quarantine of birds and the Foot and Mouth disease outbreak at Pirbright.

Professor Lightfoot was appointed CBE in the 2009 New Year's Honours List for services to public health.

NIGEL LIGHTFOOT

Executive Director

*CORDS
France*



Dr Christophe Longuet is the Medical Director of Fondation Mérieux since March 2007.

Its responsibilities at the foundation include training and knowledge sharing for health professionals and projects aiming to strengthening the health systems and the access of the populations to better services.

Medical doctor, specializing in tropical diseases and HIV/AIDS, he worked during twelve years at Bichat Claude Bernard Hospital, Paris, where he participated in clinical research into HIV/AIDS and malaria treatment, and in medical care of people. He still keeps a clinical practice on a part time basis in the infectious diseases department of Croix Rousse Hospital, Lyon.

Dr. Christophe Longuet has a nine-year experience in the pharmaceutical industry (Merck Sharp & Dohme) where he had the responsibility to introduce antiretrovirals in Africa within international partnerships with WHO and UNAIDS. At MSD he has also been in charge of the humanitarian donation of Mectizan for the control of onchocerciasis.

Prior to this, he has been district medical officer in the Commonwealth of Dominica for the French Co-operation and then practiced internal medicine in Pointe à Pitre University Hospital, Guadeloupe.

Dr. Christophe Longuet also holds a Master's Degree in International Public Health from the Catholic University of Louvain, Belgium, and a postgraduate degree in Health Economics from Paris IX-Dauphine University.

CHRISTOPHE LONGUET

Medical Director

*Fondation Mérieux
France*



PIERRE NABETH

Team leader
*World Health Organization
France*

Dr Pierre Nabeth graduated as a Medical Doctor from the University of Paris, France, with a specialization in biostatistics and epidemiology.

He started his professional life in hospital settings and in general practice, then worked for medical NGOs in Liberia, Guinea, and Malawi, as coordinator and head of missions. He has gained a large experience in the management of health systems and in the control of outbreaks (mainly cholera) in populations in precarious situations (war, refugees).

He worked at Epicentre, an agency specialized in epidemiology, as a researcher, primarily on viral haemorrhagic fevers, nutrition, and epidemiological surveillance, contributing to the investigation of the Ebola virus outbreak in Democratic Republic of Congo, in 1995. He was also in charge of the training department.

As a technical adviser in the Ministry of Health, Nouakchott, Mauritania, he was in charge of analyzing and disseminating information produced by the National Health Information System, but was also involved in several outbreak investigations. He contributed to the building of a project associating laboratory specialists, and animal and human health specialists for the detection and control of Rift Valley Fever outbreaks.

He joined the Pasteur Institute in Dakar, Senegal, as Head of the Epidemiology Unit where he was in charge of the management of a cohort follow-up study on acquisition of protection against malaria, but also conducted epidemiological studies on resistance to anti-malarial drugs and to antibiotics. He investigated outbreaks of Crimean-Congo Haemorrhagic Fever in Senegal, Mauritania and Iran.

He coordinated two training courses in epidemiology targeting professionals from Algeria, Morocco, and Tunisia.

Since 2006, he has been working at WHO where he has held different positions. He is currently leading a team providing support to countries in field epidemiology training, epidemiological surveillance, and building of networks, in the scope of the International Health Regulations. His current projects concern the development of guidance on early warning, event based surveillance, coordination of surveillance between points of entry and national surveillance systems, and development of national strategies for the strengthening of human resources in field epidemiology. He is also coordinating the development of software for weekly surveillance of epidemic prone diseases in Africa.

He is a member of network steering committees and boards: Tephinet, Episouth, SURVAC.



Dr. Bounlay PHOMMASACK, Medical Doctor and Public Health Specialist, has spent nearly 30 years working at Provincial Health Department (nearly 15 years) and working at Ministry of Health (nearly 15 years). Currently working at the Ministry of health, holding two positions such as Director General of the Department of Disease Control (DDC), Ministry of Health of the Lao PDR, and Director General of the National Emerging Infectious Diseases Coordination Office (NEIDCO), under the National CDC Secretariat of the Government's Office.

Since 2010, Dr. BounlayPhommasack, was elected as Chair of the Executive Board of the MBDS (Mekong Basin Disease Surveillance), Chair of Inter-Ministerial Task Force for Tobacco Control in Lao PDR in 2008.

Since 1994 up to 2012, Dr. BounlayPhommasack has been invited by WHO to be Temporary Advisor in several disciplines ranking from: Healthy Cities, Partnership for Parasite Control, Communicable Diseases, Maternal Child Health and Tobacco Control.

Under ASEAN, currently Dr. BounlayPhommasack is the Head of Asean Expert Group on Communicable Diseases and Alternate Chair of SOMHD of the Ministry of Health, Laos.

BOUNLAY PHOMMASACK

Chair of MBDS and
Director General

*Department of Disease
Control, Ministry of Health
Lao PDR*



Mark Rweyemamu is the Executive Director of the Southern African Centre for Infectious Disease Surveillance (SACIDS), which is a One Health Virtual Centre linking academic and research institutions in Southern Africa (primarily the DRC, Mozambique, South Africa, Tanzania and Zambia) in smart partnership with centres of science in industrialised countries, especially the Royal Veterinary College and the London School of Hygiene and Tropical Medicine. He manages grants from the Wellcome Trust, Rockefeller Foundation and Google Foundation which total approximates USDollar 11 million. The SACIDS Headquarters is located at Sokoine University of Agriculture (SUA), Morogoro, Tanzania where it is associated with the Faculty of Veterinary Medicine.

He is a Visiting Professor at the RVC, London and the Sokoine University of Agriculture, Morogoro, Tanzania. Previously he headed the FAO programme on infectious diseases including the coordination of global rinderpest eradication. He has worked in government, industry and academia. He has consulted widely for national governments and international organisations. He was a member of the EFSA Working Group on assessing the risk of Foot and Mouth Disease introduction into the EU from developing countries, and The Foresight study on Infectious Diseases – Preparing for the Future.

He is a member of the Scientific Advisory Board of the UK Institute for Animal Health and the Chairperson of the Scientific Advisory Committee of the GALVmed, a public-private partnership that focuses on supporting the development of biologicals and therapeutics for orphan diseases in developing countries. He is Chair of CORDS, a One Health focused global network that connects organizations for regional disease surveillance. He has published over 100 papers in peer reviewed journals.

MARK RWEYNEMAMU

Executive Director

*Southern African Centre
for Infectious Disease
Surveillance (SACIDS)
Tanzania*



STANLEY SONOIYA

Principal Health Officer
*The East African
Integrated Disease
Surveillance Network
(EAIDSNet)
Tanzania*

Dr. Stanley Sonoiya is the Principal Health Officer of the East African Community which is the regional inter-governmental organization that comprise five (5) Partner States, namely; the Republic of Burundi, the Republic of Kenya, the Republic of Rwanda, the Republic of Uganda and the United Republic of Tanzania, with its Headquarters located in Arusha, Tanzania. The Mission of the East African Community is to widen and deepen economic, political, social and cultural integration in order to improve the quality of life of the people of East Africa through regional cooperation on health, including taking joint action in the prevention and control of various diseases and public health events of national and internal importance, among other provisions as stipulated in the Treaty on the Establishment of the East African Community.

Dr. Sonoiya was appointed by the Council of Ministers of the East African Community (EAC) as the Principal Health Officer and the first employee under the EAC Health Sector with effect from 1st October, 2004. Before he joined the Community in the year 2004, Dr. Sonoiya was working as a Medical Specialist in Paediatrics, Nephrology and Immunology at Kenyatta National Hospital in Nairobi, Kenya.

Previously, Dr. Sonoiya worked in various capacities within the Ministry of Health of the Republic of Kenya including holding the position of the District Medical Officer of Health in-charge of Nakuru District, Rift-Valley Province, Kenya, the Medical Superintendent of the Rift Valley Provincial General Hospital, Rift-Valley Province, Kenya and also the National Manager of the Kenya Expanded Programme on Immunization (KEPI).

Dr. Sonoiya has wide local and international training in various institutions of higher learning in Kenya, United States of America (USA), United Kingdom (UK) and Japan. He graduated from the University of Nairobi with the degree of Bachelor of Medicine and Bachelor of Surgery (MB, ChB) in 1986 and also with the post-graduate degree of Master of Medicine in Paediatrics and Child Health (M. Med. Paeds) in 1993.

Subsequently, Dr. Sonoiya undertook further post-graduate medical training in General Nephrology at the Sheffield Kidney Institute, University of Sheffield, England, UK. In addition, he also undertook

further graduate studies in Immunology at the Graduate School of Health and Life Sciences, King's College, University of London, UK and at the Renal Transplant Unit, Department of Nephrology, Transplantation and Urology at Guy's and St. Thomas Hospital NHS Trust, London, England, UK.

Previously, Dr. Sonoiya attended public health management training at the Harvard University School of Public Health in Boston, Massachusetts, USA and he is a Hubert H. Humphrey Fellow (HHHF) of Emory University, Atlanta, Georgia, USA. Dr. Sonoiya also undertook further training on the "Eradication of Vaccine Preventable Diseases" in Fukuoka, Japan under a Japan International Cooperation Agency (JICA) Programme.



Dr. Kumnuan Ungchusak was born in 1955. He received his MD from Siriraj Medical School, Thailand, and got his Master of Public Health from Mahidol University. He also joined a two-year on the job training of the Field Epidemiology Training Program (FETP) under the Thai Ministry of Health in 1984.

Since then he acted as field epidemiologist who supervises communicable diseases surveillance and outbreak investigation in the country. He served as the director of Thailand FETP and became the Director of Bureau of Epidemiology from 2001-2008 oversee the country surveillance and investigation network. At present, He is the senior expert in preventive medicine, Department of Disease Control. He played role for the establishment of "SRRT" or Surveillance Rapid Response Team which is now on function in every district and province of Thailand.

His recent work are related to Avian Influenza, Pandemic Influenza, Public health emergency of international concern especially in the Asean region. He has served as one of the review committee appointed by WHO Director General for the first review of International Health Regulation and pandemic response. He is also currently Chair of the ASEAN+3 Field Epidemiology Training Network.

KUMNUAN UNGCHUSAK

Senior Expert Preventive
Medicine

*Department of Disease
Control
Ministry of Public Health
Thailand*

2.4

Measuring the Impact of Cross-sectoral Collaboration on Disease

PREVENTION AND CONTROL

at the Human-Animal-Ecosystems Interface

BACKGROUND

Health threats at the human-animal-ecosystems interface have increased over the past few decades. These health threats are caused by multiple drivers, many of which are associated with human behavior, including the effects of modified landscapes, and changes in agricultural practices. With approximately 60% of emerging infectious diseases originating from animals, and of those, 70% deriving from wildlife, we are challenged to establish robust, global animal health systems. The recent efforts to control highly pathogenic avian influenza (HPAI) reflect the need for reducing risks associated with zoonotic pathogens and other diseases of animal origin. Reducing these risks cannot be done by one sector alone, therefore international organizations and their member states are increasingly converging towards a One Health approach that incorporates a collaborative, cross-sectoral, multidisciplinary mode of addressing threats and reducing health risks at the human-animal-ecosystems interface.

It is often assumed that disease prevention is more cost-effective than response, however it is difficult to quantify the benefits of prevention. This leads to difficulty in attracting the required investment to implement activities that address disease emergence, maintenance or spread. This session will be dedicated to broadening the discussion around indicators used to evaluate the impact of cross-sectoral collaboration in various sectors (health and non-health related) and poses the question: How can we meaningfully measure the impact of One Health in the next decade? During High Level Technical Meeting held in Mexico City in November 2011 (convened by the government of Mexico, with support from FAO, OIE, WHO and UNSIC) the following key operational elements of effective cross-sectoral collaboration were identified:

- Joint cross-sectoral coordination mechanisms
- Routine communication
- Joint simulation exercises
- Data sharing
- Joint risk assessment
- Active cooperation on disease prevention/control programmes

OBJECTIVES

- Provide a specific country example where the One Health approach has been successfully adopted;
- Examine other domains that have established indicators for measuring similar collaborative programs;
- Identify options for measuring the impact of cross-sectoral collaboration on disease prevention, taking into consideration the key elements, but not limited to them;
- Discuss how we can meaningfully measure the impact of One Health in the next decade.

SPEAKER

Nitish Debnath, National Consultant, FAO ECTAD Bangladesh, Bangladesh

PANELISTS

- **Penelope Mavor**, Consultant, Impact International, Italy
- **Paul Williams**, Director, Agriculture, Food and Veterinary Programs, Georgia Office of Homeland Security, USA
- **Wilhelm von Trott**, Partner, Trott Consulting, Germany
- **Frans van Knapen**, Head of the Veterinary Public Health Division, Institute for Risk Assessment Sciences, Utrecht University, The Netherlands

MODERATOR

Katinka DE BALOGH

Senior Officer
Veterinary Public Health
Food and Agriculture
Organization of the UN
Italy

Debra OLSON

Professor
School of Public Health
University of Minnesota
USA



Katinka de Balogh is of Dutch and Hungarian origins and grew up in Latin-America. She studied veterinary medicine in Berlin and Munich and graduated and obtained her doctorate in tropical parasitology from the Tropical Institute of the University of Munich in 1984. Later she specialised in tropical animal production and health in France and in Veterinary Public Health (VPH) in the Netherlands. After a short career as a zoo veterinarian in the Rotterdam Zoo she moved to Africa where he worked for 9 years initially as a district veterinary officer in rural Zambia and later as lecturer at the veterinary faculties of Lusaka, Zambia and Maputo, Mozambique.

Thereafter she worked for 5 years at the Utrecht veterinary faculty in the Netherlands as lecturer and international project coordinator. In the late 80's she had spent two years as a young professional at the Veterinary Public Health Unit of the World Health Organization (WHO) in Geneva. In 2002, she started working at the Food and Agriculture Organization of the United Nations (FAO) in Rome, Italy in the Pro-poor Livestock Policy Facility (PPLPF) and after the start of the highly pathogenic avian influenza global outbreaks as coordinator for avian influenza projects and as response manager of the newly created Crisis Management Centre of FAO.

Presently she leads the global Veterinary Public Health activities of FAO where every day she uses at least 5 of her 7 languages.

KATINKA DE BALOGH

Senior Officer

*Veterinary Public Health
Food and Agriculture
Organization of the UN
Italy*



Received Doctor of Veterinary Medicine (DVM) degree from the Bangladesh Agricultural University in 1978, MSc in Tropical Vet. Medicine from the University of Edinburgh in 1983, PhD in the field of Animal Virology in 1992 from the University of Surrey and postdoctoral training in Japan in 1994. Joined the Department of Livestock Services, Bangladesh in 1979 and worked at different positions until 1986. From 1986, continued research in the field of Animal Virology and Epidemiology in Bangladesh Livestock Research Institute until November 1996. In November 1996, joined the newly established Chittagong Government Veterinary College (CGVC), Bangladesh and occupied the position of Principal and founder Vice Chancellor of Chittagong Veterinary and Animal Sciences University (CVASU). In November 2010, returned to the Department of Microbiology, CVASU in as Professor. As of August 2011, worked for the Food and Agriculture Organization (FAO) of the United Nations, Bangladesh as National Consultant.

Pioneered a One Health movement in Bangladesh in 2007 jointly with veterinarians, physicians and environmental scientists, and launched a new professional organization called One World One Health Bangladesh Initiative (One Health Bangladesh). He has been chairing One Health Bangladesh for the last five years and organized three international conferences at CVASU on One Health. Because of his leading role in research and educational networking and collaboration with RVC London, University of Copenhagen, Tamil Nadu Veterinary and Animal Sciences University, EcoHealth Alliance, CDC, Commonwealth Veterinary Association, DANIDA, DFID and British Council, CVASU has become one of the premier universities in South Asia. Interests lie in virology, one health, and veterinary public health teaching, research and development. Served as President of the Bangladesh Veterinary Council and now serving as President of Krishibid (Agricultural Graduates) Institute, Bangladesh (KIB). Also has been serving on the board of the International Association for Ecology and Health (IAEH) as one of the members since 2011.

NITISH DEBNATH

National Consultant

*FAO ECTAD Bangladesh
Bangladesh*



Penelope is an internationally experienced leadership coach and consultant. Penelope draws her expertise, experience and energy from working in sustainable development and leadership development in New Zealand, United Kingdom and Italy. For the last 19 years she has been helping individuals, teams and organizations from multiple industry sectors enhance their performance through coaching and facilitation.

She was Senior Programme Director with international leadership organization Common Purpose, and a consultant with Performance Consultancy Lane4 Management Group Ltd, in the United Kingdom. Since 2009 she has been in Rome as a freelancer under Quintessenza Consulting and has become an associate of Impact International.

Penelope's diverse consultancy experience has focused on leadership development and creating a high performance culture. As delivering on client and programme objectives is central to Penelope's approach, her consulting experience also includes programme evaluation and delivery of feedback from 360 questionnaires and other diagnostic offerings.

Her broad sector range experience includes the Professional Services, Financial Services, Information Technology, Engineering, Project Management, Energy, Manufacturing, Retail, Pharmaceutical, Life Sciences, Healthcare, Leisure, Government and Not-for-Profit organisations. Various clients include UN FAO, Ericsson, Oracle, Pfizer, Coca-Cola Enterprises, Centrica Energy, GE and UK NHS Trusts.

PENELOPE MAVOR

Consultant

*Impact International
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Interested in supporting her practice with academic rigour, she holds a Masters in Regional and Resource Planning (Sustainability) and an MBA in International Business (Italy), has published articles on mindfulness and intuition and blogs regularly on leadership and learning.



Debra Olson, is Professor and Associate Dean at the University of Minnesota School of Public Health and is responsible for developing strategic partnerships for the delivery of competency based learning opportunities for interdisciplinary health professional students and the public health practice community.

These programs increase the availability of public health education world wide through the application of innovative teaching techniques such as technology-enhanced learning. She has been instrumental in moving forward One Health at the university as well as internationally.

DEBRA OLSON

Professor

*School of Public Health
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USA*



Dr von Trott graduated as veterinarian from Munich University and specialised in tropical veterinary medicine.

After a short period in the Commission of European Communities in Brussels he joined Bayer Animal Health, Germany, where he held various positions in marketing and general management in headquarters, Africa, Latin America and Italy.

In 2001 he became the Head of Global Marketing of Boehringer Ingelheim Animal Health and member of the Management Team.

In 2009 he became a shareholder and Managing Director of Comp-Any and in 2010 he founded Convaero GmbH, Erding, Germany, a company which developed a process for Bio-Drying of waste for the generation of alternative fuels, where he was the MD until 2012.

Today he is a member of the shareholder's committee in various companies and a consultant to the animal health industry and international organisations.

WILHELM VON TROTT

Partner

*Trott Consulting
Germany*



Frans van Knapen started his career as a veterinary surgeon in 1973. After two years he obtained a position in the National Institute of Public Health Bilthoven, the Netherlands. He joined various laboratories in this Institute during more than 15 years (pathology, zoonoses, food hygiene). Eventually he got in charge of the laboratory of parasitology and mycology. His major field of research was in parasitic infections: trichinellosis and toxoplasmosis. In 1993 he was invited to a part-time professorship at the Faculty of Veterinary Medicine Utrecht in the field of epidemiology of parasitic infections. From 1995 onwards he obtained a full professorship and became head of the department of Food Science and Public Health.

His special fields of interest are today: food safety and exposure assessment of zoonoses. He is director of the IRAS - division VPH, Utrecht University. He advises/advised in numerous commissions on parasitology, veterinary public health, food safety, water hygiene, responsible pet-ownership, and risk assessment of man's direct environment related to pets, vermin and wildlife.

FRANS VAN KNAPEN

Head

*Veterinary Public Health
Division
Institute for Risk
Assessment Sciences
Utrecht University
The Netherlands*



Dr. Williams joined the Georgia Emergency Management Agency / Office of Homeland Security in 2000 and has since directed programs that include food, agriculture and veterinary medicine. In 2001 he received the Governor's Award for Contributions to Emergency Management and Public Safety.

Dr. Williams is a graduate of the University of Georgia with a Doctorate in Veterinary Medicine and has had extensive training in a wide variety of fields that include the Centers for Disease Control and Prevention, the Federal Emergency Management Agency/ Emergency Management Institute, the Department of Defense Civil / Military Institute, the Department of Energy, and the Department of Homeland Security / Center for Domestic Preparedness.

He has been fortunate to experience twenty years of private practice, worked as a researcher for the National Institutes of Health in the area of tropical parasitic disease, directed the laboratory for Advanced Trauma Life Support, directed Interagency Coordination for various capabilities for the 1996 Centennial Olympic Games, provided cross-sectorial coordination for the 2004 G 8 Summit in Food Defense and Mass Causality capability and in 2011 provided subject matter expertise to Tsunami / Earthquake planning for the US Virgin Islands.

Today he provides subject matter expertise to a variety of areas that have influenced the National Response Plan, National Response Framework and the National Infrastructure Protection Plan. His ground breaking work in measuring and quantifying effectiveness of cross-sector collaboration in the reduction of morbidities, mortalities and economic consequences in chemical, biological and radiological incidents has painted a picture of 21st Century Preparedness. Most recently he provided testimony before the United States Senate Committee on Homeland Security regarding the importance of being able to measure effectiveness of our capabilities in the reduction of consequences in chemical, biological, radiologic incidents as well as natural disasters.

PAUL WILLIAMS

Director

*Agriculture, Food and
Veterinary Programs
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ONE HEALTH MOVEMENT IN BANGLADESH:

Its Progression and Way Forward

Nitish C DEBNATH

Emergency Centre for Transboundary Diseases (ECTAD), FAO Bangladesh

INTRODUCTION

The concept of One Health is rapidly gaining recognition and acceptance, internationally, articulated through the official statements being made by governmental agencies and by a range of professional associations and international bodies, and expressed through a number of forums - colloquia, conferences etc. Increasingly, on a number of stages and in variety of ways, this thinking is becoming translated into research and developmental practice. One Health is based on the understanding that the health of humans, animals and of the environment is inextricably linked, and that promoting the wellbeing of all species can only be achieved through co-operation across sectors, professions, disciplines and national borders, and by promoting sustained collaboration between donor agencies and those organizations responsible for delivery. Fundamental to One Health thinking is that research and development should be implemented which is inter-disciplinary in nature; undertaken by health, veterinary and environmental professionals pooling their insights, knowledge and expertise. In addition, attention must be paid to enhancing the

quality of leadership and management to ensure goals are met.

A set of principles underpins the implementation of One Health practice. Although these are expressed somewhat differently from agency to agency, they are evolving in educational programme, joint outbreak investigation and surveillance and in intersectoral collaboration for combating diseases at human-animal-environmental interface. Although, the underpinning principles are widely accepted, how these translate into practice, in different contexts is still evolving. Since One health is being interpreted in different ways, and at different rates in different countries, this fluidity provides institutions and agencies with a unique opportunity to play a very significant role in shaping development in relation to education, research, collaborative development and communication in their own national context. Bangladesh having unprecedented population growth, intensive agricultural production, fragile ecosystems and hot spots for emerging diseases is considered to be an ideal place to benefit from one health concept.

BEGINNING OF ONE HEALTH MOVEMENT IN BANGLADESH

The outbreak of avian influenza in 2007 demonstrated the interdependencies of human, animal and environmental health and vulnerabilities of Bangladesh to the eyes of policy makers and related sectors. In order to combat HPAI in Bangladesh intersectoral collaboration was initiated and multisectoral task force was formed to take measures against the spread of avian influenza. While government initiative was underway to bring related sectors together to control avian influenza, informal discussion began at Chittagong Veterinary Animal Sciences University (CVASU) in 2007 to bring professionals including veterinarians, physicians and wildlife specialists to articulate one health approach for controlling emerging infectious diseases including HPAI H5N1, Nipah and other re-emerging diseases. Positive responses from professionals working in human, animal and environmental health sectors prompted to convene a meeting to promote one health concept among health professionals, scientists, policymakers and environmental activities. A leading role of CVASU, Institute of Epidemiology and Diseases Control Research (IEDCR), International Centre for Diarrheal Disease Research, Bangladesh (ICDDR,B) attracted other major agencies associated with animal health, human health and environmental health to be involved with the promotion of one health concept at working level. Professionals, scientists and social workers from nearly twelve government and nongovernment organizations decided to get together in a conference in Chittagong in March 2008 and made a Chittagong Declaration and formed a professional body, One Health Bangladesh, to promote and coordinate one activities.

ACTIVITIES OF ONE HEALTH BANGLADESH:

Advocacy and Communications

One Health Bangladesh provides a forum for discussing the idea of One Health and its relevance for Bangladesh. Over the last five years, a diverse group of professionals from across Bangladesh have participated in six conferences (three in Chittagong and three in Dhaka), that discussed scientific and policy issues, related to One Health. Several presentations at these conferences have explored zoonotic diseases that are moved from animal to human. In Bangladesh, recent outbreaks of avian influenza, Nipah virus, and anthrax have highlighted the linkage between animal health and human health and provided useful specific local examples to discuss better ways for diverse professionals and groups to work together. Bangladesh hosted a regional one health forum which convened representatives from human health and animal health from several neighboring countries to discuss sound approaches to shared concerns. In addition, One Health Bangladesh has been regularly organizing seminars, and consultations and sharing experiences on cross-cutting issues. Through these activities a general consensus developed that One Health Approach would particularly be relevant to Bangladesh. Bangladesh has the highest population density of any country in the world that is not a small city state. Even with this highest density of population, the great majority of food consumed in Bangladesh is grown within the country, grown often treated inappropriately with pesticides and increasingly contaminated with industrial wastes. Shallow tube wells are most common source of drinking water in Bangladesh but half of all tube wells have levels

of arsenic that exceed the WHO standard for safe drinking water and 40% of drinking water samples collected from tube wells are contaminated with bacteria. Above all, the Bangladeshi population has exceptionally close contact with domestic animals. Sixty-one percent of rural households raise poultry and over half of those keep poultry inside their home. These issues have discussed in a one health context and communicated to a wider audience

Joint outbreak Investigation

Over the last several years Bangladesh has been experiencing outbreaks of several emerging infectious diseases including HPAI H5N1, Nipahm Influenza A H1N1 and remarkable increase of both cattle and human anthrax cases. In these cases, diverse professional groups including veterinarians, public health experts and anthropologists are jointly undertaking outbreak investigation and sharing both field and laboratory data between sectors, professions and disciplines. Those practices have laid the foundation of creating Bangladesh Laboratory Response Network (BLRN) to promote sharing laboratory data between animal health and human health. This initiative is also accelerating the 4-way linking approach between laboratory and epidemiology units in both human and animal health sectors in Bangladesh. One Health approach in both laboratory practices and epidemiological studies is thus now visible in Bangladesh.

One Health approach for rabies control programme.

Over the last two years or so both human and animal health agencies of the government in collaboration with local governments and NGOs are undertaking Rabies control programme in Bangladesh through mass vaccination in dog population and dog bite management. A rabies

control strategy document has been prepared and has set a goal of eliminating rabies from Bangladesh by 2021. Mass dog vaccination programme has in the meantime covered more than 60% of the municipality areas. A dog population management programme through sterilization and mass vaccination, building mass awareness and social mobilization is also being implemented in Dhaka city jointly by human and animal health agencies, FAO and NGO. Joint training programme on laboratory diagnosis of rabies has been implemented and a joint surveillance programme is now underway of implementation. It has been envisaged that a One Health approach in rabies control programme in Bangladesh will enable to achieve the goal of eliminating rabies from Bangladesh in 2021.

One Health Capacity Building

In order to achieve the goal of capacity building in One Health, an Introductory Training course on One Health has recently been implemented in Bangladesh with the initiative of ECTAD FAO Bangladesh. Participants received intensive hands-on training in 'One Health' issues with a specific focus on zoonotic diseases and issues relating to Bangladesh. There were 30 young professional participants from the Department of Livestock Services, Department of Health, and Forestry Department as well as colleagues from NGOs, Universities, and Research Institutes working at the human-animal-environment interface. The course included a combination of lectures (20), problem based learning activities (5), group presentations (5), and field site visits (9). Topics of the training included, but were not limited to ecosystems of Bangladesh and the importance of ecological

services in protecting human and animal health, anthropogenic & environmental drivers of disease emergence in wildlife, livestock and humans, risk communication and management of politics at the interface, and farming intensification and expansion in Bangladesh with implications for wetland and forest ecosystems. Specific diseases of importance addressed by the training included rabies, Ebola, H5N1 HPAI, Leptospirosis, Henipah Viruses, anthrax, and food safety or food borne illnesses. In addition, CVASU authority has recently taken decision to establish a One Health Institute to promote training, research and academic programme in Bangladesh. Furthermore, CDC , USA jointly with the Directorate General of Health , Bangladesh is going to implement Field Epidemiology Training Programme in the beginning of 2013. This initiative will contribute to capacity building both in human and animal health sectors.

Developing Strategic Framework for a One Health Approach to Emerging, Re-emerging and High Impact Infectious Diseases in Bangladesh

Aforementioned activities culminated in a request by One Health Bangladesh to the UN Agencies and Government of Bangladesh for support to develop a strategic framework for the application of the One Health Approach in Bangladesh. In this process, three ministries of the Government of Bangladesh (Ministry of Health and Family Welfare, Ministry of Fisheries of Livestock and Ministry of Forestry and Environment) through three major agencies such as Directorate General of Health, Department of Livestock Services and Forestry Department and UN agencies such as FAO, WHO and UNICEF made a joint approach to take One Health approach forward. As a result FAO and UNICEF offered material support to the conduct of

a workshop ‘Envisioning One Health for Emerging Infectious Diseases and Beyond’ that led to the formulation of a strategic framework for an One Health approach to Infectious Diseases in Bangladesh in January 2012 followed by a validation workshop in September 2012

This strategic framework provides the platform for initiatives that are possible under a One Health Approach to prevent and control emerging, re-emerging and high impact infectious diseases that have an interaction with the human-animal-environment interface in Bangladesh. It does not prescribe what diseases should be included, but outlines the mechanism whereby diseases will be prioritised for action. It was agreed that for success and sustainability the One Health Approach in Bangladesh needed the following attributes –

- An overarching vision of improving health outcomes for the people, animals and environment of Bangladesh
- Recognition of the interplay between factors related to people, animals and the environment in determining disease outcomes
- Application of a multi-disciplinary prediction, prevention and response focus on disease
- Promotion of multi-sectoral collaboration and communication to engage partners and stakeholders, including communities
- Emphasis on equitable partnerships and recognition of the individuals, institutions and civil societies engaged
- Focus on the importance of establishing the necessary institutional mechanisms to effectively deliver the outputs

- Incorporation of processes to correct capacity deficits for collaborating partners
- Recognition that achieving success depends on long term engagement and commitment
- A framework that is adaptive and responsive to change

In line with these attributes the strategy for the One Health Approach in Bangladesh has the overall vision that: ***The consequences of emerging, re-emerging and high impact infectious diseases are minimized through institutionalizing the One Health Approach, so contributing to food security, food safety and a healthy population in thriving ecosystems***

The strategic framework has 3 key goals to support achievement of the vision

1. Establishment of the necessary institutional arrangements to enable effective collaboration between sectors involved
2. Development of necessary capacity and technical procedures to prevent and control targeted emerging, infectious diseases
3. Application of sound environmental principles when ecosystems with potential disease/health interfaces with humans and animals are involved in control strategies

To achieve these goals the framework has following 9 interlinked components to organise and manage a comprehensive implementation of the One Health Approach

- Institutional Governance and programme management
- Coordinated surveillance
- Coordinated outbreak preparedness, prevention and response

- Applied research
- Networks and partnerships
- Capacity building
- Strategic communication and advocacy
- Social and economic aspects of disease
- Wildlife and ecology

CONCLUSION

The Government of Bangladesh exerts major influence by setting policy that affects activities across the environment, agriculture and human health. For Bangladesh to benefit from One Health approach, the approach needs some degree of institutionalization within the government. Collaborative investigations and response to disease outbreaks is government function that would be a particularly effective area to develop multisectoral collaboration. Similarly, dealing with pathogens at human-animal-environmental interface will need multidisciplinary as well as multi-ministerial approach. Social scientific research has demonstrated that diverse groups of professionals are more effective in solving difficult problems compared with even very capable professionals from a single discipline. By working together on health issues, diverse professionals and diverse ministries will be more effective in understanding the underlying cause and identifying appropriate steps for prevention. Additionally, by working together, professionals will begin to develop personal and professional linkages making future collaboration. Implementation of Strategic framework for One Health Approach to Infectious Diseases could be a step forward to cross ministerial and cross professional collaboration, and so to institutionalization of a One Health approach to Bangladesh.

2.5

INNOVATIONS ADVANCING

Health Surveillance at the Human-Animal Interface

BACKGROUND

Understanding the connections among people, domestic animals and wildlife will help to improve the forecasting of disease outbreaks and facilitate surveillance and response. By exploring the methodological and technological innovations in the presented cases, planners of national and regional surveillance programs or networks can benefit from lessons learned and evaluate applications that may dramatically advance disease recognition and control.

OBJECTIVES

Provide a thorough exploration of innovations in cross-sectoral surveillance tools through case presentations and panel discussion. Offer policy makers examples of effective on-the-ground applications of cross-sectoral surveillance that may be considered for inclusion in national and international systems to advance disease recognition and control. Topics include: advances in field simulation exercises, practicalities of One Health integrated disease investigations, advantages of sentinel surveillance, innovations in diagnostics for undiagnosed diseases, application of mobile technologies in participatory disease surveillance, and integration of information systems and mathematical modeling to control expansion of disease.

MODERATOR

Charlanne BURKE

Senior Associate

*The Rockefeller Foundation
USA*

SPEAKERS

- *Advances in field simulation exercises: Highly Pathogenic Avian Influenza control (simulated) between Kenya and Uganda*
Maurice Ope, Medical Epidemiologist, East African Community (East Africa Integrated Disease Surveillance Network-EAIDSNet), Tanzania
- *Joint Livestock, Wildlife and Public Health Investigation of Q fever in Chiang Mai*,
Teerasak Chuxnum, Veterinarian, Bureau of Epidemiology, Thailand
- *Role of sentinel surveillance in the detection of emerging infectious diseases at the human-animal interface, Nigeria*
Clement Meseko, Principal Veterinary Research Officer, National Veterinary Research Institute, Nigeria
- *Using a Conventional Strategy to Develop a New Paradigm for Novel Virus Detection and Building Capacity to Implement Globally*
Tracey Goldstein, Research Faculty, UC Davis School of Veterinary Medicine One Health Institute, USA
- *Short Messaging Service based Diseases Surveillance System – Part of Integrated Disease Surveillance Project in Andhra Pradesh, India*
Vivek Singh, Public Health Specialist, Public Health Foundation of Indian (PHFI), Indian Institute of Public Health (IIPH), India
- *Progress on a One Border One Health binational, multi-sectoral, collaborative system for simulating the spread of pathogens at the USA – Mexico frontier*
Rafael Villa-Angulo, Professor, University of Baja California, Mexico



Charlanne Burke joined the Rockefeller Foundation in 1991. As a Senior Associate, she assists in developing strategic direction and providing administrative oversight for select Foundation initiatives. She is currently working on initiatives devoted to strengthening disease surveillance networks in southeast Asia and Africa, and improving the lives of workers in America.

Prior to joining the Rockefeller Foundation, Dr. Burke served in the Peace Corps in Lesotho, southern Africa. She also has worked as an adjunct assistant professor of anthropology in the City University of New York (CUNY) system.

Dr. Burke received a bachelor's degree from the University of California, San Diego, a master's degree in education from Teachers College, and a Ph.D. from Columbia University.

CHARLANNE BURKE

Senior Associate

*The Rockefeller
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Teerasak Chuxnum earned his Doctor of Veterinary Medicine degree from Chulalongkorn University in 1999. He received his Master of Arts degree in Library and Information Science in 2003 from the Khon Kaen University. According to work in Ministry of Public Health, he graduated the bachelor program in Public Health from Sukhothai Thammathirat Open University in 2007.

Dr. Chuxnum has been the Veterinarian at Bureau of Epidemiology, Ministry of Public Health, Thailand since 2002. His interest is basically in Zoonotic diseases as Rabies, Brucellosis, Avian Influenza, Leptospirosis, Trichinosis, Anthrax, Streptococcus Suis infection and Q fever. His research is focusing in Disease Surveillance System and Investigation.

His current position is the head of International Cooperation Center in Epidemiology. His duties are in International Health Regulations and International Cooperation and other Bilateral/Multilateral Epidemiology Cooperation.

TEERASAK CHUXNUM

Veterinarian

*Bureau of Epidemiology
Thailand*



Tracey Goldstein, PhD, is Research Faculty at the University of California Davis where she developed and oversees the One Health Institute Laboratory and the Marine Ecosystem Health Diagnostic and Surveillance Laboratory. She is also the Laboratory and Surveillance Capacity Coordinator for the new viral emergence early warning project, named PREDICT, developed with the US Agency for International Development's Emerging Pandemic Threats (EPT) Program. Her background is in Wildlife Molecular Epidemiology and in developing disease diagnostics to detect novel pathogens in wildlife. She focuses on solving global health problems using research, training, and capacity building. She provides service to government agencies and the public faced with emerging infectious disease challenges, including U.S. Agency for International Development, U.S. Fish and Wildlife Service, U.S. Geological Survey, National Oceanic and Atmospheric Administration, California Department of Fish and Game, National Marine Fisheries Service, and the U.S. Marine Mammal Commission.

Dr. Goldstein founded the Marine Ecosystem Health Diagnostic and Surveillance Laboratory, with the goal to provide timely, accurate diagnostic services to assess health and the impact of disease on marine wildlife and to identify the role of various pathogens in contributing to wildlife losses. Working with the academic and scientific community she performs high quality marine and terrestrial wildlife research, and partners with state, federal, profit and not for profit organizations to accomplish this goal; working to disseminate information to promote science-based decisions affecting living resources and their habitat. As a co-investigator of PREDICT projects she leads the effort to build laboratory testing capacity within the participating countries collaborating laboratories to perform diagnostic testing for priority viral families.

TRACEY GOLDSTEIN

Research Faculty

*UC Davis School of
Veterinary Medicine
One Health Institute
USA*



Dr Clement Adebajo Meseko is a senior researcher at the Nigerian National Veterinary Research Institute (NVRI) in Vom. A recipient of NIH travel fellowship, he recently conducted advance molecular virology research on pandemic influenza virus at Istituto Zooprofilattico Sperimentale delle Venezie, Padova - Italy under the RSM World Bank Institute's fellowship and undertaken courses in serology with the immunology and pathogenesis branch/Influenza Division at the Center for Disease Control (CDC) Atlanta Georgia, USA.

He started his career in 1998 in the Technical Department of Animal Health industries- Pfizer PLC in Lagos - Nigeria where he later became a Field Technical Representative for 5 years. Currently, with over 15 years experience in infectious disease investigation, Dr Meseko acquired dual expertise in human and animal health intervention. In 2006, he prepared a research thesis in virology on the isolation of influenza virus from patients presenting influenza-like illness at the University College Hospital in Ibadan - Nigeria. He was later extensively involved in the diagnosis and control of the first introduction of highly pathogenic avian influenza (HPAI) to Africa leading to effective control of the outbreak in Nigeria in 2008. He received EU sponsored trainings at Veterinary Institute, Oldenburg, Germany, FAO funded training at NAMRU-3 Cairo Egypt and several in-country training courses in biosafety, disease surveillance, research methodology and advance diagnostic techniques. He has served in various technical capacities with the Federal Livestock Department, IFPRI, CIRAD, FAO, World Bank sponsored projects and participated at the WHO expert consultation on influenza at Geneva, Switzerland.

CLEMENT MESEKO

Principal Veterinary
Research Officer

*National Veterinary
Research Institute
Nigeria*

Dr Meseko's research interest spans many infectious viral diseases at the human-animal interface. He is presently focused on influenza virus and has published some articles, presentations and reports in national and international journals. A member of Wildlife Disease Association (WDA) and International Society for Influenza and other Respiratory virus diseases (ISIRV), Dr Meseko is a family man and a passionate adventurer who loves mountain climbing.



Dr Maurice Ope is a medical doctor trained in Kenya with postgraduate specialization in Public Health and Epidemiology at Universite Libre de Bruxelles in Belgium and Jomo Kenyatta University of Agriculture and Technology (JKUAT) in Kenya respectively. He is also pursuing a PhD in epidemiology at JKUAT. Dr Ope is currently the medical epidemiologist at the East African Community Secretariat in Arusha, Tanzania.

He is currently involved in prevention and control of communicable and non-communicable diseases at the regional level in all the five East African Countries of Burundi, Kenya, Rwanda, United Republic of Tanzania, and Uganda. These include among others disease prevention and control in the cross-border regions; harmonization of surveillance protocols; disease prevention and control guidelines; evaluation of outbreak preparedness; disease outbreak investigation and response; designing and evaluating surveillance systems and strengthening of laboratory capacity in East Africa.

Dr Ope's recent publications include "Regional initiatives in support of surveillance in East Africa: The EAIDSNet Experience" in Emerging Health Threats of 2012, and "Risk factors for hospitalized seasonal influenza in rural western Kenya" in PLoS ONE of 2011. He has also co-authored recent publications including among others "The population-based burden of influenza-associated hospitalization in rural Western Kenya" in the Bulletin of the World Health Organization of 2012, "What are the most sensitive and specific sign and symptom combinations for influenza in patients hospitalized with acute respiratory illness? Results from Western Kenya, January 2007-July 2010" in Epidemiol. Infect. of 2012, "The global burden of respiratory infections due to seasonal influenza in young children: a systematic review and meta analysis" in the Lancet of 2011 and "High mortality in a cholera outbreak in western Kenya after post-election violence in 2008" in the American Journal of Tropical Medicine and Hygiene of 2009. Dr Ope has also written a book chapter on "Implementation of Biological Weapons Convention in Kenya" in the book Implementation of the Biological Weapons Convention: The 2007-2010 intercessional Process of 2011.

MAURICE OPE

Medical Epidemiologist

*East African Community
(East Africa Integrated
Disease Surveillance
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Tanzania*



VIVEK SINGH

Public Health Specialist
*Public Health Foundation
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India*

Areas of Interest: Public Health Surveillance, Communicable Disease Epidemiology, Field Epidemiology, Information Technology for Strengthening of Health Systems, Public Health Administration & Program Management

Dr. Singh is Assistant Professor at the Indian Institute of Public Health (IIPH) – Hyderabad. He is a graduate of Government Medical College in Nagpur, MH, India and Emory University in Atlanta, GA, USA. He is currently pursuing a fellowship from

the Wellcome Trust on Disease Surveillance. He began his public health career as a medical officer in-charge of a Primary Health Center in a tribal region in Maharashtra. He then worked with the National Polio Surveillance Program of World Health Organization (WHO), providing leadership and technical support to the healthcare system at multi-district level in the states of Bihar and Maharashtra.

At IIPH, he coordinated the first two batches of Post Graduate Diploma in Biostatistics and Data Management (PGDBDM) program. He conducts and coordinates courses on applied epidemiology, public health surveillance, public health emergency preparedness and public health program management. He is involved in developing content and coordinating state and national level trainings of epidemiologists, surveillance officers and district and state public health managers under various national health programs. He also provides technical support to the Andhra Pradesh state government on disease control, surveillance and response programs. He is a member of the Immunization Technical Support Unit (ITSU) for the Ministry of Health, Government of India. ITSU has been constituted by the ministry of health in the year 2012 to guide the strengthening of routine immunization program in the country. He has been a member of the national Common Review Mission of the National Rural Health Mission (NRHM).

He has experience in providing leadership and technical support to the disease surveillance and vaccine preventable diseases elimination programs at the Ministry of Health in Kenya; he worked as a consultant with Center for Disease Control and Prevention (CDC), Atlanta's 'STOP' program and WHO country office in Kenya.

He has provided consultancy as public health systems domain expert to some high impact Information, Communication and Technology (ICT) projects in the domain of health information systems, public health surveillance and maternal & child health.

He is an active member of the International Society for Disease Surveillance (ISDS) and he represents the Global Outreach Committee and Global Health Informatics Group of the ISDS as a member. Dr. Singh is an associate edit of following journals, Springer Journal – Earth Perspectives, Internet Journal of Epidemiology and Indian Emergency Journal.



Dr. Rafael Villa-Angulo, chief of the Laboratory of Bioinformatics, University of Baja California. Co-chair of the Informatics workgroup, USA-Mexico One Border One Health Consortium.

Dr. Villa earned his undergraduate degree in electrical engineering at the University of Baja California. He was awarded Master in Computer Science from the Center of Scientific Research and Higher Education of Ensenada, and he obtained his Phd in Bioinformatics from George Mason University. He has been a research scientist at the Engineering Institute of the University of Baja California since 2002. From his more relevant work: he participated in the International Bovine HapMap Consortium, characterizing the genetic structure of the Bos Taurus and Bos Indicus evolutions of Cattle, and generating a Haplotype Map of the Cattle Genome. The results of his research have been published in major journals as Science and BMC Genetics. In 2009 he receives the award "Outstanding Research in Bioinformatics" given by the College of Science of the George Mason University. Nowadays, Dr. Villa is collaborating with the Functional Genomics Laboratory of the USDA in Maryland, developing computational algorithms for the analysis of information of the Last Generation DNA Sequencers, and the analysis of High Density Genotype data from the Bovine Genome. He is the responsible researcher of the "Iniciativa Mexico 2010" for the implementation of Genomic Selection in Dairy Cattle from The State of Baja California. And he is coordinating the work for the creation of the first Mexican Bioinformatics Resource Center for Biodefense.

In 2011 Dr. Villa joined to the USA-Mexico One Border One Health consortium, as co-chair of the informatics workgroup. This consortium is working in the design and implementation of the first operational prototype for disease surveillance and response using One Health paradigms in the U.S./Mexico border. Dr. Villa and collaborators are developing a web-based Hybrid Geographic Information System which uses mathematical models to simulate how pathogens could spread in the border region and permits to visualize contingencies for different scenarios including information from past events such as pandemic H1N1 and other emerging and reemerging pathogens affecting surrounding areas of the USA-Mexico frontier.

RAFAEL VILLA-ANGULO

Professor

*University of Baja California
Mexico*

ADVANCES IN FIELD SIMULATION EXERCISES:

Highly Pathogenic Avian Influenza Control
(Simulated between Kenya and Uganda)

Maurice OPE

East African Community

(East African Integrated Disease Surveillance Network-EAIDSNet), Tanzania

Here we describe the experience of a simulation exercise conducted in 2010 to test the Kenyan and Ugandan national highly pathogenic avian influenza (HPAI) preparedness and response plans. The simulation exercise demonstrated EAIDSNet's role in facilitating multi-country joint testing of both national and regional preparedness plans for pandemic influenza; and highlighted areas for improvement.

First detected in Hong Kong in 1997, highly pathogenic avian influenza (HPAI) has been detected in over 22 countries. Approximately 566 cases and 332 deaths have been reported in 15 countries. In addition to its high case fatality rate (60 percent), HPAI has been associated with a high economic burden amounting to an estimated loss of USD 20 billion primarily due to the culling of several millions of birds. While international efforts have led to widespread control of HPAI, the disease persists in several countries, including Egypt and Indonesia, and continues to pose a threat to animal and human health. Although the East African Community (EAC) has not experienced any documented cases of HPAI, the region is vulnerable because of its location in the migratory pathway of birds, its shared borders with high-risk countries,

and continued importation of poultry products that may carry the virus.

EAIDSNet conducted one of the first field simulation exercises (FSXs) designed to test the effectiveness and efficiency of EAC partner state national HPAI preparedness and response plans. The focus of the exercise was on Kenya and Uganda. The FSX was conducted in Busia, a metropolitan border town between Kenya and Uganda. Busia lies within the migratory pathway of birds, has a thriving informal cross-border live bird market, and is home to many poultry farms. The exercise involved assessing the investigation and response of both countries to an imaginary scenario of a zoonotic public health emergency. Specific objectives of the FSX were to determine whether procedures were realistic and understood by all stakeholders; to reveal weaknesses and gaps; and to clarify roles and responsibilities of all key stakeholders.

The scenario for the simulation exercise was developed by experts from Food and Agriculture organization with the participation of EAIDSNet and it involved a report of bird mortality in a fish farm, followed a few days later by reports of significant mortality in a nearby backyard poultry

farm and in a nearby commercial poultry farm. Meanwhile, the backyard poultry farmer had sold some of his chickens in a live bird market in Kenya. Subsequently there was a massive death of caged poultry in the bird market. Two traders from the market complained of fever, cough and sore throat and were treated at a private clinic. A few days later, the traders developed severe chest complications. The district veterinary officer was made aware of the two traders during his routine inspection of the market, after which he informed the clinician in charge of the local health center about the situation and referred the two traders to the health center. An evaluation criterion to determine the success of each operation was developed prior to the simulation exercise.

Several teams composed of staff of various disciplines, from both countries were formed to respond to the situation: veterinary, public health, communication, and security and biosecurity. Each team had specific roles and responsibilities to carry out. The veterinary team conducted investigations among both domestic and wild birds; identified and isolated infected areas; collected fecal, oral and blood samples from suspected birds; and confirmed HPAI at the central laboratory. They subsequently arranged for quarantine of birds at the live bird market, safe and timely disposal of carcasses, installation of footbath devices, provision of personal protective equipment, and disinfection of cages and affected areas.

The public health team conducted investigations and clinical assessments; transported suspected human cases to a designated health facility; set up an appropriate isolation unit and isolated patients; took samples for testing; and disinfected

the ambulance. The communication team was responsible for producing and distributing paper and media communication; preparing and installing notice boards at crossing points; and creating public awareness through fliers, posters, and drama. Finally, the security and biosecurity teams were responsible for controlling traffic at the border and checking to see whether poultry products were being carried on board; closing some routes to the informal live bird market in order to enable thorough inspection of the vehicles; installing car footbaths; and disinfecting vehicles.

The FSX proved to be an effective method of testing regional preparedness and response. It demonstrated that control of border trade is possible in the event of an outbreak; that the synergistic roles of the different teams can be realized if the teams are composed of human and animal experts from both sides of the border; and that it is possible to increase public awareness of the risk of emergence and spread of HPAI and of the identification of areas where appropriate responses are required.

However, the exercise also revealed some weaknesses: overall poor coordination of the response activities, inadequate biosecurity measures, poor communication, and minimal involvement of medical workers in response to the HPAI outbreak. To address these weaknesses, EAIDNet recommended that each district set up permanent multi-sectoral rapid response teams; communication materials be translated into local languages that can be understood by illiterate communities; and instructions for roadblock operations be included in the preparedness and response plans.

PROGRESS ON A ONE BORDER ONE HEALTH BINATIONAL, MULTI-SECTORAL, COLLABORATIVE SYSTEM

for Simulating the Spread of Pathogens at the USA – Mexico frontier

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Abstract

One Border One Health (OBOH) is a binational, multisectoral initiative to build more resilient and healthy border communities by creating sustainable solutions to health risks at the human – animal – environmental interface along the California/ Mexico border. The coalition consists of over 50 institutions – >30 from the USA and >20 from Mexico – from government, military, public, private and academic sectors. Created in 2011 OBOH has organized into three committees - Surveillance, Informatics, and Training & Outreach – that are cooperating to design and implement the first operational prototype for disease surveillance and response using One Health paradigms. In this background paper, we present the progress in the development of a bioinformatics collaborative system for administering and doing research on multi-sectoral-relational databases to be fed and shared by the coalition. This web-based Hybrid Geographic Information System uses mathematical models to simulate how pathogens could spread in the border region and will assist in the design of binational strategies for controlling the spread of infection. The model input includes environmental, ecological, biological, socioeconomic, and

demographic factors and is validated by data from historical disease outbreaks in the region. This is the first model of its kind to be used at the U.S./Mexico border. It models an area with large disparities between health systems, cultures, languages, socioeconomics, politics, animal management strategies, industries and ecosystems. The versatility of the system will permit us to visualize contingencies for different scenarios including information from past events such as pandemic H1N1 and other emerging and reemerging pathogens affecting surrounding areas of the USA – Mexico frontier.

Background

Mexico and USA are two countries with large disparities: both have evolved within a very different culture, language and kind of government. However, both have evolved sharing the same problems in their frontier. The risk of emerging and reemerging pathogens affecting population in both sides of the frontier is latent. While the Mexican population is vaccinated at early age for some pathogens (e.g. Tuberculosis), the USA population is vaccinated for others (e.g. Diphtheria). However,

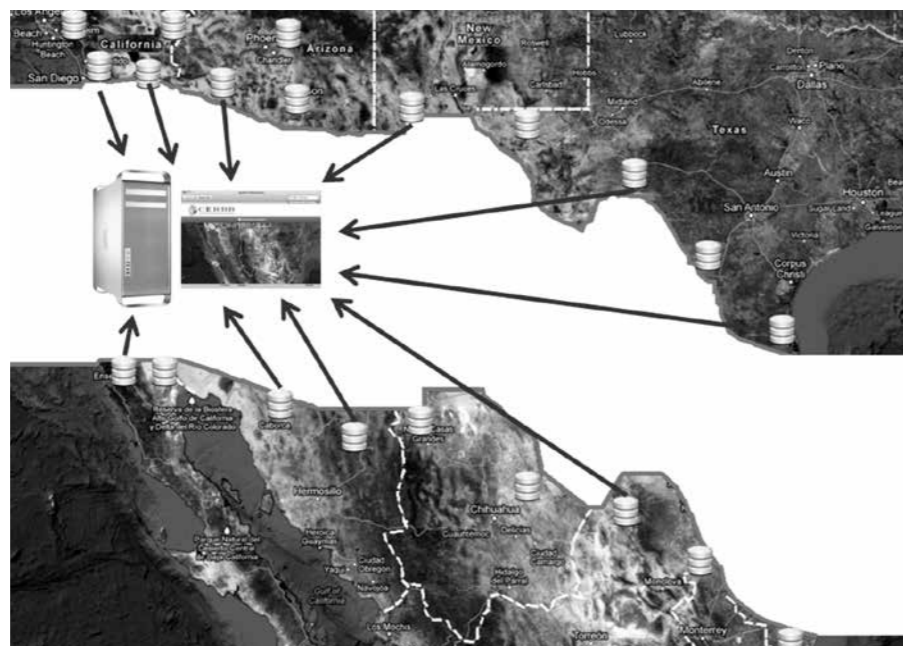


Figure 1. A Web-based Geographic Information System Server will administer connectivity of databases from ten states along the Mexico-USA frontier.

both populations are in jeopardy for different pathogens, in addition to those against which none of the population is protected. In recent years, emerging and reemerging infections have proliferated due to yet undiscovered reasons. In 2009 the H1N1 pandemic outbreak and an eruption of Rickettsia caused infection and deaths of many people in both sides of the Mexico-USA frontier [1-3]. These events uncovered our vulnerability in biodefense aspects, and helped us to establish as maximum priority to do research for designing operations to increment national security. OBOH is an initiative of collaboration for protecting, through surveillance, the surrounding areas of the Mexico-USA border line, adopting a One Health paradigm [4]. OBOH joins more than 50 institutions from both countries and is organized by three committees- surveillance, informatics, and training -that are cooperating to design and implement the first operational prototype

for disease surveillance and response using One Health paradigm. This prototype input includes environmental, ecological, biological, socioeconomic, and demographic factors and is designed to be validated by data from historical disease outbreaks in the region. This is the first model of its kind to be used at the U.S./Mexico border. It models an area with large disparities between health systems, cultures, languages, socioeconomics, politics, animal management strategies, industries and ecosystems. In the following sections we present a description of the system.

General concept

The system is being designed for hosting a set of relational multisectoral databases distributed all along both sides of the Mexico-USA frontier.

These databases belong to the members of OBOH. A Web-based Geographic Information System Server (WGISS) will administer connectivity for information access and sharing. The collaborative participation of members is achieved through targeted designation of specific information regarding the sector. The Web server for example, which is administered by academics, permits all members, though a personalized password, to access accounts for feeding, uploading, and running simulation of pathogens of interest. This web-based GIS uses mathematical models to simulate how pathogens could spread in the border region for controlling the spread of infection.

The system will allow access from the general public with restricted capabilities and is designed to offer, besides the capabilities for OBOH members, a platform for notification and overcome the general confusion of who to contact regarding unusual infectious diseases in humans, companion animals (pets) and livestock animals. The first prototype is being implemented in two states (California from USA and Baja California from Mexico), but, as shown in figure 1, the main goal is to interconnect databases from four USA frontier states- California, Arizona, New Mexico, and Texas – and six Mexico-frontier states - Baja California, Sonora, Chihuahua, Coahuila, Nuevo Leon, and Tamaulipas.

Simulation platform

The simulation platform input includes environmental, ecological, biological, socioeconomic, and demographic variables and is validated by data from historical disease outbreaks in the region. The state health departments from

both countries are allowed to upload information of public health and clinical status. Information regarding socioeconomic, geographic, and demographic is provided by government dependencies of statistics and geography. Transportation information is provided by urban planning and transportation departments, and pathogens information is provided by health and vector departments. Each member of the consortium will have access to the system under a password and is able to upload information for running specific simulations restricting access to her/his results as a convenience. Academic institutions do research in the data, generate epidemic models and update information needed to run simulations.

Figure 2 shows the simulation platform. Information is fed by members and the system administrator. Given the pathogen of interest, an epidemic model is selected for computing infected, susceptible, recovered, deaths, and immune people, through time. An interaction network model in conjunction with demographic information is used to estimate the affected area. As part of the Web-based GIS system, a projection will be done in Google maps for selecting the city and the number of initial cases, along with the projection of the affected area.

Overall strategy

In its current version, the system is executed on the web-based GIS, integrating tools from Google maps V3, different layers of information provided by the Mexican Institute of Geography and Statistics (INEGI) [5], and three different epidemic models capable of implementing

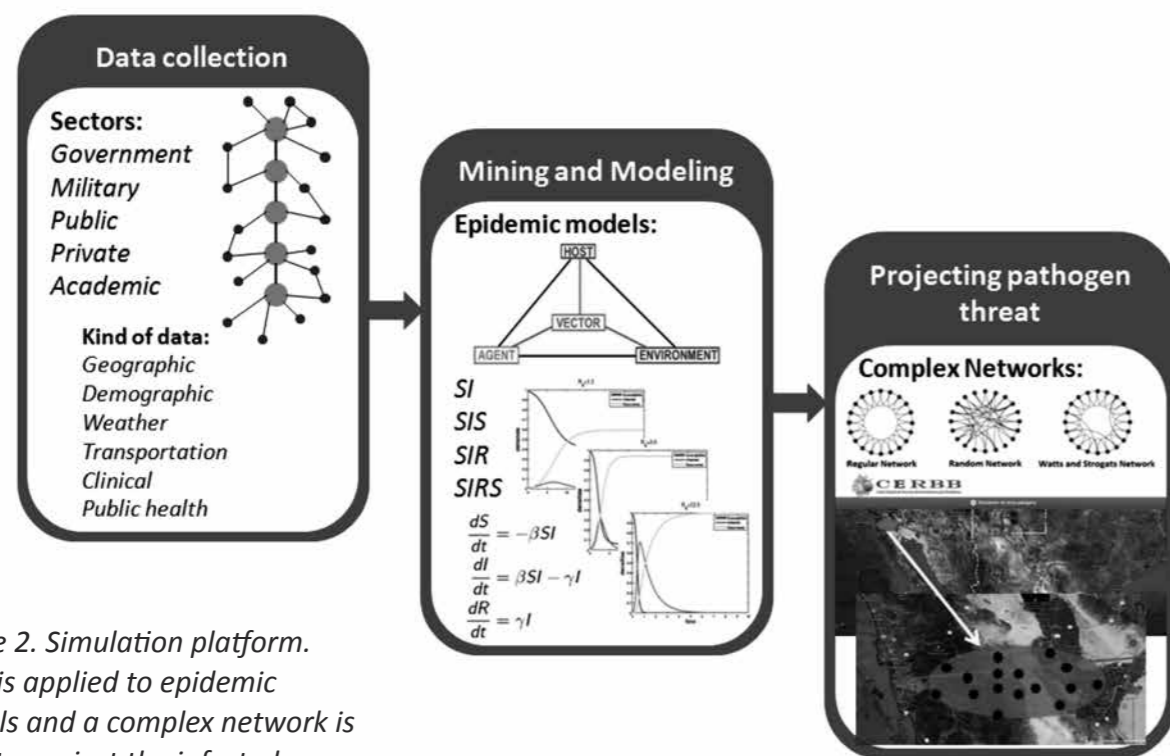


Figure 2. Simulation platform. Data is applied to epidemic models and a complex network is used to project the infected area.

vector-borne diseases. It can simulate the spread of pathogens all across the state of Baja California, Mexico. It is in process the inclusion of the state of California, USA. After this first stage is running and being used by the consortium, the next step is to gradually include the rest of states. As shown in Figure 3, a simulation starts with the selection of the place in which the infection would be simulated, along with the kind of Google maps image, and initial conditions of the place. Then, the pathogen is selected from a list which includes H1N1, Rickettsia, and Dengue. After this, the simulation is executed and the epidemic models along with an interaction network provides the number of people infected, recovered, and susceptible, and how they are distributed in the region around the initial infection.

Preliminary conclusion

This is the first model of its kind to be used at the U.S./Mexico border. The versatility of the system will permit us to visualize contingencies for different scenarios including information from past events such as pandemic H1N1 and other emerging and reemerging pathogens affecting surrounding areas of the USA – Mexico frontier. Integration of web-based tools, information systems and mathematical modeling helps to reconcile disparities between health systems, cultures, languages, socioeconomics, politics, animal management strategies and ecosystems, and design strategies for controlling the spread of infection in surrounding areas of the USA-Mexico frontier.

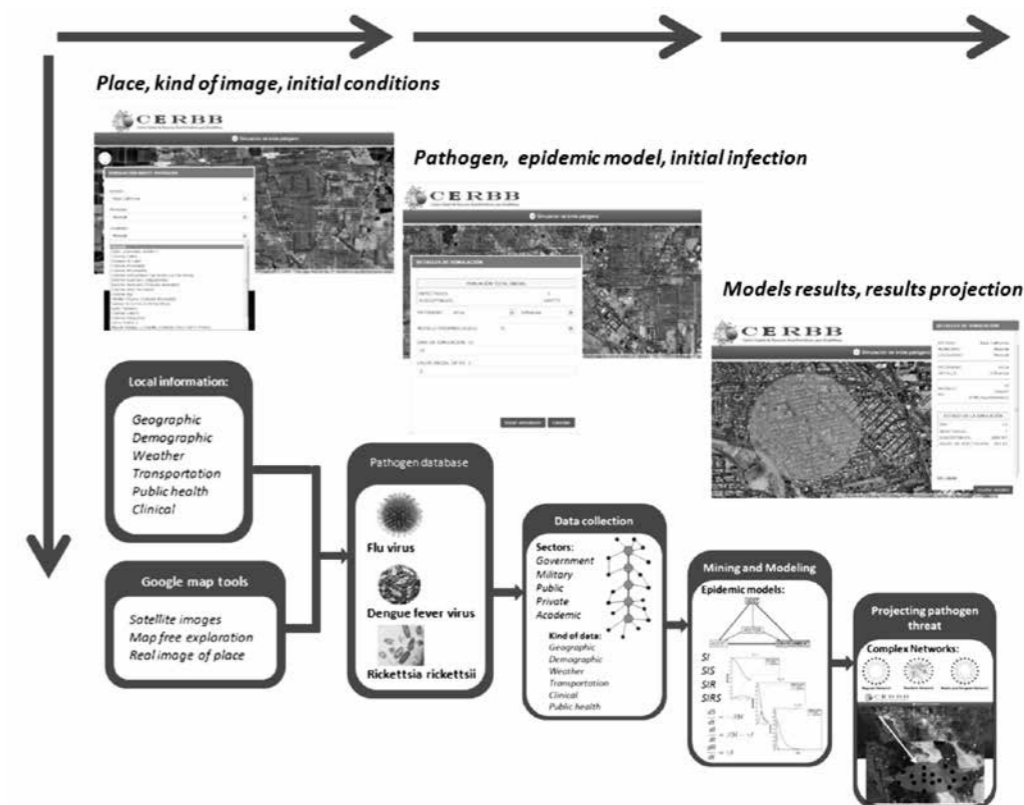


Figure 3. A Web-based GIS integrates all resources necessary for executing complete simulations, and provide a projection for results in a Google map based form.

One Health strategies for combating zoonoses effectively requires interdisciplinary collaborative models for prevention and control of infectious disease epidemics, as well as chronic illnesses. Physicians, veterinarians, ecologists, environmental scientists, laboratory animal specialists, and other health science-related disciplines are getting involved in this work, equally without regard to “turf” barriers. We aim to accelerate the rate of change in surveillance, research, prevention, and control measures for cross-species infections like influenza and dangerous bacteria emerging from antibiotic resistance, with the design and implementation of this kind of collaborative models in which experts can share, access, and manage information from both sides of the USA-Mexico Frontier.

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 [2] Epidemic Department. Mexican Health Department, ‘Rickettsia en Baja California’. <http://www.dgepi.salud.gob.mx/boletin/2010/sem6/pdf/edit0610.pdf>
 [3] Centers for Disease control and Prevention. ‘2009 H1N1 Early Outbreak and Disease Characteristics’. <http://www.cdc.gov/h1n1flu/surveillanceqa.htm>
 [4] One Border One Health. Official site. <http://www.oneborderonehealth.com/>
 [5] National Institute of Statistics and Geography. Official site. <http://www.inegi.org.mx/>

ROLE OF SENTINEL SURVEILLANCE

in the Detection of Emerging Infectious Diseases

at the Human-Animal Interface, Nigeria

Meseko CLEMENT

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BACKGROUND

Climate change and global warming has altered the process and outcome of infectious diseases worldwide. This alteration in the environment and increase in urban agriculture in response to population growth cause intensification of livestock farms in confine feeding operations (CAFO) thereby contributing to emerging diseases at the animal-human interface. This is both an economic and public health risk to the society. However early detection and control of these emerging diseases hinged on effective surveillance system is important for sustainable development. Unfortunately disease surveillance is poorly organized in developing countries of Africa.

OBJECTIVE

Despite present challenges with the spread of infectious diseases in developing countries especially, there are no effective and sustainable

national surveillance for early detection of emerging diseases at the human- animal interface in Nigeria. It in this presentation, I outline how adoption of sentinel surveillance had served effectively in the detection of emerging infectious diseases of both economic and public health importance at the human-animal interface in Nigeria.

MAIN MESSAGE AND LESSON LEARNED

Swine farming is one of the fastest growing sources of meat protein in the world today with 40% of the world meat protein consumption derived from pork and pork products and millions of metric tons traded across international borders. Nigeria accounts for about 30% of pig production in Africa and pig farms are widely spread in the country with higher concentrations in the Southern and Central agro-ecological regions, providing meat protein for Africa's most populous nation. The industry has witnessed gradual growth over the years with the promotion of peri urban intensive farm estates but

not without a number of challenges that ranges from diseases, nutrition to reproductive losses.

The recent pandemic of influenza A/H1N1 said to originate from swine is a cause for concern in the pig industry because pigs play significant role in the epidemiology of swine influenza and the emergence of pandemic virus. Constant monitoring of emerging virus among the animals and in persons occupationally exposed provides data for better public health policy.

Sentinel surveillance was designed and implemented in an intensive urban piggery production operation with over 5000 human concentration and 1 million pigs in a single site for over 24 months. Clinical specimens were collected from case presentation of swine influenza and human exposure. This was transported on ice to the laboratory for virus detection and isolation. Data on biosecurity practices were also collected with structured questionnaires and analyzed.

It was observed that the biosecurity practice in farm is far below acceptable standard. This obviously would encourage easy circulation and spread of swine influenza intra and inter species. Analyzed specimen confirms the circulation of human strain of swine influenza virus in pigs which may have been contracted from the farmers.

ADVANCEMENT OVER PREVIOUS SYSTEM

Previous national surveillance in livestock is bedeviled by weak veterinary infrastructure, poor capacity and political will. This surveillance

expended less resources, ensure close monitoring and took advantage of the peculiarity of the operation system.

This to my knowledge is one of the first effective surveillance at the human-animal interface in Nigeria where both animals and animal handlers were taken into consideration.

PRACTICAL RECOMENDTION

Epidemio surveillance programme in developing countries should in addition to National surveillance be designed as focus groups of sentinel surveillance that would address unique terrain, culture, farm operation, diseases and population groups and observed over a period of time which is more effective in the detection of emerging infectious diseases.

The observation that human can readily be infected by viruses circulating in animals and vice versa, requires that diseases control measures such as biosecurity and vaccination should be targeted at this occupationally exposed group.

JOINT LIVESTOCK, Wildlife and Public Health Investigation of Q fever in Chiang Mai, Thailand

Teerasak CHUXNUM¹, Pattarin OPASCHAITAT², Sowapak HINJOY¹,
Pranee RODTIAN³ and Tanit KASANTIKUL⁴, Susan MALONEY⁵

BACKGROUND

Q fever, a zoonosis caused by *Coxiella burnetii*. In animal, the majority of cases, abortions occur at the end of gestation without specific clinical signs until abortion is imminent. But in human, the acute disease appears like a flu-like infection, usually self-limiting illness accompanied by myalgia and severe headache. Complications, such as pneumonia or hepatitis, may also occur. Endocarditis in patients suffering from valvulopathy, as well as premature delivery or abortion in pregnant women, is the main severe manifestations of the chronic evolution of the disease. [1]

Q fever in Thailand is an emerging disease. There were nine clinical cases in a prospective study in patients with acute febrile illness who were admitted to four hospitals in northeastern Thailand were reported in 2003. [2] In 2011, a study in Khon Kaen focusing on zoonotic causes of endocarditis in humans identified four confirmed cases of Q fever endocarditis. All case-patients had a history of contact with farm animals such as dairy and beef cattle. [3] Little information exists on the

incidence and prevalence of Q fever in animals. A serological survey in 1967 in Thailand showed seroprevalence of *Coxiella burnetii* of 28.1% in dogs, and seroprevalence in goats, sheep, and cattle varied from 2.3% to 6.1%. [4]

The One Health concept, the collaborative effort of multiple disciplines to attain optimal health for people, animals and the environment [5] is adapted in this study.

MATERIALS AND METHODS

Based on the strategic framework of the One Health concept, its achievement involves the strengthening of animal, public health and environment surveillance. (Figure 1) Sharing information between each surveillance system is practical for response, prevention and preparedness system at the provincial level.

The public health authorities are including Chiang Mai Public Health Office, District Public Health Offices, Sub-district Health Promotion Hospitals

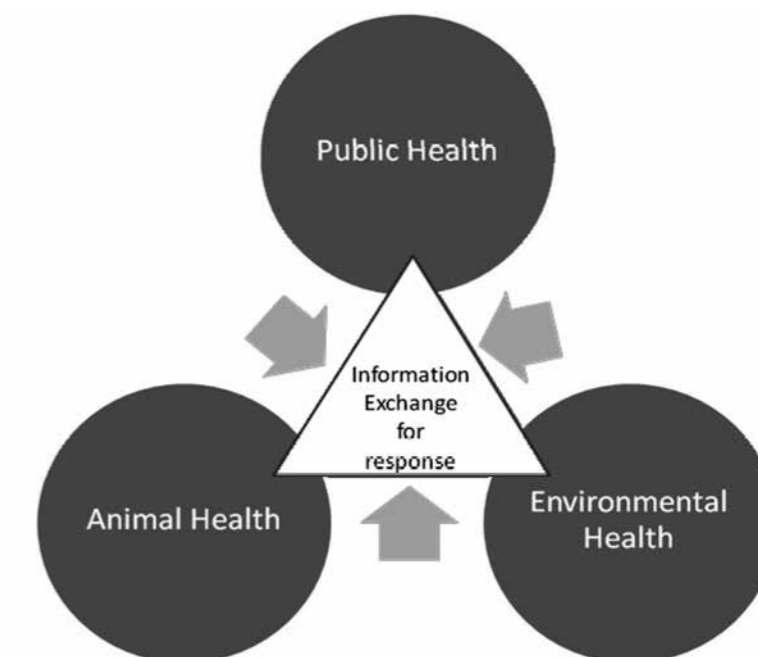


Figure 1: The animal, public health and environment surveillance with sharing information for response

and National Institute of Health. The animal health authorities are including Chiang Mai Livestock Office, The Fifth Regional Livestock Office and National Institute of Animal Health. Chiang Mai Zoo and Chiang Mai Night Safari are representatives for environmental health.

The joint surveillance and investigation of Q fever was conducted to develop network of animal health and public health surveillance and response at provincial level.

RESULTS

A joint investigation of Q fever by livestock, wildlife and public health authorities aimed to determine the prevalence and risk factors of Q fever in animals and animal care takers in Chiang Mai, Thailand.

The One Health team was established at first in Chiang Mai provincial level. (Figure 2) The team is comprised with human and animal health, zoologist, epidemiologist and laboratorian as well as other professionals, would be charged with joint surveillance for Q fever and disease response.

The Q fever surveillance and investigation were set up. Blood samples from 271 dairy cows, 61 deer, 1 camel and 1 Indian bison were collected at two Chiang Mai zoos, Chiang Mai Zoo and Chiang Mai Night Safari, and ten dairy farms in April 2012. Three cow placenta and three buffalo placenta were also sampled from the fresh market in Chiang Mai during the same period. (Figure 3) Animal sera were tested for antibodies against *Coxiella burnetii* by ELISA at the National Institute of Animal Health.

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³ The Fifth Regional Livestock Office, Department of Livestock Development, Ministry of Agriculture and Cooperation, Chiang Mai, Thailand

⁴ Zoological Park Organization under the Royal Patronage of H.M. The King, Bangkok, Thailand

⁵ International Emerging Infections Program, Global Disease Detection Regional Center, Thailand Ministry of Public Health (MOPH)-U.S. Centers for Disease Control and Prevention (CDC) Collaboration, Nonthaburi, Thailand

Figure 2:
One Health Team



Of the animals tested, 22/334 (6.59%) had antibodies to *C. burnetii*: 22/271 (8.12%) in dairy cows. There is no antibody positive against *Coxiella burnetii* in zoo animal and cow placentas and buffalo placentas.

The response for Q fever in dairy farmer has been monitored. The blood samples will be collected after any symptom related to Q fever. Joint investigation will be conducted by the One Health team in order to prevent and control the disease.



Figure 3: Placentas collection from the fresh market in Chiang Mai

DISCUSSION

The results of these animal surveys will be used in conjunction with the results of the ongoing zoonotic endocarditis study in Khon Kaen to develop and implement effective surveillance models for Q fever in humans and animals. This model of joint investigation can also be applied to other zoonotic diseases to strengthen collaboration among livestock, wildlife and public health officers working in the same area. Human laboratory test result will be reported once they are confirmed.

¹ Rodolakis A. Q fever, state of art: epidemiology, diagnosis and prophylaxis. *Small Ruminant Res* 2006 Mar; 62(1) 121–4.

² Suputtamongkol Y, Rolain JM, Losuwanaruk K, Niwatayakul K, Suttinont C, Chierakul W, et al. Q fever in Thailand. *Emerg Infect Dis* 2003 Sep;9(9):1186-7.

³ Pachirat O, Fournier PE, Pussadhamma B, Taksinachanejij S, Lulitanond V, Baggett HC, et al. The first reported cases of Q fever endocarditis in Thailand. *Infect Dis Rep* 2012;4:e7.

⁴ Sankasuan V, Pongpradit P, Bodhidatta P. *Seato Medical Research Study on Rickettsial Diseases in Thailand*.1967:449-04

⁵ The American Veterinary Medical Association. One Health Initiative Task Force. "One Health: A New Professional Imperative" [online]. 2008 [cited 2012 July 15]. Available from https://www.avma.org/KB/Resources/Reports/Documents/onehealth_final.pdf.

USING A CONVENTIONAL STRATEGY

to Develop a New Paradigm for Novel Virus Detection and Building Capacity to Implement Globally

T. GOLDSTEIN, S.J. ANTHONY, B. SCHNEIDER, D. JOLY, W.B. KARESH, P. DASZAK, A. CLEMENTS, D. CARROLL, J.A.K. MAZET

Rapid identification of pandemic threats has recently become more feasible due to implementation of One Health approaches. Most genomic approaches for viral discovery are extremely expensive and available only in sophisticated laboratories with teams of diagnosticians and bioinformaticians. Therefore, more economical and technologically simple approaches were sorely needed to forecast novel pathogen emergence. Broadly reactive consensus polymerase chain reaction (PCR) assays have been used extensively for decades in research laboratories to detect and characterize novel pathogens. Through the Emerging Pandemic Threats PREDICT Project, this strategy for viral identification and pathogen detection has been newly initiated in diagnostic laboratories globally to detect both known and novel pathogens in tandem rather than sequentially. Consensus (genus/family level) PCR is a powerful tool that produces specific, high-resolution data and allows for quicker detection of potential pathogens, especially important for the diagnosis of mystery illnesses in medical hospitals and veterinary labs and in the event of an outbreak to respond appropriately to minimize both effect and spread. Because the PREDICT Project has focused on viral emergence from wildlife in remote areas, we have been working with laboratories in some of the most resource-constrained countries to develop local capacity to use consensus PCR. Testing of targeted samples based on the circumstances that promote disease and the potential route of exposure has already been implemented in 15 of 27 partner laboratories, and in less than two years the project has detected more than 200 novel viruses from wildlife that are related to those that cause illness, epidemics, and pandemics in people including SARS-like coronaviruses, novel human adenoviruses, and a new clade of Ebola. Not only have animal viruses shared by multiple animal hosts been detected, but also human viruses in animals and vice versa. Combining cutting-edge surveillance techniques with practical implementation of holistic, One Health approaches, the global health community has now contributed significantly to inexpensive diagnostic improvement for the individual, while realizing the original goal of step-wise improvement of pandemic prevention.

SHORT MESSAGING SERVICE BASED DISEASES SURVEILLANCE SYSTEM

Part of Integrated Disease Surveillance Project in Andhra Pradesh, India

Vivek Singh^{1*}, B Madhusudana Rao² and Jagan Mohan²

There is mounting interest in the field of mHealth - the provision of health-related services via mobile communications. This can be attributed to certain interrelated trends. In many parts of the world epidemics and a shortage in the health care workforce continue to present grave challenges for health care systems. Yet in these same places, the explosive growth of mobile communications over the past decade offers new hope for the promotion of quality healthcare. In many nations paper based surveillance reports must be submitted in person and manually entered into a central health database. Recent evidence from small scale pilots in developing countries have shown that the data collection process can be more efficient and reliable if conducted via mobile phones rather than in the previous paper based formats.

The overall objective of the Integrated Disease Surveillance Project (IDSP) launched in 2004 was to improve the timeliness and quality of the response to infectious disease outbreaks at district level, and to improve the quality of monitoring and surveillance of infectious disease at state and national level. Periodic reviews of the IDSP undertaken internally and by the Joint

Implementation Support Review Mission (JISM), comprising of state officials and members from the development partners, have reported many challenges to improving the effectiveness of the IDSP. These include the lack of human resources, poor communications with the distant and remote reporting site locations, resource limitations and lack of analytical skills and capacity.

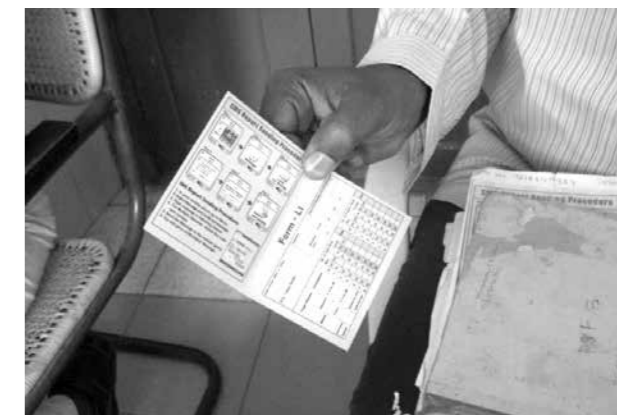
In the state of Andhra Pradesh (AP) the situation with the IDSP was not dissimilar. To address the challenges, a Short Message Service (SMS) based surveillance system was designed and piloted in six of AP's 23 districts, starting in August 2008. The SMS based surveillance system was an attempt to tackle the barriers to improving the IDSP by capitalizing on the exponential growth in numbers as well as reach of mobile phones in the state.. The system was jointly designed in the state by the Directorate of Health Services (DH) and the National Informatics Centre (NIC). The system used simple alpha-numeric codes to collect information compatible with the prescribed IDSP formats. Health workers across the state were trained to report the information via SMS to a central server in Hyderabad. To ensure data security the system was designed to identify every health facility

(reporting unit) involved in the project with a unique identification number and the SMS was accepted only from registered mobile numbers. The system was also able to send automatic alerts to registered mobile numbers when the frequency of reports crossed pre-set threshold levels. Health workers in 3,832 reporting units (hospitals and health centres) across six pilot districts began using this system to send IDSP reports in August 2008. Anecdotal reports suggested some promising results such as improved reporting from the hard to reach areas, possibility of generation of more timely alerts regarding outbreaks, reduced burden of paper work and savings on resources such as stationery and postage. As a result of this promising feedback from the pilot sites, the SMS based system was rolled out to about 16,000 reporting units across the state.



Medical officer at a PHC training health staff on SMS reporting procedures

In the conventional paper based surveillance system the reporting was done manually or semi-automatically, i.e. entirely by post or in person to



Health worker displaying Pocket flip card of SMS reporting procedures

the district level surveillance unit. From the district centre the data used to be consolidated and sent to the state level surveillance unit by email or by fax. Usually the information about the health events used to take a few weeks of time to travel from the field level to the state level. In the mHealth surveillance system, the field level health workers were given a messaging template, or a 'midlet' was stored in their mobile phones to capture the data with menu driven interfaces, which were converted into an SMS. The SMS thus created is sent to a central gateway, which gets processed at state level, and subsequently the national level disease surveillance servers get updated. SMS based alerts and early warnings get generated automatically to the registered stakeholders responsible for taking timely remedial measures. The State Surveillance Unit (SSU) printed and distributed pocket sized flip cards with SMS reporting procedures to aid the sending of SMS reports by the health workers. Flex posters of SMS reporting procedures were also printed

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Flex board of SMS reporting procedures in the laboratory

and distributed to all reporting units, including the laboratories. The SSU has also hosted a website where web based customized reports generated from the SMS reports can be accessed by different stakeholders.

Results from an evaluation of the system have shown an increase in regular reporting from the hard to reach reporting sites. The health workers surveyed reported that they were receiving reminders through the SMS based surveillance system, and that these reminders have led to an improvement in the reporting frequency. The system acknowledged receipt of SMS reports in the proper format, and many health workers stated that the immediate acknowledgement of a report



Mobile phone of a health worker showing a reminder from the SMS surveillance System

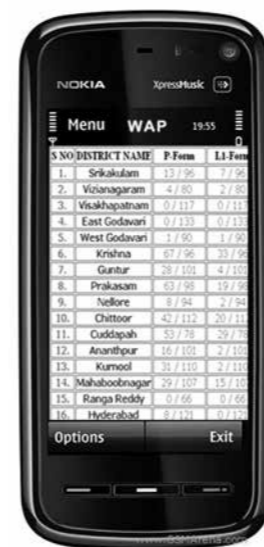
encouraged them to send regular reports. The system also generates automatic alerts based on thresholds set for the number of cases reported for various diseases. The threshold levels are set based on the definitions of outbreaks given in the IDSP manuals and are unique to a disease. These alerts can lead to a significant decrease in the response time to disease outbreaks in the state. Alerts to multiple stakeholders may also lead to better inter-sectoral coordination in responding to disease outbreaks in the state.



Interactive state map with complete disease surveillance reports

An evaluation of the system has shown that there is significant decrease in the time taken to report every week in a SMS based surveillance system as compared to the paper based reporting system. This system has also led to a significant reduction in the money spent on travel and stationery versus the conventional paper based reporting system.

Mobile phones in this system have also made availability of real time data from the field easily accessible on the hand sets in a user-friendly mode. District and state level managers are accessing real time reports from the field through their mobile handsets and making timely decisions. This has led to a significant increase in the number of situations in which



District wise disease surveillance reports on mobile phone

the managers have taken some preemptive measures to prevent outbreaks or control the spread of outbreaks.

Overall, the Short Message Service technology has been successfully utilized in Andhra Pradesh to create a disease surveillance system which is adept for timely and adequate response to disease outbreaks in a cost effective way. The evaluation of this system has shown that high mobile phone penetration in the population provides the opportunity for making public health programmes more community-centric.

Mobile phone based surveillance also offers an opportunity for linking human and animal health surveillance from the grass roots right up to the national level. Efforts need to be made to explore further possibilities for knowledge sharing and for forging appropriate collaborations to find solutions to health problems across the public health and veterinary sectors.

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2.6

TRANSFORMING THE GLOBAL WORKFORCE

for One Health Approaches

BACKGROUND

Implementing One Health approaches globally requires transformation of the workforce driven by a new pre-service and in-service educational paradigm. The new workforce is exemplified by dynamic, transdisciplinary professionals and paraprofessionals working together to address the systemic determinants of health issues at the human, animal and environment interface. The paradox of One Health capacity development is the need for both depth and breadth of knowledge, skills, aptitude and experience. The critical competencies for the One Health approach include the ability to deal with dynamic challenges through active stakeholder engagement and resiliency. A coalition of traditional and non-traditional partners must be actively involved to shape student learning experiences and in-service training.

OBJECTIVES

Policy recommendations for transforming global workforce capacity-development by:

- Creating a new educational paradigm for pre-service and in-service training
- Establishing global one health priorities as key drivers for academic curriculum development and continuing educational programs
- Catalyzing cross-sectoral capacity development to implement One Health approaches

MODERATOR

William HUESTON

Professor

*Veterinary Medicine and
Public Health
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SPEAKERS

- Enhanced learning capturing the power of global communications technology
Willem Vink, Senior Research Officer,
EpiCentre, Massey University, New Zealand
- Experiential field training and active simulations
Sopon Iamsirithaworn, FETP Director,
Ministry of Public Health, Thailand
- Integrating health priorities and engaging workforce employers in curriculum development
William Bazeyo, Dean, School of Public Health,
Makerere University, Uganda
- Inter-professional education approaches
Malika Kachani, Professor of Parasitology, College of Veterinary Medicine,
Western University of Health Sciences, USA
- Private sector perspective
Narin Romlumduan, Vice President,
Bangkok Agro-Industrial Products Public Co.,Ltd, Thailand



Will Hueston, DVM, PhD, directs the Global Initiative for Food Systems Leadership (GIFSL), comprising the leadership and experiential education programs of the Center for Animal Health and Food Safety, University of Minnesota (UMN). He also serves as Director of the University of Minnesota Food Policy Research Center and the World Organisation for Animal Health (OIE) Collaborating Center in Veterinary Services Capacity Building. Dr. Hueston holds faculty appointments in the College of Veterinary Medicine and the School of Public Health at UMN.

Most of Dr. Hueston's work focuses on One Health capacity-building, public policy and risk communication with the ultimate goal of creating integrated and harmonized systems for global food security. He has a long history of creating and delivering professional development programs for mid-career government, industry and academic professionals in collaboration with an international consortium of universities, government agencies, intergovernmental organizations and the private sector. Further, Dr. Hueston has extensive experience facilitating strategic public-private partnerships to address the complex challenges and exciting opportunities of global food system and public health issues.

While at University of Minnesota, Dr. Hueston worked with partners in the School of Public Health and the College of Veterinary Medicine to create a combined DVM/Master of Public Health (MPH) degree program, an Executive MPH program for working health professionals, and a two-year post-graduate residency program in public health for veterinarians. These programs are unique in their focus on experiential learning and their blending of on-line coursework with intensive public health institutes. Together, these educational programs constitute the largest veterinary public health educational program in the world today, with over 200 students enrolled at any given time. Graduates of these programs are now employed in North America, the Caribbean, Africa and Southeast Asia working with regional and national governments, non-governmental organizations, academia and the private sector.

Prior to joining UMN in 2001, Dr. Hueston was Associate Dean for the University of Maryland campus of the Virginia-Maryland Regional College of Veterinary Medicine and Director of the Center for

Government and Corporate Veterinary Medicine. Dr. Hueston worked for the United States Department of Agriculture's Animal and Plant Health Inspection Service from 1987-1996 during which he gained international recognition for his work with the emerging disease, Bovine Spongiform Encephalopathy (BSE). Dr. Hueston advised the British, Canadian and US governments, the World Health Organization and the World Organisation for Animal Health on BSE prevention and control. Earlier experience includes teaching and research as a university faculty member at Ohio State University, serving as a resident veterinarian for a large farmer cooperative, private veterinary practice and community organizing in rural areas. He holds degrees in biology (BA, University of Virginia 1976); veterinary medicine (DVM, Ohio State University 1980), preventive medicine (MS, Ohio State University 1980) and epidemiology (PhD, Ohio State University 1985). Dr. Hueston advises governments, industry and non-governmental organizations on public health and policy issues involving people, animals and the environment. He has published over 55 scientific papers and delivered several hundred presentations nationally and internationally.

WILLIAM HUESTON

Professor

*Veterinary Medicine and
Public Health
University of Minnesota
USA*



William Bazeyo is an Associate Professor of Occupational Medicine at Makerere University College of Health Sciences, School of Public Health and is currently the Dean of the School.

He received an MBCHB from Makerere University and M.Med in Occupational Health from University of Singapore, Singapore. He has been teaching in the University for more than 20 years and has done research and Published in several areas including Health Care Financing, Leadership and One Health. He was the among the key pillars of The HEALTH Alliance (Higher Education Alliance for Leadership Training for Health) which was formed in 2005 with funding from USAID that brought together 7 schools of Public Health in Six Countries. An organization that he has lead till now which addressed the Leadership gaps in Health, Health Emergency management Programs for the District first responders that trained and equipped District staff and responded to Emergencies like the Bududa landslides in Uganda, and Post Elections violence in Kenya to mention but a few. He organized the formation of the Summit of 14 Deans of Schools of Public Health and Schools of Veterinary in the Six Alliance Country members. He is the Current Chair of the Summit. The Schools are implementing the One Health activities under the umbrella of OHCEA- One Health Central and Eastern Africa net work funded by USAID in the EPT program through RESPOND. The Project is being implemented in DRC, Kenya, Tanzania, Ethiopia, Rwanda and Uganda with US partner Universities namely University of Minnesota and Tufts University.

He is the Principal Investigator of various projects such as, Strengthening and Expansion of One Health Central and Eastern Africa Net Work, Monitoring and Evaluation Technical Assistance a CDC Program that offers M & E support to CDC supported institutions and also the Director of the newly established Centre for Tobacco Control in Africa which is aiming at reducing the consumption of tobacco by supporting governments in implementing evidence-based tobacco control strategies in Africa, USAID Higher Education Network- Resilient Africa , it's a consortium of 20 African Universities led by Makerere University School of Public Health together with Stanford University, Tulane University and Center for Strategic and International Studies (CSIS) which provides insight in how programming affects the resilience of populations, Strengthening Leadership In Disaster Resilience Program

WILLIAM BAZEYO

Dean

*School of Public Health
Makerere University
Uganda*



Sopon Iamsirithaworn is Director of Field Epidemiology Training Program (FETP) in Thailand. He graduated from Ramathibodi Medical School, Mahidol University. Between 1994 and 1997, he served as Director of Laemngob Hospital, a community hospital in a rural province of Eastern Thailand. His interest in public health began during the time he saw a number of patients with infectious diseases, e.g., diarrhea, dengue hemorrhagic fever, HIV in the hospital. During 1997-1999, he received 2-year training in field epidemiology at the Bureau of Epidemiology, Ministry of Public Health. After graduation, he began his public health career as a trainer in the FETP-Thailand that aims to train young medical doctors to be field epidemiologists.

Following the completion of a MPH and a PhD in Epidemiology from University of California at Los Angeles in 2006, Dr.Sopon returned to FETP and started to collaborate with many organizations to expand in-service training in epidemiology to other health professionals including nurses, pharmacists and veterinarians. His areas of technical expertise include infectious diseases modeling, influenza and HIV research. He was appointed to be Director of FETP-Thailand in 2009.

He was Chair of the Drafting Group for “Emerging Infectious Disease Preparedness and Response” resolution in the Thai Health Assembly in late 2009 and incorporated “One Health” concept into the development of the “Thailand National Strategic Plan for Emerging Infectious Diseases Preparedness and Responses 2013-2016”.

Over the last 10 years, Dr.Sopon has supervised several FETP trainees to establish and/or evaluate surveillance systems and investigating many important disease outbreaks around the country. In early 2012, he worked with his collaborators in the Field Epidemiology Training Program for Veterinarians (FETPV) in the Department of Livestock Development, Department of Natural Parks, Wildlife and Plant Conservation and Zoological Park Organization to train “One Health Epidemiology” teams in 5 provinces of Thailand. This combined didactic and on-the-job training course was specially designed for professionals who work for human health, livestock health and wildlife health sectors to utilize “One Health” concept and “Epidemiology” methods to improve surveillance and investigation of infectious diseases at Human-Animal-Ecosystems Interface.

SOPON IAMSIRITHAWORN

FETP Director

*Ministry of Public Health
Thailand*



Malika Kachani, DVM, PhD, is a professor of Parasitology at the College of Veterinary Medicine, Western University of Health Sciences, Pomona, California, USA. She is responsible for the Parasitology course. She is the course leader for the 3rd year Global Health course, and the International Veterinary Medicine 4th year course.

Dr. Kachani specializes in parasitic zoonoses and Veterinary Public Health. Her current research focuses on cystic echinococcosis (CE) (*Echinococcus granulosus* infection) in animals and in humans.

She has developed strategies to control CE in an endemic area of Morocco. She has organized extension, education and training programs for the prevention of zoonoses and promotion of animal and public health involving various target audiences. She has conducted various development activities in rural areas of Morocco, such as integrated programs to alleviate poverty, supervision of agricultural and income generating activities of rural women, formal and informal education for rural children, intensive village studies to evaluate the importance and the cost of parasitic zoonosis in humans and animals, public health education programs and control of zoonotic diseases. She was a co-editor of a compendium on CE in Africa and in the Middle-Eastern countries, published in 1997. She was the principal investigator in several projects funded by the European Union on tick-borne and zoonotic diseases.

She works with Intergovernmental organizations such as The Food and Agriculture Organization of the United Nations (FAO), the World Health Organization (WHO). She also has working relationships with the ILRI, IAEA, IFAD, PAHO, CDC, Heifer International and the USDA. She has worked with the FAO on parasitic zoonoses, Veterinary Public Health, Dog Population Management for the Control of Zoonotic Disease, and served as moderator of the FAO VPH network for Francophone Africa.

She is currently a member of the WHO Strategic and Technical Advisory Group (STAG) for Neglected Tropical Diseases and she is the current chair of the STAG working group on Neglected Zoonotic Diseases. She is also currently a member of the Stone Mountain working group on One Health and is the co-chair of the One Health Proof of Concept subgroup.

At Western University of Health Sciences, she organizes student exchange programs with Colleges of Veterinary Medicine in Africa and Latin America. She also participates in health interprofessional educational programs. She collaborates with researchers in Peru on CE control. She has been the Principal Investigator in numerous grants funded by the EU, American private foundations, WHO and various NGOs.

Throughout her activities, she has been a strong advocate for the One Health approach in Morocco, Peru, European, North African and Middle Eastern countries and in the USA.

MALIKA KACHANI

Professor of Parasitology

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Narin Romlamduan is a veterinary practitioner. He specializes in poultry diseases. In 1988-2001, he had started his career as a veterinarian who taking care of poultry health and diseases monitoring program for CPF integrated farms. During 2002-2004, he had supported CPF key customer farms to set up vaccination and biosecurity management programs to prevent and control diseases outbreak.

His two main interests are Emerging/Re-emerging diseases of livestock animal and Zoonotic diseases especially Avian influenza.

At the present, Dr. Narin Romlamduan is the Senior Vice President of CPF, Head of Animal Health and Veterinary Service. His office is located at 29/2 Moo 9 Suwintawong Road, Lumpakchee, Nongjok, BKK 10530.

NARIN ROMLUMDUAN

Vice President

*Bangkok Agro-Industrial
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WILLEM VINK

Senior Research Officer

*EpiCentre
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Daan was born in Zambia of Dutch descent, and educated up to university level in Southern Africa. He studied veterinary medicine at Utrecht University, graduating as Doctor of Veterinary Medicine (DVM) in 1999. Realising the socio-cultural and economic importance of livestock in rural livelihoods, he had substantial involvement with the Vétérinaires sans Frontières - Europa (VSF-E) network during his studies, and visited a number of field projects in developing countries incorporating animal health components. In addition, field studies in Egypt (subclinical mastitis under different management systems, 1995) and Mozambique (neurological diseases in smallholder sector goats, 1997 and 1998) instilled a keen interest in epidemiology.

After graduation, Daan was employed by VETAID in Mozambique from 2000 to 2002, initially to implement a livestock disease surveillance system in flood-affected areas, and later in management of community-based animal health service provision projects. This work drew heavily on participatory epidemiological techniques and reinforced the close interrelatedness between human and animal health.

Subsequently, Daan undertook a PhD at the University of Liverpool (2002 – 2006), which gave him the opportunity of formally specialising in veterinary epidemiology, particularly acquiring expertise in statistical and mathematical modelling of infectious livestock diseases. He continued this academic trajectory by performing postdoctoral work at the EpiCentre, Massey University, New Zealand, performing analytic work on a range of livestock disease problems (2007 – 2009).

From 2009 to 2011, Daan managed the establishment of a 'One Health' Master programme at Massey University. This included specification of the curriculum, design of the web-based courses, co-ordination of the course development team, delivery of the courses into six countries across South Asia and assessment of the candidates. It involved working closely with a wide range of people, including instructional designers and educators, veterinary and public health subject experts and of course the 70 candidates – a number of whom are attending this conference! He is passionate about the capacity of emerging information and communication technologies to transform education, information sharing and collaboration, and convinced that the success of the 'One Health' approach will be determined by this.

Daan is a family man, being married with two children. He enjoys outdoor pursuits, and has a tendency to head out for the hills when given the opportunity.

INFLUENCE OF INTERPROFESSIONAL EDUCATION on Student Knowledge, Attitudes and Beliefs of One Health. Preliminary results.

Malika KACHANI¹, Helen ENGELKE¹, Sorrel STIELSTRA¹ & Brandon HAYES²

INTRODUCTION

Interprofessional education can potentially teach One Health topics in a novel interactive format, bringing together future health professionals in a forum that enables them to understand the importance of interdisciplinary collaboration.

The purpose of this study is to determine the influence of interprofessional education (IPE) on student knowledge, attitudes and beliefs (KAB) of One Health. The rationale behind the research is that while there are multiple studies that promote the importance of interdisciplinary care in human health delivery, less is known about the effectiveness of using IPE to promote cross-disciplinary collaboration that includes veterinary and environmental components. Western University of Health Sciences is in a unique position to conduct such research as its IPE program is comprised of over 900 students from various health professions.

MATERIALS AND METHODS

Groups of 9 students, 1-2 from each college meet

3 times per IPE case. A facilitator helps guide the students through the case with a cross-disciplinary collaborative approach. Every case is designed with human-animal-environmental interactions that require involvement of multiple health professions. This yields an excellent educational environment, in which students gain a perspective that would not otherwise be present in a traditional, single discipline, classroom.

Out of the 900 first year IPE students, 307 completed an electronically administered anonymous survey. Professions represented were: Veterinary Medicine, Osteopathic Medicine, Dentistry, Allied Health, Graduate Nursing, Pharmacy, Physician Assistant, Podiatric Medicine and Optometry.

The survey sought to assess the students capacity to correctly define One Health. Respondents were then given a definition of One Health: "A collaborative effort of multiple disciplines- working locally, nationally, globally – to attain optimal health for people, animals and the environment". In a separate section of the survey, a 5 point Likert scale was used to identify students level of agreement to statements regarding their knowledge of zoonoses and infectious diseases, biomedical

Table 1- Student Respondent Enrollment by College

College	Frequency	Percent	Valid Percent	Cumulative Percent
Allied Health	27	7.9	8.8	8.8
Dental Medicine	25	7.3	8.1	16.9
Graduate Nursing	7	2.0	2.3	19.2
Nursing	6	1.7	2.0	21.2
Optometry	16	4.7	5.2	26.4
Osteopathic Medicine	133	38.8	43.3	69.7
Pharmacy	27	7.9	8.8	78.5
Podiatric Medicine	10	2.9	3.3	81.8
Veterinary Medicine	55	16.0	17.9	99.7
Physician Assistant	1	.3	.3	100.0
Total	307	89.5	100.0	
Missing System	36	10.5		
Total	343	100.0		

and comparative research, environmental health, human-animal bond and their perceptions of effective health care delivery. Options on the Likert scale included "strongly agree, agree, neither agree nor disagree, disagree and strongly disagree".

Similarities and differences between health professions were identified and analyzed. For the Likert scale responses, each category was assigned a point value ranging from 1-5 with 5 equivalent to "strongly agree" and 1 equivalent to "strongly disagree". The T test for comparison of means was utilized to assess whether responses by students at differing health professional colleges were statistically significant.

Table 1 shows the breakdown of students by college of attendance.

RESULTS AND DISCUSSION

This study involved students from 9 colleges. However, for the purposes of this paper, preliminary

results relating to responses by the students from the colleges of Veterinary Medicine (n=55) and Osteopathic Medicine (n=133) are being reported. Ages ranged from 18-55 with 36% male and 64% female.

DEFINITION OF ONE HEALTH:

Table 2 shows responses to the question "If asked could you define what One Health means?".

While 71.3 % of veterinary and osteopathic medical students combined believed they could define one health, only 44.1% adequately

Table 2: Students' Self-Assessment of Ability to Define "One Health"

	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	134	71.3	71.3	71.3
No	54	28.7	28.7	100.0
Total	188	100.0	100.0	

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Table 3. Comparison of Means of Zoonoses and Infectious Diseases Statements

Zoonoses and Infectious Diseases Statements				
Statements		N	Mean	Std. Deviation
Animal health can impact human health	Veterinary student	47	4.85	.416
	Medical student	114	4.28	.659
Animals can serve as disease sentinels for human health	Veterinary student	47	4.83	.481
	Medical student	113	4.31	.682
Humans and animals are not susceptible to many of the same chronic diseases	Veterinary student	47	1.66	.700
	Medical student	113	2.69	1.018
Zoonotic diseases do not pose a serious threat to the health of the human population	Veterinary student	47	1.36	.819
	Medical student	113	2.01	.950
It is important to monitor animal populations in order to detect disease outbreaks as soon as they occur	Veterinary student	47	4.57	.580
	Medical student	111	4.07	.583
Many pathogens that get people sick also get animals sick	Veterinary student	47	4.47	.747
	Medical student	110	3.73	.800
Being knowledgeable in One Health will be important to my professional practice	Veterinary student	47	4.36	.673
	Medical student	110	3.68	.918

defined it when asked to write their own definition. A correct definition of one health was fairly leniently assessed. Inclusion criteria included words such as collaborative, integrated approach, multi-professional/intersectoral. At the very least students had to understand that veterinarians and physicians should work together. Based on those criteria 76% of veterinary students (n=42) correctly defined One Health, but only 21% of those (n=9) were aware of an environmental component. Interestingly, fewer medical students successfully defined one health (30.8%, n=41), but for those

correct definitions, 36.5% (n= 15) included an environmental component.

ANALYSIS OF LIKERT SCALE RESPONSES

Tables 3- 8 present comparisons of the means for student responses to statements assessing their knowledge of zoonoses and infectious diseases, biomedical and comparative research, environmental health, human-animal bond and their perceptions of effective health care delivery. All differences in means between

veterinary and medical students were statistically significant to a p value of < 0.01.

Table 3 shows that, compared to medical students, veterinary students were statistically significantly more likely to strongly agree that:

- animal health can impact human health
- animals can serve as disease sentinels for human health
- humans and animals are susceptible to many of the same chronic diseases
- zoonotic diseases pose a serious threat to the health of the human population
- it is important to monitor animal populations in order to detect disease outbreaks as soon as they occur
- many pathogens that get people sick also get animals sick
- being knowledgeable in One Health will be important to their professional practice

Table 4 shows that, compared to medical students, veterinary students were statistically significantly more likely to strongly agree that:

- research into obesity treatment and prevention translates well between animals and people
- collaborative research between human and animal health workers in the field of obesity can result in more rapid research advances.

Table 5. Comparison of Means for Environmental Health Statements

Environmental Health				
Statements		N	Mean	Std. Deviation
Climate change can have direct and indirect effects on human and animal health	Veterinary student	47	4.57	.542
	Medical student	110	4.07	.875
Population encroachment can cause previously isolated diseases to come into contact with naïve human and animal populations	Veterinary student	47	4.55	.653
	Medical student	112	4.12	.732

Table 5 shows that, compared to medical students, veterinary students were statistically significantly more likely to strongly agree that:

- Climate change can have direct and indirect effects on human and animal health
- Population encroachment can cause previously isolated diseases to come into contact with naïve human and animal populations.

Table 4. Comparison of Means for Biomedical and Comparative Research Statements

Biomedical and Comparative Research Statements				
Statements		N	Mean	Std. Deviation
Research into obesity treatment and prevention translates well between animals and people	Veterinary student	47	4.00	.885
	Medical student	111	3.24	.765
Collaborative research between human and animal health workers in the field of obesity can result in more rapid research advances	Veterinary student	47	4.64	.568
	Medical student	111	3.81	.733

Table 6. Comparison of Means for Human Animal Bond Statements

Human Animal Bond		N	Mean	Std. Deviation
People who own pets tend to be happier than those who do not	Veterinary student	47	4.11	.729
	– Medical student	114	3.46	.854
Pets can serve important roles in helping patient recovery and morale	Veterinary student	47	4.66	.522
	– Medical student	111	4.20	.685

Table 6 shows that, compared to medical students, veterinary students were statistically significantly more likely to strongly agree that:

- people who own pets tend to be happier than people who do not
- pets can serve important roles in helping patient recovery and morale

Responses for these statements were also stratified based on current ownership of pets. Out of a total of 188 respondents, 52.7% (veterinary and medical students) owned pets.

Table 7 shows that, compared to non pet owners, students who own pets were statistically significantly more likely to agree that:

- people who own pets tend to be happier
- pets can serve important roles in helping patient recovery and morale

Table 7. Comparison of Means for Human Animal Bond Statements Stratified by Ownership of Pet(s)

	Do you own any pets?	Std.		
		N	Mean	Deviation
People who own pets tend to be happier than those who do not	1 Yes	137	3.93	.769
	– 2 No	114	3.31	1.014
Pets can serve important roles in helping patient recovery and morale	1 Yes	136	4.50	.596
	– 2 No	113	4.14	.766

Table 8 shows that, compared to medical students, veterinary students were statistically significantly more likely to strongly agree that:

- their role as healthcare providers is not just to maintain health but to improve it and also not just to fight disease but prevent it
- collaboration between human and animal healthcare providers is important for protecting Public Health

CONCLUSION

This study showed that there were significant differences between veterinary and medical students in their ability to define One Health and in their appreciation of One Health concepts. These results seem to reflect the professional differences that may be impacting the adoption of the One Health approach in the current public

Table 8. Comparison of Means for Perceptions of Effective Health Care Delivery Statements

Effective Health Care		N	Mean	Std. Deviation
Our role as healthcare providers is not just to maintain health, but improve it	Veterinary student	46	4.80	.453
	– Medical student	111	4.40	.704
Collaboration between human and animal health care providers is important for protecting the public health	Veterinary student	47	4.64	.568
	– Medical student	110	4.02	.704
Our role as healthcare providers is not just to fight disease, but prevent it	Veterinary student	46	4.83	.486
	– Medical student	112	4.48	.697

health arena. It suggests that greater emphasis should be paid to medical curricula to further advance and apply the One Health approach.

Strengthening education regarding the environmental component of One Health is also needed.

A limitation of this study was that the student knowledge of One Health was not assessed before taking the IPE course. It is hard to appreciate the educational value of IPE as it relates to One Health and quantify whether students were knowledgeable before the IPE course. A future study should thus include a pre and post test of knowledge, attitudes and beliefs.

Despite this shortcoming, Western University should be commended for taking the step to expose students from all health professions to One Health through the IPE program. It is clear that having students from various professions in the same room and discussing common health issues is already a first step towards greater intersectoral collaboration. In real life, health professionals rarely have the opportunity to interact at conferences and meetings, to collaborate on projects or to communely address health issues.

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EXPERIENTIAL FIELD TRAINING AND ACTIVE SIMULATIONS

Sopon IAMSIRITHAWORN¹, Karoon CHANACHAI², Angkana SOMMANUSTWEECHAI³

INTRODUCTION

In the last decade, high profile infectious disease outbreaks including Severe Acute Respiratory Syndrome (SARS), highly pathogenic avian influenza (HPAI) H5N1, and pandemic H1N1 influenza, have demonstrated the need for prompt epidemiological investigation and response, and the importance of teamwork and improved communications among multiple sectors. Field-based training has demonstrated its effectiveness in response to major epidemics worldwide, and has become a key strategy to strengthen disease prevention and control capacity in many countries.

In 1980, the Thai Ministry of Public Health's Department of Disease Control (DDC) established Thailand's Field Epidemiology Training Program (FETP) in response to the country's need for competent field epidemiologists with disease outbreak and surveillance experience capable of responding promptly and effectively to public health emergencies. FETP-Thailand is modeled after the US CDC's Epidemic Intelligence Service (EIS) program with support from the World Health Organization (WHO). In the past 3

decades, the program has graduated over 200 field epidemiologists. Although initially only physicians were enrolled in the FETP's 2 years for field-based training, in 2005 the program was expanded to include other health professionals (including veterinarians) who focus on public health work.

During the SARS crisis in Asia in 2003, Thailand's DDC proposed a novel disease prevention and control strategy by having every province set up at least two operational teams consisting of a physician, an epidemiologist, a lab technician and a disease control officer, tasked with identifying persons with possible SARS. The teams were on duty 24 hours a day, 7 days a week. Following a notification of a suspected SARS case, a local team was immediately deployed to visit the patient and begin a field investigation. Due to the success of this strategy, the health emergency response team concept was gradually incorporated as an integral component of the national system for disease surveillance and response.

In early 2004, HPAI (H5N1) outbreaks were

Surveillance and Rapid Response Team (SRRT)

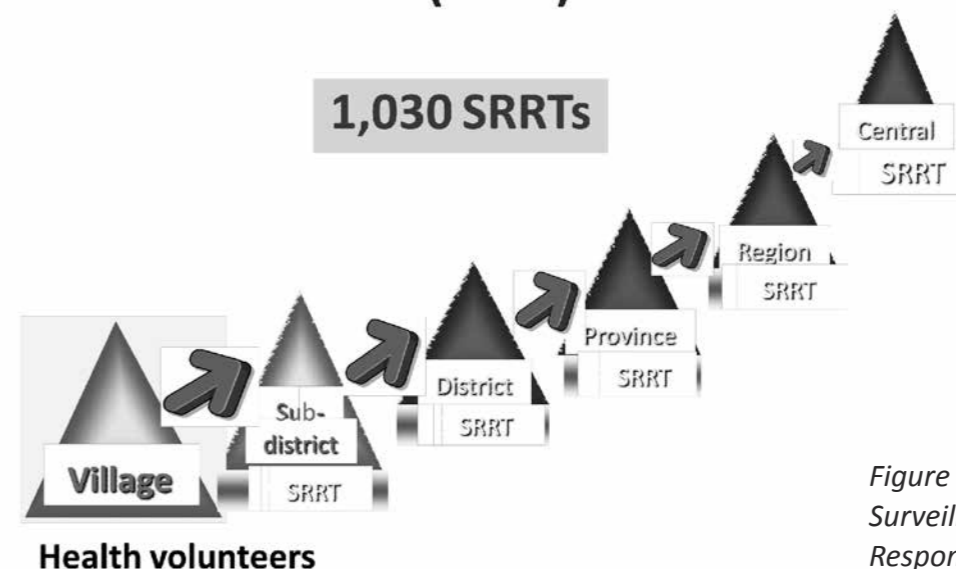


Figure 1. Network of Surveillance and Rapid Response Teams in Thailand

detected in several provinces of Central Thailand. The new crisis stimulated the Thai Ministry of Public Health (MoPH) to launch a policy to establish 1,030 Surveillance and Rapid Response Teams (SRRTs) nationwide (Figure 1). The strategy approved by health authorities was for a team in every district and at least one provincial SRRT in every province, including Bangkok. At the regional level, there is a SRRT in all 12 regional offices of DDC. At the national level, a central SRRT, responsible for coordinating response to all outbreaks of national importance, is staffed by experienced FETP graduates and senior officials from the Bureau of Epidemiology (BoE).

The SRRT members receive training and mentoring from experienced trainers of FETP-Thailand with support from FETP graduates working at different levels of the public health service, both in the Ministry of Public Health and in other ministries. A short-course training called "Field Epidemiology and Management Training" (FEMT) was designed

by faculty members of FETP-Thailand with the objective to provide a 6-month in-service training for SRRT leaders who are physicians and public health professionals. The training assignments include one field outbreak investigation and one surveillance evaluation study.

COLLABORATION ON TRAINING OF VETERINARIANS

In 2005, the first cohort of veterinarians was enrolled in the FETP-Thailand with strong policy support from the Department of Livestock Development (DLD) of Thailand. Animal doctors and physicians received field-based training and joined hands to investigate disease outbreaks. Furthermore, in 2009 with support from FAO, USAID and U.S. CDC, the collaboration was expanded to establish a Regional FETP for Veterinarians (FETP-V). The program aims to

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strengthen animal health personnel and promote multi-disciplinary response capacity for diseases in animals. It is closely linked to FETP and focuses on surveillance and investigation of outbreaks in animal diseases and zoonoses. As of December 2012, a total of 15 veterinarians have graduated from the FETP-V, including eleven Thai and four veterinarians from neighboring countries in Southeast Asia. Currently, five international trainees and two Thai trainees are enrolled in the program. In addition, a total of 38 international and 44 Thai participants were trained during a one-month FETP-V prerequisite course. The program has promoted a number of field-based activities in Thailand. Several surveillance activities and outbreak responses to both zoonotic and non-zoonotic pathogens were conducted by trainees and alumni, including human Streptococcosis caused by Streptococcus type 2 from pigs, human and animal Brucellosis, Rabies, Anthrax and Avian Influenza.

In July 2011, a special meeting among government officers from human health, animal health and wildlife health, university professors and NGOs was held to form the Thai One Health Network. At the end of the meeting, a One Health Declaration was drafted and approved by meeting participants. The goal is to strengthen Thailand's capacity for better preparedness and response to emerging infectious diseases (EIDs) through multi-sectoral and multi-disciplinary collaborations.

MOVING TO ONE HEALTH EPIDEMIOLOGY TRAINING

In 2012, building upon long term experiences

with FETP and SRRT training, a multisectoral project to "Support Training to Strengthen One Health Epidemiological Teams at the Provincial and District Level" was planned based on a collaboration between FETP-Thailand, the Field Epidemiologist Association of Thailand (FEAT), FETP-V, DLD, the Zoological Park Organization (ZPO), the Department of Natural Parks, Wildlife and Plant Conservation (DNP), the USAID's RESPOND project, and U.S. CDC. This applied outbreak response training and capacity building activity was conducted in 5 different regions of Thailand, and involved key medical epidemiologists, veterinarians and wildlife experts. Faculty members from five universities were invited to be project advisor for the field-based projects and the relationship has led to an improvement of government-university collaboration in the country. Subsequently, in late 2012, the Chair of Thailand One Health University Network was invited to co-chair the Thai One Health Network and discussion on continuing activities through additional projects as well as in-service training.

The project goals are to strengthen national capacity in preparedness and response through collaborative work of a multisectoral team of health professionals through:

- Improved mentoring skills of supervisors;
- Strengthened disease surveillance and joint response to public health events of national and international concern;
- Enhanced communication and knowledge among the sectors;
- Education to improve knowledge and technical skills of SRRT members;

- Closer collaboration with university faculty to exchange ideas on enhanced training methods, materials and curricula to improve knowledge and adult learning techniques; and
- Encourage managers in all sectors to improve teamwork and the use of timely and accurate disease and outbreak information to protect the public's health and limit the impact of EIDs, including zoonotic diseases, on national productivity and economic growth.

This One Health-focused training project involved two one-week national workshops, and five provincial-level field projects over six months involving zoonoses which are a priority for Thailand (Q fever, tuberculosis, Melioidosis, Brucellosis, West Nile virus). A final seminar was held to showcase results and lessons learned from the projects completed (Figure 2). Experienced field epidemiology trainers from multiple sectors and a representative of university faculty reviewed and modified the training curriculum based on national priorities. Five pilot provinces, namely, Chiangmai, Chonburi, Nakhon Ratchasima, Songkhla and Kanchanaburi were selected based on the presence of both FETP alumni and health professionals and university faculty interested in strengthening EIDs preparedness and responses through "One Health" approach.

West Nile encephalitis has been listed as one the potential EIDs in Thailand. No human cases have been identified or reported. In preparation for a potential West Nile outbreak in Thailand, an active simulation was initiated with a focus on developing effective surveillance for the disease. A joint investigation was conducted to identify the

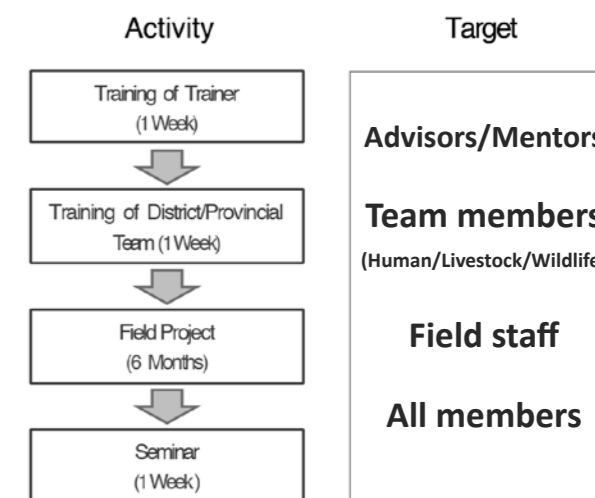


Figure 2. Structure and Stakeholders of "Training of One Health Epidemiological Teams at the

etiology of encephalitis cases with unknown cause. Participating organizations were from different health sectors, including public health, the vector control unit, the livestock office, and wildlife health sectors in the province. Following a notification of a suspected human case of encephalitis of unknown etiology, a multi-disciplinary team will be deployed to investigate the human case, identify possible vectors of disease and animal reservoirs in both livestock and wildlife.

CONCLUSIONS

Working collaboratively in the design, planning and implementation of applied epidemiology

training at the provincial and district levels has improved teamwork and the capacity among the multiple sectors responsible for disease surveillance and outbreak response. The “One Health”-based curriculum and training experience can serve as a guide for future One Health training workshops in the nation and region. Collaboration between government agencies and universities should be stressed in developing curricula to strengthen One Health knowledge and skills. Trust-based cross-sectoral collaboration will contribute to timely sharing of surveillance information and enhanced emergency response capacity, resulting in improved EID prevention and control. Collective leadership, trust and policy commitment are vital factors for the success and sustainability of the One Health network in the provinces and country.

ACKNOWLEDGEMENTS:

The authors are grateful for assistances from a number of collaborators in human health, livestock and wildlife health sectors in the 5 provinces who work collaboratively to strengthen surveillance and outbreak responses through field projects. Special thanks go to Dr. Douglas Hatch and Dr. Stanley Fenwick of USAID EPT RESPOND project, and to Dr. Alden Henderson of U.S. CDC for their full support in the development and implementation of the “Support Training to Strengthen One Health Epidemiological Teams at the Provincial and District Level” project.

IMPLEMENTING ONE HEALTH APPROACHES for Private Veterinarians in Livestock Derived Food Business

Narin ROMLAMDUAN

According to FAO-OIE-WHO collaboration report in April 2010, they committed to work together closer for aligning the activities which related to animal-human-ecosystem interface, so called “One Health” in order to support member countries.

In perspective of CPF, as the private company in Thailand, we has provided meat and food products from livestock production more than 80 years. Our company’s vision in 5 years from 2008-2013 is “To provide meat and food products that are nutritious with food safety integrity to satisfy customers in each market region”

The Animal Health and Technical Service Office, CPF (Thailand) co., ltd., provides animal health solutions by specific prevention and control measures for livestock’s diseases, especially for poultry and swine production in order to produce safety food for consumers.

We are focusing on food safety, innovation, traceability, medication, vaccination, animal welfare and environmental concerns. Veterinarians who deal with livestock health in food business have to be trained about the basic issues on one health concept, biosecurity, food safety, emerging and re-emerging diseases, emergency plan for disease outbreak, early warning system and health monitoring program for diseases prevention and elimination from food chain and continuous supporting safety food for the consumers.

CAPTURING THE POWER OF GLOBAL COMMUNICATIONS TECHNOLOGIES

to Enhance Learning and Capacity Development for One Health

Willem VINK

ABSTRACT

The One Health approach is appealing but highly complex; implementation of relevant activities is influenced by professional competencies, attitudinal factors and institutional support. Transdisciplinary professional education is an essential component of developing a cadre of motivated One Health professionals. This paper illustrates how dynamic developments in the field of education, supported by emerging online information and communications technologies and social media, represent exciting opportunities for synergy with One Health, and discusses how these will have a fundamental and growing impact on its implementation.

INTRODUCTION

The field of One Health is, by definition, highly multidisciplinary. Its philosophical foundations are intuitively and inherently compelling: by advocating a holistic approach and counteracting the divergence of the human, animal and environmental health professions arising from increasing specialisation, One Health has the

potential to result in improved effectiveness and efficiency of health-associated outcomes. This has undoubtedly been a contributing factor to the rapid gain in popularity of, and support for, One Health in recent years. However, it is a highly complex concept: its outcomes are impacted by (among others) geographical, economic, political and socio-cultural factors. Consequently, implementing One Health approaches demands a broad understanding of issues which cut across human and animal medicine, environmental, social and other sciences, as well as the intricacies of their interactions and their impacts on each other. The major international human and animal health agencies, World Health Organisation (WHO), Food and Agriculture Organisation (FAO), World Organisation of Animal Health (OIE) and Centers for Disease Control (CDC) have endorsed and promoted inter-agency and inter-sectoral collaboration (Anon., 2008a; Anon., 2008b; Anon., 2010; CDC, 2010). Such high-level leadership is necessary to mobilise opinion and solicit political support. However, it does not create One Health practitioners that are capable of engaging the principles and discussion, integrating these into public health practice at multiple levels, and converting them into meaningful action.

There has recently been substantial discussion of the competencies required, and three broad areas can be identified (Vink et al., in press). A primary requirement is that One Health practitioners are able to draw on a nucleus of shared competencies. While it is neither realistic nor desirable to train people who are 'specialists in all disciplines', successful practice requires relevant ability, knowledge or skills that must extend beyond narrower professional capabilities (Moser, 2008). In addition, the capability of professionals with different backgrounds to operate in a multi-disciplinary context also depends on their ability to communicate and collaborate effectively (Kahn, 2011). Inconsistencies or omissions in technical and scientific terminology can make this problematic. Thirdly, successful implementation demands the willingness and preparedness of One Health practitioners (as well as the institutions they work in) to break out of organizational 'information silos' and initiate collaborations.

Education and collaborative research are key activities to build One Health capacity (Conrad et al., 2009; Osburn et al., 2009). The seminal Centers for Disease Control meeting held in May 2010 at Stone Mountain (CDC, 2010) identified a set of "critical enabling initiatives" and selected training as its top priority. Training is required at multiple levels, including positions related to coordination and decision-making (Anon., 2008b); this was described in the Stone Mountain meeting as creating "One Health leaders" (Rubin, 2011). Although academic curricula have incorporated principles of multidisciplinary health-related teaching, to varying extents, for decades, the emergence of One Health as a credible discipline has led to a sharp increase in the number of courses and degree programmes explicitly marketed as One Health. However, these are frequently operated by North American or European institutions, and

may have limited relevance and applicability in developing countries, where the shortage of capacity is the greatest.

A short section on the global changes in the education sector, driven primarily by the developments in information and communications technologies, is appropriate, as this informs the subsequent discussion.

THE CHANGING FACE OF EDUCATION

In the previous decades, there has been growing emphasis on the pedagogy of problem-based learning (PBL), especially in the medical sciences. As a style of learning, PBL is considered to represent a social constructivist approach: knowledge is actively "constructed" in groups, by flexibly encouraging problem-solving, strategising and collaboration. Crucially, students incorporate their pre-knowledge and experience, are expected to contribute this, and learn from each other as well as the tutor. Consequently, the student's knowledge base is not static, but is constantly being expanded and augmented by information-sharing and incorporation of tacit knowledge. This is an iterative process: learners continuously attempt to "update" meaning (Siemens, 2005) and "learn by doing". The constructivist theory has led to the concept of "communities of practice" consisting of individuals or members who actively contribute to and expand this collective knowledge base (Sandars and Heller, 2006).

As a parallel development, over the past decade or so, there has been an unprecedented rise of distance education. This has been enabled by the spread of the internet, in combination with the development of specialised learning

management systems (LMSs) for course delivery. An LMS is effectively a content-managed website, that is, a website which can be edited, developed and used, primarily via graphical interfaces, by users assigned different levels of access or roles. The functionality of the LMS has been specifically designed for educational purposes. In addition to the presentation of static text-based subject content, this includes features such as discussion boards, messaging, chat facilities, wikis, presentation of audiovisual content etc. A variety of interactive learning resources are available, such as lessons, quizzes, questionnaires etc. Students can be grouped, which enables collective activities and facilitates the implementation of constructivist approaches (sometimes characterised as “computer-supported collaborative learning”). Another strength of the LMS is its functionality to conduct and record student assessment. Typically, course teachers can change settings, upload and create content, while students cannot.

The cross-fertilisation of social constructivism and the burgeoning development of the internet led George Siemens to propose the term “connectivism” in 2005. The underlying idea is that knowledge “exists in the world” rather than being possessed by an individual, and is accessed through a network of information sources (Siemens, 2005). Learning is the process of identifying and linking information from multiple sources into a dynamic personal knowledge base. In this model, learning is fluid and relatively unstructured, adopting a variety of tools such as an LMS, RSS feeds, blog posts, synchronous online meetings etc. Siemens’ work led him to organise the first Massive Open Online Course (MOOC) in 2008, which was freely enrollable by anyone who wished to contribute. The recent emergence of the Open Educational

Resources movement (OER Commons, 2012), and the well-publicised development of leading universities worldwide participating in the establishment of platforms for the delivery of MOOCs (such as Coursera, Udacity and EdX) attests to the fundamental paradigm shift that is taking place in the educational sector.

The rapidity with which these developments have taken place is astonishing. It is clear that many of these exciting ideas and technologies are highly compatible with the principles of One Health, and will have a large bearing on how One Health ideas, collaboration and education will spread in future. A case study which attempts to implement many of these new ideas in Asia will be presented.

MASSEY UNIVERSITY’S ONE HEALTH FOR ASIA PROGRAMME

This programme, which aims to strengthen the management of current and emerging human and animal diseases, was launched in 2010 and provides formal training of public health doctors and veterinarians through two Masters degrees: a Master of Public Health (Biosecurity) and a Master of Veterinary Medicine (Biosecurity) (Vink et al., in press). The first cohort of students, who commenced their studies in May 2010, consisted of 70 doctors and veterinarians from Afghanistan, Pakistan, India, Bangladesh, Nepal and Sri Lanka (Figure 1). Approximately equal numbers of doctors and veterinarians were enrolled.

The Masters programmes required completion of eight courses, as shown in Figure 2. Seven

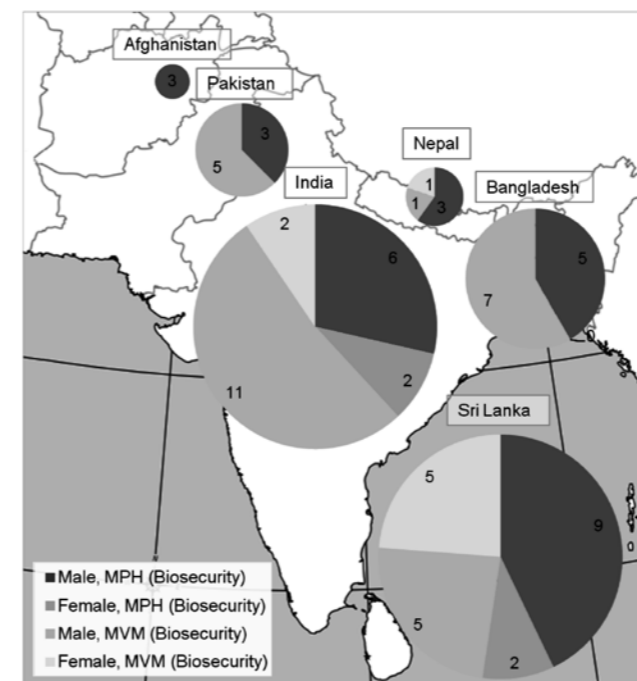


Figure 1: Student demographic of students enrolled into Massey University’s One Health Masters programme

of these were taught entirely online, using the Moodle LMS (Moodle, 2012); the remaining course (the fourth of the foundation courses) was a combination of online and face-to-face training. The first four courses provided a foundation in epidemiology and were common to both degrees. The remaining four courses addressed specialised topics related to human or animal health. The courses were delivered online over a six-week period with a study load of about 20 hours per week.

The primary objectives were to establish a consistent lexicon and mastery of relevant technical competencies in epidemiology and public health, and to establish groups of students from a wide range of countries, professional expertise

and experience as One Health “communities of practice”. Key strategies to achieve this were to teach into a common learning space, and to establish effective communication and collaboration between students with different professional backgrounds. A consistent approach for bringing this into practice was to adopt “active” modes of learning, frequently consisting of relevant, engaging and multifaceted case studies which required completion of a set of interactive activities. A secondary benefit of the online delivery was that it improved the candidates’ competence at using information and communication technologies, and bolstered confidence in working in an online environment.

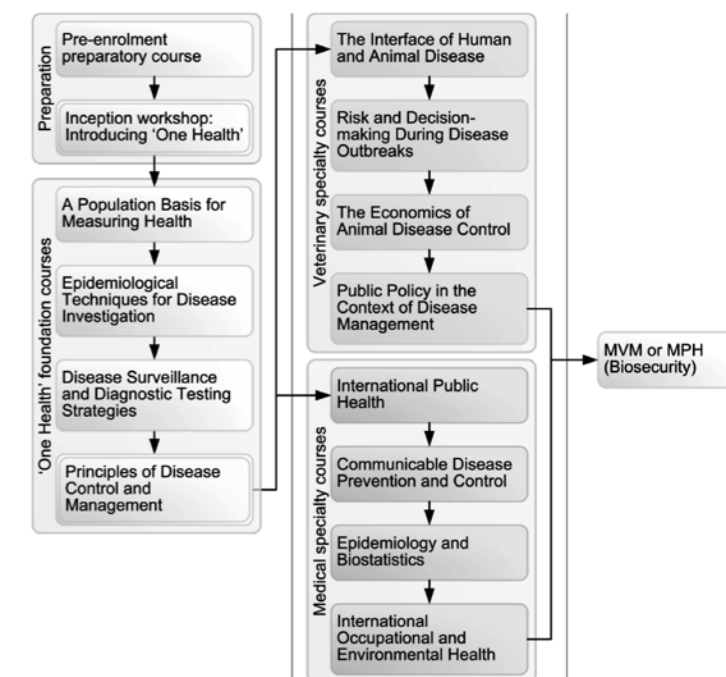


Figure 2: Programme structure of the MVM (Biosecurity) and MPH (Biosecurity) programme.

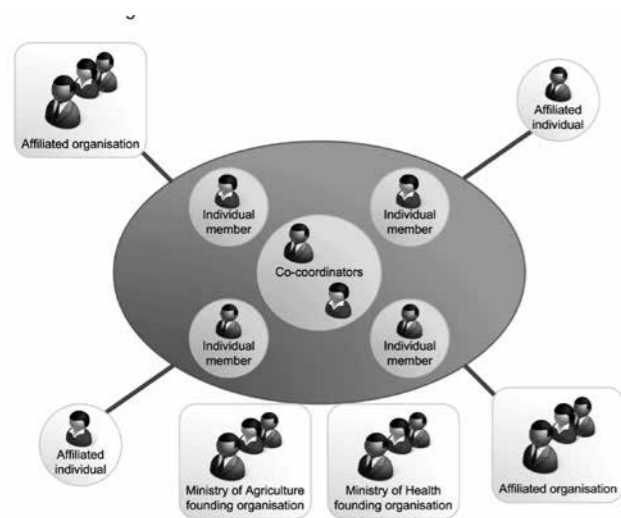


Figure 3: Organizational structure of One Health Hubs

All study materials were made available in the Moodle course, including readings and resources; in addition, all students had full access to the Massey University library. Intensive use was made of native Moodle functionality to perform a combination of individual and group work, including discussion forums, lessons, quizzes and questionnaires. To carry out specific activities related to various courses, use was made of additional software tools which were embedded as seamlessly as possible into the LMS. Assessment consisted of a combination of individual and small-group outputs. Students were encouraged to make the best possible use of various information domains, including traditional sources such as the University library, but extending to the internet as well as the knowledge and experience held by the participating students themselves.

Establishing the degree programme was challenging from a number of perspectives. Firstly, the evolving and fast-developing concept of One Health meant

that the curriculum and the course content necessarily had to be designed and built from the ground up. Secondly, online learning was a new experience for almost all the students, the teaching model was unfamiliar to most, and a large range in the students' pre-knowledge and experience needed to be accommodated. Thirdly, the technical aspects of delivering online distance education into a region with highly variable internet availability required careful consideration. Despite these challenges, our experience has been that online learning lends itself organically to the One Health approach. De Laat et al. (2006) endorse this with the comment that the field of networked learning, too, is increasingly interdisciplinary and draws upon theoretical perspectives from the domains of education, the social sciences, computer sciences and linguistics.

Research has shown that training programmes that focus on application and providing ongoing support, rather than on theoretical knowledge, are more successful (Winthrop and Smith, 2012). Consequently, the Masters-level training is being followed up by a second phase aimed at implementation of collaborative activities and research. Organizationally, this is underpinned by the establishment of One Health Hubs (OHHs), which consist of a consortium of individuals and organisations that are directly or indirectly involved in the management of zoonotic diseases. The OHHs are established with the Ministry of Health and the Ministry of Agriculture or Livestock in each country as founding organizations (see Figure 3). OHHs will be connected to develop an informal regional One Health network. The OHHs are underpinned by HubNet, a web-based platform using state-

of-the-art information technologies to provide tools for communication, collaboration, resource-sharing and professional networking. The use of open-source software will enable HubNet to be hosted and maintained in the region.

CONCLUSION: ONE HEALTH IN A NETWORKED WORLD

The One Health approach aspires to a joint design of disease investigation, control and management systems for emerging and endemic zoonotic diseases (Kahn, 2006), requiring integrated teams of veterinarians and public health professionals, both in operational teams and in leadership roles. Effective collaboration involves building new relationships and respect for the roles and expertise of professionals in different sectors (Anon., 2008b). Structured and relevant education in a common environment represents an effective strategy for achieving these goals, and stands at the basis of fostering a cadre of health professionals that will be the decision-makers of the future.

One Health cannot be considered in isolation from the world in which we live. The developments in the field of education, supported by emerging learning technologies and social media, reflect a paradigm shift that has many parallels with One Health, and hence represent opportunities for synergy. Concepts such as "communities of practice" and "networked learning" resonate to a high degree, and are bound to have a fundamental impact on the operationalization of One Health. Ongoing developments in mobile technologies - for communication as well as education - will undoubtedly influence the way in which One Health will be put into practice over the next decade or so.

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INTEGRATING HEALTH

Priorities and Workforce Employers in Curriculum Development

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INTRODUCTION

With support of USAID through the RESPOND project, in the year 2010, 14 Institutions of Higher Education (7 Schools of Public Health and 7 Schools of Veterinary Medicine) agreed to establish a university based network to champion One Health Approach in the Central and Eastern Africa region (OHCEA). The network covers six countries; Democratic Republic of Congo, Ethiopia, Kenya, Rwanda, Tanzania, and Uganda. The establishment of the network benefitted from the five years of experiences documented by Health Alliance, a network of 7 Schools of Public Health in the region. During the period 2011-2014, the USAID support will be utilized to Strengthen and Expand the OHCEA network with two main objectives; i. Expand the human resource base needed to detect and respond to potential pandemic disease outbreaks, and ii. Increase integration of animals, wildlife and human disease surveillance and outbreak response systems.

Curriculum Development in institutions of higher education is in practice a preserve of the institutions with insufficient or minimal input from

the potential employers of the graduates from the academic institutions. The extent to which health priorities of the bodies that employ the graduates of the universities are integrated in the development of various curricula requires strengthening. One such priority or challenge is how to address the current complex health problems that may not be resolved by a single sector as has been the traditional practice but rather to use a different approach that enables multi sectoral collaboration to address identified complex problems. Thomas Kuhn (1) in "The Structure of Scientific Revolution" (1962) notes that Paradigms change when old systems and methods don't solve new problems and when events occur that can't be explained by current models.

The Bellagio Working Group (2) adopted a definition of One Health - One Health approach requires working collaboratively across disciplines and professions to address complex contemporary health issues. A One Health approach enables better understanding of the threats and greater innovation for more holistic and integrated intervention strategies.

INTEGRATING ONE HEALTH PRIORITIES AND EMPLOYERS IN CURRICULUM DEVELOPMENT IN CENTRAL AND EASTERN AFRICA REGION

Creating a more sustainable public health human resource base requires not only preparing the workforce, but also enhancing worker performance. OHCEA proposes to address both of these areas by developing and providing pre-service and in-service training, as well as improving communication and collaboration between sectors and stakeholders who traditionally operate in isolation. (3)

Assessment of Training Needs of health related professionals currently in service and in service training

Before developing curricula for in service training the professionals in health related sectors in the Central and Eastern region, OHCEA has developed a Training Needs Assessment tool to be used to determine the training needs that will be addressed through a cascade training model. Each of the six countries will assess the needs in the months of January 2013. The Training needs will be validated by stakeholders that will include the employers of the respective professionals. The training needs assessment will focus on the One Health Core Competencies domains agreed on in a regional OHCEA workshop that drew delegates from Government sector ministries.(4)

The core competencies domains agreed on are:

- Management
- Communication
- Values and Ethics
- Leadership
- Systems Thinking
- Culture, gender and beliefs
- Policy and Advocacy

- Collaboration and Partnership
- Research

A regional workshop will be convened to develop training materials for Training of Trainers(60) who will in turn develop training materials for training health Professionals at country level (600 in two years). The trained personnel will in turn train 3000 first responders in two years (3)

Strengthen and Develop University Curricula and Programs

One of the key activities for OHCEA is to develop a cadre of One Health experts through developing curriculum at both pre-service and in-service level that support the capacity needs of government, countries and the region. Competency-based training programs will be developed and curriculum mapping customized at the country level based on the identified core competencies.

To promote cross-disciplinary collaboration, OHCEA focal persons together with UMN and Tufts faculty will implement inter- and intra-University workshops. Workshops will facilitate cross-disciplinary collaboration through co-teaching, curriculum review and partnership. OHCEA will also foster One Health promotional activities for faculty and students including brown bags, health days, bomas, OH student clubs and seminars. DRC for example, plans to create Scientific Multidisciplinary Groups involving public health veterinary and nursing schools. Each of the OHCEA institutions also plans to foster One Health collaboration and training through OH student internships, field attachments and applied field experiences in partnership with relevant stakeholders (EPT

partners, IGOs, government agencies, private sector).

OHCEA also plans to focus significant effort on strengthening and building pre-service courses, programs and curricula. This will include strengthening existing pre-service courses and programs, reviewing existing curriculum, and creating new courses or new programs at certificate, masters, professional and undergraduate levels. Where appropriate and possible, US and African OHCEA universities will work with OHCEA schools to develop new curricula to be approved, accredited and implemented at the country level in collaboration with stakeholders. Examples of pre-service approaches currently proposed by OHCEA include: 1) strengthening of wildlife curriculum and faculty development in wildlife health across OHCEA institutions; 2) development of One Health pre-service curricula for vet technicians in DRC; 3) review of existing and development of new undergraduate and graduate level degree programs at OHCEA schools; and 4) delivering quality assurance training to OHCEA schools to strengthen curricular development and management approaches. Some OHCEA institutions are interested in developing wildlife and environmental expertise to include Emerging Zoonotic diseases and Wildlife training. (5)

OHCEA plans to develop Regional collaboration sites (One Health Demonstration Sites) for capacity building, outreach, and applied research in One Health where student, faculty and government will work together to address joint complex health problems in long-term research, training and outreach at the human-wildlife-livestock-environmental interface. A situational analysis will be conducted to identify regional One Health sites.

A team of faculty across the region interested in the concept will be identified and this faculty team will review regional commonalities at the OH intersection and identify sites of interest. Specifically, OHCEA and US faculty will review existing field based programs and attachments, identify sites of interest in interested countries, conduct situational analysis and planning/preparation for each site and engage local, regional and national stakeholders to assure that activities align with priorities and existing activities. MOUs will be developed as needed based on local/regional government and institution requirements. A cross disciplinary group of students will be identified and attached to these chosen OH demonstration sites. Once the students have finished their attachment to the field site, they will jointly develop and present field activities and projects. OHCEA and US university faculty will identify and fund research and outreach projects in the sites across the region and disciplines. These sites will be used to foster international faculty and student exchanges and promote communication and collaboration across One Health organizations and projects.

In addition to review and development of health curricula, OHCEA schools in partnership with US universities will develop, implement and support innovative applied One Health education and training programs. The One Health Residency at Makerere University plans to recruit 2 veterinary, nursing and public health professionals as residents to participate in this applied, experience-based training program where students earn a Masters level degree (MPH, MSc) while spending 75% of their time working on practical, real-world projects

with Stakeholders to build skills in identified competencies. Each OHCEA country will send two in-service staff to attend a two year MSc. program in Preventive Veterinary medicine with Field Epidemiology track at Makerere University. Other innovative programs identified include Team Outbreak, One Health curriculum for vet technicians and nurses, and Vet-Nursing-Medical students' joint field practicums. For example, training materials for the vet-nursing-medical joint field practicum will be developed by OHCEA and students will jointly be attached to the field to acquire hands-on experience in OH activities.

OHCEA faculty and its leadership will conduct One Health seminars, lectures and campaigns to support sensitization of One Health concept at existing and new OHCEA schools.

CONCLUSION

By 2014, OHCEA will have established itself as a fully functional regional One Health network with in-house capacity for sustaining continuous improvement of health and well-being of humans, animals and ecosystems through multidisciplinary research, training and community service. From its regional base OHCEA strives to contribute to One Health as indicated by its collaboration with international partners. OHCEA members and the human, veterinary and wildlife health systems they represent will be demonstrably better trained in the One Health approach and linked through integrated institution function, communications, operational protocols and policies. Curricula jointly designed and tested by these partners will be in place and utilized by pre- as well as in-service personnel. National government offices responsible

for disease surveillance and response will form key partners in OHCEA's transformation strategy and be targeted as a beneficiary of its training efforts. Most importantly, the new capacity and coordination facilitated through OHCEA will result in more rapid detection and response to emerging and episodic zoonotic incidents, thereby limiting loss of human and animal life and reducing the risks of pandemics while simultaneously operating more effectively to address common debilitating and deadly diseases.

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 Proceedings of the OHCEA Regional Workshop to identify targeted, practical and applied One Health related in service training programs- Dar es- Salaam 17th-21st September 2012
 OHCEA 2012/2013 Work plan Narrative

2.7

PREPAREDNESS FOR NIPAH VIRUS OUTBREAKS

in At-Risk Countries

BACKGROUND

Nipah virus (NiV) is a lethal bat-borne paramyxovirus that first emerged in Malaysia in 1998-9, killing pigs and people. It is now known that Nipah virus is distributed widely across South and southeast Asia, with related henipaviruses found in Australia and Africa. In Malaysia NiV moved from bats into pig farms close to fruit bat habitat, then into people, suggesting that countries with large pig populations where this virus occurs are at-risk of future outbreaks. However, in Bangladesh, NiV has repeatedly been transmitted directly from bats to people as a food-borne infection. Furthermore, it has shown capacity to move person-to-person. The wide distribution of the virus and its reservoir hosts, the large human population in these countries and diverse farming and cultural practices suggest that the risk of future outbreaks is high.

MODERATOR

Jonathan EPSTEIN

Associate Vice President

*EcoHealth Alliance
USA*

OBJECTIVES

To demonstrate the value of a One Health approach to dealing with the emergence of henipaviruses in 3 different countries, with different impact and involving wildlife, livestock and humans. Each speaker will tell the 'story' of how NiV or HeV emerged in their country, how they mobilized resources to deal with it, and what this means for preventing the risk of emergence in the future. Each talk will touch on:

- how open communication and sharing of reagents and samples among countries helped rapid identification of cause and limited the size of outbreaks
- the public perception of these viruses in their countries

SPEAKERS

- **Emergence of Nipah Virus in Malaysia**
Ramalan bin Mohamed, Director,
Veterinary Research Institute, Malaysia
- **Assessing the risk of Nipah virus emergence in Thailand**
Supaporn Wacharapluesadee, Laboratory Chief,
Faculty of Medicine,
Chulalongkorn University, Thailand
- **Repeated emergence of Nipah virus in Bangladesh via novel pathways**
Stephen Luby, Professor, Stanford University, USA
- **The Application of One Health Approaches to Henipavirus Research**
Hume Field, Principal Scientist,
Queensland Centre for Emerging Infectious Diseases, Australia



Dr. Jonathan Epstein is a veterinary epidemiologist and Associate Vice President of Conservation Medicine at EcoHealth Alliance (www.ecohealthalliance.org). He is the Asia Regional Coordinator under the USAID-funded Emerging Pandemic Threats: PREDICT program, a global effort to establish an early warning system for emerging viruses with pandemic potential through targeted wildlife disease surveillance. He also directs the One Health Alliance of South Asia (OHASA), a multi-lateral science and policy network with members from India, Pakistan, Bangladesh, Nepal, and Bhutan, focused on the control and prevention of trans-boundary zoonotic diseases. His current research activities are focused on understanding the ecology of emerging zoonotic viruses such as Nipah virus, Ebola and SARSCoV; which spill over through human-animal interfaces such as agriculture and trade. He is currently part of a large international collaboration that is investigating the ecology of Nipah virus in Bangladesh, where outbreaks occur in people almost every year with mortality rates reaching 90%.

Dr. Epstein is also the Executive Director of the Consortium for Conservation Medicine (CCM) based at EcoHealth Alliance. The CCM is a unique collaborative multi-institutional partnership including Johns Hopkins School of Public Health, Tufts School of Veterinary Medicine, University of Pittsburgh School of Public Health, University of Wisconsin-Madison, and the USGS National Wildlife Health Center. The CCM is the first formal inter-institutional partnership to applied conservation medicine - linking ecology, conservation, and health (both human and animal).

He holds adjunct faculty positions at Columbia University's Mailman School of Public Health; Tufts Cummings School of Veterinary Medicine and Tufts School of Medicine; and Mount Sinai School of Medicine. He holds advisory positions on two committees in the International Union for the Conservation of Nature (IUCN): the Wildlife Health Specialist Group and the Bat Species Specialist Group. His work has been published in several leading scientific journals including Science, PNAS, PLoS Pathogens, Emerging Infectious Diseases, The Annals of the NY Academy of Science, and The Journal of Applied Ecology. Dr. Epstein has been an invited speaker at several US and international meetings including those held by the Institute of Medicine, The American Society of Microbiology, The CSIRO Australian Animal Health Laboratory, The Food and Agriculture Organization, and the World Health Organization.

JONATHAN EPSTEIN

Associate Vice President

*EcoHealth Alliance
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Dr Hume Field is an internationally recognized authority on emerging diseases associated with bats. He is a veterinary epidemiologist with particular expertise in Hendra virus and Australian bat lyssavirus (the focus of his PhD research), Nipah virus (he worked with US Centres for Disease Control colleagues to control the 1999 Malaysian outbreak and identify the natural reservoir) and SARS coronaviruses (he worked with Australian, Chinese and US colleagues to identify the origins of SARS in 2003-4).

He has been a temporary advisor to the United Nations World Health Organisation (on henipaviruses and SARS), the United Nations Food and Agricultural Organisation (on SARS), and the World Organisation for Animal Health (on rabies and other lyssaviruses). He strongly believes that human, livestock, wildlife and environmental health are inextricably linked, and has long championed a 'One Health' approach to emerging infectious diseases associated with wildlife. He coordinated the Ecology of Emerging Infectious Diseases research program for the Australian Biosecurity Cooperative Research Centre from 2003-2010.

He developed the Wildlife Epidemiology component of the Master of Veterinary Public Health course for the University of Western Sydney in 2004-5. He was visiting Professor of Zoonoses at the University of Malaysia, Sarawak in 2009-10.

His current research is focused on identifying risk factors for Hendra virus spillover. He is Principal Scientist in the Queensland Centre for Emerging Infectious Diseases in Brisbane.

HUME FIELD

Principal Scientist

*Queensland Centre
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Stephen Luby is Professor of Medicine with the Division of Infectious Diseases and Geographic Medicine; Deputy Director for Research at the Center for Global Health Innovation; Senior Fellow at the Woods Institute and Senior Fellow at the Freeman Spogli Institute for International Studies at Stanford University.

Prior to his current appointment, Dr. Luby served for eight years at the International Center for Diarrheal Diseases Research, Bangladesh (ICDDR,B), where he directed the Centre for Communicable Diseases. Dr. Luby was seconded from the US Centers for Disease Control and Prevention (CDC) and was the Country Director for CDC in Bangladesh.

Dr. Luby studied philosophy and earned a Bachelor of Arts summa cum laude from Creighton University in 1981. Dr. Luby earned his medical degree from the University of Texas Southwestern Medical School at Dallas in 1986 and completed his internship and residency in internal medicine at the University of Rochester-Strong Memorial Hospital. He studied epidemiology and public health in the Epidemic Intelligence Service (EIS) and the Preventive Medicine Residency of the Centers for Disease Control and Prevention.

Dr. Luby's career has included an EIS assignment to the South Carolina Department of Health and Environmental Control 1990-91; work with the CDC Malaria Branch in 1992; from 1993-98 Dr. Luby directed the Epidemiology Unit of the Community Health Sciences Department at the Aga Khan University in Karachi, Pakistan; and from 1998-2004 worked as a Medical Epidemiologist in the Foodborne and Diarrheal Diseases Branch of the CDC in Atlanta exploring causes and prevention of diarrheal disease in settings where diarrhea is a leading cause of childhood death.

Dr. Luby's research has addressed a number of public health issues. During his time in Bangladesh he lead a research group that explored the epidemiology of Nipah virus including detailed studies of villager's perspective on and response to the outbreaks and studies of virus circulation in its bat reservoir and spillover into domestic animals and humans. He has published over 200 scientific manuscripts.

STEPHEN LUBY

Professor

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Dr. Ramlan earned his Bachelor of Science degree in Biochemistry from University of Malaya, Kuala Lumpur in 1988. He received his Master of Science degree in Clinical Biochemistry in 2000 from the University Putra Malaysia. After 14 years of service in the government he was awarded post-graduate scholarship and obtained his PhD in 2006 from University of Sheffield, United Kingdom in Molecular Biology and Biotechnology. Dr. Ramlan joined the Department of Veterinary Services in 1991 as Research Officer specializes in animal's vaccine development.

During Nipah outbreak in 1998/1999, he was involved directly and responsible in laboratory diagnosis and testing Nipah. He was appointed as the director of Veterinary Research Institute in 2007 and served as reference laboratory for all animal's diseases in the country. He has been active in scientific publication and currently serving as Chief Editor of the Malaysian Journal of Veterinary Research.

He also serves as penal reviewer for research proposal under Ministry of Science and Technology.

RAMALAN BIN MOHAMED

Director

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Dr. Supaporn Wacharapluesadee is the laboratory chief of Neuroscience Center for Research and Development and associate director of WHO Collaborating Centre for Research and Training on Viral Zoonoses, Faculty of Medicine, Chulalongkorn University, Bangkok Thailand. She received her undergraduate degree in Medical Technology at Chiang Mai University, earned her master's degree in Biochemistry at Mahidol University and her Ph.D. in Biomedical Science at Chulalongkorn University, Bangkok Thailand.

During 1994-1997, she worked in the malaria research laboratory at the Department of Entomology, Armed Forces Research Institute of Medical Sciences. In 1997, she worked at Chulabhorn Research Institute in cancer research areas. During 1998-2000, she worked in HIV research at The HIV/AIDS Collaboration Thai-USA. She started working at Chulalongkorn University in 2000, in the Neurology Division, Department of Medicine.

Dr. Wacharapluesadee's current research focus is in the area of viral encephalitis and zoonoses. She is a molecular biologist and field virologist. Her interests are on diagnostics, pathogenesis, and surveillance researches. She has developed several nucleic acid amplification methods for ante-mortem detection of rabies virus in humans and post-mortem diagnosis in animals. Doctor Wacharapluesadee and her colleagues are interested in the causes and mechanisms that differentiate rabies as furious or paralytic forms. She has developed the PCR protocols for Nipah virus detection from biological samples which is the most sensitive and reliable among others published protocol. Dr. Wacharapluesadee and her colleagues have engaged in wildlife research since 2002. Her group has found that Nipah virus infected bats in Thailand and demonstrated the seasonal prevalence of Nipah virus transmission in *Pteropus lylei*. This finding correlate with the seasonal outbreaks found in Bangladesh.

Dr. Wacharapluesadee's surveillance team included various scientific disciplines for example medical doctors, veterinarians, wildlife veterinarians, wildlife zoologists and scientists. The one health approach is being used in her current research. The collaboration involved the government sectors, academic sectors and the local community. She believed that the community or village-based initiation is the most powerful tool for the success of disease control and prevention, particularly with zoonoses.

SUPAPORN WACHARAPLUESADEE

Laboratory Chief

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THE APPLICATION OF ONE HEALTH APPROACHES to Henipavirus Research.

HAYMAN DT, GURLEY ES, PULLIAM JR, FIELD HE.

Abstract

Henipaviruses cause fatal infection in humans and domestic animals. Transmission from fruit bats, the wildlife reservoirs of henipaviruses, is putatively driven (at least in part) by anthropogenic changes that alter host ecology. Human and domestic animal fatalities occur regularly in Asia and Australia, but recent findings suggest henipaviruses are present in bats across the Old World tropics. We review the application of the One Health approach to henipavirus research in three locations: Australia, Malaysia and Bangladesh. We propose that by recognising and addressing the complex interaction among human, domestic animal and wildlife systems, research within the One Health paradigm will be more successful in mitigating future human and domestic animal deaths from henipavirus infection than alternative single-discipline approaches.

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EMERGENCE OF NIPAH VIRUS

In Malaysia

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Abstract

The Nipah outbreak that rocked the swine industry in Malaysia in 1998/1999 has brought about positive changes to the industry. Around 1.1 million pigs were culled as a result of about 105 deaths in humans, mainly affecting swine farmers and their families. The disease was initially considered to be Japanese Encephalitis but subsequently announced to be a novel paramyxovirus named Nipah virus. In VRI, the reference laboratory for Nipah was set up to monitor the Nipah disease nationwide and carry out research to update and upgrade information pertaining to the disease in swine and other species. From 2001 to 2011, a total of 28,866 samples involving most animal species including pigs are tested every year to ensure a national free status. The tests conducted to establish the free status are ELISA or PCR. In pigs, the tests are being done on commercial pig farms whereby 15 percent of the sow population is tested on a yearly basis. The results thus far indicate Malaysia has not detected Nipah in swine from 2002 till now indicating the effectiveness of the control methods implemented.

Abstract

A pig-borne virus causing viral encephalitis amongst human beings in Malaysia was detected in 1997 by the Ministry of Health. Initially, the disease was considered to be Japanese encephalitis. Subsequently, it was thought to be a Hendra-like viral encephalitis, but on 10th April, 1999 the Minister of Health announced this mysterious and deadly virus to be a new virus named Nipah virus. The virus was characterized at CDC, Atlanta, Georgia. The gene sequencing of the enveloped virus revealed that one of the genes had 21% difference in the nucleotide sequence with about 8% difference in the amino acid sequence from Hendra virus isolated from horses in Australia in 1994. The virus was named after the village Nipah. In all, the Ministry of Health declared 101 human casualties, and 900,000 pigs were culled by April, 1999. The worst affected area in Malaysia was Negri Sembilan. The symptoms, incubation period in human being and pigs, animal to human transmission, threat of disease to other livestock, and control program adopted in Malaysia is described.

Abstract

Nipah virus, a novel paramyxovirus, closely related to Hendra virus emerged in northern part of Peninsular Malaysia in 1998. The virus caused an outbreak of severe febrile encephalitis in humans with a high mortality rate, whereas, in pigs, encephalitis and respiratory diseases but with a relatively low mortality rate. The outbreak subsequently spread to various regions of the country and Singapore in the south due to the movement of infected pigs. Nipah virus caused systemic infections in humans, pigs and other mammals. Histopathological and radiological findings were characteristic of the disease. Fruitbats of Pteropid species were identified as the natural reservoir hosts. Evidence suggested that climatic and anthropogenic driven ecological changes coupled with the location of piggeries in orchard and the design of pigsties allowed the spill-over of this novel paramyxovirus from its reservoir host into the domestic pigs and ultimately to humans and other animals.

ASSESSING THE RISK OF NIPAH VIRUS EMERGENCE

in Thailand

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Since the initial outbreak of Nipah virus pneumonia/encephalitis in Malaysian abattoir pig workers in 1998 (Chua et al., 2000), there have been more than 25 human outbreaks in India and Bangladesh. Outbreaks in Bangladesh have occurred almost every year since 2001 and tended to be seasonal (Luby et al., 2009; Lo et al., 2012). Pteropid bats are the primary natural reservoirs (Yob et al., 2001; Halpin et al. 2011; Yadav et al. 2012). Their distribution ranges across the tropical regions of Asia and Africa. Viral transmission occurs among bats and spills over to other dead end host species including humans. Humans develop disease from having contact with virus contaminated tissues from infected pigs (Malaysia) (Chua, 2003) or otherwise by drinking bat-contaminated fresh date palm sap (Bangladesh) (Luby et al., 2006). Human-to-human transmission poses a serious threat and has been only documented in Bangladesh (Gurley et al., 2007).

To date there has been no report of pig or human cases of Nipah virus (NiV) infection in Thailand.

However, there are several factors which could allow NiV emergence in Thailand. Thailand borders Malaysia where NiV outbreaks have been documented in 1998. Thailand harbors at least 20 million bats with 138 species among which several have been reported as NiV reservoirs. There are approximately 9.7 million pigs in this country and this has led to a preparedness initiative program. It consists of cooperation and joint activities among inter-sectoral organizations concerned with surveillance of wildlife, pigs and active testing for NiV infection in patients with encephalitis. Evaluation of health status and determination of risk behaviors as well as serology screening of residents in NiV prevalent zones are being conducted. This has been done in parallel with studies of bat ecology, behavior, population size and relation to seasons.

The Department of Livestock Development (DLD) under the Ministry of Agriculture and Cooperatives of Thailand has conducted sero-surveillance for Nipah infection in pigs since 1998. Regions 8th and 9th adjacent to Malaysia and regions 2nd and 7th

with high density of pigs were chosen from a total of 9 regions. Serum samples were collected from pigs at both farms and backyards for seroprevalence study. During 1998-2010, 44,658 pig sera were all negative by ELISA testing. In 2011, 3,352 tested pig sera from twenty (of 77) provinces were also negative. Passive surveillance was performed by postmortem examination of pig lung tissues with interstitial pneumonia. A total of 1,996 lung tissue specimens during 1998-2011 were all negative. This surveillance plan has been continually updated and adjusted, based on the previously obtained information. This included risk-based surveillance, according to the geographical location and seasonal preferences. For effective incident management and coordination of emergency responses, DLD has developed a Manual on Emergency Preparedness and Contingency Plan for NiV outbreaks. This manual has been distributed to the relevant DLD officers.

Further surveys of NiV infection in Thai bats is being conducted since 2002. Three species of flying foxes (genus *Pteropus*); *P. lylei*, *P. hypomelanus*, and *P. vampyrus*, have now been shown to be major reservoirs of NiV in Thailand (Wacharapluesadee et al., 2005). Although NiV infection has been found mainly in 3 species, *P. lylei* is dominant reservoir due to its population size and distribution. Furthermore, its habitat is closer to humans compared to the other two *Pteropus* species. Genetic characterization of NiV found in *P. lylei* in Thailand, based on 357 base pairs of nucleoprotein gene, indicated 2 existing genotypes: Bangladesh- and Malaysian- like (Wacharapluesadee and Hemachudha, 2007). Seasonal prevalence of NiV transmission in *P. lylei* has been shown during April-May (Wacharapluesadee et al., 2010). Although both strains are co-circulating, the Bangladesh-like genotype dominates in *P. lylei* bat populations.

Assessing the risk of Nipah virus emergence at the high risk areas, has been conducted in villagers, pigs, and bats at the areas where NiV infection has been demonstrated in bats. Bats were trapped monthly at two pig farms, using mist nets and harp traps. Blood, saliva and urine specimens were collected from each bat for further identification. Numbers of bats that were captured at the pig farms were highest in May, which is the weaning period that juvenile started to fly. Bats that were captured at pig farms were NiV positive only in May (by serology and/or viral RNA). The findings of seasonal preference in May were similar to our previous findings from pooled urine samples at bat roosts (Wacharapluesadee et al., 2010). The finding of NiV infected bats at the pig farms raises concern of possible NiV transmission to pigs. Although there were no evidence of NiV infection in pigs in the same study, measures to prevent bats from coming into contact with pigs and avoidance of feeding pigs with partially eaten fruits must be actively promoted.

To ensure that there is no human transmission of NiV, a community in Chonburi province located near a temple inhabited by NiV infected bats (*P. lylei*), was chosen for community-level study. After obtaining written consent, a standard questionnaire which included questions related to potential risk behaviors was administered to 418 local residents. Blood samples were assayed for NiV antibody using an indirect ELISA for IgG antibodies against NiV-infected cell lysate. Positive criteria for NiV infection was a dilution $\geq 1:400$. No NiV-specific IgG antibodies were found. The low NiV prevalence in *P. lylei* (9.3%) and different culture of not drinking fresh date palm sap may have negative impact upon emergence of infection in Thailand. This is in

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contrast with the finding in Bangladesh. People living in risk regions are being educated to avoid risk behavior and monitored continuously concerning symptoms possibly related to NiV infection. Febrile patients and those with respiratory or encephalitis symptoms living in or near NiV zones require particular attention. To date, transmission to human has not been identified in Thailand. Cerebrospinal fluid of 232 patients with encephalitis admitted to King Chulalongkorn Memorial Hospital during 2001-2012, were tested negative for NiV RNA.

Inter-sectoral cooperation among wildlife-animal-human departments in preparedness response to emergence of NiV outbreak in Thailand is a successful example of a transboundary “one health” approach. Establishment of alert system and promotion of awareness from the bottom level (village-based) is also the key of the success for this one health initiative. The ultimate goal of the whole process cannot be achieved without public recognition and willingness, otherwise this cannot be sustainable. Policy makers must value this as an opportunity in strengthening public health infrastructure.

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PLENARY SESSION | 3

**POLICIES AND STRATEGIES
TO MEET THE CHALLENGE OF
EMERGING DISEASE THREAT
THROUGH PREVENTION,
PREPAREDNESS AND RESPONSE**

POLICIES AND STRATEGIES TO MEET THE CHALLENGE OF EMERGING

Disease Threat through Prevention, Preparedness and Response

BACKGROUND

The speed with which emergent infectious diseases can surface and spread, as illustrated by the 2009 H1N1 pandemic influenza virus, presents serious public health, economic, security and development concerns. It also underscores the need for the global community to act pre-emptively and systematically to improve international, regional and individual countries' abilities to identify and mitigate the severity of health threats arising within their borders. Over the past decade, particularly in response to the threats posed by Severe Acute Respiratory Syndrome (SARS), Avian Influenza H5N1, and the 2009 H1N1 pandemic influenza virus there has been a significant increase in support for building national, regional and global capacities related to zoonotic disease emergence, including disease surveillance, detection, diagnosis, reporting, and control, while simultaneously supporting efforts to mitigate the risk of emergence. This experience has led to increased understanding of the drivers that underlie disease emergence and an appreciation of the factors (i.e. policies), institutional capacities, and social conditions that contribute to its prevention and control. Among the most fundamental insights has been that the future well-being of humans, animals and the environment as inextricably linked and that any effort to mitigate the impact of future emergent disease threats requires an equally comprehensive and cross-sectoral approach. This session will explore the policy and institutional challenges to forging a One Health response.

MODERATOR

Ximena AGUILERA

Director

*Center of Epidemiology and Public Health Policy
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OBJECTIVES

Examine the broad policies unique to One Health that strengthen preparedness and response; and highlight existing cases/examples (global, regional, and national) of One Health preparedness and response and how they address cross-sectoral collaboration, joint risk assessment of emergent potential threats, innovation, and systems strengthening.

SPEAKER

David Heymann, Head,
Centre on Global Health Security, Chatham House,
United Kingdom

PANELISTS

- **Dilys Morgan**, Head,
Gastrointestinal, Emerging and Zoonotic Infections,
Health Protection Agency, United Kingdom
- **Pierre Formenty**, Team Lead - Emerging and Dangerous Pathogens, World Health Organization, Switzerland
- **John Mackenzie**, Professor of Tropical Infectious Diseases, Curtin University, Australia
- **Mark Rweynemamu**, Executive Director,
Southern African Centre for Infectious Disease Surveillance (SACIDS), Tanzania



Dr. Ximena Aguilera, MD Specialist in Public Health, Residence in International Health at PAHO.

Director of the Center of Epidemiology and Public Health Policies at the Faculty of Medicine Clínica Alemana-Universidad del Desarrollo in Chile.

Former Senior Advisor in Communicable Diseases at Pan-American Health Organization (2008-10) where among other duties she coordinated the technical response to the H1N1 pandemic. Previously she was the Chief of Health Planning Division at the Ministry of Health in Chile (2005-08) and Head of the Department Epidemiology at the same institution (1999-05). She was the Chilean representative during the negotiations of IHR2005; official delegate for APEC-HWG, and for MERCOSUR SGT-11. Also was primarily responsible for pandemic preparedness and for the implementation of the IHR at the Ministry of Health of Chile. She has worked as consultant for PAHO, UNDP, IDB and the WB in several countries in Latin America and participated in the WHO mission to support the SARS outbreak response in China (2003). It has also been member of the Advisory Committee of the Global Outbreak Alert and Response Network at the WHO.

Currently dedicated to teaching and research in applied epidemiology to health policy and communicable diseases.

XIMENA AGUILERA

Director

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Dr. Pierre Formenty is a Doctor in Veterinary Medicine with a Master in Public Health. He has been working in global public health with the World Health Organization (WHO) since January 1996. At WHO, within the Department of Pandemic and Epidemic Diseases he is leading the Emerging and Dangerous Pathogens (EDP) team. The EDP team is responsible for global prevention, preparedness and response to emerging infectious diseases epidemics of international public health concern. Dr Formenty and his team are covering a large number of emerging infections: viral emerging pathogens (Ebola, Marburg, Rift valley fever, Crimean-Congo haemorrhagic fever, Lassa and Arenaviruses, Monkeypox, SARS, Hantavirus, Nipah and Hendra,...) and bacterial zoonotic diseases of epidemic importance (Leptospirosis, plague, rickettsiosis, tularemia..). In addition, their research interest include ecological studies on emerging zoonosis at the human-animal interface, viral haemorrhagic fevers, vector borne forecasting models and climate change.

Dr Pierre Formenty is a field epidemiologist specialized in Public Health and in Medical Virology with special focus on viral haemorrhagic fever. He is also a Veterinary officer, specialized in virology and epidemiology for domestic and wild animals. He has more than twenty two years' experience in both tropical animal pathology and tropical medicine.

Since 1996, Dr. Pierre Formenty has participated with WHO in field control activities of more than 35 major outbreaks of international importance. During these missions he supported outbreak response activities for the following diseases: Chikungunya, Cholera, Dengue, Ebola, Marburg, Monkeypox, Nipah, Plague, Rift Valley Fever, SARS and Yellow Fever.

PIERRE FORMENTY

Team Lead - Emerging and Dangerous Pathogens

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He has more than 75 published papers in peer review journals.



Professor David Heymann is currently Head of the Centre on Global Health Security at Chatham House, London, Chairman of the Health Protection Agency, UK and Professor of Infectious Disease Epidemiology, London School of Hygiene and Tropical Medicine. Previously he was the World Health Organization's Assistant Director-General for Health Security and Environment. He also represented the Director-General for polio eradication. He was Executive Director of the WHO Communicable Diseases Cluster till 2003. From 1995 to 1998 he held the post of Director for the WHO Programme on Emerging and other Communicable Diseases. He served as the Chief of research activities in the WHO Global Programme on AIDS until 1995.

Before joining WHO, Prof. Heymann worked for 13 years as a medical epidemiologist in sub-Saharan Africa on assignment from the US Centers for Disease Control and Prevention (CDC).

He is a member of the Institute of Medicine of the United States National Academies and the Academy of Medical Sciences (United Kingdom). In 2009 he was appointed an honorary Commander of the Most Excellent Order of the British Empire (CBE) for services to global public health.

DAVID HEYMANN

Head

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JOHN MACKENZIE

Professor of Tropical Infectious Diseases
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John Mackenzie is a part-time Research Associate and Professor of Tropical Infectious Diseases at Curtin University, Western Australia, where he had also been the inaugural Premier's Research Fellow from 2004-2008. He is currently domiciled in Melbourne where he is also an Honorary Senior Principal Fellow at the Burnet Institute. He had been Professor of Microbiology at the University of Queensland from 1995-2004, and continues to hold a position as an Honorary Professor in the School of Chemistry

and Molecular Biosciences at the University of Queensland. From 1973 to 2004 he was a member of the Department of Microbiology at The University of Western Australia, where he attained the rank of Professor of Microbiology.

His elected honours have included Secretary-General of the International Union of Microbiological Societies (IUMS) from 1999-2005, Fellow of the American Academy of Microbiology, and Past President of the Australian Society for Microbiology and of the Asian-Pacific Society for Medical Virology. He continues to be involved in IUMS and recently served as Vice-President of the International Committee for the Taxonomy of Viruses. He was the recipient of the D I Ivanovsky Medal of the Russian Academy of Medical Sciences, Distinguished Service Award of Australian Society for Microbiology (1999) and the Excellence in Virology Award of the Asian-Pacific Society for Medical Virology (2000). In 2002, he was appointed as Officer in the Order of Australia for services to public health research and to education. He was the inaugural recipient of the Academy of Science Malaysia's Mahathir Science Award for Excellence in Tropical Research in 2005.

He serves as a member of the steering committee of the Global Outbreak Alert and Response Network of the World Health Organization (WHO), as a member of the Technical Advisory Group of the WHO Asia-Pacific Strategy for Emerging Diseases, and recently served as Chair of the WHO International Health Regulations Emergency Committee for the Pandemic H1N1 influenza. He led the WHO team into China to investigate the emergence of SARS in March 2003, and was a member of the WHO tsunami relief team in Banda Aceh in 2005. He sits on a number of national committees including the Biosecurity Advisory Council, National Arbovirus and Malaria Advisory Committee, and the Australian Government Advisory Committee for the WHO Collaborating Centre for Reference and Research on Influenza. He is also a member of the Science Advisory Panel of the Crown Research Institute, the Institute of Environmental Science and Research, New Zealand.

His recent research interests are mosquito-borne virus diseases and emerging zoonotic viruses. He has published over 300 major papers and research chapters on these and other research topics concerned with human and animal viral diseases, and contributed to a number of reference texts.



DILYS MORGAN

Head
Gastrointestinal
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Dilys Morgan has had a long and interesting career alternating between mainly medical research in rural Africa where she lived and worked for 13 years, and UK public health.

Dilys qualified in Medicine at Liverpool and after training as a general practitioner, worked for Save the Children Fund in the Gambia for 2 years. She returned in 1985 to start training in public health medicine and after completing her MSc at the London School of Hygiene

and Tropical Medicine, she lived in Sierra Leone for 4 years studying the effects of treatment on riverine onchocerciasis. She continued her training in public health and became a Consultant Epidemiologist at the Public Health Laboratory Service Communicable Disease Surveillance Centre (CDSC) in London in 1992, responsible for the investigation and management of outbreaks of infectious disease. From 1995 to 2001, Dilys worked for the Medical Research Council as a Clinical Epidemiologist in Uganda, where she was in charge of a rural field station and project leader for the study of the natural history of HIV infection in a rural area. Despite HIV infection having such an impact in sub-Saharan Africa, little was known about the natural history of the infection and this study was the first to report median survival times from seroconversion to AIDS and death as well other reporting other features of the infection which greatly increased our understanding and hence management of infected patients.

Dilys is currently Head of Gastrointestinal, Emerging and Zoonotic Infections at the Health Protection Agency, London. The Department undertakes surveillance of gastrointestinal and zoonotic infections to monitor trends and interventions and to detect and respond to outbreaks and incidents, and provides expert advice and support. She has been responsible for developing the Emerging Infections and Zoonoses portfolio of the Agency, including providing the scientific support to the Chief Medical Officer's National Expert Panel on New and Emerging Infections. This involved establishing horizon scanning activities for emerging infectious threats on behalf of the Panel and since the majority of new and emerging infections are zoonoses, setting-up the Human Animal Infections and Risk Surveillance group (HAIRS) in 2003. This multiagency, multidisciplinary group meets every month and acts as a forum to identify and discuss infections with potential for interspecies transfer and plays an increasingly pivotal role for human and animal health by contributing to National policy development and operational responses on zoonoses. An interesting area of development has been the production of rapid risk assessment tools for potential emerging infectious threats. The risk assessment tool has been applied to a range of emerging infections and proved invaluable in documenting and communicating risk.

She is also an honorary Professor at the London School of Hygiene and Tropical Medicine.



Mark Rweyemamu is the Executive Director of the Southern African Centre for Infectious Disease Surveillance (SACIDS), which is a One Health Virtual Centre linking academic and research institutions in Southern Africa (primarily the DRC, Mozambique, South Africa, Tanzania and Zambia) in smart partnership with centres of science in industrialised countries, especially the Royal Veterinary College and the London School of Hygiene and Tropical Medicine. He manages grants from the Wellcome Trust, Rockefeller Foundation and Google Foundation which total approximates USDollar 11 million. The SACIDS Headquarters is located at Sokoine University of Agriculture (SUA), Morogoro, Tanzania where it is associated with the Faculty of Veterinary Medicine.

He is a Visiting Professor at the RVC, London and the Sokoine University of Agriculture, Morogoro, Tanzania. Previously he headed the FAO programme on infectious diseases including the coordination of global rinderpest eradication. He has worked in government, industry and academia. He has consulted widely for national governments and international organisations. He was a member of the EFSA Working Group on assessing the risk of Foot and Mouth Disease introduction into the EU from developing countries, and The Foresight study on Infectious Diseases – Preparing for the Future.

He is a member of the Scientific Advisory Board of the UK Institute for Animal Health and the Chairperson of the Scientific Advisory Committee of the GALVmed, a public-private partnership that focuses on supporting the development of biologicals and therapeutics for orphan diseases in developing countries. He is Chair of CORDS, a One Health focused global network that connects organizations for regional disease surveillance. He has published over 100 papers in peer reviewed journals.

MARK RWEYNEMAMU

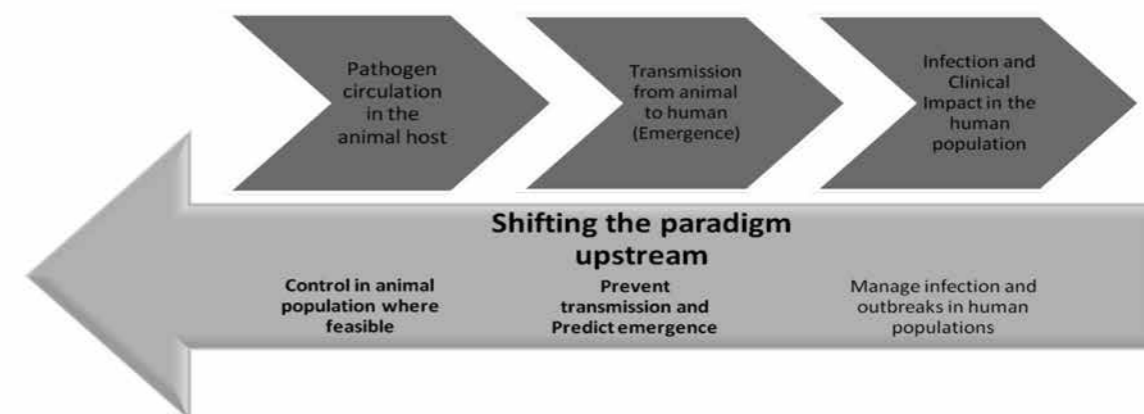
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POLICIES AND STRATEGIES

to Meet the Challenge of Emerging Disease Threat through Prevention, Preparedness and Response

David L. HEYMANN



SHIFTING THE PARADIGM

The majority of emerging infectious diseases have their source in animals, and emergence occurs at the human/animal interface, when infections in animals breach the species barrier to infect humans, the population in which they are often first identified. The response is often a series of emergency activities to contain and manage the infection in human populations, and at the same time to identify the source of the infection in nature. If infection is found to have a source in animals, and if animals cause a continuous threat of human infection, culling is often recommended, with severe economic impact.

Currently efforts are being undertaken for more close interaction at the animal/human interface through joint surveillance and risk assessment between the animal and human medicine sectors, and research is underway in geographic areas where emergence from wild and/or domestic animals has occurred in the past. The goal of this research is to identify infectious organisms in tropical and other wild animals, to genetically sequence these organisms, and to attempt to

predict which organisms have the potential to emerge in human populations.

It may be more cost-effective, however, to learn from past emergence events, and to shift the paradigm from disease surveillance, detection and response in humans; to prevention of emergence at the source by understanding and mitigating the risk factors, or determinants, that influence animal infection (see figure).

These determinants of emergence are clearly understood from the study of previous emergence events and include human-induced changes in natural environments, urban areas and agricultural systems; raising and processing animal-based foods; and the roles of global trade, migration and climate change. Better understanding of these factors learned from epidemiological investigation of past and present emergence events, and modelling and study of the cost effectiveness of interventions that could result in their mitigation, could provide evidence necessary to better address the political and economic barriers to prevention of infections in animals and/or their emergence in

humans further down stream. Such economically convincing arguments for change and mitigation are required because of the basic difference in animal health – often driven by the need for profit and financial gain; and human health – driven by the need to save lives, with cost a secondary consideration.

CASE STUDY

A close examination of the 2003 outbreak of Severe Acute Respiratory Syndrome (SARS) clearly demonstrates the public health emergency that can be caused by emerging infections, and how a paradigm shift from emergency response to prevention at the source might be accomplished.

First detected because it caused a severe atypical pneumonia, SARS soon became a burden in hospitals in the Guangdong Province of China in late 2002, where many patients required respiratory support, and broad-spectrum antibiotics had no effect. Hospital workers caring for these patients became infected as well, and one of them – a medical doctor who had treated patients in the

Guangdong Province of China - travelled to Hong Kong in February 2003 where he stayed in a hotel on the same floor as both Chinese and international guests. Some of these other hotel guests became infected but it is not clearly understood how – hypotheses ranged from transmission of the causative agent through the hotel ventilation system to transmission in a shared closed environment such as occurs when using the same lift (Chan-Yeung & Xu 2003).

Those who became infected at the hotel were admitted to Hong Kong hospitals when they became ill, or travelled to other countries, many times while still in the incubation period, to become seriously ill at their next destination. Hospitalized, they too became the source of infection of hospital workers who in turn unintentionally infected other patients and family members (Scales DC, Green K, et al).

Molecular and epidemiological investigation suggested that the infection of the index case (never identified) was a one time event. As more information became available, it was further hypothesized that this initial infection

was due to close contact with an infected animal, probably a civet cat, thought to have been a carrier of a coronavirus that mutated, either in the animal or an infected human, in such a way as to cause severe human illness (Wang & Eaton 2007).

The world's interconnectivity through air transport facilitated the international spread of SARS. Its electronic connections also facilitated a virtual collaborative effort for surveillance, and for an emergency outbreak investigation, management and containment. The most favourable patient management regimes and modes of transmission were rapidly identified; the causative organism was identified and characterized; international travel advisories were recommended to stop international spread; and after human to human transmission had been interrupted, the scientific evidence that was collected during the outbreak was used for guidelines to prepare for another similar outbreak should it occur (World Health Organisation 2004).

SARS resulted in 8422 probable infections and 916 (11%) deaths (Chan-Yeung & Xu 2003). The economic impact of the outbreak on GDP was estimated at US\$30-100 billion from decreased commerce, travel and tourism (Keogh-Brown & Smith, 2008). Unlike HIV, the SARS coronavirus did not become endemic, and economic recovery was rapid.

SARS and other emerging infections share a common theme: infection is often first detected in human populations in which an emergency clinical response and hypothesis-generating outbreak investigation begin before the source of infection is understood. Initial recommendations for control are often precautionary - based on what evidence is available from the current outbreak or

previous outbreaks caused by similar organisms – and they can cause severe negative economic impact.

At the time of the SARS outbreak there was a flurry of field research activity in the Guangdong Province during and just after the outbreak, but over time funding decreased and research slowed. A key piece of research conducted was a study of workers in some of the province's wet markets that suggested that up to 22% (12/55) had antibody evidence of a coronavirus infection related to the SARS coronavirus, but that none had a history of severe respiratory symptoms such as were occurring in persons with SARS (Parry, 2003).

Based on the evidence generated by this simple study, however, the determinants of emergence - in addition to the risk of being a wet market worker - could include being a hunter of wild animals, being a restaurant worker who kills and or butchers/prepares wild animal meat for consumption, or being a member of a household that buys live or recently killed wild game meat from a wet market.

It is clear that from this simple risk assessment that a series of actions outside the human and animal health sectors could be useful in decreasing the risk or preventing a future outbreak from an emerging pathogen in the Guangdong Province. These include education of all those who come into contact with wild game (and domestic animals) about how to protect themselves against infection; regulation with enforcement of safety practices in wet markets and eating establishments that does not drive these activities underground, but rather ensures safe animal handling; and regulation

and enforcement of less risky trade between hunters and markets, and between markets and those who purchase. Other activities might be research to determine whether any wild animals could be raised commercially under conditions that prevent their infection and risk to humans - or further downstream, more effective education of health workers about infection control. This latter activity would ensure that if other actions further upstream fail to prevent emergence, amplification of transmission of emergent organisms could be prevented.

Because of the cross-sectoral action required to mitigate the risks associated with these determinants, a ¹one health approach – defined as a collaborative effort of multiple disciplines to attain optimal health for people, animals and the environment - is required to change the existing paradigm of detection and emergency response to prevention, or to a decrease in the frequency of emergence, by mitigation of the determinants that have the potential to cause emergence.

Shifting the current paradigm from emergency response further upstream using a one health approach - to managing and mitigating the determinants or risks that lead to emergence - could help reduce or prevent the risk of emergence of infections at the animal/human interface at the source.

¹ American Veterinary Medical Association 2008

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3.1

CROSS-SECTORAL SOLUTIONS: CHALLENGES AND BEST PRACTICES

from Country and Regional Experiences

BACKGROUND

At country level, implementing One Health requires a genuine and effective collaboration across different government sectors, in particular those responsible for human health, animal health (mostly focused on domestic animals and animals for food) and health and illnesses of wild life. Such effective collaboration aims to fostering the containment of infectious diseases crossing between human and animals. Government sectors are often built up in silo where sectoral plan and annual budget are used by individual sector, joint planning and budgeting across sectors to tackle a common challenge is often difficult for which sometimes a special coordinating committee was applied.

At supra-national or regional level, implementing One Health faces further similar huge challenges, this requires trust and effective collaborative works across sovereign Nations, where sometime trade interests such as sanction on export of poultry and cattle are at stake that frank and accurate infectious diseases in animal are often obscured or not promptly reported. Collaborative surveillance and effective responses, experienced by Mekong Basin Diseases Surveillance (MBDS) is invaluable in the past decades how these challenges are overcome. Further challenges are efforts to mobilize adequate, and sustain in long term where third party funding such as Rockefeller Foundation plays significant role, funding to keep the network effective.

MODERATOR

Masato MUGITANI

*Assistant Minister for
Global Health*

*Ministry of Health
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OBJECTIVES

Such global public goods as One Health, fostering diseases surveillance and response require redouble efforts ensuring on cross-sectoral action and regional actions are taken place effectively. This parallel session contributes to the understanding how challenges were overcome at country and regional levels and how development partners support to overcome such challenges.

COUNTRY EXPERIENCES

- **One Health approach to curb anthrax in Bangladesh**
Baizid Khorshid Riaz, Assistant Professor,
National Institute of Prevention & Social Medicine, Bangladesh
- **Effectiveness of control measures for highly pathogen Avian influenza in Thailand**
Suvichai Rojanasthien, Associate Professor,
Faculty of Veterinary Medicine, Chiang Mai University, Thailand
- **One Health collaborative mechanism at the international level in Vietnam**
James Kile, Veterinary Medical Epidemiologist,
U.S. Centers for Disease Control and Prevention, Vietnam

REGIONAL EXPERIENCES

- **Making Regional Networks Work**
Bounlay Phommasack, Chair of MBDS and Director General,
Department of Disease Control, Ministry of Health, Lao PDR
- **Overcoming challenges: role of development partners fostering One Health**
Annette Dixon, Country Director for Thailand, Cambodia,
LAO PDR, Malaysia and Myanmar, The World Bank, Thailand



Annette Dixon, a New Zealand national, joined the World Bank in 1999. She has worked across the countries of Europe and Central Asia for ten years, including as Director for Operations and Strategy, and as Country Director for Central Asia, where she was based in Kazakhstan.

In December 2008, Ms. Dixon took up the position of Country Director for Southeast Asia (covering Cambodia, Lao PDR, Malaysia, Thailand, and the Greater Mekong Sub-Region) and as Representative in Bangkok for Myanmar in the East Asia and Pacific Vice Presidency (EAP).

Ms. Dixon brought to the Bank significant social policy and management experience, gained during her service in the Government of New Zealand, where she was Chief Executive of the Ministry of Youth Affairs. She also served as General Manager, Sector Policy, and Deputy Director-General in the Ministry of Health; and for five years was an advisor in the Department of the Prime Minister. Prior to becoming a senior public servant, Ms. Dixon worked for ten years with non-governmental organizations.

Ms. Dixon holds a Master of Public Policy in Politics, Economics, and Law from Victoria University, Wellington, New Zealand. She was also awarded the Harkness Fellowship, which she undertook at The George Washington University, Washington DC in 1994/95.

ANNETTE DIXON

Country Director for
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Public health & hospital administration specialist. Government servant. Presently working as an Assistant Professor at National Institute of Preventive & Social Medicine (NIPSOM), Dhaka with additional charge as the Project Director of Expansion & Modernization of Dhaka Medical College Hospital. Immediate past posting was at Prime Minister's Office (PMO) as a Director; the responsibility there was bureaucratic coordination between PMO & Ministry of Health & Family Welfare, Ministry of Social Welfare & NGO Affairs Bureau.

Participated as a member of Bangladesh delegation in World Health Assemblies in Geneva (2009 & 2010), RC Meetings of SEARO in Thailand (2010) & Nepal (2009), United Nations General Assembly (2011), UN High Level Meeting on HIV/AIDS in USA (2011), International Family Planning Summit in UK (2012) & other summits. Also took part in several international conferences like Prince Mahidol Award Conference (2011) in Thailand, Flagship course on Universal Health Coverage (UHC) (2012) by World Bank Institute in France etc.

Scientific research papers published in several national & international journals. Assistant Managing Editor of the journal of Bangladesh Medical Research Council (BMRC) at present. Also served as Assistant Managing Editor of Bangladesh Medical Association Journal (BMJ). Fond of literature & cultural activities. Author of a number of books in literature titled 'Encyclopedia of Martyred Doctors of Liberation War of Bangladesh', 'Language Movement to Liberation War' etc. Composed several theme songs to build mass awareness on public health issues like immunization, malaria, HIV/AIDS, safe motherhood, child injury, breast feeding, autism etc. Won the prize of Best Orator in National Television Debate Competition (1989-90).

Performs as a part time newscaster of national television channel BTB. Elected as the Vice President (1991-92) & Literary Secretary (1989-90 & 1990-91) of Mymensingh Medical College Students Union. Completed medical graduation from Mymensingh Medical College of Dhaka University. Qualified for Japanese Development Scholarship (JDS) of JICA & thereby achieved Masters degree in Medical Administration from Nagoya University, Japan.

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Dr. James Kile is a Veterinary Medical Officer with the U.S. Centers for Disease Control and Prevention (CDC). He serves as Chief of the Animal-Human Interface Initiative within the Influenza Program at CDC Vietnam. In this position, he supports surveillance and research of influenza and other zoonotic diseases through cooperative agreement One Health partnerships with both the Vietnam Ministry of Health and the Ministry of Agriculture and Rural Development.

Before joining the U.S. Government, Dr. Kile was a veterinary medical practitioner and a college educator. With the U.S. Department of Agriculture, he held positions as a food-borne disease epidemiologist, a developer of food safety policy, and a food safety program manager and division director. He also served at CDC Atlanta as an Epidemic Intelligence Service Officer.

Dr. Kile holds a DVM from the University of Tennessee, and a MPH from the University of Washington. He is board-certified as a Diplomate with the American College of Veterinary Preventive Medicine, and in Public Health with the National Board of Public Health Examiners. Dr. Kile has presented at international conferences related to One Health activities, and has publications related to outbreak investigations of vector-borne and zoonotic diseases.

JAMES KILE

Veterinary Medical
Epidemiologist

*U.S. Centers for Disease
Control and Prevention
Vietnam*



Dr Masato MUGITANI, Assistant Minister for Global Health, Ministry of Health, Labour and Welfare, Japan, is a medical doctor with professional and profound engagement in the global health, pandemic Influenza response, cancer policies, medical system and public health policies at global, regional and national level.

Dr Mugitani has demonstrated strong and committed leadership in global health, including the Chair of the Board for the Global Health Workforce Alliance, the Chair of the Committee A at the 63rd World Health Assembly in 2010, the Chair of the 2010 APEC Health Working Group (1st and 2nd meeting), and the Vice-chair of the Open-Ended working group of Member States on Pandemic Influenza Preparedness (May 2010-April 2011). He has also been serving as a board member of the International Agency for Research on Cancer (IARC) and a senior official member of Global Health Security Action Group (GHSAG).

MASATO MUGITANI

*Assistant Minister for
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Dr. Bounlay PHOMMASACK, Medical Doctor and Public Health Specialist, has spent nearly 30 years working at Provincial Health Department (nearly 15 years) and working at Ministry of Health (nearly 15 years). Currently working at the Ministry of health, holding two positions such as Director General of the Department of Disease Control (DDC), Ministry of Health of the Lao PDR, and Director General of the National Emerging Infectious Diseases Coordination Office (NEIDCO), under the National CDC Secretariat of the Government's Office.

Since 2010, Dr. BounlayPhommasack, was elected as Chair of the Executive Board of the MBDS (Mekong Basin Disease Surveillance), Chair of Inter-Ministerial Task Force for Tobacco Control in Lao PDR in 2008.

Since 1994 up to 2012, Dr. BounlayPhommasack has been invited by WHO to be Temporary Advisor in several disciplines ranking from: Healthy Cities, Partnership for Parasite Control, Communicable Diseases, Maternal Child Health and Tobacco Control.

Under ASEAN, currently Dr. BounlayPhommasack is the Head of Asean Expert Group on Communicable Diseases and Alternate Chair of SOMHD of the Ministry of Health, Laos.

BOUNLAY PHOMMASACK

Chair of MBDS and
Director General

*Department of Disease
Control
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Dr. Suvichai Rojanasthien is an associate professor at the Faculty of Veterinary Medicine, ChiangMai University, Thailand. He is a bovine practitioner, a dairy herd health specialist, a Chairman of Thailand Veterinary Council. He began his career as an instructor and a bovine practitioner in Nong-pho dairy hospitals belonging to Faculty of Veterinary Medicine, Kasetsart University in Thailand from 1980 to 1983.

In 1988 he got Ph.D. in Veterinary Medicine from the Swedish University of Agricultural Sciences, Uppsala, Sweden. He was the director of the animal hospital, an assistance dean. Since 1996 he moved to work at the Faculty of Veterinary Medicine, ChiangMai University as an associate dean. He was the dean of the Faculty of Veterinary medicine, ChaingMai University during 2001-2005. His main interests are in animal health management, zoonosis and eco-health (one-health) approach. He has been extensively involving in research and development in the areas of animal-human interfaces for health management.

He has published more than 60 papers, reports and books locally. He is the editor committee of a local journal for dairy. He has been working in his carrier for 32 years. He is currently appointed to be a Chairman of Thailand Veterinary Council.

SUVICHAI ROJANASTHIEN

Associate Professor

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MAKING REGIONAL NETWORKS WORK

Bounlay PHOMMASACK

The advanced of new technologies had brought an opportunity for countries around the world to live more closely in a “global village”, which at the same time increased the risk for Emerging Infectious Diseases (EID) or increasing the risk for any public health emergency of international concerns (PHEIC) to spread faster than ever such as SARS 2003, Highly Pathogenic Avian Influenza (HPAI) H5N1, Pandemic Influenza H1N1 2009. The PHEIC means an extraordinary public health risk to other states through the international spread of diseases and potentially require a coordinated international response. Those EID diseases now becoming on going challenges for all the countries around the world. The International Health Regulation (IHR 2005), has shown and proved that Infectious Disease occurred in one country is no more the problem or the sole responsibility of that particular country. The key IHR (2005) Philosophy highlighted that the best way to prevent international spread of diseases is to detect public health threats early and implement effective measures when the problem is small and at local level. Because of the complexity of emerging infectious diseases, challenging the functioning of health system and the functioning of other related ministries, there is a need for close technical collaboration among countries in

the region using APSED (2010), which is stands for “Asia Pacific Strategy for Emerging Diseases”, composed of eight components. These eight components of APSED (2010) included: 1. Surveillance, Risk Assessment and Response, 2.Laboratory, Zoonosis, 4. Infection Prevention and Control, 5. Risk communication, 6. Public Health Emergency Preparedness, 7. Regional Preparedness and Response, 8. Monitoring & Evaluation. The first five components belong to APSED (2005) and the components of APSED (2010) composed of components of APSED (2005) plus the following three components as follows: Public Health Emergency Preparedness, Regional Preparedness and Response and Monitoring & Evaluation . APSED (2010) is a common regional goal to build sustainable national and regional capacities and partnerships to ensure public health security through preparedness and planning, prevention, early detection, and rapid response to emerging diseases and other public health emergencies.

With the aims to put collective efforts among countries in various regions for further mitigating the impact of emerging infectious diseases, breaking the continuous challenges of

emerging infectious diseases in the region, several regional networks have been established and developed, such as ASEAN+3FETN, CORDS, MBDS, APEIR, CAREID, KENAN Asia, REDI, LMI, etc... Such networks have provided an opportunity for countries in the region to strengthen technical capacity, develop coordination, exchange information, and solving problem together. These regional networks are very important for strengthening Core Capacity (CC) for the effective implementation of IHR (2005). Apart from making the regional network workable, there is also an urgent need to establish coordination mechanism among different regional networks to ensure smooth coordination, collaboration, information sharing and put common efforts for keeping the regional health security. Therefore, networking among different regional networks are also very important and necessary. Mechanism for collaboration among different regional networks need to be established. Once established, the forum will be an opportunity to identify issues and at the same develop tools, strategies for effective functioning, collaboration among regional networks.

ONE HEALTH COLLABORATIVE MECHANISMS

at the International Level in Vietnam

James C KILE

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BACKGROUND

Promoting and implementing One Health collaborative activities, between governments and/or across government sectors, can be both challenging and rewarding.

The concept of the interaction of humans, animals, and the environment affecting the health of all has, from a Western medicine perspective, been around since the ancient Greeks or earlier (1). In his treatise on "Airs, Waters, and Places", Hippocrates suggested that to investigate medicine properly, one must first consider the seasons, and then the wind, the water, and the ground.

In the mid-1800s, the term "zoonosis" has been credited to a German physician, who indicated there should be no dividing line between human and animal health (2,3). In the mid-1940s, a U.S. veterinarian further promoted this concept by establishing the field of veterinary public health at the CDC (2).

In the 1960s, a veterinary epidemiologist spoke of "one medicine", calling for a unified human and

veterinary approach to combat zoonotic diseases, and providing a modern foundation for the concept of One Health (2,4).

While the term One Health had already been in use by 2004, in that year, the Wildlife Conservation Society held a meeting of health experts from many fields, and referring to "One World-One Health" (5).

In 2007, a Joint Task Force including the American Veterinary Medical Association (AVMA) and the American Medical Association (AMA) adopted a vision, definition, and scope in support of One Health (6). This definition, "The collaborative effort of multiple disciplines - working locally, nationally, and globally - to attain optimal health of humans, animals, and our environment", was also referenced in a 2008 document on One Health by a joint United Nations' organizational consultation that included FAO, OIE, and WHO (7).

Also in 2008, WHO, FAO, and OIE published a zoonotic diseases guide for establishing collaborations between animal and human health sectors (8). The guide identifies establishing a sustainable

coordinating mechanism for collaboration in three areas, 1) surveillance and information sharing, 2) coordinated response, and 3) risk reduction.

In 2010, FAO, WHO, and OIE developed a Tripartite Concept Note that further identified the "sharing of responsibilities and coordinating global activities to address health risks at the animal-human-ecosystems interface" (9). This concept note was shared with the international community at the International Ministerial Conference on Avian and Pandemic Influenza in Hanoi, Vietnam.

The Tripartite Concept Note provides a background, strategic alignment, collaborations and joint actions, and the way forward that partners may consider when conducting One Health activities. This includes identifying complementary animal-human agendas, and a strategic alignment identifying collaborative needs. Finally, the Concept Note identifies a number of collaborative and joint actions that may occur to meet these agendas and needs.

These One Health references and others form a background of information on what is One Health, as well as how to provide support and assistance domestically or internationally to conduct One Health surveillance and research activities with cross-Ministry partners.

This report describes the background and steps to a One Health collaborative mechanism at the national level in Vietnam, with international support, and used as a platform for cooperative public and animal health surveillance and research activities between the U.S. Centers for Disease Control and Prevention (CDC) and the Vietnam Ministries of Health (MOH) and of Agriculture and Rural Development (MARD).

INFLUENZA PROGRAM, US-CDC VIETNAM:

CDC began collaborative activities with MOH in 1997. CDC further established an Influenza Program (IP) in 2005, providing technical assistance and funding support for a national influenza surveillance system with the MOH National Institute of Hygiene and Epidemiology (NIHE).

Additional program expansion occurred in 2007 with MOH General Department of Preventive Medicine (GDPM) support for influenza pandemic preparedness and response. In 2009, CDC IP expanded again with a NIHE cooperative agreement for research of influenza and other infectious diseases, as well as the establishment of the Animal-Human Interface (AHI) Initiative for influenza and other zoonotic diseases.

The AHI Initiative established its first activities in 2010 and in 2011 through both the NIHE surveillance and research cooperative agreements. The activities included collaboration with the animal health sector. In 2012, CDC established a unique cooperative agreement with the MARD Department of Animal Health (DAH), for surveillance and research at the animal-human interface of influenza and other zoonotic diseases in Vietnam, and which also called for collaboration with the human health sector.

Mechanisms are in place at the human health and animal health sectors to conduct joint cross-Ministry surveillance and research activities of influenza and other zoonotic diseases.

COLLABORATIVE MECHANISMS:

While discussions of One Health concepts and approaches continue at international levels, implementation of One Health activities occurs in many countries. The international partners and inter-Ministry sectors that develop and implement these activities must each identify and address their own mechanisms for achieving cross-sector One Health approaches to surveillance, response, control, and communication of zoonotic diseases.

Vietnam MOH and MARD already have experiences working cross-Ministry on a number of occasions, including continued zoonotic disease outbreaks in poultry and human cases of Highly Pathogenic Avian Influenza since 2003, and cases of Severe Acute Respiratory Syndrome (SARS) in 2003. CDC provided assistance and support during these periods, to both MOH and to MARD.

Using existing bi-lateral U.S. Government and Government of Vietnam relations and framework, and developing more specific bi-lateral and multi-sector formal agreements, technical assistance support, and cooperative agreement funding mechanisms cross-Ministry, we designed and are implementing surveillance and research activities at the animal-human interface of influenza and other zoonotic diseases in Vietnam.

These activities supported cooperation and collaboration between both the animal (MARD) and human (MOH) health sectors. The mechanisms also work both ways, with MOH supporting and funding activities with MARD, and with MARD supporting and funding activities with MOH.

Following is a brief overview of the steps to develop a CDC-MOH-MARD One Health collaborative mechanism in Vietnam. Many of the steps occurred concurrently with other steps.

1. 2009-2010: Introduce AHI program in-country, with funding support and technical assistance from CDC.
2. 2009-2010: Meet with Ministerial partners of existing IP platforms; introduce and establish AHI activities through this platform.
3. 2010-2011: Meet with Ministerial partners of proposed IP/AHI platform.
4. 2010: Develop for signatures a Letter of Intent at the Ministerial level of both countries.
5. 2010-2011: Two AHI studies supported through established MOH cooperative agreements with CDC.
6. 2010-2012: Develop proposed program with funding support and technical assistance from CDC.
7. 2011: Conduct a workshop with cross-Ministerial Department level partners that would be participating in AHI activities with CDC.
8. 2011: Develop for signatures a Letter of Agreement at the Department level of cross-Ministerial partners.
9. 2012: AHI cooperative agreement awarded by CDC to Vietnam Department of Animal Health (MARD).
10. 2012-2015: Implement program activities at international partner level and at cross-Ministerial level.

ACCOMPLISHMENTS:

Since 2009, there have been a number of accomplishments in developing and implementing One Health CDC-MOH-MARD collaborative activities in Vietnam. First, using the CDC-NIHE cooperative agreement, in 2009-2010, NIHE and DAH conducted a pilot AHI cross-section study of the sero-prevalence and subtypes of Influenza A viruses in people, pigs, and poultry in a northern province.

In 2010, representatives of MARD and DAH signed a Letter of Intent, along with representatives of U.S. Department of Health and Human Services and CDC, for research of influenza viruses and other zoonotic diseases in Vietnam. In 2011, representatives of the main MOH and MARD sectors that would be working together on CDC cooperative agreement projects, signed a Letter of Agreement for an inter-agency and intra-agency partnership for influenza and other zoonotic diseases projects and activities in Vietnam.

Also in 2011, NIHE conducted along with DAH, a 4-month extension of the AHI pilot study to further look over time at Influenza A virus subtypes and sero-prevalence in people, pigs, and poultry. Results of both the 2010 and 2011 studies identified a number of influenza viruses in humans and animals, although at low levels in the community. There was also a potential reverse zoonotic transmission of Influenza A/H1N1 2009 from humans to pigs. Results of these studies have been presented at international conferences.

With both NIHE and DAH cooperative agreements in place in 2012, CDC plans a number of AHI

surveillance and research studies with our MOH and MARD partners, through both mechanisms and with both sectors conducting the study activities together. The studies will be concentrating on the prevalence and subtypes of Influenza A viruses of people, pigs, and poultry in rural communities, the risks and transmission factors, and the phylogenetic co-evolution of the influenza virus in both humans and animals in Vietnam.

DISCUSSION:

Building upon existing bi-lateral government relations and in-country CDC programs with MOH, the AHI Initiative has enhanced and added to the existing cooperative partnerships. This occurred through both funding support and technical assistance. The AHI Initiative added One Health activities to the MOH cooperative agreement platform, and added a new cooperative agreement platform with MARD. The AHI Initiative established cross-Ministry agreements at appropriate organizational levels to provide for MOH and MARD collaborative One Health surveillance and research projects and activities. Collaborative mechanisms are in place with both Ministries to allow for activities from either sector, while utilizing the other sector for operations in their respective health areas.

Establishing and conducting One Health collaborative mechanisms and activities at the international level is both challenging and rewarding; with potential benefits to human, animal, and environmental health, at the national, regional, and global levels.

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ONE HEALTH APPROACH to curb anthrax in Bangladesh

Baizid KHOORSHID RIAZ¹, AND Mahmudur RAHMAN²

KEY MESSAGE: *This study aimed to identify the gaps in responding to anthrax in Bangladesh. Ineffective institutionalization of one health approach was a barrier to curb the epidemic. The microplanning of EPI can be utilized to reform the animal vaccination strategy.*

INTRODUCTION

From August 2009, 21 outbreaks of human and animal anthrax reported from different districts were investigated from the national level. This study aimed to identify the gaps in responding to anthrax in Bangladesh.

risk, poverty, and social norms propagated these outbreaks. Poor vaccine production, acute shortage of animal vaccinators, and faulty vaccination planning grossly deficient to annually vaccinate 47 million susceptible animals, and immature institutionalization of one health approach were barriers to curb the epidemic.

METHODS

The results from the analysis of outbreak investigation reports and key informant interviews were triangulated to identify the strengths and challenges for anthrax prevention.

RESULTS

Multi-disciplinary teams from IEDCR, DLS, and icddr, including epidemiologists, physicians, veterinarians, and anthropologists investigated these outbreaks. They identified *Bacillus anthracis* from human and animal samples and linked slaughtering/handling raw meat or meat products of sick animals with the disease. Lack of community awareness about transmission

CONCLUSION

Multi-sectoral outbreak investigations helped to understand the interrelated chains of the processes that led to anthrax outbreaks in Bangladesh. Effective institutionalization of the joint human, animal and environmental health concept could further strengthen the response by utilizing the combined synergy of relevant sectors. The experience of the Expanded Program on Immunization (EPI), its micro-planning, workforce and communication infrastructures can be utilized to improve animal vaccination coverage under the stewardship of DLS. Given the limited practical examples to operationalize one health worldwide, multi-sectoral outbreak investigation can be considered as a useful initial model.

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EFFECTIVENESS OF CONTROL MEASURES for Highly Pathogen Avian Influenza in Thailand

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Thailand was severely affected by highly pathogen avian influenza H5N1 since 2004. The last reported outbreak of the disease was in 2008. Control measures which have been performed successfully without vaccination campaign, being clarify. Since the first outbreak, the national strategic plan was developed in order to tackle the problems in an integrated, holistic, and sustainable manner. At local level, the provincial committee was set up. The committee consists of representatives of all stakeholder including governor, public health, livestock official and the administrations. Local strategic plans were set up. Stamping out was performed effectively. The disease reporting systems and active surveillance programs were introduced widely. There was sub-



The centre for prevention and control of zoonosis



The meeting of zoonosis prevention and control committee



The meeting of zoonosis prevention and control committee



The risk behavior of fighting cock owners



The good standard fighting cock farm

clinical infection in ducks. Movement controls was performed but it could not applied to very small consignments of poultry. Farm biosecurity had been promoted. However, it remains weak in most of the small farms/households. Disinfectants were used widely by farmers and government officials during and after outbreaks but were often used inappropriately. Controls on visitors and vehicles, the limited quarantine of newly introduced poultry, absence of all in all out management in some farms also create vulnerabilities not only for

HPAI but for other diseases as well. Only large farms had formal biosecurity plans. Hygiene had been improved in registered cock fighting rings in Thailand but a significant amount of cock fighting still occurs at unregulated arenas. The integration and progress of actions between local government officials and also with farmers was the most successful factor for the control and preventive measures for highly pathogen avian influenza in Thailand.

3.2

MANAGING PANDEMIC DISEASE THREATS

in the International Extraction Industry

BACKGROUND

Over the past several decades, nearly three-quarters of emerging infectious diseases have emerged from animal reservoirs – zoonotic diseases. Environmental and social changes that affect how people, pets, livestock, and wildlife interact can create conditions that favor the emergence infectious diseases such as Lassa fever, Marburg fever, Ebola and SARS. Potential disease outbreaks present a significant public health threat, and economic, security and development concerns at a global level.

Of particular concern is the surge in extractive industry operations –namely mining, petroleum and logging operations– into previously remote wildlife areas worldwide. By cutting down forest areas, building roads or rail lines, establishing temporary and permanent labor camps, and encouraging migration into previously uninhabited areas, the activities of the extractive industries fragment wildlife habitats and can unintentionally increase the interaction between wildlife and humans and therefore the risk of disease transmission. Areas abundant in wildlife with massive reserves of natural resources, and under intensifying population pressures –such as the larger Congo Basin, South-East Asia, India’s Gangetic plain, the Amazon Basin and the island of New Guinea– are now emerging as hotspots for infectious disease outbreaks.

While there is a growing concern that the activities associated with extractive industries could lead to increased incidence of disease outbreaks among workers and communities, these risks can be easily minimized by ensuring worksites and settlements follow simple measures to reduce exposure risk. Companies should already be familiar with such precautionary measures to address other public health threats facing the extractive industry and associated settlements in new areas, including water-borne diseases, or infectious diseases caused by poor sanitation and food hygiene.

MODERATOR

Steven PHILLIPS

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*Chatham House
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OBJECTIVES

Contribute to better understanding of:

- The risks of zoonotic disease emergence as an unintended consequence of extractive industry operations and facilitate discussion around potential mitigation measures. Examine the roles and responsibilities of the public and private sectors, particularly those of the extractive and international finance industries, and opportunities for partnerships
- A framework for global response, including policy, technical guidance, implementation planning and support

SPEAKERS

William Karesh, Executive Vice President for Health, EcoHealth Alliance, USA

PANELISTS

- **Frank Fox**, Global Manager Occupational Health, Anglo American Plc., South Africa
- **Marta Cabrera**, Medical Director, Fomenta Salud, Chile



Obtained her MD Degree from the University of Chile in 1988. Went through the Occupational and Environmental Residency Program and got her Masters degree in Community Medicine, both at Mount Sinai School of Medicine from the University of New York. Worked for 15 years with ExxonMobil Corporation managing the Occupational Health Programs in the mining, lubricants, chemicals, oil refineries and fuel distribution businesses in 11 countries in the Latin America region.

She actively participated in the corporate Clinical Center of Excellence leading several of its committees. Since 2010, Dr. Cabrera is a senior partner and executive director of FomentaSalud, an occupational health consulting company that provides services to the main mining companies operating in Chile as well as other in the energy and construction industry. In addition, Dr. Cabrera is a certified Medical Review Officer and a consultant for International SOS, the Chilean Ministry of Labor and for one of the most prestigious private health centers in the country (Clínica Alemana).

Marta is a proud and happy mother of 3 college students and resides in Santiago, Chile.

MARTA CABRERA

Medical Director

*Fomenta Salud
Chile*



After qualifying at the University of Rhodesia he worked in the government health services in rural hospitals for 4 years before moving to Botswana where he spent 13 years in clinical practice on a copper-nickel mine. Tropical infectious diseases were a common part of the daily workload, ranging from malaria and typhoid to leprosy, rabies and STDs. In the early 1980's HIV became a common infection in Botswana and a disease management programme was set up.

While in Botswana he developed an interest in occupational and environmental medicine and qualified in occupational health at the University of the Witwatersrand in 1985 followed by a specialist qualification in occupational medicine from the Faculty of Occupational Medicine at the Royal College of Physicians in London.

During the time in the nickel industry he served as vice-chairman of the scientific advisory committee of the Nickel Producers Environmental Research Association (NiPERA).

In 1995 he moved to South Africa taking up a position with an international Forest products company and worked in forestry, sawmilling (setting up the health services for these businesses and the HIV/AIDS management programmes) and the paper industry eventually becoming the Group Medical Consultant with exposure to occupational health care at operations in Europe, Eastern Europe, Russia and the UK.

He currently heads up occupational health for Anglo American plc, a global mining company with its main operations in Brazil, Chile, South Africa and Australia.

He is the Chairman of the Health and Safety task force of the International Commission on Metals and Mining (ICMM) where, with his background in rural health care and occupational medicine he has been instrumental in the production of a number of best practice guidelines, on various subjects (notably Health Impact Assessment) for the membership of ICMM.

He is National Secretary of the South African Society of Occupational Medicine (SASOM) and has served as an examiner for the College of Public Health Medicine (Division of Occupational Medicine) of South Africa and the Faculty of Occupational Medicine of the Royal College of Physicians in the UK.

FRANK FOX

Global Manager

*Occupational Health
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Dr. William Karesh is the Executive Vice President for Health and Policy for EcoHealth Alliance. He serves as the President of the World Organisation for Animal Health (OIE) Working Group on Wildlife Diseases and also chairs the International Union for the Conservation of Nature (IUCN) Species Survival Commission's Wildlife Health Specialist Group, a network of hundreds of wildlife and health experts around the world. Currently, Dr. Karesh is the Technical Director for the USAID Emerging Pandemic Threats PREDICT program, a \$75 million effort focused on predicting and preventing pandemic diseases.

Dr. Karesh has pioneered initiatives focusing attention and resources on solving problems created by the interactions among wildlife, people, and their animals and created the "One World – One Health" initiative linking public health, agriculture and environmental health agencies and organizations around the world. International programs under his direction have covered terrain from Argentina to Zambia and include efforts in the Congo Basin to reduce the impact of diseases such as Ebola, measles, and tuberculosis on humans and endangered species such as gorillas and chimpanzees, to global surveillance systems for emerging diseases. In addition to his work in the private sector, Dr. Karesh has also worked for the USDA, DOD, DOI and the Food and Agriculture Organization of the U.N. Dr. Karesh is internationally recognized as an authority on the subject of animal and human health linkages and wildlife. He has published over one hundred and fifty scientific papers and numerous book chapters, and written for journals such as Foreign Affairs.

WILLIAM KARESH

Executive Vice President
for Health

EcoHealth Alliance
USA



Senior Fellow at Chatham House and Project Manager for the IDRAM initiative (Extractive Industries Infectious Diseases Risk Assessment and Management), a global policy-level discussion among the extraction industry, international development and finance institutions, national government stakeholders and science leaders addressing the risks and management of infectious disease outbreaks in global transmission hot zones. Dr. Phillips was formerly Medical Director for Global Projects at Exxon Mobil Corporation. His career there included managing the \$110 million ExxonMobil Malaria Initiative.

He has worked closely with governments, NGOs, foundations, UN agencies, multilateral, and faith-based organizations, and the private sector in fostering public-private partnerships as a development platform to address urgent global health priorities. He has served two terms as private sector representative on the Board and Executive Committee of the Roll Back Malaria partnership in Geneva.

He currently serves on the boards of malaria NO MORE™, the World Economic Forum's Global Health Advisory Board, and as an advisor to the United Nations Special Envoy for Millenium Development Goals (MDGs), as well as the Global Health Programs of Harvard's Massachusetts General Hospital and the University of California at San Francisco.

STEVEN PHILLIPS

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MANAGING PANDEMIC DISEASE THREATS

in the International Extraction Industry

William KARESH, Kris MURRAY, Elizabeth LOH, Carlos ZAMBRANA-TORRELIO, Sarah ELWOOD, Catherine MACHALABA, and Peter DASZAK,

ABSTRACT:

Infectious diseases are a significant public health issue and a demonstrated threat to biodiversity and ecosystem health. Over 60% of new emerging infectious diseases originate in animals (termed “zoonotic”); of these, over 70% come from wildlife [1]. Additionally, the economic costs for mitigation and eradication of infectious disease outbreaks and pandemics can be enormous. This is alarming as the risk of novel disease emergence is on the rise globally, and increasing contact between humans, domestic animals and wildlife resulting from changes in land-use practices is a significant contributor to novel disease emergence and outbreaks.

Natural resource extraction (e.g., oil/gas, mining, timber extraction/logging) and augmentation (e.g., plantation) industries are at the forefront of land-use changes in many regions, particularly in high risk areas in developing, tropical countries (known as disease emergence “hotspots”). Activities associated with the natural resources industries have been implicated in novel disease emergence events and outbreaks in the past. For example, a protracted outbreak of Marburg hemorrhagic fever occurred in DRC between 1988 and 2000 [2],

resulting from gold mining and exposure to cave-dwelling bats [3]; 154 cases were recorded, with an 83% mortality rate [4]. In 1995 an Ebola outbreak occurred in Mékouka and other gold-mining camps in Gabon; a total of 52 cases were confirmed with 31 deaths among cases (60% mortality rate) Furthermore, deforestation associated with logging [5,6] and oil extraction [7] has led to increased risk for Malaria and Yellow Fever transmission.

Disease emergence events and outbreaks can have wide-ranging local impacts as demonstrated by Marburg and Ebola, as well as regional and potentially global impacts. In example, HIV is thought to have originated from non-human primates, spilling over into humans that engaged in hunting, butchering or consuming wild animals. Roadways both increase the opportunities for humans to enter relatively pristine forests as well as their capacity to leave and come into contact with others [8], and in addition to the increased forest accessibility, the influx of forest workers for logging and other activities increases the demand for Bushmeat, thus increasing the potential for spread of HIV [8]. HIV has become a persistent threat with significant negative global impacts on human health, survival and livelihoods.

There are potentially significant mutual benefits to the natural resources industries and to public health agencies in actively addressing risk assessment and mitigation strategies for disease emergence and outbreaks. These encompass production, profitability and social or environmental responsibility as well as liability for health outcomes. Both proactive and participatory disease risk assessment and ‘best-practice’ and ‘beyond compliance’ management can help reduce health risks. Health impact assessment (HIA) is used to assess the potential health impacts of a project on worker and nearby populations, and to recommend mitigation measures. HIA includes risk assessment, which is often used to qualitatively or quantitatively rank the potential risks.

Given the commonalities that exist among industries, there are several potential health risks relating to infectious diseases that are shared between most industries including:

- Vector-borne diseases (malaria, schistosomiasis, dengue, onchocerciasis, lymphatic filariasis, yellow fever, etc.)
- Respiratory and housing issues- respiratory effects from housing, overcrowding, housing inflation
- Soil- and Waterborne diseases
- Food- and Nutrition
- Hunting practices and bushmeat

Thus, there can be wide-ranging benefit across the industries to develop best practices for risk prevention and control that promote the health of the workers and communities affected by extractive industries. Although HIA guidelines developed by the International Finance Corporation (IFC), International Council of Mining and Minerals

(ICMM) and IPIECA, the global oil and gas industry association for environmental and social issues, include veterinary and zoonotic diseases, they emphasize vector-borne diseases and diseases of livestock and domestic animals. USAID’s EIWG Working Group has developed a Planning Tool that provides steps to incorporate emerging infectious diseases of zoonotic origin, including those of wildlife origin, into HIA. These include developing measures for risk prevention and management that reduce likelihood of exposure to potential health hazards, strengthening of systems for monitoring and responding to disease-related risks, and engagement of local health officials in risk control.

Industry action, in coordination with technical and evidence-based guidance, is urgently needed to address these issues to reduce the risk of disease emergence through extractive industry practices.

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3.3

PEOPLE, PRACTICES AND POLICIES

Designing and Implementing Effective Multisectoral, Trans-disciplinary Interventions to Reduce Risk and Mitigate the Negative Impact of Infectious Diseases under One Health

BACKGROUND

The risks of disease emergence, transmission and spread is increasing and being driven by complex factors. Globalization, increased urbanization, demand for and trade in animals and animal products, and increased need for land, food and natural resources is creating an environment for disease emergence and is spreading disease faster and wider. Environmental exploitation and degradation, poor environmental management and increased interaction between wildlife, domestic animals and people provide the ideal opportunity for pathogens and their vectors to potentially mutate into more formidable forms. Poverty, overcrowding, population displacement, weak health systems with limited capacity for timely identification and response to epidemics, inadequate access to safe water and sanitation, and the underlying health conditions of populations all provide the right environments for the proliferation of infectious diseases.

MODERATOR

Kama GARRISON

Senior Public Health Advisor

U.S. Agency for International Development (USAID) USA

It is clear that mitigating endemic disease and preventing and managing emerging infectious diseases is highly complex and challenging and human behavior is at the core of many of these issues. The traditional approach has been to either focus on “changing” the behaviours of individuals to make better choices or addressing the environmental, policy or legal context in which individuals make decisions and take action. What is clear is that investments in prevention, preparedness and response strategies need to move beyond a reliance on bio-medical models combined with one-way information dissemination approaches. Increasing importance is being given to the strategic and considered design and implementation of multilevel and multisectoral actions that address the underlying causes of disease emergence and intensifies collaboration between wildlife, domestic animals and human health sectors.

This session will focus on understanding the role human behavior plays within the dynamics of endemic as well as newly emergent diseases and why it has been so difficult to address by any single intervention. It will explore current deeply-held paradigms and assumptions that underpin many “behavioral and social change programs” that render them ineffective and will explore how these assumptions goes against much of what science is telling us about the way we need to think about ourselves and about our relationships to each other and the world around us. It will consider what the range of approaches and interventions needed to address human behavior need to include and will suggest how these can be effectively harnessed within One Health.

OBJECTIVES

The objective of this session is to provide an opportunity to share the latest scientific evidence and discoveries concerning human behavior and to debate the policy and programmatic implications for behavioral and social change programs relevant to infectious disease emergence, transmission and spread.

SPEAKERS

- **Bill Smith**, CEO, MakingChange4u, USA
- **Daniel Siegel**, Executive Director, Mindsight Institute, USA
- **Duc J. Vugia**, Clinical Professor, University of California San Francisco, School of Medicine, USA
- **Petra Dickmann**, Research Fellow, London School of Economics, United Kingdom
- **John Parrish-Sprowl**, Co-Director, Global Health Communication Center, Professor, Communication Studies, Indiana University Purdue University Indianapolis, USA
- **Asiya Odugleh-Kolev**, Team Leader, Behavioural and Social Interventions, World Health Organization, Switzerland



Petra Dickmann is a risk communication expert with a strong background in humanities and medicine. She holds an MA in communication and completed her PhD in cultural and political sciences (HU Berlin & ETH Zurich) with an interdisciplinary research on biosecurity; she is also a medical doctor by training and did her medical doctoral research (MD) in the field of CBRN threats and their impact on public perception (King's College London & University Hospital Frankfurt). She is currently a Research Fellow at the London School of Economics and Political Science (LSE) conducting research on international health policy and global health security. Before joining LSE worked for the Centre for Biological Security at the Robert Koch Institute (the German federal institute for infectious diseases and prevention) and at the University Hospital Frankfurt (Department for Infectious Diseases) and developed risk communication strategies for highly infectious diseases and high containment laboratories. She has founded and is the director of strategic risk communication consultancy offering advice to global industry, international institutions and governments.

Petra is a member of the WHO virtual advisory board on Mass Gatherings and has worked in the framework of the Global Health Security Initiative (GHSI). She has developed risk communication training for the European Centres for Diseases and Infection Control (ECDC) and is working on risk communication projects for WHO.

PETRA DICKMANN

Research Fellow

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Kama Garrison is a Senior Public Health Advisor for the United States Agency for International Development (USAID). Ms. Garrison manages all Behavior Change Communication activities for USAID's Pandemic Influenza and Other Emerging Threats program focusing on how mitigate the risks associated with emerging diseases. Ms. Garrison has worked globally in the area of human capacity development (HCD), human behavior and monitoring and evaluation. Ms. Garrison joined USAID 7 years ago to manage the anti-microbial resistance and pharmaceutical activities for USAID's programs in tuberculosis, malaria, child health, and HIV/AIDS. Prior to joining USAID Ms. Garrison was the Performance Improvement Advisor for JHPIEGO, a Johns Hopkins University Affiliate.

Ms. Garrison holds a Masters Degree in Public Health from Tulane University, and has over 15 years of experience in the International Health field with an emphasis on capacity building, behavior change, quality of care and service delivery issues. She has managed programs in many of USAID's priority countries.

KAMA GARRISON

Senior Public Health
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Ms Asiya Odugleh-Kolev is Team Leader, Behavioural and Social Interventions, which includes WHO's risk communication capacity building activities under the International Health Regulations (IHR) in WHO Headquarters and social mobilization in outbreak response. She joined WHO in 2001 to work on WHO's Communication-for-Behavioural-Impact (COMBI) methodology and has applied the framework to a range of health challenges including: avian influenza, dengue, Ebola, leprosy, lymphatic filariasis, pandemic influenza and polio. In addition to being the focal point for COMBI in WHO, over the last 4 years, her work has concentrated on developing approaches, tools and guidance which integrate behavioural interventions into readiness and response to epidemics and emerging diseases. She has been part of WHO multidisciplinary outbreak response teams and has trained international and national rapid response teams through the WHO Global Outbreak Alert and Response Network (GOARN) at Headquarters and in collaboration with WHO Regional Offices. Prior to joining WHO, she worked for UNICEF Somalia in Programme Communication and Social Mobilization.

Ms Odugleh-Kolev qualified as a Registered General Nurse from the Sheffield School of Nursing; she has a BA (Hons) in Third World Studies with Anthropology from the University of East London; a Postgraduate Diploma in Print Journalism from the University of Westminster, London; and a Masters in Public Health from the London School of Hygiene and Tropical Medicine. Her professional training and experience covers, adult learning, community development, health communication, journalism, risk communication and social mobilization.

ASIYA ODUGLEH-KOLEV

Team Leader - Behavioural
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John Parrish-Sprowl PhD, currently serves as the Co-Director of the Global Health Communication Center (GHCC) of the Indiana University School of Liberal Arts. Prior to this position, he was the Chair of the Department of Communication Studies. In addition to being a Professor of Communication Studies, he is also a member of both the University College and the Russian and Eastern Europe Institute faculties of Indiana University.

He has been a member of the legislative Assembly of the National Communication Association, twice Chair of the Applied Communication Division, and past chair of the theory and methodology as well as the applied divisions of the Eastern Communication Association. In addition, he is a reviewer and editorial board member for a number of Communication journals. He is known for his international applied communication research and project consultancies, focusing on issues of health, economic development, and education. His work has resulted in improved performance for a number of organizations. He has lectured, conducted research and consulted with universities, businesses, and NGOs in a number of countries, including Belarus, France, Ghana, Indonesia, Kenya, Netherlands, Macedonia, Poland, Russia, Thailand, and Vietnam. He has been honored with awards from his current and past universities as well as universities in both Macedonia and Poland for his work.

He has numerous papers and publications, including a recent chapter on applied research and globalization in the Handbook of Applied Communication Research and one just out on the role of new media in the transformation of post-socialist Europe. Currently he is contributing to the Community Health Engagement Program (CHEP) of the Clinical Translational Sciences Institute of Indiana (CTSI) and collaborating with WHO to work with Ministries of Health in multiple countries to create better health (including risk and crisis) communication capabilities, leading to improved health care access and indices.

JOHN PARRISH-SPROWL

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Daniel J. Siegel, M.D. received his medical degree from Harvard University and completed his postgraduate medical education at UCLA with training in pediatrics and child, adolescent and adult psychiatry. He served as a National Institute of Mental Health Research Fellow at UCLA, studying family interactions with an emphasis on how attachment experiences influence emotions, behavior, autobiographical memory and narrative.

Dr. Siegel is currently clinical professor of psychiatry at the UCLA School of Medicine where he is on the faculty of the Center for Culture, Brain, and Development and the Co-Director of the Mindful Awareness Research Center. An award-winning educator, he is a Distinguished Fellow of the American Psychiatric Association and recipient of several honorary fellowships. Dr. Siegel is also the Executive Director of the Mindsight Institute, an educational organization, which offers online learning and in-person lectures that focus on how the development of mindsight in individuals, families and communities can be enhanced by examining the interface of human relationships and basic biological processes. His psychotherapy practice includes children, adolescents, adults, couples, and families. He serves as the Medical Director of the LifeSpan Learning Institute and on the Advisory Board of the Blue School in New York City, which has built its curriculum around Dr. Siegel's Mindsight approach.

Dr. Siegel has published extensively for the professional audience. He is the author of numerous articles, chapters, and the internationally acclaimed text, *The Developing Mind: How Relationships and the Brain Interact to Shape Who We Are* (Guilford, 1999). This book introduces the field of interpersonal neurobiology, and has been utilized by a number of clinical and research organizations worldwide, including the U.S. Department of Justice, The Vatican's Pontifical Council for the Family, Microsoft and Google. *The Developing Mind, Second Edition* was published in 2012. Dr. Siegel serves as the Founding Editor for the Norton Professional Series on Interpersonal Neurobiology which contains over two dozen textbooks. *The Mindful Brain: Reflection and Attunement in the Cultivation of Well-Being* (Norton, 2007) explores the nature of mindful awareness as a process that harnesses the social

circuitry of the brain as it promotes mental, physical, and relational health. *The Mindful Therapist: A Clinician's Guide to Mindsight and Neural Integration* (Norton, 2010), explores the application of focusing techniques for the clinician's own development, as well as their clients' development of mindsight and neural integration. Dr. Siegel's latest book is *Pocket Guide to Interpersonal Neurobiology: An Integrative Handbook of the Mind* (Norton, 2012).

Dr. Siegel's book, *Mindsight: The New Science of Personal Transformation* (Bantam, 2010), offers the general reader an in-depth exploration of the power of the mind to integrate the brain and promote well-being. He has written two parenting books, *Parenting from the Inside Out: How a Deeper Self-Understanding Can Help You Raise Children Who Thrive* (Tarcher/Penguin, 2003) with Mary Hartzell, M.Ed. and *The Whole-Brain Child: 12 Revolutionary Strategies to Nurture Your Child's Developing Mind* (Random House, 2011) with Tina Payne Bryson, Ph.D., both of which explore the application of the mindsight approach to parenting.

Dr. Siegel's unique ability to make complicated scientific concepts exciting has led him to be invited to address diverse local, national and international groups of mental health professionals, neuroscientists, corporate leaders, educators, parents, public administrators, healthcare providers, policy-makers, mediators, judges, and clergy. He has lectured for the King of Thailand, Pope John Paul II, His Holiness the Dalai Lama, Google University, London's Royal Society of Arts (RSA), and TEDx. For more information, please visit: www.DrDanSiegel.com.

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After entering phased retirement in 2009 Dr. Smith continues to serve as Co-Editor of the Social Marketing Quarterly and as consultant to various foundations and agencies. For the last two years he has worked as Senior Communications Consultant to the PEW Foundation on the development of their Community Water Fluoridation Initiative; consultant to PAHO on salt reduction strategies, and various state and local governments on tobacco cessation, HIV/AIDS, and obesity. He has served on two Institute of Medicine panels, including the co-authorship of the IOM's Health Literacy Report. He continues an active a career of public speaking on the application of integrated behavior change to widely diverse health and environmental challenges.

As Executive Vice President (1981-2008) at the Academy for Educational Development, Dr. Smith supervised a worldwide staff of more than 1900 employees, serving people in all 50 U.S. states and more than 150 countries. He directed multi-national behavior change programs directed at oral rehydration, mass immunization, HIV/AIDS prevention, environmental protection, and maternal child nutrition.

Dr. Smith is recognized for his multi-disciplinary application of behavior change strategies to social change organized around integrated marketing theory. He is a co-founder of the Institute for Social Marketing. He publishes a regular column in Social Marketing quarterly and serves as editor on that Journal as well as The Journal of Communication: International Perspective and the Applied Environmental Education and Communication: An International Journal. He received the Alan Andreasen Award for excellence in Social Marketing in 2004 and the Phillip Kotler Award for Leadership in 2010. His major publications include three books, as well as the Chapter on Communication, Marketing and Behavior Change for the 4th and 5th Editions of Sexually Transmitted Diseases, one of America's premier medical textbooks.

His Ed/D is from the University of Massachusetts and the Honorary Ph.D. from the University of South Florida. He is fluent in Spanish; lived in Latin America for more than 10 years; and completing his Ed.D at the University of Massachusetts and served in the U>S> Peace Corps in Colombia, SA.

BILL SMITH

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Dr. Duc Vugia has more than 20 years of experience as an infectious disease public health practitioner and medical epidemiologist in the United States, primarily in the State of California. He received his medical training and Doctor of Medicine at the University of California San Francisco and Master of Public Health in Epidemiology at the University of California Berkeley. He completed an Internal Medicine residency and Infectious Disease Fellowship at the University of California Irvine Medical Center. He was a U.S. Public Health Service officer in the Epidemic Intelligence Service of the U.S. Centers for Disease Control and Prevention, before returning to California.

As an infectious disease epidemiologist and public health administrator, Dr. Vugia has worked extensively with various local, state, and federal partners and academic collaborators to investigate and manage numerous outbreaks of foodborne disease, waterborne disease, vectorborne disease, and emerging infections. He has authored or co-authored over 100 peer-reviewed articles on a variety of infectious diseases.

DUC J. VUGIA

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THE SIGNIFICANCE OF COHERENCE IN COMPLEX SYSTEMS:

an Example from WHO's Experiences in Building Risk Communication Capacity to Prepare for and Respond to Infectious Diseases

Asiya ODUGLEH-KOLEV

Team Leader, Behavioural and Social Interventions
Global Capacities Alert and Response Department (GCR), WHO Geneva

This presentation will explore how recent scientific advances and research, as described by co-panelists, are suggesting shifts in the way we design and implement public health interventions to take into account relational and systemic approaches. This shift has major implications for any interventions that require some adaptation (whether temporary or long term) of individual, organizational, social, and cultural practices and norms.

Prevention, preparedness and response strategies targeting endemic and emerging infectious diseases that cross environmental, animal and human health require multilevel and trans-sectoral actions over time. Mitigating endemic infectious diseases and preventing and managing emerging infectious diseases is therefore highly complex. Human behavior is a common denominator that underlies the factors that contribute to the problems associated with infectious diseases, in turn; it also contributes to finding necessary solutions. However, human behaviour has also been the most challenging to influence.

Drawing upon experiences and lessons learnt from WHO in applying systemic and relational approaches to building risk communication capacity under the International Health Regulations (IHR 2005), the presentation will offer new ways of thinking about "behaviour change" that can significantly contribute to better and faster results and which move beyond typical information dissemination, messaging and community mobilization approaches. That, in fact, sustainable and appropriate behavioral outcomes are an inevitable and natural consequence when we pay attention to structuring a substantive transformative process that promotes meaningful conversation and dialogue within and between connected systems that contribute to a common goal.

It will conclude that most challenging part about behaviour change programmes is not about changing the behaviours of communities and populations – but are about changing the behaviours of public health practitioners, policy makers and institutions to bridge their knowledge-practice gap and design effective and meaningful policies and programmes.

INTEGRATING SYSTEMS:

One Health and the Human Mind

Daniel J. SIEGEL, M.D.

Executive Director, Mindsight Institute, Los Angeles California;
UCLA School of Medicine
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and Development Mindful Awareness Research Center

In this presentation, the scientific understanding of the nature of complex systems will be discussed as it pertains to multiple layers of interacting elements relevant to One Health. Drawing on the synthetic, multi-disciplinary view of interpersonal neurobiology, this talk will explore how the human mind can be viewed as a self-organizing emergent property of both the human nervous system and the social system. Ways of harnessing this view of the mind as an embodied and relational process that regulates energy and information flow will be explored, and principles of health will be offered that examine the process of integration, defined as the linkage of differentiated parts, as a potential core mechanism at the heart of well-being. Empowering individuals to use the mind to integrate the brain and relationships—the connections we have with other people, other animals, and the physical environment—offers one approach to psychological and behavioral strategies that can be used to link animal systems and ecosystems with human systems in the unfolding of infectious disease processes. These principles are offered to encourage discussion and a focus on potential practical applications for the individual, families, and communities in approaching global challenges.

THE SOCIAL MARKETING PROCESS

of Integrated Behavior Change

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Social marketing is a form of large-scale behavior change. It is often contrasted with two other broad approaches to behavior change:

- **EDUCATION:** People change because they know something. (AIDS kills)
- **REGULATION:** People change because they wish to avoid punishment. (Parking tickets).
- **MARKETING:** People change because they get something they want more than the existing behavior. (Energy Star light bulbs).

Social marketing is guided by three broad principles.

- **EXCHANGE:** people do things in exchange for benefits they receive.
- **SEGMENTATION:** people value a wide range of benefits under different circumstances; including, but not limited to, financial gain, the respect of others, and altruism.
- **COMPETITION:** people have choices, therefore, any new behavior competes with the benefits people are already receiving.

Given this perspective the social marketer job's is to select a specific segment of the population,

determine what benefits they want and provide those benefits.

All this sounds a bit dry. Here's an example:

Hispanic women newly arrived in America are resistant to using car seats for their children. Officials assumed the problem was the cost of car seats and provided car seats free. Use of car seats increased only 5%. Discussing with these women why they did not use car seats, the women answered that they did not trust technology and that God determined if their child would die in a car crash, car seat or no car seat. The program had priests bless car seat and car seat use increased to over 60%.

- Exchange was offering a car seat "protected by a Priest's blessing"
- Segment was those women who believed God controlled their child's destiny.
- Competition was the arms of the mother.

One way to understand social marketing is to understand the kind of questions social marketers ask in developing a large scale program.

BASIC 5 SOCIAL MARKETING QUESTIONS

There are many versions of these, but they are pretty well accepted now.

- What do I as a social marketer want to achieve?
- What does my customer want?
- How do I really know that's what they want?
- What am I competing against?
- What am I going to do to satisfy our customer and compete successfully?

The problem with writing and numbering these questions is that writing demands that something comes first. Thinking doesn't make that demand. You can think about the answers to all these questions at the same time. It's a lot like playing chess, in which you think of multiple possibilities before moving the chess piece.

THE SOCIAL MARKETING MANAGEMENT PROCESS.

Here's how the management process I am going to suggest works.

- You tell your staff you are interested in the answers to these questions and you will check within as the process goes along. Discuss the questions with the team. Customize your own list.
- Give them the full set of questions. You're not trying to trick them into making mistakes. You're helping them to avoid mistakes.
- As they complete each part of the process, have them discuss their answers with you and the full team.
- Tell them when did they good. Tell them when you're confused. And Tell them when they went off track.

- This process only works if you give the staff the questions before they do the work. You are not trying to trick them....you want them to know what you think is important.

THE SOCIAL MARKETING MANAGEMENT QUESTIONS

What Do We Want to achieve?

- What will be different after this program?
- What will people be doing after that they are not doing now?
- Is there good science that supports this behavior? Any concerns?
- Will this get us what we want to achieve?
- Are other things needed besides what we are able to do?
- What do we do best, and does this built on that experience?
- Are we sure this idea works? Where are the complications in the science?
- What could go wrong?
- Do we have to start with awareness? How can we get directly at change?
- Do we have the resources to achieve this level of success?
- How do I sell this to my Board, our donors, my boss?
- Are there other ways to get where we want to be? Let's talk about them a minute?
- Are we taking a true marketing perspective? How are we going to look for new products or services that we could offer – understand access and pricing issues, and not go directly for message strategies?

What does my customer want?

In deciding on what we want to accomplish, there is often an implied audience; a customer, maybe many customers. Our fundamental marketing assumption about customers is that they want solutions:

- to problems they already know about.
- that are possible to do, easy to find, and they make them feel better.
- And that impress their friends.

The management questions at this stage focus on who the customer is and what they want. You team is likely to come in having done a lot of thinking about this and this is your time to do some serious checking.

- Do we really have the right segment? Are we trying to reach too many different kinds of people?
- What has worked with these folks before- any examples of successes with them specifically? What did you learn from these successes?
- What kinds of products and services do they use now? I don't want to get caught in the message only trap.
- What benefits do they really want? Not just the obvious, things that surprised you.
- What do you know about their journey in solving this problem? Where will they start... what are the key decision points...how do they rewarded?
- What are the barriers that stop them from doing it. NO, not just what they complain about- what's actually interferes with their doing what we want from them?
- Where's the fun in it for them? Yes, fun. They have a right to some fun too.

How do we really know that's what they want?

Great social marketing research goes both deep and wide. It uses a variety of tactics to understand the customer. Qualitative stuff is susceptible to our prejudices. Surveys are susceptible to asking the wrong questions and observations are often amateurish. Doing some of all improves the quality of the analysis and conclusions.

- Are you watching and listening to the right people?
- You did not focus only on early adopters and the hardest to reach did you?
- How did you triangulate data from multiple sources?
- Show me your prototyping results. What did they create when you gave them a chance?
- Did you find anything that surprised you? What were your own prejudices in going into this?
- Did you find anything you did not believe was true?
- What do you think really matters to them? Why did this stand out?
- Are their alternative answers to this question?
- What's the direct line between these findings and your plan.

This last question can be important, because this is a common place where a programs gets de-railed. Someone gets excited about a finding and forgets what the program is supposed to accomplish.

What are we competing against?

The competition is a complex set of products, services, and perceptions. It is what the customer is doing instead of what we hope they will do. It is the solution he has found to a problem. Sometime we have to reframe the solution and therefore reframe the problem. Understanding the competition means looking for new opportunities for attack; new openings for our behavior.

- What are people doing already? What do they like about it?
- Why do they complain about it?
- What are our competitors' strong point?
- How are we going to do better, not just compete, but offer something better?
- Are you sure this is the only competitor?
- Could we reframe the problem to take on a weaker competitor?

What are we going to do to satisfy our customer and compete successfully?

- What changed since we last talked?
- What did you test in this plan? What went wrong?
- What did you not test and how important is it?
- How are we making this easier for people?
- Where's the fun? They think this is fun?
- Are the allies on board? What did we offer them?
- Timing- how do these things relate? Do we have the right order of events?
- The message strategy is all about the problem. Where's the solution?

- Now, are you sure this behavior is going to work under these new conditions?
- How will we know we're having an effect on health- don't tell me about awareness, I want to know how we get behavior change and how that is going to have a health benefit?
- What are you worried about? Tell me.

These are not all the right questions by any means. But they are a start. The management process is about being clear from the beginning about what you want and then checking for it as you go along.

You are not trying to show your staff you are smarter than they are, but help them be smarter than you are.

COMMUNICATION COMPLEX: Achieving Improved Public Health Through Greater Coordination and Collaboration

John PARRISH-SPROWL

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Despite many advances in scientific theory and research related to human communication in general, and social and behavioral change in particular, many programs still function in the 21st century based on a 20th century model of communication. Growing awareness that new approaches to communication are needed have been noted by many, including some from WHO (2009) and ECDC (2010), along with a number of communication scholars (Barge and Craig, 2009, Parrish-Sprowl, 2012, In Press, Pearce, 1989, 2007). Given the growing complexity of public health issues, especially with the global rise of non-communicable diseases such as diabetes, along with an increasing awareness of mental health issues as a major public health concern, we must develop improved processes of cross sector and organizational collaboration with the aim of engaging the public in more effective approaches good health. Moving from a communication simple to a Communication Complex approach opens our thinking to strategic and programmatic possibilities that place public health professionals in a better position to meet the challenges faced around the world.

Most public health NGOs, agencies, and Ministries construct their communication efforts in the image of a basic Source, Message, Channel, and Receiver (SMCR) model, such as that proposed by Shannon and Weaver and elaborated by Berlo (1960). This overly mechanistic and linear framing of communication tends to under value communication issues, often leaving it as an after thought with little budget and expectations (Inagaki, 2007). The SMCR model has been the focus of much analysis and criticism by communication scholars for its utter inadequacy in either modeling communication or leading us to better performance in the critical episodes of our lives (Craig, 1999). One response to the challenge of moving beyond the simple has been the development of an approach to communication known as the Coordinated Management of Meaning (CMM) (Pearce, 1989, 2007).

Just as we might consider the idea that Newtonian physics is a statistical approximation of quantum mechanics, we begin with the notion that the transmission model of communication holds the same relationship to CMM. It is not that it

is wrong; simply that it is such a limited way to understand the primary process by which we construct our social worlds. Rather than a Sender, Message, Channel, Receiver conceptualization of communication, Pearce offers the following:

The communication perspective sees all forms of human activity as a recurring, reflexive process in which resources are expressed as practices and in which practices (re) construct resources. In this sense, “practices” consist in actions such as building a bridge, playing bridge, and seeking to bridge misunderstandings. “Resources” comprise the stories, images, symbols, and institutions that persons use to make their world meaningful. (Pearce, 1989, p 23)

If we shift from an SMCR model to a communication perspective, such as that posited by Pearce (1989) in *Communication and the Human Condition*, our assessment of given circumstances becomes not only something different, but also more complex and much less amenable to simple diagrams and the simplistic prescriptive approaches that are invariably rooted in the transmission approach to improvement, which is to offer prescriptions of either more talk, better talk, or to label the situation hopeless (Parrish-Sprowl, In Press). In turn, CMM has been engaged by a number of practitioners in various contexts to make advances in environments where communication framed as SMCR is simply not up to the task (Creede, Fischer-Yoshida, and Gallegos, 2012, Parrish-Sprowl, 2003, 2006).

CMM suggests that communication is a process, one that often develops into patterns, and it is the patterns that should capture our attention, not simply the messages that we want to offer to others (Parrish-Sprowl, 2000). If we want to create change

we must perturb those patterns in ways that lead to sustainable change. Both illuminating and augmenting CMM is the work of Siegel in the development of interpersonal neurobiology (IPNB) (Siegel, 2010, 2012). Building on a growing body of scientific literature, Siegel suggests a fundamental understanding of human activity that is predicated on three primes of brain, mind, and relationships (2010). In *The Developing Mind* (2012), he details the science that underpins IPNB. CMM and IPNB nicely complement each other. Much of the work of Siegel elaborates the connection between mind and brain while CMM elaborates the process of communication. When taken together they form the approach I label Communication Complex.

COMMUNICATION COMPLEX

In public health we should consider communication not to be an activity, but as a process. Consider the difference between conversation and conversational episodes. Conversations are topics discussed across time, space, and people. For example, in many countries people have been talking about malaria for centuries. Each culture has its own way of talking about what it is, how it is transmitted, and what could or should be done about it. This conversation has gone on for a long time and will continue to do so. A conversational episode, takes place among specific people at a specific time. It is but one part of the whole conversation. Too often, when we think of communication simple we only focus on the episode and our analysis does not take into account that it is but one small

part of a larger conversation. This can skew our assessment and lead to unproductive solution to organizational issues.

Second, although humans are fully capable of inventing anew each time they talk, mostly we interact in patterns. Simple tends to lead us to focus on individuals, analyzing what each person says. Communication complex shifts our attention to the pattern that is created when people talk. The pattern offers a much richer unit of analysis for improving communication. We become more interested in what people are creating together than in what each person is doing. For example, simply telling people about nutrition and hoping that people eat better (a simple approach) is different than considering the conversation and conversational episodes that comprise the story regarding eating in a community. When taking this approach it shifts the focus to patterns of interaction, their impact on the embodied brain, and offers differing notions regarding how we might address the issue.

A perturbation refers to how we choose to intervene in a process, to alter undesirable patterns to promote greater health. Whenever we endeavor to change a community (for better or worse) ultimately what we are doing is perturbing the way people engage each other. This is true whether we are trying to develop better response to outbreak emergencies, reduce obesity, or improve the management of mental health. If we want change we must do something differently. Often people are viewed as resistant to change. While this could be the case, we can think of it in a different way that is more likely to produce the change we want and need. No matter how ineffective a pattern might be, it is familiar. Doing what we are already doing is something we

understand and have developed a competence in performing that is comfortable. Perturbing a pattern leads people to do something that at first can be uncomfortable and leave people feeling incompetent. Almost nobody likes to feel incompetent. Thus, we see resistance to change.

In communication complex I refer to this as putting people's resources at risk. Resources are those basic ideas and actions that enable us to do anything, such as start a business, cook a meal, or teach our children. If we directly challenge a person's resources then we can expect pushback. It is better, to work with them first, to develop a sense that the resources are obsolete or by comparison not as effective as a different set of resources. Once convinced of that people are not resistant but motivated to change. This can entail the use of demonstrations, discussion with community members, presentation of data, and coaching. We must then work with them to insure that the new resources, contributing to a new pattern, are mastered. This builds effective change.

Moving from communication simple to Communication Complex requires some learning, both in the area of theory and that of practice. But it can yield better performance. At a fundamental level, the process can begin by choosing to do two things. First, consider process, patterns, and perturbations. Second, lead your analysis with some key questions such as the following:

- When people talk in this community what kind of health indices are they making? (Proper immunizations, good eating habits, exercise, healthy relational patterns, etc.)

- When people disagree are they more interested in being right, or being effective? (Do they seem compelled to stay in unhealthy patterns)
- What are our goals? (If we change, what do we hope to achieve?)
- Who benefits and how from the changes? (Do people get something for their efforts? If so, what?)
- How might the process of change work? (Can we envision the transformation process as opposed to just thinking about what the change will look like when we are done?)

Communication complex requires inquiry and introspection. It also works best when change is based on data rather than supposition.

People already know how to communicate. What they need to do is learn to communicate differently to create change. It is not to say that they are poor communicators, but rather new patterns, new ways of doing things, can create benefits. Actually, it is because people already know how to communicate that we can create effective change. Sometimes the change is easy, sometimes not. It depends in part on how different the pattern needs to be and how prepared people are to do things differently. This is the role of public health officials and community leaders as it is their job to not just run things but to make things better to meet the demands of an ever-changing world.

Communication Complex takes into account the process, patterns, and means of perturbing patterns, within a framework built on neuroscience research that, as one article notes "cognition materializes in interpersonal space" (Hassan, et al, 2012). By considering the systemic nature of communication and the patterns formed, we are

able to construct environments that are more collaborative and more successful in creating meaningful and successful change. As we face the 21st century challenges of growing obesity, diabetes, and mental health issues across the planet, along with maintaining vigilance with respect to communicable disease outbreaks it is important that we develop patterns of policy and practice that offer our most capable means of establishing a healthy population.

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3.4

SUCCESSFUL COLLABORATION:

Trust and Transparent Data Sharing and Communication

BACKGROUND

A successful collaboration in response to infectious diseases requires effective communication and timely sharing of information among different sectors working on the problems. Many challenges including delays in sharing accurate data and lack of transparency pose significant barriers to effective control of infectious diseases. It is necessary to build trust among stakeholders and to develop transparent system for timely data sharing within and between agencies involve in the preparedness and response. This session highlights importance, gaps and solutions to improve communication and data sharing in response to infectious disease problems by using case studies and experiences from developing and developed countries.

OBJECTIVES

- To emphasize the importance of effective communication and timely data sharing among different sectors in a country (or a region) to fight against infectious diseases
- To promote trust-based collaboration and transparent data sharing and communication with a focus on intra- and inter-agency communication
- To identify gaps, common pitfalls and solutions for improving cross-sectoral communication, transparency and timely sharing of information

MODERATOR

Wantanee KALPRAVIDH

Regional
Project Coordinator

*FAO Regional Office
for Asia and the Pacific
Thailand*

PANELISTS

“Highly Pathogenic Avian Influenza H5N1 in Egypt”

- **Soheir Abdelkader**, Head of Preventive Medicine, Egyptian General Organisation for Veterinary Services (GOVS), Egypt

“Experiences from Hendra outbreaks in Australia”

- **Peter Black**, Director, Emergency Animal Disease Preparedness Department of Agriculture, Fisheries and Forestry, Australia
- **Hume Field**, Principal Scientist, Queensland Centre for Emerging Infectious Diseases, Australia

“Rabies”

- **Pudjiatmoko**, Director of Animal Health, Directorate General of Livestock and Animal Health Services, Ministry of Agriculture, Indonesia
- **I Nyoman Kandun**, Director, FETP Indonesia, Indonesia



Under secretary of preventive medicine at General Organization of Veterinary Services (GOVS) from 20/10/2012

Finished theoretical part of PHD in infectious diseases, registration of 2008. Master in infectious diseases 1999. Diploma in diseases of farm animals 1994. Bachelor of medical preventive science 1985.

Participant and country speaker in the 2nd FMD global conference in BKK June 2012.

Participant and speaker in OFlu 2nd and final workshop in Rome in June 2011

Participant in several workshops and meetings in: France, Netherlands, Kenya, Tanzania, Turkey, Italy, USA discussing subjects related to Transboundary Animal Diseases.

Member of all GOVS scientific committees related to diseases control

Participant and speaker in all workshops related to endemic Transboundary Animal Diseases inside Egypt.

SOHEIR ABDELKADER

Head of Preventive
Medicine

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Peter has a special interest in the use of strategic foresight within government with a particular focus on the investigation of the underlying drivers of disease emergence. Peter graduated from the University of Queensland in 1982 and worked for seventeen years for the Queensland Department of Primary Industries (QDPI) as a field veterinarian and policy officer. In 1992-3, he completed a Masters of Preventive Veterinary Medicine (MPVM) at the University of California, Davis and was subsequently the project leader for animal health surveillance in Queensland. Peter's involvement in the first two detections of Hendra virus in Queensland in 1994 and 1995 and the first human case of Australian bat lyssavirus in 1996 stimulated his initial curiosity in emerging infectious diseases. In 1997, Peter worked in a policy role in Brisbane where he was instrumental in introducing a formal risk management approach to animal and plant health activities within QDPI and developed a particular interest in risk perception and risk communication. It was this interest coupled with strategic planning activities that encouraged him to undertake a Masters of Science in Strategic Foresight at Swinburne University of Technology, Melbourne, which he completed in 2005.

The application of foresight perspectives to veterinary epidemiology and more particularly to emerging infectious diseases, led Peter to adopt and promote more cross-sectoral and interdisciplinary approaches. Accordingly, he is a strong supporter of the One Health movement and EcoHealth approaches. Peter is the Director of Emergency Animal Disease Preparedness in the Animal Health Policy Branch within the Department of Agriculture, Fisheries and Forestry (DAFF) where he has introduced strategic foresight approaches and thinking to his work colleagues. Peter is a member of the Epidemiology Chapter of the Australian College of Veterinary Scientists as well as being a member of the broader EcoHealth and foresight communities in Australia.

PETER BLACK

Director
Emergency Animal
Disease Preparedness

*Department of Agriculture
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Australia*



Dr Hume Field is an internationally recognized authority on emerging diseases associated with bats. He is a veterinary epidemiologist with particular expertise in Hendra virus and Australian bat lyssavirus (the focus of his PhD research), Nipah virus (he worked with US Centres for Disease Control colleagues to control the 1999 Malaysian outbreak and identify the natural reservoir) and SARS coronaviruses (he worked with Australian, Chinese and US colleagues to identify the origins of SARS in 2003-4).

He has been a temporary advisor to the United Nations World Health Organisation (on henipaviruses and SARS), the United Nations Food and Agricultural Organisation (on SARS), and the World Organisation for Animal Health (on rabies and other lyssaviruses). He strongly believes that human, livestock, wildlife and environmental health are inextricably linked, and has long championed a 'One Health' approach to emerging infectious diseases associated with wildlife.

He coordinated the Ecology of Emerging Infectious Diseases research program for the Australian Biosecurity Cooperative Research Centre from 2003-2010. He developed the Wildlife Epidemiology component of the Master of Veterinary Public Health course for the University of Western Sydney in 2004-5. He was visiting Professor of Zoonoses at the University of Malaysia, Sarawak in 2009-10. His current research is focused on identifying risk factors for Hendra virus spillover.

He is Principal Scientist in the Queensland Centre for Emerging Infectious Diseases in Brisbane.

HUME FIELD

Principal Scientist

*Queensland Centre for
Emerging Infectious
Diseases
Australia*



Dr I Nyoman Kandun was born in Denpasar, Bali, in 1948, he is currently the Director of Indonesian FETP. Dr Kandun has extensive experience in public health and infectious diseases, with responsibilities spanning programme planning, monitoring and evaluation, international collaboration, and sustainability management of FETP revitalization in Indonesia.

When he was the Director-General of Disease Control and Environmental Health in Ministry of Health Republic of Indonesia, he was responsible for the development and implementation of the country's very first national influenza pandemic preparedness plan, which was distributed as a lesson learned and good practices to other regions through the Ministry of Health.

Dr Kandun until now is actively known for his contributions to the International Vaccine Institute as an Emeritus Member of Board of Trustee, Immunization Technical Advisory Group-WHO/SEARO, Sub Committee of Health Research WHO-SEARO, South Asia Field Epidemiology Training and Technology Network (SAFETYNET) as a member of Board of Directors, Chairman of National Task Force of Lymphatic Filariasis Elimination, member of National Commission of Zoonotic, President of Indonesian Epidemiologic Association, and Member of Advisory Board of National Agency for Disaster Management.

Dr Kandun graduated with a Medical Degree from the University of Gadjah Mada in Yogyakarta, Indonesia. His postgraduate studies include public health and epidemiology from Institute of Public Health, University of the Philippines Systems, Manila (MPH) and Field Epidemiology Training Program (Conducted Jointly-WHO-CDC Atlanta), Jakarta.

I NYOMAN KANDUN

Director
Emergency Animal
Disease Preparedness

*Department of Agriculture
Fisheries and Forestry
Australia*

Related to his previous and current position, Dr Kandun has been practically experience of success international collaboration for Influenza Pandemic (H5N1), SARS, tsunami disaster, etc through a transparent data sharing and communication. One of his favourite quote is, "Of all of our inventions for mass communication, pictures (in this case - public health: picture = data) still speak the most universally understood language." (Walt Disney).



WANTANEE KALPRAVIDH

Regional Project
Coordinator

*FAO Regional Office
for Asia and the Pacific
Thailand*

Dr. Wantanee Kalpravidh obtained her DVM in 1986 from Faculty of Veterinary Sciences, Chulalongkorn University, Thailand and PhD in veterinary epidemiology from College of Veterinary Medicine, University of Minnesota in 1993.

She worked for the Thai Department of Livestock Development during the first ten years of her career. She then worked for Faculty of Veterinary Science and Chulalongkorn University and Betagro Holding, Ltd. before she joined the Food and Agriculture Organization of the United Nations, Regional Office for Asia and the Pacific, Bangkok, Thailand since 2004 as Regional Coordinator until now. Over the years, she has been working on disease control planning and facilitating the coordination among sectors at national and international levels.

Scholarship, Awards and Honor Recognition

- 2007 Award for the Outstanding Alumni of Faculty of Veterinary Science of the year 2006, Chulalongkorn University
- 2005 Award “ Asian Poultry Person of 2005” in recognition of outstanding services to the Asian Poultry Sector by International Poultry Production and VIV
- 2003 Award for the Outstanding Veterinarian in promoting veterinary profession and social services from the Thai Veterinary Medical Association
- 2001 DLD Recognition for the DLD officer with the Merit of Honor and Honesty
- 1997 Award for the Outstanding Civil Service Officer in the year 1996 from the Department of Livestock Development
- 1997 Award for the Outstanding Civil Service Officer in the year 1996 from the Office of the Civil Service Commission
- 1987-1992 Royal Thai Scholarship to study PhD in Veterinary Medicine (Epidemiology) in the United States
- 1986 Gold medal for the graduate in the first rank of the class from Chulalongkorn University

Career History

- November 2005-Now Regional Coordinator Emergency Center for Transboundary Animal Disease for Asia and the Pacific FAO

- July 2004-November 2005 Regional Coordinator for Southeast Asian HPAI Surveillance Network FAO
- June 2004 Expert on Food Safety Betagro Holding Co.Ltd
- 2003-2004 Lecturer Faculty of Veterinary Sciences, Chulalongkorn University
- 2003 Director, Southern Veterinary Research and Development Center Department of Livestock Development
- 2001-2003 Senior Expert in Veterinary Services Department of Livestock Development
- 1995-2000 Chief, Disease Control Planning Section Division of Disease Control, Department of Livestock Development
- 1993-1995 Veterinary Officer, Disease Control Planning Section Division of Disease Control, Department of Livestock Development
- 1990-1993 Research Assistant College of Veterinary Medicine, University of Minnesota

Key Professional Experience

- Experience in design and implementation of livestock projects as well as evaluation of policies and program activities under supervision of the Department of Livestock Development and Ministry of Agriculture and Cooperatives, Thailand
- Experience in the formulation, planning and coordination of international livestock projects
- Experience in the design and implementation of livestock projects as well as evaluation of policies and program activities under supervision of national animal and public health agencies and institutes
- Experience in being guest speaker for international technical meetings, training courses and workshops
- Experience in giving lectures, thesis co-adviser, thesis external examiners for Master and PhD levels for Veterinary and Public Health Schools of various universities
- Experience in chairing or facilitating international meetings/workshops
- Being author and co-author for various international publications related to animal health issues



Dr. Pudjiatmoko is a veterinarian who currently serves as Director of Animal Health, Directorate General of Livestock and Animal Health Services, Ministry of Agriculture. He studied in Veterinary Medicine Faculty in Bogor Agriculture University, Bogor Indonesia for about 5 years, then continued his study in Japan for doctoral degree in Gifu University, Japan for 4 years.

He began his career as examiner in National Veterinary Drug Assay Laboratory (NVDAL) who performed assay on Bacterial vaccine quality and conducted some studies to improve the methods from 1986 to 2002. Then he was promoted to be the supervisor of Bacterial vaccine assay unit in NVDAL until 2005. Later he was sent to Japan to take a responsibility as an Agricultural Attaché at Embassy of the Republic of Indonesia, Tokyo for 4 years. After his return from Japan, he was trusted to be the Director of NVDAL from 2009-2010, then promoted to be the Director of animal health.

His main interests are in research and policy. His background as biology molecular researcher graduated from Gifu University, has encouraged him publishing many papers nationally and internationally that giving more focus on biology molecular study on Chlamydia . He has registered 14 kinds of Chlamydia species to Genebank as part of his study. His studies are not limited only in Bacterial diseases but also in viral diseases such as Egg Drop Syndrom, Newcastle disease and Gumboro disease. As a director of animal health his focuses become broader to many kind of diseases control policy. He has experienced in establishing some strategic diseases control policy for example Rabies dan Avian Influenza control in animal health sector. He has also involved in establishing good cooperation cross sectoral together with Minsitry of Health and Minsitry of Forestry in zoonotic diseases control and eradication. In Indonesia, coordination in animal health sector has been built nicely from national to sub national under his supervision. He has presented animal diseases control policy particularly priority diseases nationwide and has been adopted by provincial, district and subdistrict. In Regional cooperation, he represents as focal point of Asean Sectoral Working Group on Livestock (ASWGL) in Indonesia.

He has been actively as a member of Indonesian Veterinary Association, Indonesian Agricultural Biotechnology Association, Veterinary Drug Evaluation Committee and Veterinary Drug Commision. During studied in Japan he was appointed as an Alumni Association from Japan University and Advisor of Indonesian Agricultural Sciences Association.

PUDJIATMOKO

Director of Animal Health

*Directorate General of
Livestock and Animal
Health Services
Ministry of Agriculture
Indonesia*

3.5

IDENTIFY GAPS/BARRIERS THAT IMPEDE EFFECTIVE CROSS BORDER

Preparedness and Response Planning and Execution for Infectious Diseases

BACKGROUND

The recent emergence and rapid global spread of the zoonotic highly pathogenic avian influenza has served to highlight many factors that contribute to cross border and international spread of infectious diseases. Global movement of people, cross border trade in livestock and livestock products, trade and seasonal migration of wild animals are some of the major methods of disease spread. With increased globalization and greater connectivity among countries through improved road infrastructure and air and ship travel this trend will continue to rise.

In order to minimize disease incursion events and cross border impacts of infectious diseases effective border preparedness and response capacity are necessary. Currently many countries and regions in the world lack this capacity and the complex issues that contribute to this state include inadequate resources, untrained manpower, poor cross border checks, inadequate understanding of the market chains for livestock and livestock movements, poor or no cross border collaboration, lack of transparency in sharing disease information, and poorly defined policy and legislation to address cross border spread of disease. While some of the constraints and challenges relate to socio-political and economic development, there are also a number of other issues that can be addressed in the short to medium term. For example, accepting that addressing cross border, regional and international spread of disease is a global public good, what is the role of the international community and regional organizations in supporting cross border and regional preparedness for disease detection and response? What policies and mechanisms need to be put in place to improve cross border sharing of disease information? What other stakeholders such as farmers, traders, community health workers, NGOs, cross-border immigration and customs departments can contribute to improved border preparedness?

MODERATOR

Subhash MORZARIA

Regional Manager
Emerging Centre for
Transboundary Animal
Disease

FAO Regional Office for Asia
and the Pacific
Thailand

The session will examine what are the main political, social and technical barriers and constraints to effective implementation of cross border preparedness and response, and also attempt to identify how these challenges can be met. In order to address this issue, an international group of panelists with policy and technical expertise from a range of background, sectors, and regional and international agencies will be invited to present their views and participate in a discussion with the audience.

OBJECTIVES

- Identify major factors involved in cross border introduction and spread of infectious diseases and highlight the importance of cross-border dialogue and collaboration in addressing this problem
- Identify key players at country, regional and international levels that are involved in the control and spread of diseases and define their specific roles in supporting cross border preparedness
- Identify constraints to cross border collaboration and how these constraints can be addressed
- Identify existing programs that are involved in regional control of infectious diseases and recommend how they can support improved cross border preparedness and response to infectious diseases

PANELISTS

- **Ferdinal M. Fernando**, Head, Division of Health and Communicable Diseases (HCDD), The ASEAN Secretariat, Indonesia
- **Jan Hinrich**, Agricultural Economist, FAO-ECTAD Regional Office for Asia and the Pacific, Thailand
- **Vincent Martin**, EMPRES Head, FAO Headquarters, Italy
- **James Hopkins**, Independent Consultant, Thailand
- **Moe Ko Oo**, MBDS Foundation Secretary, MBDS Foundation, Thailand
- **Mahmudur Rahman**, Director, Institute of Epidemiology Disease Control and Research and National Influenza Centre, Bangladesh
- **Jonathan Rushton**, Senior Lecturer in Animal Health Economics, Royal Veterinary College, United Kingdom



The main competencies of Dr. Ferdinal M. Fernando are in the fields of: (1) Local Health Systems and Development and Quality Management; (2) Health Policy and Regulation Development specific on Public Health/ Pharmaceutical/Food/Reproductive Health/Adolescent Health/HIV/AIDS/STIs; (3) Development Management & Research on Public-Private Sector Programs; (4) Family & Community Medicine in Rural/Urban Settings; (5) Public Health Program Development and Management relevant to HIV/AIDS/STI Prevention, Adolescent/Women's Concerns, Clinical Management, Pulmonary TB Prevention; (6) Localized Population and Development Planning, Monitoring and Evaluation; (7) Integrated Population and Resource Management in Rural/Peri-Urban/Coastal Areas; (8) Training Development on Integrated & Participatory Reproductive Health/Public Health Initiatives; and, (9) Monitoring & Evaluation of Rural/Urban RH & Public Health Care. These competencies have been applied in local and international settings.

Value added with these competencies are his knowledge and skills in development management, social entrepreneurship, organizational development, development finance, social marketing management, development research and rapid area assessments; program and project proposal development; strategic planning for NGOs and LGUs; and, participatory planning/monitoring & evaluation/learning in rural, urban and conflict settings. His achievements, abstracts and researches have been shared in local and international meetings and symposia.

- Master in Development Management at the ASIAN Institute of Management (AIM), 202-2003
- Family and Community Medicine Specialization through the Philippine Academy of Family Physicians (PAFP), 1999 - present
- Expertise in primary health care, public health, community medicine and management, and integrated family medicine
- Doctor of Medicine and Surgery at the University of Santo Tomas, Manila City under Scholarship from 1988 to 1992
- Passed the Physician's Licensure Examination on August 1993
- Bachelor of Science, Major in Biology – Accelerated at the 1985 – 1988 University of Santo Tomas, Manila City, 1985 to 1988 (under scholarship)

Ferdinal M. Fernando

Head
Division of Health and Communicable Diseases (HCDD)

*The ASEAN Secretariat
Indonesia*



Mr Hinrichs holds a master degree in agricultural economics from Humboldt University Berlin, Germany. In 2003, he joined an interdisciplinary researcher group on structural change and transition funded by the German Research Foundation. His research was focused on the development of econometric models to analyse the impact of risk and flexibility on investment behaviour in the livestock sector. In 2005, Mr Hinrichs was awarded a PhD in agricultural economics from Humboldt University Berlin, Germany.

Mr Hinrichs started his career as an Associate Professional Officer in the livestock information and policy branch of FAO Headquarters Rome in 2005. He has been responsible for the analysis of economic issues in the control of avian influenza. He is currently based in the FAO Regional Office for Asia and the Pacific and responsible for the integrated analysis of livestock value chains and disease transmission risks.

Jan Hinrich

Agricultural Economist

*FAO-ECTAD Regional
Office for Asia and the
Pacific
Thailand*



James Hopkins has 38 years experience in Asia in sustainable development program management with 20 years experience in malaria control, including 4 years managing pilot implementation of malaria elimination strategies in Thailand.

From 2000 to 2012, he was Senior Program Manager directing Kenan Institute Asia's Regional Public Health Program focusing on building partnerships for cross-border collaboration on communicable disease surveillance and response among countries in the Greater Mekong Sub-region, and development of strategy and models for pilot implementation of malaria elimination in Thailand.

He was a member of the mid-term and final evaluation teams for Thailand's Global Fund Round 2 malaria project, and was a member of the WHO External Malaria Program Review Teams for Indonesia and Myanmar.

JAMES HOPKINS

Independent Consultant

Thailand



Dr Vincent Martin joined the Food Agriculture Organization, Rome Headquarters in 1998. In June 2007, he moved to the FAO representation in China and took up the position of Senior Technical Advisor and team leader of the FAO ECTAD (Emergency Center for Transboundary Diseases) office in China. After five years in China, he is now back in FAO Rome where he leads the Infectious Disease Group / EMPRES (Emergency Prevention System) program and its Animal Health component.

His responsibilities are in the area of risk analysis, response to disease emergencies and coordination of global infectious disease surveillance and control programs in close collaboration with national government agencies, national and international research centers as well as donors and international organizations.

He graduated from the National School of Toulouse in 1992, France; obtained his Doctorate of Veterinary Medicine in 1993; He studied veterinary public health and disease management at the National School of Veterinary Services (ENSV), Paris. He started his career in 1994 as a research scientist in Zimbabwe at the Central Veterinary Laboratory, with the French Agricultural Research Centre for International Development (CIRAD), a French research institute working in the area of international agricultural research and development. He also holds several post-graduate degrees and diplomas in statistics applied to medicine and medical biology (University Pierre et Marie Curie – Paris VI), a Master of Science in animal production in tropical regions delivered by the National Institute of Agronomy (INA-PG), the National Veterinary School of Maisons-Alfort and Museum of Natural history of Paris as well as a PhD in Agronomic sciences and biology engineering

VINCENT MARTIN

EMPRES Head

*Food and Agriculture
Organization of
the United Nations (FAO)
Italy*



SUBHASH MORZARIA

Regional Manager
*Emerging Centre for
Transboundary Animal
Disease, FAO Regional
Office for Asia and the
Pacific, Thailand*

Subhash Morzaria, a veterinarian with an MSc in Medical Parasitology and a PhD in veterinary medicine, has over 30 years of international experience in technical and management capacity on animal health and livestock development. He has worked for a number national and international organizations in Africa, UK and Asia and held senior research and managerial positions in various institutions that include the Ministry of Agriculture, Fisheries and Food, Weybridge, UK, the International Laboratory

for Research on Animal Diseases (ILRAD) and International Livestock Research Institute (ILRI) of the Consultative Group on Agriculture (CGIAR), and the Food and Agriculture Organization (FAO) of the United Nations.

In Africa and the UK, he has contributed significantly in addressing a range of animal disease problems focusing on the improvement and commercialisation of existing technologies and development of novel vaccines against a range of vector-borne pathogens. The key achievements in this field have been improved vaccines against bovine respiratory diseases, and the development of a range of diagnostics, live vaccines, and an experimental subunit vaccine against a killer disease of cattle, East Coast fever.

Dr. Morzaria joined the FAO Regional Office for Asia and the Pacific (FAORAP) in early 2003 and worked firstly as the Senior Animal Health and Production Officer, and then in various capacities to address priority animal disease problems that constraint livestock development, and impact negatively on food security, food safety and livelihoods of poor farming communities.

For the last 8 years with FAORAP, he has primarily focused on developing regional and international strategies for prevention and control of major transboundary animal diseases (TADs) including FMD, CSF and HPAI. With his experience in TADs and emerging infectious diseases of animals and humans, and with his background in development of vaccines and diagnostics and epidemiology, he continues to play an active role in coordinating regional and international efforts to address the severe problems of infectious diseases in Asia under the joint FAO/OIE Global Framework for the Control of Transboundary Animal Diseases (GF-TADs) umbrella.

Currently he is the Regional Manager of FAO's Emergency Centre for Transboundary Animal Diseases (ECTAD RAP) based in Bangkok, Thailand. Most recently he has been involved in the development and promotion of One Health concepts, and has played a significant role in coordinating the development and writing the UN joint interagency (FAO, WHO, UNICEF), UNSIC, OIE and WB document: Contributing to One World One Health: Strategic Framework for Reducing Risks of Infectious Diseases at the Animal-Human-Ecosystems Interface.

Dr. Morzaria has authored over 200 scientific papers in international refereed journals and has supervised a number of PhD students in the Africa, UK and Asia. He is also Adjunct Professor at University of Murdoch, Perth, Australia.



Moe Ko Oo, currently working as coordinator as well as secretary in Mekong Basin Disease Surveillance Foundation. He has more than 20 years of experience in family health care, public health and infectious diseases, and communicable diseases. Apart from working as Medical Practitioner in his country, he also worked as Medical officer, Communicable disease surveillance and response Unit, at SEARO, WHO, New Delhi.

He joined MBDS in 2005 and work responsibilities include program management and technical guidance to project staff, set priorities and plan successful implementation of programs, monitor and evaluate program activities, and document and disseminate reports on the effectiveness of project strategies and intervention.

He holds a M.Sc. in Emerging and Neglected Infectious Diseases from University of Edinburgh, as well as Master of Public Health from Mahidol University, Thailand and M.B,B.S. from University of Medicine 1, Myanmar.

MOE KO OO

MBDS Foundation
Secretary

*MBDS Foundation
Thailand*



Serving as the Director of Institute of Epidemiology, Disease Control and Research (IEDCR) and National Influenza Center in Bangladesh for the last seven years. Served as the Professor and Head of the Department of Epidemiology of National Institute of Preventive and Social Medicine (NIPSOM) from 2002 to 2004, following six years as Associate Professor of Epidemiology in NIPSOM. Devoted most of academic career to the fields of epidemiology and public health. Past research has focused on disease surveillance, communicable, particularly infectious disease and non-communicable disease epidemiology and public health policy issues.

Played a key facilitator role in establishing the National Influenza Center, BSL 3 and Nipah laboratory and web based disease surveillance in Bangladesh. Lead the H1N1 pandemic response in Bangladesh. At IEDCR and NIPSOM, chaired and served on a number of panels dealing different issues of epidemiology, disease surveillance and public health policies, ranging from avian and pandemic influenza surveillance to health and population program planning. Served as the Managing Editor of the Journal of Preventive and Social Medicine and member of the International Health Regulation (2005) and Pandemic Review Committee at WHO HQ in Geneva. Currently serving as a member of the Expert Review Committee for Polio eradication, as a member of the Scientific Advisory Committee on Visceral Leishmaniasis of TDR, WHO, Executive Board Member of the International Association of National Public Health Institutes (IANPHI), Member SEAR Certification Commission for Polio Eradication (SEARCCPE), Editorial Board member of the SEARO Journal and Enlisted in the "International Health Regulation (IHR) Roster of Experts". Leading different national international projects as principal investigator.

MAHMUDUR RAHMAN

Director

*Institute of Epidemiology
Disease Control and
Research and National
Influenza Centre
Bangladesh*

Editor of the "Text Book of Community Medicine and Public Health". Authored 85 research publications and studies published in international and national journals. Earned Masters in Primary Health Care Management degree from ASEAN Institute of Health Development, Mahidol University, Thailand and Ph.D in Epidemiology from the University of Cambridge, UK.



Jonathan Rushton is an agricultural economist who specialises in livestock economics and development. He works on livestock development, animal diseases and one health issues in Africa, Asia, Europe, and Latin America. This work has been in association with a range of regional and international agencies and national governments.

His key interests are the role of livestock in the livelihoods of poor people worldwide, impact of livestock diseases, the use of participatory methodologies in veterinary epidemiology and the marketing of agricultural products. He sits on the management committee of the Leverhulme Centre for Integrative Research on Agriculture and Health, is a non-executive director of the Animal Health and Welfare Board for England and has played a role in the debates on One Health through his continuing associations with the World Bank, FAO and CDC.

He is currently working at the Royal Veterinary College as a senior lecturer in animal health economics

JONATHAN RUSHTON

Senior Lecturer in Animal Health Economics

*Royal Veterinary College
United Kingdom*

3.6

Contribution of the **ONE HEALTH PARADIGM TO FOOD SECURITY**

BACKGROUND

Human health, welfare and security are dependent healthy animals and functioning ecosystems. The One Health approach aims to bring together the three sectors of human, animal and ecosystem health to work together to prevent or mitigate the potential negative impacts of their interactions. By working together in partnership they can maximize social and economic benefits while protecting biodiversity and natural resources.

Zoonotic diseases, which are passed from animals to humans, are of great concern because of their potential rapid spread and pandemic threat. They cause human illness and production losses and reduce the ability of people to benefit from their food. Many zoonoses also affect wildlife (e.g. rabies) – including endangered species.

Zoonoses impact on food production, rural economy and levels of poverty especially among people who are already vulnerable. Livestock make a major and growing contribution to economic development and livelihoods of rural poor and are a source of nutritious food especially animal protein. The demand for livestock will continue to grow as population growth increases especially in developing countries. And in turn this will bring with it new threats of human diseases. Around 75 percent of emerging infectious diseases have been zoonotic.

Good husbandry practices usually prevent emerging zoonotic diseases and also contribute to environmental sustainability. However, effective zoonosis control relies on intersectoral collaboration between animal health, public health and environmental health groups at district, national and regional levels. International organizations and donors can help increase capacities when they work in support

of national preparedness policies. Interdisciplinary collaboration, especially in the field of emerging zoonotic diseases, is also critical to achieve One Health outcomes. Improved collaboration and integration requires breaking the silos and boundaries between sectors and disciplines toward more societal and ecological perspectives. The ultimate goal is to build resilience to anticipate, withstand and recover from risks at the interface including diseases threats, economic shocks and natural disasters including climate change related extreme events.

OBJECTIVES

Contribute to better understanding of:

- The linkages between One Health and Food and Nutrition Security
- Challenges to address this link
- The way forward to build individuals, households and communities' resilience to health risks at the animal-human-ecosystem interface.

PANELISTS

- **Government**
Pathom Sawanpanyalert, Deputy Secretary General, Thai Food and Drug Administration, Thailand
- **UN : FAO on behalf of the Tripartite partnership (FAO, WHO and OIE)**
Berhe Tekola, Director of the Animal Production and Health Division, UN Food and Agriculture Organizations (FAO), Italy
How the three agencies work together to address the interactions between One Health, Food Security and Nutrition, to tackle zoonoses and to sustain food production systems (FAO), food safety (WHO) and animal health (OIE).
- **World Bank**
Francois Le Gall, Livestock Advisor, World Bank, USA
Livestock global agenda for action: Livestock for Livelihoods in the Next Decade
- **Academia**
Craig Stephen, Director, Centre for Coastal Health, Canada
- **NGO**
Lany Rebagay, Policy Advocacy Officer, Asian Farmers' Association for Sustainable Rural Development, Philippines

MODERATOR

David NABARRO

Senior Coordinator
Avian and Pandemic
Influenza

*United Nations/UNSCIC
Switzerland*



FRANCOISE LE GALL

Livestock Advisor
World Bank
USA

François Le Gall graduated from Ecole nationale vétérinaire de Toulouse (France) in 1987. He obtained post-graduate diplomas in tropical veterinary medicine (IEMVT, 1987), medical virology (Institut Pasteur, 1988) and veterinary public health (French Ministry of Agriculture, 1989). He received his Veterinary Doctorat in 1989 and, the same year, his status of Veterinary Public Health Inspector. After joining the World Bank in 1993, his training continued with the World Bank learning program on Economics, Operations, and Management.

From 1989 to 1993, he served with the French Cooperation as co-Director of Animal Health and Applied Research at the Agence Nationale de Développement de l'Élevage in Central African Republic.

From 1993 to 1997, he was a secondee to the World Bank in Washington DC as a livestock expert in the Agriculture and Rural Development Central Unit.

From 1997 to 2006, he served as a livestock specialist in the Africa Region of the World Bank. In this capacity he supported operations promoting livestock sector development in the region and participated in the formulation of policy and strategy. In 2004 he created the multi-stakeholder partnerships for the development of livestock in Africa, ALive. He led the multi-disciplinary operational task force for AHI in the Africa region until 2006.

In addition to his geographic responsibilities, he has participated in a number of corporate thematic initiatives, including the Livestock Thematic Group (to which he was elected president in 2000) and the Sustainable Agriculture Systems Thematic Group (elected president in 2003). He was in charge of veterinary issues in the Global Emergency Response to the Avian and Human Influenza (AHI). In 2005, he established the Global Partnership for Animal Health with the World Organization for Animal Health (OIE). He has been the Chairman of the advisory committee to the OIE World Animal Health and Welfare Fund since its creation in 2006.

From 2006 to 2011, he held several managerial positions, including:

- Acting Sector Manager for Agriculture and Rural Development for Central African countries (July 2006 to June 2007).
- Program Coordinator for Agriculture and Rural Development in the Francophone countries of sub-Saharan Africa (July 2007 to June 2009)
- Operational Adviser of the Sustainable Development Department of the East Asia and Pacific Region (July 2009 to August 2011).

In September 2011, he was appointed Livestock Adviser of the World Bank, in the Agriculture and Rural Development Department of the Sustainable Development Network.

He is author or co-author of several technical and scientific publications in the area of agriculture and rural development, and livestock and animal health. He is an alumni of the Institut Pasteur de Paris since 1989.



David Nabarro trained as medical doctor, worked for six years in South Asia, East Africa and Iraq and taught for six years at the London and Liverpool Schools of Tropical Medicine.

In 1990 he served as Chief Health and Population Adviser in UK Overseas Development Administration (ODA) then in 1997 he became Director for Human Development in the UK Government's Department for International Development (DFID).

In 1999 joined the World Health Organization (WHO) to lead Roll Back Malaria: he moved to Health Action in Crises in 2002.

In September 2005 he joined the UN Secretary-General as Senior Coordinator for Avian and Pandemic Influenza. In January 2009 he also became Coordinator of the UN system's High Level Task Force on Global Food Security; in October 2009 he was nominated as the Secretary General's Special Representative for Food Security and Nutrition and – in December 2011 – he was appointed Coordinator of the Scale Up Nutrition (SUN) Movement.

DAVID NABARRO

Senior Coordinator
Avian and Pandemic
Influenza

United Nations/UNSCIC
Switzerland



Maria Elena V. Rebagay is the senior policy advocacy officer of the Asian Farmers' Association for Sustainable Rural Development (AFA), a regional federation of farmer's organizations (FOs) composed of around 11 million small-scale women, men and young farmers in three sub-regions in Asia (South, Southeast, Northeast). For the past 23 years, she worked mainly in rural development focusing in the Philippines and in Southeast Asia. Her work in the Philippines focused on the management of programs related to agrarian reform, agricultural cooperative building, PO federation building, NGO networking, organizational and leadership development. Her work at the regional level focused on constructive engagement of CSOs, particularly of FOs, with regional and international bodies (e.g. ASEAN, FAO, IFAD, ADB, etc.) through people-to-people exchanges promoting sustainable rural development policies and programs, including knowledge management and engagement on participatory agricultural value chain development.

She is also a gender-sensitized practitioner with significant experience in participatory project designing/development, project evaluation including development of results-based management system within the context of rural development programs and projects.

She holds master's degree in Development Economics and Business Administration and is pursuing her doctoral degree in Economics.

LANY REBAGAY

Policy Advocacy Officer

*Asian Farmers' Association
for Sustainable Rural
Development
Philippines*



Dr Pathom SAWANPANYALERT received his medical doctor degree from Mahidol University Thailand in 1986. Immediately after his medical graduation, he worked in a small rural hospital in northeastern Thailand where he served as a general practitioner and later acted as the hospital director. He later turned his interest to field epidemiology by joining the Field Epidemiology Training Program in Thailand, and pursued his Master's Degree and Doctoral Degree in Public Health in infectious diseases abroad. After the higher education in public health and infectious diseases from the Johns Hopkins School of Hygiene and Public Health in 1995, he worked in a number of technical and administrative capacities and public health fields including occupational medicine, environmental medicine, genetic medicine, HIV/AIDS, influenza, and infectious diseases. In the year 2000, he became the Director of the National Institute of Health of Thailand (Thai NIH). After 10-years services at the Thai NIH, he served as the Deputy Director General of the Department of Medical Sciences, and now becomes the Deputy Secretary General of the Food and Drug Administration of Thailand (Thai FDA) overseeing regulatory control of drugs and narcotics.

He was involved in a number of national and international activities including services in the preparatory working group for establishment of the National Social Security Office. He was a key member in the Thai Delegation to discuss and negotiate framework for sharing of influenza virus and its resultant benefits. He also served in the WHO-supported Advisory Committee for Global Action Plan (GAP) for Influenza Vaccine until 2012.

Dr Pathom is the founding member and the current President of the Field Epidemiologists' Association of Thailand (FEAT).

PATHOM SAWANPANYALERT

Deputy Secretary General

*Thai Food and Drug
Administration
Thailand*



Dr. Craig Stephen is the founder of the Centre for Coastal Health in Canada. The Centre is a non-profit organization that, for the past 17 years, has worked on frontline problems at the interface of people, animals and our shared environment. He holds academic appointments at the University of Calgary as a Professor in Ecosystem and Public Health and at the University of British Columbia as a Clinical Professor in the School of Population and Public Health.

Professor Stephen is a veterinarian and epidemiologist who has worked in fields of emerging infectious diseases, environmental risk surveillance and health promotion through collaboration between human, animal and environment health sectors.

CRAIG STEPHEN

Director

*Centre for Coastal Health
Canada*



Dr. Berhe G. Tekola, a national of Ethiopia, holds a Doctor's degree in Veterinary Medicine from the University of Camaguey, Cuba; a Master's degree in Veterinary Science from l'École nationale vétérinaire de Toulouse, France and a PhD from l'Institut national polytechnique de Toulouse, France.

In 1986, Dr. Tekola started his professional career as Field Veterinarian and Head of the Veterinary Section for the District of Ginnir, in Bale Province, Ethiopia and, in 1987, he became Head of the Chilalo Awraja Veterinary Section in Arsi, Ethiopia. From 1989 to 1992, he served as Leader of the Animal and Fishery Resources Development Team of the Bale Administrative Region, Ethiopia.

Dr. Tekola joined the National Veterinary Institute (NVI) of Ethiopia in 1992 as a Junior Research Officer. He became the Acting Head of the Quality Control Laboratory in 1994 and, subsequently, was appointed Manager of the Institute's Research and Technical Department in 2001.

In 2003, Dr. Tekola became General Manager of the Institute, a position he held until 2007.

In 2007, Dr. Tekola was appointed to the position of Director, Animal and Plant Health Regulatory Directorate within the Ministry of Agriculture and Rural Development of Ethiopia. One Health initiative has always been his area of interest in using it as a tool, to bring a collective efforts of animal, human and ecosystem health on board, so as to tackle diseases at its source.

Since August 2011, he joined the UN-Food and Agriculture Organization of the United Nations as Director of the Animal Production and Health Division, leading the Animal Health Service (AGAH), the Animal Genetic Resources Branch (AGAG) the Livestock Production Systems Branch (AGAS) and the Livestock Information, Sector Analysis and Policy Branch (AGAL).

BERHE TEKOLA

Director of the Animal
Production and Health
Division

*Food and Agriculture
Organization of
the United Nations
(FAO)
Italy*

3.7

IS TECHNOLOGY OR FAILURE OF THE IMAGINATION

the Bigger Challenge for Disease Detection?

BACKGROUND

This session will discuss and debate the potential contribution of emergent technologies (surveillance and diagnostics) to improve/accelerate detection and assessment of familiar and new/uncharacterized risks. Together with participation from the audience, the panels will discuss/debate what is needed to reduce the collective global risk from microbial threats to health.

- *In a world of finite resources, where should we focus our efforts on detection?*
- *How fast can we find emerging infections that threaten the globe?*
- *How fast to do we need to be to stop a potential pandemic?*
- *How can regional disease surveillance networks and one health approaches lead the way?*

MODERATOR

Mark SMOLINSKI

Director
Global Health Threats

*Skoll Global Threats Fund
USA*

OBJECTIVES

- Discuss innovative approaches to disease surveillance using digital data through on line media sources, social networks, and Internet searching.
- Explore the role of point-of-care diagnostics in rapid verification of threats.
- Explore the role of mobile technologies in disease alerts, syndromic surveillance, and direct transmission of observations.
- Discuss how a one health approach could lead to earlier detection.

PANEL ONE

- **John Brownstein**, Co-founder and Director of HealthMap, Harvard University, USA
- **Channe Suy**, Director, Cambodia's iLab, InSTEDD, Cambodia
- **Eron Karimuribo**, Associate Professor, Sokoine University of Agriculture and Southern African Centre for Infectious Disease Surveillance, Tanzania
- **Carl E. Koppeschaar**, Editor / Creative Director, Science in Action, Netherlands
- **Juan Lubroth**, Chief Veterinary Officer, FAO, Italy
- **Patipat Susumpow**, Co-Founder, Opendream Co., Ltd., Thailand
- **Karl Brown**, Associate Director of Applied Technology, The Rockefeller Foundation, USA

PANEL TWO

- **Dennis M. Israelski**, President and CEO, InSTEDD, USA
- **Dionisio Jose Herrera Guibert**, Director, TEPHINET, USA
- **Ann Marie Kimball**, Senior Program Officer, Epidemiology and Surveillance, Bill and Melinda Gates Foundation, USA
- **Peter Daszak**, President, EcoHealth Alliance, USA
- **Larry Madoff**, Editor, ProMED-mail, USA
- **Rosanna Peeling**, Professor & Chair, Diagnostic Research, London School of Hygiene and Tropical Medicine, United Kingdom
- **Stephen S. Morse**, Professor of Epidemiology, Columbia University & EPT/PREDICT, USA



Karl Brown joined the Rockefeller Foundation in 2006. As Associate Director of Applied Technology, Brown is focused on the application of information technology to the programmatic work of the foundation. He is working on exploring and nurturing imaginative uses of technology by Rockefeller grantees, and improving collaboration and knowledge management within the Foundation.

Prior to joining the Rockefeller Foundation, Brown worked as the Chief Technical Officer of GNVC, an NGO that fostered entrepreneurship in Ghana. Previously, Brown was a technical team lead with Trilogy, where he developed and deployed enterprise systems and consumer-facing websites for Fortune 500 companies such as Ford and Nissan.

Brown received a Bachelor of Science in Computer Science from Stanford University and a Master of International Affairs from Columbia's School of International and Public Affairs.

KARL BROWN

Associate Director of
Applied Technology

*The Rockefeller
Foundation
USA*



John Brownstein, Ph.D. is an Associate Professor at Harvard Medical School and directs the Computational Epidemiology Group at the Children's Hospital Informatics Program in Boston. He was trained as an epidemiologist at Yale University.

Overall, his research agenda aims to have translation impact on the surveillance, control and prevention of disease. He has been at the forefront of the development and application of public health surveillance including HealthMap.org, an internet-based global infectious disease intelligence system. The system is in use by over a million people a year including the CDC, WHO, DHS, DOD, HHS, and EU, and has been recognized by the National Library of Congress and the Smithsonian. Dr. Brownstein has advised the World Health Organization, Institute of Medicine, the US Department of Health and Human Services, and the White House on real-time public health surveillance. He plays a leading role in a number of international committees including Board Member of the International Society for Disease Surveillance.

He recently was awarded the Presidential Early Career Award for Scientists and Engineers, the highest honor bestowed by the United States government to outstanding scientists and engineers. He has authored over sixty peer-reviewed articles on epidemiology and public health. This work has been reported on widely including pieces in the New England Journal of Medicine, Science, Nature, New York Times, The Wall Street Journal, CNN, National Public Radio and the BBC.

JOHN BROWNSTEIN

Co-founder and Director

*HealthMap
Harvard University
USA*



Dr. Peter Daszak is President of EcoHealth Alliance, a US-based organization which conducts research and outreach programs on global health, conservation and international development. Dr. Daszak's research has been instrumental in identifying and predicting the impact of emerging diseases across the globe. His achievements include identifying the bat origin of SARS, identifying the causes of Nipah and Hendra virus emergence, producing the first ever global emerging disease 'hotspots' map, identifying the first case of a species extinction due to disease, coining the term 'pathogen pollution', and the discovery of the disease chytridiomycosis as the cause global amphibian declines.

Dr Daszak is a member of the Institute of Medicine's Forum on Microbial Threats, and served on the IOM Committee on global surveillance for emerging zoonoses, the NRC committee on the future of veterinary research, the International Standing Advisory Board of the Australian Biosecurity CRC, and he has advised the Director for Medical Preparedness Policy on the White House National Security Staff on global health issues.

Dr Daszak won the 2000 CSIRO medal for collaborative research on the discovery of amphibian chytridiomycosis and is Editor-in-Chief of the journal Ecohealth. He has authored over 150 scientific papers, and his work has been the focus of extensive media coverage, ranging from popular press articles to television appearances.

PETER DASZAK

President

EcoHealth Alliance
USA



Dr. Israelski has over three decades of diverse accomplishments in the domain of Infectious Diseases and Global Health. As an internationally recognized clinician, educator and researcher, his career has been dedicated to ensuring that most at-risk populations have access to high quality, community-based healthcare services. He is currently the President and CEO at Innovative Support to Emergencies, Diseases and Disasters (InSTEDD). Dr. Israelski began his work with InSTEDD in 2007; as Vice President of Programs, he was responsible for-- among other things--overseeing implementation of program strategies related to building integrated early warning and response systems for disease outbreaks in the Mekong Sub Region of South East Asia. As part of the work in South East Asia, InSTEDD established an Innovation Laboratory (iLab) in Phnom Penh, Cambodia, which serves as a regional asset for capacity building and technical innovation in design and development of software for social impact.

At present, Dr. Israelski is also Clinical Professor of Medicine in Infectious Diseases and Geographic Medicine at Stanford University School of Medicine. Previously, he served as the Chief Medical Officer at the Pangaea Global AIDS Foundation where he provided adaptive technical assistance to national programs for HIV/AIDS prevention, care and treatment services in Cambodia, China, Ghana, and Zimbabwe. In addition, he was the Chief of Infectious Diseases at the San Mateo County Medical Center and Health Department in Northern California, United States from 1988 until 2006.

The body of Dr. Israelski's work underscores the value he places on collaborative, multidisciplinary and community based activities. The major theme of his work for past two decades has been on use of innovative technologies -- and the innovative use of technologies-- to strengthen public health systems. Dr. Israelski has an extensive portfolio of past and current research achievements including: antimicrobial treatment trials, pathogenesis of protozoal (e.g., Trypanosoma cruzi and Toxoplasma gondii) and chronic viral diseases (e.g., HIV, HCV, HBV); STDs; behavioral medicine, health services delivery and public health policy. His current focus is on the use, design and development of technologies for scalable impact in Global Health. There are many active projects at InSTEDD, currently underway worldwide; these in part relate to use of communication technologies to improve global bio-surveillance, HIV care, TB control, malaria detection, crises response in vulnerable populations, cloud based management of point of care diagnostic services and overall strategic interventions for Health System Strengthening.

DENNIS M. ISRAELSKI

President and CEO

InSTEDD
USA



**DIONISIO JOSE
HERRERA GUIBERT**

Director

TEPHINET
USA

Dr. Dionisio Herrera Guibert is a Doctor of Science with a focus on preventive medicine and public health. He was given his degree after attending the Autonomous University based in Madrid, Spain. He received his master's degree in Applied Epidemiology by the National Schools of Public Health in Madrid, and is a graduate of the Field Epidemiology Training Program (FETP) by the Health Institute Carlos III (ISCIII), Madrid -Spain and the Centers of Disease Control and Prevention (CDC) of Atlanta, GA USA.

Dr Herrera is a board certified specialist in Community and Family Medicine although he began his career as an internal medicine physician in Guinea Bissau in 1989.

During 1990 he was a physician in charge and a coordinator of the Cuban Cooperation Team in Zambia; from 1991 to 1994 he worked in the National Reference Center for Primary Attention in Cuba. During 1993 he also served as a consultant for the Habitat for Humanity group based in Mexico.

From 1994 to 1997 he was a fellow in the Institute Carlos III in Madrid, and from December of 1997 to March of 1999, he worked in the Ministry of Public Health in Cuba. When part of the Ministry he acted as a consultant in the Office of the First deputy Minister of Health, while simultaneously operating as a member of the research team for Primary Attention and Assistant Doctor of Family Medicine.

In 1997 he progressed into the Assistant Director and Coordinator position of the Spain Field Epidemiology Training Programs (FETP) at the ISCIII. He worked as an epidemiologist in the Institute of Public Health of Autonomous Community of Madrid and from 2003 to 2009; he was a member of the Alert Unit for Rapid response of the ISCIII and Academic Director and Coordinator of the Spain FETP.

As of March 2009 he has been incorporated as the Director of the TEPHINET secretariat in Atlanta, a program of the Task Force for global health and is also currently a member of the advisory Board of TEPHINET.

His main interests lie in public health training, surveillance epidemiology and international health. He has been extensively involved in research and training as a professor of family medicine, preventative medicine and public health at the Universidad Autónoma of Madrid and Universidad Complutense of Madrid.

Throughout his career, Dr. Herrera has published more than 70 papers, submitted more than 150 abstracts for scientific conferences and continually participates in more than 135 outbreak investigation and public health actions.

He functioned as Chairman of the Board of TEPHINET from 2002 to 2006 and has served extensively as a consultant in several Field Epidemiology Training Programs including TEPHINET, WHO, CDC, and the ECDC. He was also a member of the Advisory Committee for the WHO Alert and Rapid response department in 2002.

Dr Herrera is currently a member of the Epidemiologist and Public Health association in Spain and has partaken in the reviews of both national and international journals. He also currently sits as a member of both the boards of SAFETINET as well as EMPHINET.

He has been recognized for his efforts numerous times and most notably received several awards from W B Foege, the CDC and the TEPHINET 2003 Price Foundation Mérieux in Ottawa, Canada.



Esron Karimuribo is an Associate Professor who works with the Faculty of Veterinary Medicine at Sokoine University of Agriculture (SUA) based in Morogoro, Tanzania. He also works with the Southern African Centre for Infectious Disease Surveillance (SACIDS), a southern African consortium of medical and veterinary academic and research institutions involved with infectious diseases of humans and animals.

Esron graduated in 1995 with a veterinary degree from Sokoine University of Agriculture and in 1998 he was awarded an MSc degree of the same university. He pursued studies in veterinary epidemiology at the University of Reading in UK and awarded a PhD in 2002.

Esron began his academic career as an Assistant Lecturer at SUA in 2000 the position he held until 2002 when he was promoted to be a Lecturer at the same university. In 2007, he was awarded the UK-based Rothamsted International African Fellowship which allowed him to work with the Moredun Research Institute (MRI) in Scotland as a visiting Research Fellow. This fellowship provided an opportunity to him to acquire skills in molecular epidemiology. He was promoted to the Senior Lecturer and Associate Professor in 2009 and 2012, respectively.

In 2009, he joined SACIDS as a postdoctoral research fellow working on resource mapping and application of mobile technologies in infectious disease surveillance across human and animal health sectors. These projects were supported by research grants from the Rockefeller Foundation. Esron has been extensively involved in research activities related to investigations of diseases of domestic and wild animals as well as those of humans. His main interests are in inter- and cross-sectoral approaches of disease investigation and interventions such as one health and ecohealth fields, climate change, value chain analytical approaches and use of ICT for development. He has published more 55 articles in peerreviewed international journals.

He is a member of different professional associations and communities including the Tanzania Veterinary Association (TVA), Community Animal Health Network (CAHNET) and Participatory Epidemiology Network for Animal and Public Health (PENAPH). He is an Editor of the TanzaniaVeterinary Journal (TVJ) owned by TVA.

ESRON KARIMURIBO

Associate Professor

*Sokoine University
of Agriculture and
Southern African Centre
for Infectious Disease
Surveillance Tanzania*



Ann Marie Kimball joined the Foundation in October 2011 and focuses on Epidemiology and surveillance of Infectious Disease across the current work of the Foundation. Dr. Kimball served as Professor of Epidemiology and Health Services, Adjunct in Medicine (Infectious Diseases and Informatics) at the University of Washington and Attending Physician STD Clinic, Harborview Medical Center prior to joining the Foundation. She is emerita at this time.

During her tenure at UW Dr. Kimball founded and Directed the APEC Emerging Infections Network, and led research and training programs in Surveillance and Informatics in Peru and Thailand. Her research focus on global trade and emerging infections earned her a Fulbright New Century Scholars award and a Guggenheim Scholars award. She is the author of Risky Trade: Infectious Diseases in an Era of Global Trade (Ashgate 2006) which was highly reviewed by NEJM, Emerging Infections and Lancet. She has authored numerous scientific publications, and served on numerous Institute of Medicine panels. Most recently she lead the Rockefeller Foundation evaluation of their global Disease Surveillance Network portfolio. She is a fellow in the American College of Preventive Medicine and member of the National Biosurveillance Advisory group (NBAS) fr the Centers for Disease Control.

A former EIS Officer for the Centers for Disease Control in Atlanta, prior to joining UW she worked and lived in the Yemen Arab Republic, Ivory Coast, and Senegal. She served as Director of National Program Support for PAHO, directing the elaboration and implementation of medium term AIDS plans in member countries throughout Latin America and the Carribean. She has served as Director of HIV/AIDS for Washington State, and the founding Chair of the National Alliance of State and Territorial AIDS Directors (NASTAD) in the United States.

ANN MARIE KIMBALL

Senior Program Officer
Epidemiology and
Surveillance

*Bill and Melinda Gates
Foundation
USA*



Carl Koppeschaar studied astronomy and physics before dedicating himself to science writing. In 2003 he started www.degrotegriepmeting.nl or the “Great Influenza Survey”. Due to enormous media attention, 38,000 Dutch and Flemish ‘flu-meters’ filled in their health status voluntarily every week.

Today this Dutch language internet survey has grown into www.influenzanet.eu, a European flu survey that already encompasses twelve European countries. Carl is also responsible for the ‘Great Pneumonia Survey’ that has recently launched in The Netherlands, seeking to acquire data on low respiratory infections like pneumonia and acute bronchitis. This website not only attracts patients but is also meant for GPs reporting on cases in their daily practise. At present he is developing a website with mobile phone application that can act as a “disease radar” to monitor all kinds of (infectious) diseases, side-effects of prescribed medication, obesity and work related diseases and stress.

CARL E. KOPPESCHAAR

Editor / Creative Director

*Science in Action
Netherlands*



JUAN LUBROTH

Chief Veterinary Officer
*Food and Agriculture
Organization of the
United Nations
Italy*

Dr Juan Lubroth is the Chief of the Animal Health Service and Chief Veterinary Officer of the Food and Agriculture Organization of the United Nations (FAO). Dr Lubroth previously served for seven years as the senior officer of FAO’s Animal Health Service and head of the Infectious Diseases Group/ Emergency Prevention System in charge of worldwide surveillance, capacity building, and progressive control of transboundary animal diseases (2002-2009).

Born and raised in Spain, Dr Lubroth received his bachelor’s degree (biology) from Whitman College in Washington State and worked as a wildlife biologist before continuing studies at the University of Georgia, where he earned both a master’s degree in medical microbiology and DVM in 1985. After a stint with the Southeastern Cooperative Wildlife Disease Study, Dr Lubroth joined the diagnostic services section of the Foreign Animal Disease Diagnostic Laboratory, Plum Island Animal Disease Center, USDA. In Mexico he served as a technical officer for the Mexico-US Commission for the Prevention of Foot-and-Mouth Disease and other Foreign Animal Diseases, returning for advanced studies in the United States. In 1995, he received both a M Phil (arbovirology) and PhD (epidemiology and public health) from the School of Epidemiology and Public Health at the Yale University, School of Medicine. Dr Lubroth returned to USDA and was posted at the Panatosa Center in Brazil as research epidemiologist before being named head of Diagnostic Services at Plum Island, where among other duties managed the North American Foot-and-Mouth Disease Bank.

In 2002, Dr Lubroth joined the Animal Health Service of FAO. He has worked extensively throughout Latin America, North Africa and the Middle East. He has initiated several major initiatives for the control of transboundary animal diseases in Central Asia, South Asia, southern Africa, and served on the Pan African Programme for the Control of Epizootics Advisory Committee. He was the driving force behind several key cooperative initiatives of FAO with the World Health Organization (WHO) and World Organisation for Animal Health (OIE), including the Global Framework for the Progressive Control of Transboundary Animal Diseases, the Global Early Warning System for major animal diseases including zoonoses (GLEWS), and the establishment of the Crisis Management Centre for Animal Health. As an expert on animal health and infectious disease transmission, Dr Lubroth is often called to assist in bringing animal production and health perspectives to the work of the WHO on issues related to “One Health” zoonoses, biological safety of laboratories, and matters regarding bioterrorism and agroterrorism.

On 1 October 2009, Dr Lubroth was appointed as Chief of the Animal Health Service and Chief Veterinary Officer of FAO, headquartered in Rome, Italy, where he now resides with his wife, Adriana, a journalist, and a coterie of dogs and cats of all sizes.



Larry Madoff, MD. Dr. Madoff is an academic infectious disease physician specializing in the epidemiology of emerging pathogens, bacterial pathogenesis, and international health. He is Professor of Medicine at the University of Massachusetts Medical School and is on the attending staff at University of Massachusetts Memorial Medical Center. Dr. Madoff serves as Director of Epidemiology and Immunization, Deputy State Epidemiologist and Interim Director of the Hinton State Laboratory Institute for the Massachusetts Department of Public Health.

Dr. Madoff has been the Editor of ProMED, the Program for Monitoring Emerging Diseases, since 2002. He is a member of the American Society for Microbiology, the International Society for Infectious Diseases, past President of the U.S. Lancefield Streptococcal Research Society, a Fellow of the Infectious Diseases Society of America and a Fellow of the American College of Physicians. A graduate of Yale College and Tufts Medical School, he performed his Internal Medicine Residency at New York Hospital-Cornell Medical Center and his Infectious Disease Fellowship at the Harvard Medical School-Longwood program.

He is the author of over 100 scientific and medical publications including original research papers, reviews, editorials and book chapters on topics involving infectious diseases and microbiology.

LARRY MADOFF

Editor

ProMED-mail
USA



STEPHEN S. MORSE

Professor of Epidemiology
Columbia University &
EPT/PREDICT
USA

Stephen S. Morse, Ph.D., is Professor of Epidemiology at the Mailman School of Public Health of Columbia University (New York), and global co-Director of the PREDICT project (intended to strengthen global capacity for surveillance, identification, and risk assessment of emerging pathogens of human pandemic disease potential, particularly those originating in other animal species) of the USAID Emerging Pandemic Threats (EPT) program. He is also Visiting Professor at the University of California Davis, and an adjunct

faculty member of The Rockefeller University in New York. He was previously founding director of the Columbia University Center for Public Health Preparedness. He returned to Columbia in 2000 after four years in government service as program manager at the Defense Advanced Research Projects Agency (DARPA), where he co-directed the Pathogen Countermeasures Program and subsequently directed the Advanced Diagnostics Program. Before coming to Columbia, he was assistant professor of virology at The Rockefeller University. Prof. Morse is the editor of two books: *Emerging Viruses* (Oxford University Press, 1993; paperback, 1996), which was selected by *American Scientist* for its list of "The Top 100 Science Books of the [20th] Century", and *The Evolutionary Biology of Viruses* (Raven Press, 1994). He was a founding section editor of the CDC journal *Emerging Infectious Diseases*, was an editor-in-chief of the Pasteur Institute's virology journal, and currently serves on several editorial boards. Dr. Morse was chair and principal organizer of the 1989 NIAID-NIH (U.S. National Institutes of Health) Conference on Emerging Viruses, for which he originated the concept of emerging viruses/infections. He was a member of the Institute of Medicine-National Academy of Sciences' (IOM NAS) "Committee on Emerging Microbial Threats to Health", chaired its Task Force on Viruses, and was a contributor to the final report, *Emerging Infections* (1992) (which utilized the framework he had developed for "factors in infectious disease emergence").

He also served on the IOM's "Forum on Microbial Threats" (originally "Forum on Emerging Infections") from its planning stages and inception until 2010. He is a Fellow of the AAAS, the New York Academy of Sciences (and a past chair of its microbiology section), the American Academy of Microbiology, the American College of Epidemiology, and an elected life member of the Council on Foreign Relations. He was the founding chair of ProMED, the nonprofit international Program to Monitor Emerging Diseases, and was one of the originators of ProMED-mail, an international network inaugurated by ProMED in 1994 for outbreak reporting and disease monitoring using the Internet. Dr. Morse received his Ph.D. from the University of Wisconsin, Madison. His research interests include the epidemiology, surveillance and risk assessment of emerging infectious diseases (including pandemic influenza), and global public health capacity.



Dr. Peeling is currently Professor and Chair of Diagnostics Research at the London School of Hygiene and Tropical Medicine (LSHTM). Trained as a medical microbiologist, Dr. Peeling had been the Research Coordinator and Head of Diagnostics Research at the UNICEF/UNDP/World Bank/WHO Special Programme on Research and Training in Tropical Diseases (WHO/TDR) in Geneva, Switzerland, and the Chief of the Canadian National Laboratory for Sexually Transmitted Diseases before assuming her current position.

Her work in WHO/TDR focused on the evaluation of diagnostics to inform policy and procurement decisions. Her concern for the lack of international standards for diagnostic evaluations led to a series of publications in *Nature Microbiology Reviews* on the design and conduct of diagnostic evaluations for malaria, sexually transmitted infections, visceral leishmaniasis, dengue and CD4 assays. Dr Peeling has established an International Diagnostics Centre based at LSHTM to provide a global hub for advocating the value of diagnostics and for fostering innovative research, development and deployment of accessible quality-assured diagnostics to improve global health. She has a strong interest in ethical issues associated with conducting research in developing countries and was appointed Chair of the WHO Research Ethics Review Committee while at WHO.

Dr. Peeling is a member of many international scientific and technical advisory panels and editorial boards. She was the recipient of a YM-YWCA Women of Distinction Award and a 5NR Award for Canadian Leaders of Sustainable Development. Her research was featured in a Discovery Channel documentary on Chlamydia Infection and Infertility, and in *Fighting Syphilis*, a documentary in the highly acclaimed BBC *Kill or Cure* series.

ROSANNA PEELING

Professor & Chair
Diagnostic Research

*London School of Hygiene
and Tropical Medicine
United Kingdom*



Mark has led global efforts toward early detection and rapid response to emerging threats. His work has brought together governments, NGOs, academia, and private industry in partnerships across national borders in Southern Africa, the Middle East, Asia, Russia, and SE Asia.

In 2006, Mark joined the start-up team at Google.org as the director of the Predict and Prevent Initiative. Prior to Google, Mark served as Vice President for Biological Programs at the Nuclear Threat Initiative, a public charity directed by CNN founder Ted Turner and former U.S. Senator Sam Nunn. While at NTI, Mark led the development of a regional disease surveillance system linking Israel, Jordan, and the Palestinian Authority, demonstrating the power of health as a diplomatic tool even in areas of longstanding conflict.

In 2003, the Institute of Medicine of the National Academy of Sciences released a landmark report, the *Emergence, Detection, and Response to Microbial Threats to Health* for which Mark was the study director. He has also served as an advisor to the World Health Organization, Senior Advisor to the U.S. Surgeon General and Assistant Secretary of Health, and an Epidemic Intelligence Officer at the U.S. Centers for Disease Control and Prevention. Mark was a member of the investigation team that discovered hantavirus in 1993 in Southwestern United States.

A native of Michigan, Mark holds a B.S. from the University of Michigan in Ann Arbor where he also received his M.D. He received his M.P.H. from the University of Arizona. Mark is a trained Internist and board certified in Preventive Medicine and Public Health. *WIRED* magazine's 2008 Smart List of 15 people the next president should listen to included Mark, a.k.a., the threat detective.

MARK SMOLINSKI

Director
Global Health Threats

*Skoll Global Threats Fund
USA*



Patipat Susumpow is a social entrepreneur, software developer and data geek. With his degree in computer engineering, he began his career as a software developer, after spend 3 years in his formerly-called “corporate job” with his girlfriend, now wife, he decided to quit and start Opendream to become an IT Social Enterprise to empower social sector through IT tools.

His main interests are in ICT-based personal health care, non-formal education and open source software development. He is extensively involving in implementation of mobile disease surveillance through SMS (Short Message Service) in north-eastern provinces of Thailand in 2009; Development of DoctorMe: Thai’s first personal health care application for iOS and Android; Development of LoveNotYet: Thai’s first sex education game for iOS and Android.

He also working on behavioral data analytics such as Twitter data analysis for disease trends, user’s application browsing history for detecting sickness etc.

Patipat currently served as Co-Founder and Creative Technologist at Opendream Co., Ltd. since 2007.

PATIPAT SUSUMPOW

Co-Founder

*Opendream Co., Ltd.
Thailand*



Channe joined the InSTEDD Innovation Lab in Southeast Asia (iLab SEA) as a Product Manager in August 2008. She lead iLab SEA work with government agencies, international humanitarian organizations and telecommunication companies in South East Asia. In addition, she lead iLab SE Asia, a team of software engineers working on innovative technology solutions for partners in the region.

Channe has extensive experience in system design and development using human centered design approach.

In addition, Channe is a co-founder of ShareVisionTeam - a grassroots volunteer team of Cambodian developers, a co-founder of Snadai - a fair trade social start-up with villager women and a founder of a Khmer-language website Evithy dedicated to science & technology.

She graduated with a Masters Degree in Computer Applications from Bangalore University in India in 2006. In addition, Channe was invited to speak at at TEDxPhnomPenh, and gave a presentation titled, “Building the Future Cambodia Starts with Sharing.”

CHANNE SUY

Director

*Cambodia’s iLab
InSTEDD
Cambodia*

IS TECHNOLOGY OR FAILURE OF THE IMAGINATION

the Bigger Challenge for Disease Detection?

Peter DASZAK

ABSTRACT

The biggest challenge for disease detection is neither failure of the imagination nor failure of technology, but the failure of public health agencies to rapidly adopt new technologies and bring creative ideas into their on-the-ground programs. For example, there is a growing body of knowledge on the process of disease emergence that gives us a predictive capacity to deal with emerging pathogens. We now know that majority of emerging diseases are zoonotic; we know that most emerge due to economic development: land use change, agricultural expansion, international travel and trade, changes to food production etc. We can predict the future trends in these underlying drivers, and future trends in how people make contact with livestock and wildlife (via road building, logging concessions etc.). Yet, despite these advances, public health agencies still adopt a 'sit and wait' policy – mobilizing resources when new diseases emerge, and using emergency powers to deal with them. This is an oversimplification, of course, and there are notable exceptions, e.g. efforts to deal with H5N1 spillovers by increasing farm biosecurity, or predictive modeling of future

Rift Valley fever outbreaks. However, the critical point is that global public health is not yet working proactively enough to deal with emerging disease threats as they begin, or even before.

WHY IS THIS?

I propose that the problem begins with infectious disease and public health research. Here, the focus is probably weighted too much towards expensive molecular biological tools for diagnostics or vaccine production, and ignores the potential gains from research into the underlying process of disease emergence. There has yet to be developed a coordinated research strategy to understand how, for example, land use change leads to the emergence of a novel zoonotic virus, or how human behavior within a network of hunting, agriculture and globalized trade drives pandemic risk. Similarly, there is a lack of imagination and ambition in how Public Health Agencies have adopted the One Health mantra of environment/wildlife-livestock-human connections. How many public health agencies employ or collaborate with

ecologists to analyze where wildlife are making the most contact with people within their country?

HOW COULD A PUBLIC HEALTH AGENCY ADOPT THIS APPROACH?

1. Allocate resources for disease detection and control specifically to the regions with the highest risk of an outbreak or disease emergence (emerging disease 'hotspots'). For example, where new roads are being built into forests, funds could be allocated to clinics not only detect known zoonoses, but to conduct limited pathogen discovery and identify novel pathogens as they first emerge.
2. Work with social scientists that can identify high-risk human-activities within a country and target these populations for intensive syndromic surveillance and attempt to clear up outbreaks of unknown etiology
3. Adopt a true One Health approach involving work with veterinarians to strategically sample wildlife that have an high likelihood of harboring known or future zoonoses, and to collaborate with ecologists to identify when these wildlife populations are undergoing changes to their population dynamics which make them higher risk for novel outbreaks.

4. Identify ways to modify high risk behavior that are culturally acceptable; e.g. finding alternative sources of protein to bushmeat, identifying alternative, low risk places in which to hunt, and supporting efforts to deal with exposure at the farm and slaughterhouses in hotspot countries.
5. Collaborate with agencies that deal with the primary drivers of emerging diseases such as extractive industries, agriculture, finance ministries, etc. to identify alternatives to these activities.

Ultimately emerging infectious are a product of economic and social development and it is neither practical nor ethical to say we should not expand agriculture or develop our land. But here, the failure of imagination is to not look for alternatives. Future public health strategies will need to bring creative minds from a wide diversity of fields to identify ways through which we can continue to develop economically, but reduce our footprint and the risk of future pandemic. This will include identifying novel ways to fund these programs collaboratively among public and private sectors.



PLENARY | 4 SESSION

**THE PARADIGM SHIFT TOWARDS
CROSS-SECTORAL COLLABORATION:
POLICY, TOOLS AND EMPOWERING
FACTORS FOR HEALTH SYSTEMS
STRENGTHENING**

THE PARADIGM SHIFT TOWARDS CROSS-SECTORAL COLLABORATION:

Policy, Tools and Empowering Factors for
Health Systems Strengthening

BACKGROUND

Diseases at the human-animal-ecosystems interface pose continual threats to animal health, human health, environmental health, food safety, and food security. The global animal health and public health communities, including the Tripartite of FAO, OIE, and WHO and other partners (e.g. World Bank) are increasingly shifting the focus of both individual and collaborative work towards national health systems strengthening. Strong, resilient national health systems can respond quickly and flexibly to many existing and emerging – as yet unknown - health concerns. When strong sector-specific health systems are coordinated and aligned and given the tools, policy mandates, and mechanisms to work cross-sectorally, they can optimally address health threats at the human-animal-ecosystems interface. Political will and resources are crucial to development of the systems and their associated technical infrastructure. However, a shift in paradigm is necessary for true implementation of cross sectoral approaches to systems strengthening. All of these aspects to systems strengthening are applicable at the international, regional, and national level, although ultimately national level systems are understood to be the focus.

MODERATOR

Maged YOUNES

Senior Policy Advisor

*Committee on World Food
Security at FAO
Italy*

OBJECTIVES

- To come to a common understanding of the new and unique policies, tools, empowering factors, and constraints for systems strengthening that will support the new paradigms necessary to globally implement cross-sectoral collaboration to decrease health risks at the human-animal-ecosystems interface.

SPEAKERS

- **Tripartite representative**
Elizabeth Mumford, Human-Animal Interface,
Department of Food Safety and Zoonoses,
World Health Organization, Switzerland
- **Country representative**
Peter Maina Ithondeka, Director of Veterinary Services,
World Animal Health Organisation (OIE) Delegate for Kenya,
Kenya

PANELISTS

- Opening Tripartite and country speakers
Elizabeth Mumford
- **Human health sector**
Dilys Morgan, Head, Gastrointestinal,
Emerging and Zoonotic Infections, Health Protection Agency, United Kingdom
- Animal health sector
Peter Maina Ithondeka
- Wildlife sector
William Karesh, Executive Vice President for Health, EcoHealth Alliance, USA
- **Environmental health sector**
Borja Heredia, Head of the Scientific and Technical Unit,
Secretariat of the Convention on Migratory Species,
United Nations Environment Program , Germany



Dr Borja Heredia was appointed Scientific and Technical Officer at the Secretariat of the Convention on Migratory Species (CMS) in January 2010. Borja is well known to many in CMS circles as he has been Spain's representative on the Scientific Council, and has participated in several CMS COPs and MOU meetings, as well as being involved in other MEAs such as CBD and CITES.

Borja is a biologist with a PhD in Ecology from the University of Madrid. Since 1986 he has worked at the Spanish Ministry of Environment focussing on the conservation of threatened species, planning research, drawing up strategies and organising projects in the field. He has been involved in the conservation of several CMS Appendix I species including the Spanish Imperial Eagle, the White-headed Duck and the Mediterranean Monk Seal. The recovery of the Iberian Lynx has also been one of his main occupations in recent years, with a special emphasis on diseases that affect the Lynx and its main prey, the Mediterranean Rabbit. He also has experience of conflict resolution among different interest groups and has addressed many other factors affecting migratory species such as electrocution and invasive alien species.

From 1992 to 1995 he worked for BirdLife International in Cambridge, developing action plans for globally threatened birds in Europe.

At the CMS Secretariat Borja is responsible of the Science Unit where he deals with a number of cross cutting issues that affect migratory species, including climate change. Together with FAO he is co-convenor of the Task Force on Wildlife and Ecosystem Health that was created at the CMS Conference of the Parties in 2010, as an extension of the very successful Scientific Task Force on Avian Influenza that CMS and other partners established in 2005.

BORJA HEREDIA

Head of the Scientific
and Technical Unit

*Secretariat of the
Convention on
Migratory Species
United Nations
Environment Program
Germany*



Dr Peter Maina Ithondeka has 32 Years working experience in livestock disease control and marketing. Dr Ithondeka holds a Bachelor of Veterinary Medicine Degree from the University of Nairobi awarded in 1977. He holds a Masters of Business Administration (MBA) degree with project work in "Strategies and Challenges by Firms in the Kenyan livestock Industry in Promoting Exports of Livestock and Livestock Products: the animal health perspective". He also holds a PhD in Veterinary Public Health on "Global Sanitary Measures and Their Effect on the Kenyan Livestock and Meat exports", awarded in 2010.

Since joining the Department of Veterinary Services in 1977, Dr Ithondeka has served in diverse capacities in veterinary field and laboratory services culminating in his appointments as Director of Veterinary services in Charge of Veterinary Services in Kenya in May 2007. Dr Ithondeka is also the OIE Delegate for the Kenya.

His hobbies are mountain climbing, golf, swimming, horse riding and tennis.

PETER MAINA ITHONDEKA

Director of Veterinary
Services

*World Animal Health
Organisation (OIE)
Delegate for Kenya
Kenya*



Dr. William Karesh is the Executive Vice President for Health and Policy for EcoHealth Alliance. He serves as the President of the World Organisation for Animal Health (OIE) Working Group on Wildlife Diseases and also chairs the International Union for the Conservation of Nature (IUCN) Species Survival Commission's Wildlife Health Specialist Group, a network of hundreds of wildlife and health experts around the world. Currently, Dr. Karesh is the Technical Director for the USAID Emerging Pandemic Threats PREDICT program, a \$75 million effort focused on predicting and preventing pandemic diseases.

Dr. Karesh has pioneered initiatives focusing attention and resources on solving problems created by the interactions among wildlife, people, and their animals and created the "One World – One Health" initiative linking public health, agriculture and environmental health agencies and organizations around the world. International programs under his direction have covered terrain from Argentina to Zambia and include efforts in the Congo Basin to reduce the impact of diseases such as Ebola, measles, and tuberculosis on humans and endangered species such as gorillas and chimpanzees, to global surveillance systems for emerging diseases. In addition to his work in the private sector, Dr. Karesh has also worked for the USDA, DOD, DOI and the Food and Agriculture Organization of the U.N.

Dr. Karesh is internationally recognized as an authority on the subject of animal and human health linkages and wildlife. He has published over one hundred and fifty scientific papers and numerous book chapters, and written for journals such as Foreign Affairs.

WILLIAM KARESH

Executive Vice President
for Health

EcoHealth Alliance
USA



DILYS MORGAN

Head
Gastrointestinal
Emerging and Zoonotic
Infections
Health Protection Agency
United Kingdom

Dilys Morgan has had a long and interesting career alternating between mainly medical research in rural Africa where she lived and worked for 13 years, and UK public health.

Dilys qualified in Medicine at Liverpool and after training as a general practitioner, worked for Save the Children Fund in the Gambia for 2 years. She returned in 1985 to start training in public health medicine and after completing her MSc at the London School of Hygiene

and Tropical Medicine, she lived in Sierra Leone for 4 years studying the effects of treatment on riverine onchocerciasis. She continued her training in public health and became a Consultant Epidemiologist at the Public Health Laboratory Service Communicable Disease Surveillance Centre (CDSC) in London in 1992, responsible for the investigation and management of outbreaks of infectious disease. From 1995 to 2001, Dilys worked for the Medical Research Council as a Clinical Epidemiologist in Uganda, where she was in charge of a rural field station and project leader for the study of the natural history of HIV infection in a rural area. Despite HIV infection having such an impact in sub-Saharan Africa, little was known about the natural history of the infection and this study was the first to report median survival times from seroconversion to AIDS and death as well other reporting other features of the infection which greatly increased our understanding and hence management of infected patients.

Dilys is currently Head of Gastrointestinal, Emerging and Zoonotic Infections at the Health Protection Agency, London. The Department undertakes surveillance of gastrointestinal and zoonotic infections to monitor trends and interventions and to detect and respond to outbreaks and incidents, and provides expert advice and support. She has been responsible for developing the Emerging Infections and Zoonoses portfolio of the Agency, including providing the scientific support to the Chief Medical Officer's National Expert Panel on New and Emerging Infections. This involved establishing horizon scanning activities for emerging infectious threats on behalf of the Panel and since the majority of new and emerging infections are zoonoses, setting-up the Human Animal Infections and Risk Surveillance group (HAIRS) in 2003. This multiagency, multidisciplinary group meets every month and acts as a forum to identify and discuss infections with potential for interspecies transfer and plays an increasingly pivotal role for human and animal health by contributing to National policy development and operational responses on zoonoses. An interesting area of development has been the production of rapid risk assessment tools for potential emerging infectious threats. The risk assessment tool has been applied to a range of emerging infections and proved invaluable in documenting and communicating risk.

She is also an honorary Professor at the London School of Hygiene and Tropical Medicine.



Elizabeth Mumford trained as a veterinarian in the USA. After completing a post-graduate degree and working in equine practice, she returned to academia to work on field epidemiology projects in equine influenza and other equine respiratory diseases, vesicular stomatitis, and food-borne zoonoses including BSE. From 2002, Dr Mumford moved to Switzerland and engaged in international disease issues with the Swiss Federal Veterinary Office, and led national capacity building projects in countries including Viet Nam, Egypt, and Serbia.

Since 2006, Dr Mumford has been working at the World Health Organization in Geneva, initially with the Global Influenza Programme as the project lead for human-animal interface influenza activities and liaison with the international agencies in WHO's influenza work. Her current activities include the integrated assessment of influenza risks at the human animal interface and rapid risk assessment for zoonotic diseases generally, the facilitation of cross-institutional collaborations and networks, and development and implementation of cross-sectoral approaches to address health risks at the human-animal interface.

ELIZABETH MUMFORD

Human-Animal Interface
Department of Food
Safety and Zoonoses

*World Health
Organization
Switzerland*



Maged Younes is currently Senior Policy Adviser at the Committee on World Food Security on loan from the German government. Following an academic career as Professor of Toxicology at the Medical University of Lübeck, Germany, and as Director and Professor at the German Federal Health Office, Maged joined the World Health Organization in 1991. He held various key roles both at the WHO European Centre for Environment and Health and at WHO Headquarters, in particular in the fields chemical and food safety as well as environmental and occupational health. From 2006 to 2007, he served as Head of the Chemicals Branch of the United Nations Environmental Programme (UNEP) and Acting Executive Secretary of the Rotterdam and Stockholm Conventions. He returned to WHO as Director of Governing Bodies and External Relations, Office of the Director-General, before taking on the Directorship of the Department of Food Safety and Zoonoses until his retirement from WHO in May of this year. He holds a Doctor's and a Master's degree in Biochemistry and Physiological Chemistry from the University of Tübingen and a degree of Dr. habil. in Toxicology and Biochemical Pharmacology from the Medical University of Lübeck in Germany.

Maged is Adjunct Professor of Toxicology and Biochemical Pharmacology, Medical University of Lübeck, Germany, and Visiting Professor for Risk assessment and management, Chulabhorn research Institute, Bangkok, Thailand.

MAGED YOUNES

Senior Policy Advisor

*Committee on World Food
Security at FAO
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THE PARADIGM SHIFT TOWARDS CROSS-SECTORAL COLLABORATION:

The Tripartite Perspective on Health Systems Strengthening

Elizabeth MUMFORD

INTRODUCTION

Health threats at the human–animal–ecosystem interface have increased over the past decades, imposing a burden on human and animal health systems. The increase in health threats to humans and animals is driven by multiple, inter-related global factors generally related to human behaviour and environmental changes and also reflects the complexities of the ecosystems in which humans and animals coexist. Because reducing these risks cannot be achieved by one sector alone, there is increasing convergence toward a One Health approach that incorporates a collaborative, cross-sectoral, multidisciplinary mode of addressing these threats and reducing health risks.

The One Health approach is necessarily broad, flexible, and inclusive as it is intended to encompass the many facets of the relationships between humans, animals, and the ecosystems in which they interact throughout the world. The inclusiveness of One Health is further reflected in the very broad scope of technical and policy issues, as well as sectors and partners that comprise it. But because it can have different meanings to all

the different partners, it is not strictly definable. However, there is general agreement that the One Health concept or approach means working cross-sectorally and inclusively with the partners appropriate to the question at hand to achieve better, more comprehensive and sustainable results. Importantly, because it is broad and inclusive, the One Health approach is not owned by anyone nor does one size fit all: there is a place for everybody and circumstances will dictate how best to cooperate on health issues using One Health concepts particularly at the national level.

Around the world and at every level, more and more people are thinking about or engaging in the One Health approach, and there is some international momentum, which indicates that the approach resonates. However, there remain constraints – in infrastructure and in thinking – which suggests there is a need for a paradigm shift in the way we look at and think about health and health systems.

There is also need for guidance – how does a country “do” One Health? As a global community, there is often consensus on the main tenants of

the approach, and loose guidance can thus be generated about ideas and mechanisms that are important to consider when applying cross-sectoral approaches. As well, many countries and regions already have useful experience in working together on specific issues at the human-animal-ecosystems interface. Many regional partners and countries have begun to strongly address One Health in their approaches to zoonotic diseases and other health threats at the human-animal-ecosystems interface.

THE TRIPARTITE AND SYSTEMS STRENGTHENING UNDER ONE HEALTH

The international tripartite agencies responsible for animal health and human health - the Food and Agriculture Organization (FAO), the World Organisation for Animal Health (OIE), and the World Health Organization (WHO), “the Tripartite” – have been working collaboratively together for many years. The Tripartite’s work together is to identify, assess, and mitigate impacts from pre-existing and emerging threats to health at the human-animal-ecosystems interface where they overlap among the agencies’ respective mandates, and where the agencies need to work together in order to effectively address the problem in order to support global health security. The Tripartite, therefore, is already working cross-sectorally, within the One Health Concept.

For the tripartite, the focus is on health systems strengthening. Building strong, flexible, and responsive uni-sectoral health systems which comply with international standards is important to and forms the basis for being able to collaborate cross-sectorally nationally, regionally, and internationally.

In the context of systems strengthening, the focus includes pre-existing and endemic diseases, antimicrobial resistance in pathogens, and ensuring food safety along the production chain as well as the capacity to detect and respond to emerging diseases. National systems which can identify and characterise health events quickly can also rule out (or respond to) known pathogens quickly, thus inherently act as monitoring systems for emerging diseases. Ensuring that this capacity is built into national systems, rather than being implemented through special projects, is crucial to sustainability.

In this context, health systems is defined broadly. National health systems include not only systems responsible for surveillance and identification of cases or outbreaks and characterisation of disease agents, but also communications within and among government agencies and the regional and international communities, management of borders and movement of people and animals, and preparedness for management of health events.

These systems built to reduce threats to health require ongoing collaboration among the sectors.

CONSTRAINTS TO ONE HEALTH : HOW DO WE ACCOMPLISH A PARADIGM SHIFT ?

Defining the constraints to implementation of cross sectoral approaches in systems strengthening can help us define a path towards overcoming them. Therefore, in discussions with cross-sectoral partners we have to identify barriers truthfully or openly to be able to find

solutions. Some of the constraints identified are practical and some are conceptual. The practical constraints such as governance issues or the lack of technical mechanisms between systems for collaboration may be easier to tackle, while the conceptual constraints are more complex to solve.

For example, in the High level Technical Meeting (HLTMT) held in Mexico in 2011, two main elements deemed key to supporting implementation of cross sectoral approaches were political will and high level commitment and trust. How can these be built to support health systems at every level?

As well, it is certain that to take One Health approaches we need to break down sectoral and disease “silos.” Given the myriad of personal, professional, and technical issues tied to keeping work in silos, and a recognition of the benefits of keeping human and animal health agencies separate as such, how can we accomplish this?

The Tripartite agencies are each working for our stakeholders - for WHO the Ministry responsible for human health, for FAO the Ministry responsible for agriculture, and for OIE the national veterinary services. Because these different partners often have different objectives and the perspectives from these different parties may conflict, how do the tripartite agencies – and more importantly, the national partners – ensure the objectives of the health systems do not conflict, and allow working together towards common goals?

At the HLTMT, another element deemed key was adequate and equitably distributed resources. In the current global economic situation, there won't be much new money to fund “One Health”, but perhaps health systems and capacity building programmes for those systems that include One

Health approaches may be more robustly funded because they are more effective and impactful. So, the question can be posed, is One Health something new, requiring new funding or is it a way of working that requires a new way of thinking about prioritising the allocation of funds and resources?

It is clear that a paradigm shift is needed to address these and many other constraints. However, we also need to ask, what exactly is the paradigm shift we keep saying we are looking for? How does it related to health systems? And how to start?

THE TRIPARTITE AND OTHER SECTORS: POLICY, TOOLS AND EMPOWERING FACTORS

At the international level, the Tripartite partnership of FAO, WHO, and OIE has made a Director General-level commitment to address jointly the risks at the animal–human–ecosystem interface. The areas that the Tripartite is focusing on to implement One Health approaches are captured in the 2010 Tripartite Concept Note. This Tripartite Concept Note has become the touchstone for all Tripartite work together, as it sets a strategic direction for FAO, OIE, and WHO to take together and proposes a long term basis for international collaboration aimed at coordinating global activities to address health risks at the human–animal–ecosystem interface. Common areas of work that the Tripartite organizations can build upon are outlined in the Concept Note, and include normative work, public communication, and promoting pathogen detection, risk assessment, and management, technical capacity building

and research development, and development of common protocols and standards, when appropriate. The value of improvements in governance, combined with infrastructure and capacity building within and among all sectors, is highlighted. All of these activities are focused around building strong, responsive health systems that can work together across the sectors.

The Tripartite and its global partners are committed to helping countries to implement cross-sectoral approaches to address their health risks at the human-animal-ecosystem interface. The major outcomes of the High Level Technical Meeting held in Mexico in 2011 were the key elements of effective cross-sectoral collaboration. Facilitating adoption of cross sectoral approaches in health systems strengthening will include using these key elements to generate tools to assist national governments considering the establishment of national cross-sectoral approaches. The Tripartite and its partners could also have a role in assisting regions and countries in translating and implementing the technical and policy aspects of the tools including building them into the existing systems in a sustainable way.

International agencies and partners around the world, including the tripartite, that are implementing cross sectoral approaches can act not only as models but also provide tools and facilitate the adoption of such approaches by regions and countries. Such agencies can also use exiting communication channels within countries to encourage the political will and commitment required. They can also champion a paradigm shift by working in ways which promote trust and inclusiveness.

THE PARADIGM SHIFT TOWARDS CROSS-SECTORAL COLLABORATION:

Policy, Tools and Empowering Factors for Health Systems Strengthening in Kenya

Dr Peter MAINA ITHONDEKA, PHD

BACKGROUND

Kenya's landmass constitutes 582,650 square kilometres 80% of which is arid or semi-arid that is unsuitable for rain-fed crop agriculture. It however supports many species and breeds of domestic animals and game. 30% of Kenyan population live in this ASAL and derive virtually all their livelihood from the animal resource. ASALs also host the majority of Kenya's national parks and game reserves and contribute to the country's biodiversity.

The policy environment in the animal resource sector has hitherto been provided by the Kenya Vision 2030, the Agricultural Sector Development Strategy, the National Livestock Policy, human health and biodiversity policies as well as 26 Acts of Parliament. The National Livestock Policy has had weaknesses in the scope which covers mainly farm-food animals but has not had adequate provisions for other animals of veterinary concerns such as companion animals, draught animals, game, fish and other aquatic animals.

Kenya promulgated a new Constitution in 2010 that recognizes Veterinary Policy as a National Government Function and thus grants animal health its fitting importance and provides for the division of functions between the National and County Governments. The new Constitution of Kenya 2010 assures the public of protection of human health and attainment of the highest attainable standard of health, which includes the access to adequate food of acceptable quality and thus sets out the framework for one health in Kenya.

Traditionally, surveillance and outbreak response for zoonotic diseases been undertaken separately by the human and animal sectors with little collaboration. This approach has resulted in poor prevention and control of zoonotic diseases, which has become evident during epidemics of emerging and re-emerging diseases such as pandemic avian influenza, Rift Valley Fever, Rabies, Brucellosis, trypanosomes and anthrax

The movement towards "One Health" in Kenya

has important historical precedents that predate its formal implementation. In 2006, a multi-sectoral group of experts formed the National Influenza Task Force in response to the threat of H5N1 pandemic influenza and later (2006- 2007) responded to the Rift Valley Fever (RVF) outbreak. Using lessons learned from the RVF outbreak, the Task Force recognized the need for a more focused group dedicated to zoonotic diseases that would effectively link human and animal health experts. Later in 2006 the mission of the Task Force was expanded to form the Zoonotic Technical Working Group (ZTWG) which meets on quarterly basis and consists of approximately 20 experts with representation from the Ministry of Public Health and Sanitation (MoPHS), Ministry of Livestock Development (MoLD), WHO, Food and Agriculture Organization, Kenya Medical Research Institute, Kenya Wildlife Services, Center for Disease Control and Prevention among other stakeholders.

In an effort to ensure regular coordination of One Health activities in the Country, ZTWG advised the government to create a unit within the Ministries that would be mandated to carry out this activity. To address this need, therefore, the Ministries of Livestock Development and Public Health and Sanitation established the Zoonotic Disease Unit (ZDU) based on One Health principles by signing a memorandum of understanding (MOU) on 2nd August 2011. Terms of references were outlined in the MOU after which a strategic plan for implementing One Health in Kenya was developed. ZDU is not an implementing unit per se but a focal pivot for coordination of activities to be implemented by the collaborating divisions in Ministries.

Shortly after its inception ZDU was able to demonstrate its utility, by successfully responding to reported cases of Human African Trypanosomiasis (sleeping sickness) among tourists visiting Maasai Mara Game Reserve in March- April 2012. ZDU has also initiated a study that is looking at burden of brucellosis among humans and animals in Kenya. For sustainability, the ZDU is nested between the two Ministries and has the technical staff seconded from the MoLD and MoPHS.

Kenya continues to implement recommendations made during the OIE PVS "One Health" evaluation mission that was carried out in 2011. Participating Ministries should establish a core multidisciplinary subject matter experts on priority diseases who will participate in the development of prevention and control strategies & contingency plans and outbreak response and support collaborative operational research work on priority diseases.

4.1

STORIES FROM THE GROUND

BACKGROUND

The concept and theory behind One Health would not be completed without the ‘learning from the real experience of implementing it’. These stories from the ground session allow different sectors to tell their side of stories from the real actions at the national/subnational level. It aims at demonstrating, from the field, how different sectors, and how the policy, social, and intellectual actors, interacts to tackle the threats from emerging infectious diseases (EIDs). It will focus on how ownership and management capacity can be created and sustained jointly at the country level. Interactive learning through action, by all partners, not only allows more effective synergism, but also builds trusts among them.

CHAIR / MODERATOR

Yojiro ISHII

Senior
Health Sector Advisor
*Japan International
Cooperation Agency
Japan*

Tessa RICHARDS

Assistant Editor
*British Medical Journal
United Kingdom*

OBJECTIVES

- Sharing of experiences from the real interactive learning through collective actions at the National/Subnational level
- Summarize the factors and actors involved and how they interact towards successful/failed One Health concept, in creating ownership and adequate capacity.
- Provide recommendations for further actions by relevant partners

SPEAKERS

- Development of scalable and sustainable surveillance systems for Chagas disease in Central America
Kota Yoshioka, Technical Advisor,
JICA Nicaragua Chagas Disease Control Project, Nicaragua
- Rabies control initiative in Tamil Nadu, India: a test case for the One Health approach
Syed Abbas, Research Fellow,
Public Health Foundation of India, India
- Thailand Emerging Infectious Diseases Strategic Plan: a platform for improved preparedness and response to EIDs under One Health concept
Rungrueng Kitphati, Director,
Bureau of Emerging Infectious Diseases, Thailand
- One Health approach for assessing impacts of anthrax on the human-animal interface in rural Uganda using participatory epidemiology tools
Jeanne Coffin, Tufts University, USA
- The Global Early Warning System addressing health threats and emerging risks at the human-animal-ecosystems interface: GLEWS+
Bernadette ABELA-RIDDER, GFN Coordinator & GLEWS Focal Point, World Health Organization, Switzerland



Dr Syed Abbas completed his MBBS from Aligarh Muslim University and an MPH in Comparative Health Systems & Policy from Johns Hopkins University. He has worked for more than eight years in health systems research in different capacities and regions.

Prior to joining PHFI, he studied health care delivery systems at different levels in Aligarh, managed a multi-centric ICMR funded project studying urban mental health services at the Institute of Human Behaviour & Allied Sciences in Delhi and subsequently joined the UN as a Research Analyst in their Knowledge Management programme, Solutions Exchange. He worked on economic evaluations of Hib vaccine in India and injury interventions in Uganda at Johns Hopkins.

Dr Abbas joined PHFI in 2008. He contributed to an economic evaluation of introduction of Hib vaccine in India as a part of a joint LSHTM-PHFI group. He has contributed to a series of baseline mapping exercises, including research prioritisation and program assessments under the Roadmap to Combat Zoonotic Infections in India (RCZI) Initiative at PHFI.

Dr Syed Abbas has also contributed to different training activities at PHFI, including developing training programmes for community representatives under the NRHM and designed a three-month induction training programme for District Malaria and Kala Azar consultants for the National Vector Borne Disease Control Programme.

He has recently completed working on a Wellcome Trust-sponsored PHFI-UKC research fellowship on disease surveillance policies in India. He is also involved in a study in West Bengal that aims to use geographic information systems for developing a community health index.

His areas of expertise are policy analysis, economic evaluation, priority setting and resource allocation and developing training curriculum using competency based approaches.

Areas of interest: Infectious diseases policy; Disease surveillance; Emerging infectious diseases, Zoonoses, Research Policy, One health, Governance

SYED ABBAS

Research Fellow

*Public Health
Foundation of India
India*



Dr Bernadette Abela-Ridder works in the Department of Food Safety and Zoonoses in the Health Security and Environment Cluster of the World Health Organization. Bernadette is the lead on the Global Foodborne Infections Network (GFN), the WHO focal point for the Global Early Warning System for transboundary Animal diseases, including zoonoses (GLEWS) and manages the study to estimate the burden of leptospirosis in humans. She is closely involved in advancing the common areas of work of the FAO, OIE and WHO with regard to food safety and other risks emerging at the human-animal-ecosystem interface.

Bernadette has also worked for the Food and Agriculture Organization of the U.N., for l'Institut de recherche pour le développement (IRD) in Cameroon on emergence of simian immunodeficiency viruses from non-human primates including bushmeat, the US Food and Drug Administration and clinical veterinary practice.

BERNADETTE ABELA-RIDDER

GFN Coordinator & GLEWS Focal Point

*World Health Organization
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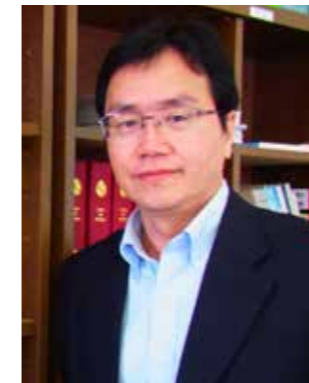


Jeanne L. Coffin is a biologist with a background in community development and an interest in infectious diseases in conservation and agricultural settings. She graduated from Tufts University with an MS in Conservation Medicine in September 2012, and from Macalester College with a BA in Biology in 2007.

Her undergraduate senior capstone was titled *The Wildlife/Livestock Disease Interface: A Case Study in the Ngorongoro Conservation Area, Tanzania*. She was an Environmental Education Volunteer with Peace Corps Morocco from 2008-2010. Her Masters case study was in the applications of participatory methods to conservation medicine, with a special focus on using participatory epidemiology to address the situation of anthrax in western Uganda.

JEANNE COFFIN

Tufts University
USA



After graduating from the Nippon Veterinary and Life Science University, Yojiro Ishii began working at JICA. He engaged in project implementation of technical cooperation programs on the human healthcare field as well as animal health over a period of 33 years.

He transferred to Pakistan and Bangladesh for a total of seven years and participated in program management of the Japan's ODA cooperation projects in human health and animal health. Yojiro was also serving for the planning and coordination of JICA's health development cooperation programs as Deputy Director General, Human Development Department at JICA HQs for 5 years.

He is now aiming to expand JICA's health cooperation among global health businesses by working with international and regional organizations. In addition, he continues to work hard to cultivate domestic assistance resources in health sector in Japan.

YOJIRO ISHII

Senior Health Sector
Advisor

*Japan International
Cooperation Agency*
Japan



Dr. Rungrueng Kitphati, MD, Director of Bureau of Emerging Infectious Diseases (BEID), Department of Disease Control, Thailand Ministry of Public Health (MOPH), graduated from Prince of Songkhla University (PSU) Medical School in 1994. During his college years, he was recognized as Outstanding Medical Student for his strong dedication to community services.

Early in his career, he joined the Royal Thai Police (RTP) as Medical Expert in Forensic Medicine working at the RTP Institute of Forensic Medicine. He was recognized for his outstanding performance by Singapore Police Force Criminal Investigation Department (CID) and the Canadian Embassy in Bangkok. In 1996 he also served as Forensic Medical Expert Witness for Singapore Criminal Court.

From 2000-2003, he pursued his studies in epidemiology at the internationally-renowned Field Epidemiology Training Program (FETP), which is jointly conducted through the collaboration between Thailand MOPH, World Health Organization (WHO), and US-CDC. He was also certified as Medical Epidemiologist and Public Health Expert by the Medical Council of Thailand. He went on to join the public service working at the National Reference Laboratory, Department of Medical Sciences, Thai MOPH, where he was instrumental in the establishment of the Coordinating Center for Laboratory Testing and Surveillance, as well as founding the National Laboratory Surveillance Network to address the EID threats, particularly the outbreaks of avian and pandemic influenza. Dr. Rungrueng joined colleagues from across Thai MOPH in developing a training curriculum for specimen collection, storage, and transport, which is being used to train over 7,000 members of the Surveillance and Rapid Response Team (SRRT) from across Thailand, as well as developing a web-based coordination and case reporting system. He contributed substantially in the post-mortem investigation titled Probable person-to-person transmission of avian influenza A (H5N1), published in the New England Journal of Medicine in January 2005, of which findings played a key role in influencing a radical change in Thailand's national health policy and preparedness and response to the outbreaks of avian influenza. In addition, Dr. Rungrueng also served as the Focal Point coordinating regular meetings between key

RUNGRUENG KITPHATI

Director

*Bureau of Emerging
Infectious Diseases
Thailand*

members of a tripartite partner network made up of those working on disease surveillance, disease control, and laboratories, thus fostering coordinated efforts among health agencies. Throughout his career, he has been recognized on several occasions by professional organizations for his exemplary work ethics and commitment to improving the quality of public health services.

Upon assuming the BEID directorship in 2011, he was acutely aware of EID threats. To address this pressing issue, he focused his works primarily on developing an efficient management system and was actively involved in the preparation and implementation of the National Strategic Plan for EIDs 2013-2016: a platform for improved preparedness and response to EIDs under "One Health" concept – which is now being implemented.

Currently Dr. Rungrueng Kitphati is also serving as special lecturer at several local institutions and president of local health and epidemiology foundations. To date he has had to his credit 27 publications available on international medical and scientific journals.



Tessa Richards is on the editorial staff of the British Medical Journal (www.bmj.com) a leading international general medical journal, where she holds the post of Analysis Editor.

Her interests are broad with a focus on global and European health policy, medical education, the role of civil society organisations, and patients as partners in care. Prior to joining the journal, she worked in the National Health Service as a specialist in general medicine and rheumatology and also in primary health care.

TESSA RICHARDS

Assistant Editor

*British Medical Journal
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THE JOINT FAO, OIE, WHO GLOBAL EARLY WARNING SYSTEM

Addressing Health Threats and Emerging Risks
at the Human-Animal-Ecosystems Interface – GLEWS+

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The Food and Agriculture Organization (FAO)

The World Organisation for Animal Health (OIE)

The World Health Organization (WHO)

MAIN MESSAGE: *Cross-sectorial risk assessment of health events of international concern at the animal-human-ecosystem interface to prevent and control risks.*

BACKGROUND

The Food and Agriculture Organization (FAO), the World Organisation for Animal Health (OIE), and the World Health Organization (WHO) recognize a joint responsibility for minimizing the health, social and economic impacts of zoonotic, high impact diseases and non-microbial health threats arising directly or indirectly from domestic or wild animals and their environments.

An important aspect of addressing and mitigating potential health threats at the human-animal-ecosystems interface is early warning complemented by robust risk assessments to inform actions, which support timely communication across agencies and sectors responsible for human health, animal health, wildlife, and food safety. In response to health threats like H5N1 HPAI and SARS, the tripartite established the FAO, OIE, WHO Global Early Warning System for transboundary

Animal Diseases, including zoonoses (GLEWS) in 2006. GLEWS builds on existing surveillance systems to confidentially track and verify relevant events and provides a framework with global reach to enable the convening and pooling of expertise, data, functional networks, operational systems and stakeholders with the ultimate goal of enhancing inter-organizational coordination and supporting member countries in the detection, prevention and control of threats to health and the food chain through cross-sectoral and multidisciplinary partnership.

GLEWS+ is a powerful mechanism sets out to construct systematic, cross-sectoral, iterative risk assessment and risk communication. GLEWS+, i) links to subject areas such as wildlife health, food, biological threats; ii) drives more advanced risk assessment when a need is identified; and iii) provides opportunity for participation from a wider base of stakeholders.

GLEWS+ represents one of the major steps within the tripartite vision to shift the paradigm from reactive to proactive preparedness and prevention through joint risk assessment for targeted and

timely action for health interventions.

The goal of GLEWS+ is to inform prevention and control measures through the rapid detection and assessment of health threats/events of potential concern at the human-animal-ecosystem interface.

This is a critical component in attaining the tripartite vision of the FAO, OIE and WHO: “A world capable of preventing, detecting, containing, eliminating, and responding to animal and public health risks attributable to zoonoses and animal diseases with an impact on food security through multi-sectoral cooperation and strong partnerships”.

A GLEWS+ event includes health events of potential international concern that are attributable to domestic and/or wild animals, humans and/or the food value chain. For food safety events which have an animal aspect, GLEWS+ will link closely with the FAO/WHO International Food Safety Authorities Network (INFOSAN).

THE OBJECTIVES OF GLEWS+ are to:

1. Enhance detection of health events of potential international concern at the human-animal-ecosystem interface

GLEWS+ provides the framework to rapidly share information and expertise, while bringing together the complementary event verification processes of the three organizations. As a result, unjustified duplication of efforts and gaps are avoided, the power of detection is increased and the possibility of timely and cost-efficient intervention is supported.

GLEWS+ is informed through existing global, regional networks or national disease surveillance and reporting systems which detect and prioritize health events of international concern. One of the most critical needs for early detection of emerging pathogens and other hazards is the existence of adequate and sensitive surveillance capacities geared towards early and reliable detection of disease events in the field. Animal disease outbreaks can provide direct early warning that enhances public health surveillance or conversely public health surveillance may trigger investigation in animals. Linking GLEWS+ to functional networks that monitor and assess food-borne threats and food safety events provides the interconnectivity between these networks while recognizing the interdependence of sectors and professions implicated when considering risks at the human-animal-ecosystem interface.

Legal and regulatory frameworks provided by the WHO International Health Regulations (IHR 2005), OIE's standards (Terrestrial and Aquatic Animal Health Codes) including the World Animal Health Information System (WAHIS), and the PVS Pathway (Performance of Veterinary Services), support early detection and notification of events, including emerging events, at the human-animal-ecosystem interface in a more complete and appropriate epidemiological context.

2. Undertake joint risk assessments to inform rapid action on all acute health events of potential international concern at the human-animal-ecosystems interface;

GLEWS+ provides a resource to deliver systematic, defensible and timely joint risk assessments to provide the basis for taking integrated and coordinated action to manage and reduce the negative consequences of public health risks at the human-animal-ecosystem interface by identifying key prevention and mitigation measures and rapid dissemination of information. Risk assessments are based on comprehensive data sets housed in the three organisations; ii) include other available, complementary data; and iii) embody multidisciplinary expertise, to provide appropriate and proportional advice for response actions;

FAO, OIE, and WHO maintain different health information systems that could potentially be used to generate an assessment of zoonotic diseases most likely to be transmitted to people via contact with livestock, animal products or exposure to wildlife or vectors or the environment. The data held by each respective organisation is currently not maintained in a single IT platform, it varies in detail and content, and the rationale behind collecting the data may be different between partners; therefore, the value of inter-connectivity, data sharing and joint assessment is high. A process of combining the data from the three organisations that utilizes good practices of organizational systems to build the risk assessment will make a greater use of these datasets. In addition to legal and regulatory frameworks and notification tools provided by the WHO-IHR, OIE's standards and OIE's WAHIS-WAHID, examples of different sources are: the WHO Event Management System (EMS), the Global Health Observatory Data Repository, International Food Safety Authorities Network (INFOSAN), FAO EMPRES-i, PROMED/Health Map, the Gridded Livestock of the World, and other unofficial sources like the Wildlife Health Event Reporter and Health Map.

Joint risk assessments would result in documented risk estimations of the adverse effects likely to occur in a given population based on the consideration of data from a variety of sources.

3. Undertake joint risk assessments that help predict changes in endemic or seasonal disease to inform prevention and preparedness activities for health events at the human-animal-ecosystems interface;

GLEWS+ is uniquely positioned to facilitate planned risk assessments that support prevention, forecasting and preparedness especially for endemic, recurring or seasonal risks. Identifying at-risk areas or populations helps to engage key policy and operational partners before an event occurs or in its early stages. No one organisation can effectively carry out a planned risk assessment for health events at the human-animal-ecosystems interface alone. The pooling of data and expertise across the three organisations and respective networks of experts is therefore a critical component of GLEWS+, allowing for more effective coordination of cross-sectoral action.

Strengthening GLEWS+ joint risk assessment activities and supplementing them with relevant data on drivers for emergence and persistence of diseases and health threats contribute to build a more complete body of evidence towards understanding trends and the epidemiology of diseases, and reinforcing preventive and predictive capacities to better assess and to ultimately aid prevention, control and effective management of these disease risks.

4. Ensure timely, coordinated and relevant risk communication for high impact health events of potential international concern at the human-animal-ecosystems interface

a. Within and between the three organisations Health threat alerts and global early warning is a core output of GLEWS+; it should guide the actions of the tripartite members, who are the key international organizations focused on providing guidance on real and perceived risks at the human-animal-ecosystems interface. Based on the outputs of GLEWS+ intelligence activities, messages on risk assessment and options for risk management can be constructed for member states and the wider public.

b. To Member countries Improving the communication of GLEWS+ outputs with regional and national counterparts will enhance the sensitivity of detection and provide evidence for appropriate action for risk management. Strengthening the GLEWS+ network with more integrated regional and country input will also improve the quality of data collected from the field bringing local context to support risk assessments, and improve the capacity of GLEWS+ for real time event verification from the field. Member states would be direct stakeholders of early warning and risk assessment messages that could be used to translate evidence in the form of a risk assessment output into policy.

c. With the public and the international community The GLEWS+ and tripartite websites and the three partners organizations are the portals for communicating GLEWS+ information which is considered a public international good, simplified

joint risk assessment messages, and they provide options for evidence-based best practices to manage zoonotic disease threats at the human-animal-ecosystem interface (and improve food safety) in both the domestic market and at a global level.

CONCLUSION

GLEWS+ cannot function in isolation, this tripartite mechanism builds on on-going One Health work at the human-animal-ecosystems interface at global, regional and national levels that target the strengthening of systems, the legal frameworks that underpin these, providing guidance and standards, building organizational and institutional capacity and technical competencies, supporting the development of surveillance and response systems. The tripartite continues to build capacity with strategic partners in countries to strengthen and support surveillance and assessment of data being collected to inform action.

GLEWS+ success counts on the increasing capacity of systems and networks in countries, regions and globally to perform indicator- and event-based surveillance which links public health, veterinary, food safety and other sectors. Each partner organisation is actively engaged in supporting countries in building capacity to detect and report events at the human-animal-ecosystems interface, investigate and respond rapidly to outbreaks, and in advocating for transparency among countries in accordance with the OIE Terrestrial and Aquatic Animal Health Codes and the WHO International Health Regulations (IHR 2005), and FAO/WHO Codex guidelines.

The global community is systematically building cross-sectoral partnerships based on comparative advantages of the partners to leverage efficiencies and increase the power of assessments to guide action to prevent and respond effectively to health threats based on the best available evidence. In this context, GLEWS+ is the framework to address health threats and emerging risks at the human-animal-ecosystems interface to enhance global health security.

A few examples of experiences and strategies for supporting creation of country ownership and management capacity that will be highlighted (these are not all labelled GLEWS but are related in-country work of which outputs/comes contribute to the GLEWS+ mechanism)

PVS and IHR strengthening human and animal institutions as well as partnership, alignment and coherence in standards and protocols when appropriate.

EPT+ USAID program to support the understanding of influenza risks emergence and spread in animal species and identifying risk hot spots areas in Asia (China, Bangladesh and Vietnam where potential pandemic viruses could emerge).

One Health in Mongolia: Under the Asia Pacific Strategy for Emerging Diseases (APSED), Mongolia has taken an initiative to clarify roles and responsibilities and create a coordination mechanism between veterinary, health and inspection agencies on food safety, and import and export control, that has increased generic capacity for zoonoses control and prevent. This proactive approach has attracted more resources

and attention from international partners and allowed pooling to improve performance in the reduction of the risk of zoonotic in Mongolia.

The Americas: Collaboration between health-agriculture- environment has been on-going , an example is the Regional Rabies Program in the Americas, which officially started in 1983, and included in the surveillance system cases in humans, domestic animals and wild animal. In many countries the Ministry of Health and Agriculture work together to control this disease that presented a reduction of around 90% of the human and canine cases. Regional elimination for canine rabies in the Americas is set for 2015 and for South East Asia and Western Pacific for 2010.

Leptospirosis in Nicaragua; a recent publication demonstrated that volcanic type of soil and rain are drivers for leptospirosis outbreaks. This country has an Intersectorial National Plan to approach this problem. <http://www.mdpi.com/1660-4601/9/11/3883>

Four-way linking project a tripartite collaboration to reduce pandemic threats from influenza at the Human-Animal Interface with a focus on data from Egypt, Indonesia, and the USA to strengthen human and animal health systems to collect and link national data and the building of a national-level joint framework for risk assessment and risk communication.

Global Foodborne Infections Network (GFN) see poster on **building capacity for integrated foodborne disease surveillance**

A few challenges

- Operationalizing One Health at country level
- Commitment (Political and financial)
- Ownership of programme
- Assuring sustainability of programmes
- Weak veterinary and public health infrastructure and country capacity to deal with zoonoses events (Technical)

ABSTRACT 105:

Acknowledging that health threats do not respect boundaries and that countries are increasingly able to detect health events at the human-animal-ecosystem interface through surveillance and early warning systems, cross-sectoral risk assessments that combines data from different sources is central to guide prevention, preparedness and response to threats of international concern. Health threats monitored by GLEWS+ include animal pathogens that jump the species barrier or invade new geographical areas and food hazards that threaten food value chains.

The Food and Agriculture Organization, the World Organisation for Animal Health , and the World Health Organization , also known as the Tripartite, are the international organizations responsible for health of people and animals, and food. Together they provide opportunity for detecting and assessing health events at the human-animal-ecosystems interface to inform prevention and control measures. The tripartite have convening power to pool expertise, data, functional networks and systems with global reach to provide a unique mechanism to conduct robust and timely cross-sectoral risk assessments. This ensures timely,

coordinated and relevant risk communication for health events at the animal-human-ecosystem interface of international concern within the three organizations and with the public and the international community.

The presentation will highlight the achievements of GLEWS since 2006, the new GLEWS+ direction. Tripartite examples based on demonstrated outcomes will be provided to set the stage for future next steps. GLEWS+ represents a true example of cross-sectoral collaboration at the international level that could be emulated at country level.

¹ FAO, OIE, and WHO Tripartite Concept Note "Sharing responsibilities and coordinating global activities to address health risks at the animal-human-ecosystems interface" www.glews.net/wp-content/uploads/2011/04/FINAL_CONCEPT_NOTE_Hanoi.pdf

² see PL 2 "National to Regional to Global Surveillance – A Path to One Health"- Current State of Global Surveillance: Public Health, Animal Health and the Interface

³ Food events that involve animals will link to INFOSAN but will not be duplicated.

⁴ <http://apps.who.int/ghodata/>

⁵ <http://www.fao.org/AG/againfo/resources/en/glw/home.html>

⁶ <http://www.fao.org/AG/againfo/resources/en/glw/home.html>

⁷ See PS 4.3 Unprecedented Move Toward a More Coherent Approach Among Sectors for the Strengthening of National Human-Animal-Ecosystem Health Capacities

ONE HEALTH APPROACH FOR ASSESSING IMPACTS OF ANTHRAX

on the Human-Animal Interface in Rural Uganda
Using Participatory Epidemiology Tools

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ABSTRACT

Anthrax is enzootic within Uganda's Queen Elizabeth National Park (QENP) and the surrounding area, affecting wildlife, domestic animals, and humans. The 2004/2005 QENP outbreak killed 306 hippopotamus, 143 other wild animals, and 405 domestic animals; a 2010 outbreak in QENP killed 154 wild animals (132 hippopotamus); and a 2011 outbreak in Sheema district temporarily halted local beef sales and killed 2 humans and 7 cattle.

A multi-disciplinary team of investigators from Makerere University African Field Epidemiology Network (AFENET) fellowship program, a biologist and Tufts Institute of the Environment Fellow in the Masters in Conservation Medicine program, and wildlife and production veterinarians are working together under the supervision of faculty from Makerere University and Tufts University as well as staff at the Uganda Wildlife Authority and the International Livestock Research Institute (ILRI) to assess the impact of anthrax on humans, wildlife, and domestic animals around QENP. Using a One

Health approach, the focus is on how humans and animals interact and how anthrax impacts the livelihoods and therefore the perceptions of conservation and public health efforts in the QENP area.

The team is using participatory epidemiology approaches to evaluate and design disease surveillance and management strategies, to assess perceived disease impacts, current surveillance efforts, and local conservation efforts in order to investigate anthrax's impact on livelihoods in the QENP area. These findings will be used to propose a conservation medicine and One Health approach to the management and prevention of anthrax through a network of stakeholders. This project is partly funded by the Tufts University Institute of Environment Graduate Fellowship Program.

INTRODUCTION

Anthrax (*Bacillus anthracis*) is a reportable disease found globally. Any case, whether human or animal,

domestic or wild, is supposed to be reported to the appropriate veterinary and human health officials to initiate the necessary control measures. Disease control strategy is well established (Turnbull 2012), as vaccination is sufficient to stop an outbreak when combined with animal movement and carcass control. However, due to the complexity of the life cycle and the unknowns regarding the bacteria's life in the soil, it is difficult to predict when and where outbreaks will occur. Further, disease control can be unpopular in agricultural areas, as the standard control methods have serious economic implications.

The disease is an ancient and virulent zoonotic disease with a complex natural ecology. The bacteria are a close relative to several species of common soil bacteria (Saile et al. 2006) and *Anthrax bacillus* also spends much of its life cycle in the ground (Schuch et al. 2009). This is the part of the life cycle we know least about. Historical research indicates that certain soils are more hospitable to the bacterial spores (van Ness 1971), and current research indicates the bacteria may replicate as saprophytes (Saile et al. 2006). Other recent research also indicates that spores may be able to germinate and replicate in common soil amoeba (Dey et al. 2012). These new theories may help solve the mystery of how apparently low spore counts can spike under the appropriate conditions. Traditionally, spores are thought to be activated and/or concentrated by varying climatic factors (van Ness 1971, Hampson et al. 2011), creating the opportunity to infect herbivorous animals as they graze via inhalation or ingestion.

Once within the body, the spores germinate, and the vegetative cells multiply rapidly, leading to septicemia. The disease causes sudden death, with the animal often displaying blood oozing from all

bodily openings, and sometimes a lack of rigor mortis (Dragon 1999). If either the carcass is opened, the bacteria in the animal sporulate and contaminate the ground surrounding the carcass. People can be infected by ingesting infected meat, or by inhaling or swallowing spores during slaughter, treatment, disposal of carcasses, or use of dried skins later. As in herbivores, gastrointestinal or inhalation anthrax can quickly prove fatal to humans (Beatty et al. 2003). Cutaneous anthrax is less serious. Predators often exhibit resistance to the bacteria (Lembo et al. 2010).

There have been two recent outbreaks in Uganda's Queen Elisabeth National Park (QENP) wildlife populations. In 2004/2005, anthrax killed 306 hippopotamus and 143 animals of other species, mostly wild ungulates and elephants (Mapesa et al. 2007). There was another outbreak in 2010, which killed a smaller number of wildlife. The most recent outbreak in Uganda was not in the park, and it temporarily shut down local beef sales and claimed the lives of both humans (two) and bovines (five) in Sheema district in November 2011 (Promed-mail 2011).

Anthrax appears to be endemic in western Uganda, given its recurrent outbreaks. This possibility is made more likely since the soils in western Uganda are often calcium rich, and are therefore presumably sufficient to support the longevity of anthrax spores (Ness 1971, Hampson 2011). In wildlife areas, it has been suggested that anthrax can act as an effective population control where the disease is endemic (Mapesa et al. 2007). This may be desirable for good wildlife management, but represents an ongoing risk to any livestock-keeping people

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who live near such wildlife areas (Hugh-Jones et al. 2002).

Current management of anthrax in Uganda officially follows OIE regulations as specified in the Terrestrial Animal Health Code (see OIE 2011 b). As such, the disease is reportable. All reports require implementation of ring vaccination, quarantine of meat and milk products, and strict movement control of animals for at least 20 days after the latest outbreak. In 2011, this whole sequence was played out in Sheema District, but not in time to prevent the deaths of two people. In practice, there is some question as to whether these management policies are well enforced. In wildlife, surveillance followed by appropriate disposal of carcasses is the operative management strategy (Mapesa 2007). This has recently been supplemented by initial efforts to monitor effects of disease in wildlife on the people who reside in QENP. Conservation Through Public Health (CTPH 2010), a non-profit that tries to mitigate harmful zoonoses and cross-species disease effects near conservation areas (Kalema-Zikusoka 2011), originally undertook this.

This application of participatory methods was modeled after the design of Mariner and Roeder 2003 and the CTPH efforts. It is intended to complement instead of repeat CTPH findings. By including both questionnaire and PE methodologies in one study, we attempted to address the criticism that participatory methodologies – and especially PE – are usually not balanced with quantitative methods (Toribio 2011). The general goals of the study are to (1) gain a better understanding of disease interactions, especially anthrax, in the area; (2) explore the connection between the presence of serious diseases and perceptions of conservation efforts; (3) identify some operative

recommendations for local and regional stakeholders to implement.

DEFINING TERMS

Conservation medicine is an emerging, interdisciplinary field that studies the relationship between human and animal health (or One Health) and environmental conditions (or ecosystem health/Ecohealth). It seeks to apply that knowledge to better the management of One Health and Ecohealth challenges.

It is important that One Health and Ecohealth practitioners have tools to work with, a toolbox of sorts. It has been argued that for these ideas to succeed, human and animal health will have to be linked together so that knowledge and practice can flow seamlessly from one to the other (Zinsstag 2009, Nara et al. 2008). However, there is more to the picture. The basis of health must be rooted in environmental and ecosystem understanding, from both ecological and sociological perspectives. This means that tools from all of these disciplines will have to be adapted to the unique problems that conservation medicine works to address. One such family of tools is participatory methods, or approaches, originally from anthropology but also applied in many other human centered fields of research and development. From that family, participatory epidemiology is one of the tools most tailored to use in One Health or Ecohealth projects. Thus, it was chosen as a methodology for studying the problem of anthrax in Uganda.

STUDY STRATEGY AND DESIGN

The multi-stakeholder nature of the politics and policy of anthrax in Uganda make it a good candidate for study with participatory methods (PMs) because they provide the option to make room for the input of as many stakeholders as the practitioners wish to include. We have aimed to include all stakeholders in the process, though have been severely limited by time constraints. We were not able to formally interview all stakeholders, and so we focused on the village level participants for interviews. We met many stakeholders (CTPH representatives, community animal health workers, sub-county extension workers, district level veterinarians, and a Uganda Wildlife Authority veterinarian), but the meetings were informal and used only for background information. We chose participatory epidemiology (PE), because the tools it encompasses are tailored to disease management. PE has been applied once to the situation of anthrax in Uganda by CTPH, and we have harmonized our study with this previous work.

OBJECTIVES

1. Define the relative perceived impact of livestock-wildlife diseases—focusing on anthrax—on human livelihoods in a sample of communities near QENP
2. Elucidate the response and response rationale of community members to disease, especially anthrax
3. Investigate the perception in local communities of the relationship between zoonotic disease and wild animals
4. Explore community perceptions of government efforts to aid in disease and conservation management

PROJECT PARTNERS

Partners came from the sectors of veterinary health, governmental wildlife management, and public health: two students in the African Field Epidemiology Network (AFENET) fellowship program, a field supervisor from the Uganda Wildlife Authority (UWA), and one Tufts Masters of Conservation Medicine (MCM) student. AFENET is a non-profit that builds public health programs, the capacity of existing ones, and professional connections. This fellowship program educates veterinarians in public health strategies. UWA is the governing body of wildlife management and conservation in Uganda, managing the protected areas in partnership with communities and organizations.

The partners had various roles in the project. Under an internship for the Tufts student, Dr. Patrick Atimmedi, Coordinating Senior Veterinarian at the UWA, agreed to be the field supervisor for the project. Two AFENET fellows (Fred Monje and Grace Asimwe-Karimu under the instruction of Dr. Terence Odoch) collaborated on the background, methodology, and the implementation of this project. The Ugandan students conducted the field work and provided de-identified data to Ms. Coffin for analysis. Dr. Jeffrey Mariner, DVM the International Livestock Research Institute also advised on participatory epidemiology methods. In Kasese District, Community Animal Health Workers trained by the NGO known as Conservation Through Public Health were used to connect with the communities. This organization is an important stakeholder in the area, and has previously done somewhat similar research focused on anthrax in communities

that live in Queen Elisabeth National Park. We have agreed to share data, and our data will be compared with theirs in the final report sent to the District level government and other stakeholders.

METHODS

Sampling

We chose two districts, Kasese and Sheema, based on the presence of past outbreaks and different proximities to the park. Within those districts we used purposive, or risk-based, sampling to select subcounties. The risk we are testing for is effect of proximity to the national park or outbreak on perceptions of anthrax, animal public health efforts, and knowledge of wild animal disease. Subcounties based on whether they are near to known outbreaks/park boundaries (<10 km), or far (>10 km) from outbreak/park boundaries. Random sampling of villages from within each subcounty was intended to reduce selection bias, but time did not allow us to use this method effectively. Where time was too short, a convenience sample of villages that had contacts we could work with were used instead. This meant that the villages chosen were those that already had either government extension workers or CTPH community animal health workers, possibly affecting our results. The sample of individuals from within each village was necessarily a convenience sample chosen by participants themselves and the community leaders who mobilized them.

Two sub-counties were selected from each district, resulting in 4 subcounties total. Two villages were chosen purposively from every subcounty, and ~10 households were chosen from each community (village). Individual village residents from each selected household completed the questionnaires.

Each village had one or two focus groups (5-15 individuals), observations from one day, and 6 and 15 questionnaires. In Sheema district, we attended a farmers' workshop, where we collected 29 questionnaires.

Subject criteria

To effectively represent local knowledge, we wanted to cast a fairly wide net, including individuals from multiple social strata, gender, occupation, and adult age groups. Local dialects were accommodated with translators or with the language skills of the Ugandan student counterparts. Participants were given refreshments (sodas) by way of thanks for choosing to participate.

- Inclusion criteria: (1) Lives in study area more than 50% of the year, (2) Adults (age 18 and older) both male and female, (3) consents to participate, (4) chooses to attend focus group or questionnaire session.
- Exclusion criteria: (1) Lives in the study area less than 50% of the year, (2) less than 18 years of age, (3) does not consent to participate, (4) chooses not to come to the focus group or questionnaire session.
- Withdrawal/Termination criteria: Individual is aggressive, excessively overpowering, or chooses to cease participation for any reason. Termination will come into play only if the safety of other participants or researchers is threatened. Participants were aware that they could leave of their own free will at any time.
- Gender balance was encouraged, and when possible focus groups were separated by gender to aid in freer communication.

Data Collection

From PE we used semi-structured interviews including participatory exercises within focus groups. The Ugandan student collaborators facilitated these focus groups. Key informants – usually defined as individuals with specific knowledge of study topics – were not included in the data collection, but were encountered during the organizational process. The students conducting the focus groups and questionnaires used conversations with key informants to brief themselves about the local history of anthrax outbreaks and relevance of study topics. For non-participatory methods to crosscheck the focus groups, questionnaires were filled out. Three main strategies were used in the collection of data. (1) Questionnaire surveys were completed with individuals from the chosen communities. (2) Semi-structured interviews were conducted in focus groups. (3) Observation in the focus groups by the note-taking partner. Observations were also made on the approach and departure from the villages.

The second strategy listed above incorporated more than one participatory technique. Participants were asked to draw a community map at the opening of the focus group. Thereafter, the map was used as a touchstone throughout the focus group interview to aid understanding and communication. Villagers were asked about husbandry techniques and wildlife in the area, and then to identify, describe, and rank the three most important diseases to each livestock species. They were asked how those diseases affected their livelihood. Through a proportional piling exercise in a matrix, we investigated the effects the three diseases had on their livelihoods. They were also asked specifically about anthrax, their knowledge about it, and how it affected their livelihoods. Checklists and sample questionnaires are available

upon request from the corresponding author.

Analysis Strategies

This study was originally designed for qualitative and spatial analyses. However, after completing the fieldwork, the authors decided to attempt quantitative analyses as well. The two Ugandan authors are mostly responsible for the quantitative analysis, and the US author is responsible for the qualitative and spatial analysis – though all three are assisting each other with the analyses for statistical ideas and design, and advice about on-the-ground details for the qualitative data.

- Qualitative Analysis: looked at the various categories of data, summarizing the main themes, points, or ranks given in responses or discussions.
- Spatial Analysis: The differences between responses of focus groups are being compared by proximity of the given village to both anthrax outbreaks and Queen Elisabeth National Park. Responses looked at included interaction of livestock with wildlife, diseases ranked as important, effects of disease on livestock rearing activities, livestock rearing challenges, and knowledge of livestock-wildlife disease transmission.
- Quantitative Analysis: Statistical tests being considered are linear regression, odds ratios, and the chi-squared test with EpiInfo software.

QUALITATIVE RESULTS

Top mentioned livestock raising challenges:

In Sheema, disease was ranked first in every focus group. Similarly, the price of medicines to treat

the animals was also mentioned as challenging. Theft of animals and lack of land were ranked second. In Kasese, however, the top challenge was always related to conflicts with wild animals or park officials. In two focus groups disease or related disease issues, such as inaccessibility of veterinarians, made rank number two, but in others were more concerned with drought and lack of farming equipment for fodder and crops.

In the questionnaires participants were free to put their personal opinions, and so a wider range of answers was received. The following were the most mentioned challenges associated with livestock rearing. In Sheema the most frequent difficulties mentioned were disease, lack of/expensive drugs, theft, ticks, poor grazing/lack of land, and low market prices. In Kasese the top mentions had

some in common with Sheema, but also some notable differences. Kasese’s top challenges were marauding predators, no compensation for marauding predators, lack of grazing land, disease, drought, and theft.

There were more questionnaires taken in Sheema than in Kasese because the authors were able to attend the farmer’s workshop in Sheema. In Sheema district the most mentioned diseases in the questionnaires were tickborne diseases (especially East Coast Fever), lumpy skin disease, worms, brucellosis, and anthrax. Other diseases such as foot and mouth disease, mange, and mastitis were also occasionally mentioned. In Kasese district brucellosis, and East Coast Fever were the top diseases mentioned. These patterns were confirmed by

TOP RANKED DISEASES FROM VILLAGE FOCUS GROUPS

Village	Disease 1	Disease 2	Disease 3
Mashonjwa 1	ECF	LSD	Mastitis
Mashonjwa 2	ECF	Mastitis	-
Mashonjwa 3	Anthrax	ECF	Brucellosis
Nyakihanga 1	Nonspecific diarrhea	FMD	3 day sickness
Nyakihanga 3	ECF	Brucellosis	Emerging rare diseases (difficult to ID)
Rwamunena	Tick-borne diseases (ECF)	LSD	Eye diseases
Rwenjuba	Brucellosis	New Castle	Trypanosomiasis
Kiganda 1	Tick-borne diseases (ECF)	Brucellosis	Anthrax
Kiganda 2	Anthrax	Brucellosis	Worms
Muhokya	FMD	Anthrax	New Castle
Muhokya	ECF	Worms	Trypanosomiasis

Table 4: Boxes in light grey are from Sheema District, and boxes in dark grey are from Kasese District. ECF = East Coast Fever, LSD = Lumpy Skin Disease. Notes -- In Kiganda 1 & 2, brucellosis was referred to as “malaria of animals.” In Rwamunena and Kiganda 1, “tickborne diseases” was reported in general, but upon further probing for symptoms and treatment ECF was the most commonly reported.

the focus group discussions with the addition of foot and mouth disease and anthrax. See Table 4 for details from focus groups.

AWARENESS

In Sheema participants were sometimes aware that brucellosis, anthrax, and TB, and worms could all infect humans as well as animals. Of those that knew of zoonosis, many did not know how to avoid specific diseases. In Kasese most participants were aware of the zoonotic characteristics of anthrax, TB, brucellosis, influenza, and worms.

Concerning the connection of disease to wildlife, Kasese also had a higher level of awareness than Sheema district. In Kasese interviewees, without prompting, specifically mentioned diseases coming from wild animals being difficult to control. In relation, it is perhaps not surprising that the level of contact livestock in Kasese had with wild animals was reported more frequently than in Sheema. In Sheema 47.8% of participants said their livestock had no contact with wild animals and 52.2% said they did have contact. In Kasese 42.3% said they had no contact with wild animals, and 61.5% said they did have contact. Further, 72% of respondents answering “no contact” in Kasese listed several wild animals that their animals come into contact with. In Sheema only 13.6% of respondents answering “no contact” listed any wild animals at all.

Specific awareness of anthrax also differed by district. Individuals who were aware of the effects of anthrax and proper prevention strategies were equally well informed in both districts, but there were fewer informed participants in Sheema. Kasese had a larger level of awareness than Sheema on general knowledge of the characteristics and appropriate response to anthrax as well as the fact that anthrax can affect wild animals as well as domestic ones.

EFFECTS ON LIVELIHOOD

In Sheema many mentioned the destructive effects of quarantines (“unable to sell animals or milk”, “unable to slaughter animals”). Other effects of animal disease reported were reductions in productivity due to time spent caring for animals, high expenditures on medicines/vaccines, the “government delays to intervene”, loss of animals, loss of body condition, loss of fertility, and individual mental distress – one man said he “can’t even sleep.” In Kasese there were similar reports: income problem, loss of animals, farmers can’t get the maximum profit from it (due to loss of milk, death of animals, and/or poor quality meat).

Specific to anthrax, only one respondent in Sheema said they had been directly affected, pointing to a reduction in income. However, many respondents mentioned the destructive effects of disease quarantines in general, and referred to the quarantine due to anthrax last year as a prime example. In Kasese there were several who had been directly affected by anthrax, and they said it was expensive to treat, resulted in a loss of livelihood/income, a loss of animals, and a lack of manpower.

In the focus groups, participants were asked to rank the disease impacts. In Sheema general disease and anthrax were separate. In Kasese this distinction was removed to avoid biasing the exercise that followed the ranking exercise.

Focus group participants in Kasese were asked to complete disease vs. disease impact matrices in a proportional piling exercise to probe into the deeper effects of disease on their livelihoods. One of the impacts mentioned was conflict (in Rwenjuba), an unexpected response, as most addressed financial concerns.

Sheema	General Disease Impacts		Anthrax Impacts		
Ranked 1st	Reduction in milk	Treatment expenditure	Lower income	Death of animals	Loss of animals
Ranked 2nd	Animals die	Milk reduction	Not allowed to eat milk or meat	Increased expenditure	Loss of income
Ranked 3rd	Blockage of teats	-	Social isolation - by members of other communities	Lack of meat and milk	Isolated from other livestock farmers

Table 5: General and anthrax specific disease impacts from Sheema District.

Kasese	General Disease Impacts				
Ranked 1st	Poverty/no income	Deaths of animals	Loss of animals	Loss of animals	Loss of calves
Ranked 2nd	Conflict*	Loss of milk	Expenditures in treatment	No sale of animals	Expenditures in meds
Ranked 3rd	Death	Poor quality [animals]	Loss of human lives	Little or no milk and meat quality	Loss of milk

Table 6: Disease impacts in Kasese District. *Both at home and between homesteads and government.

FURTHER INFORMATION ON ANTHRAX

Anthrax was not considered to be among the most important diseases in villages in Sheema district, except in one focus group. This was one of the villages that had an anthrax outbreak, and they said it was very costly to them though also very rare. Most other Sheema villages reported that they hadn't any direct experience with anthrax. However, when participants were asked to locate an anthrax outbreak on their participatory map, every Sheema village could point to an outbreak that had occurred less than 10 km from their village. This is despite the fact that 3 of our focus groups were ~30km from the formally reported anthrax cases (see map). The locations pointed out by the participants do not converge in one place, nor do all match up with known (reported) anthrax outbreaks. This could have been reported due to a desire to please, but the field workers reported that they seemed to be genuine reports. This indicates that there may have been more anthrax

outbreaks than officially reported. There were also reported historical anthrax outbreaks on Kasese participatory maps, but it is unclear if these are part of previously reported outbreaks in the national parks or not.

Further, two unofficial reports of suspected anthrax cases came to the attention of the authors during fieldwork in late July 2012, including an animal supposedly testing positive at a laboratory near one of the study areas. These have not been formally reported precisely because of the economic damage a full-fledged quarantine causes to the cattle centered and dependent culture of western Uganda. One other interesting observation that we heard from several participants in Sheema district was that most anthrax-infected cows have been coming from Mbarara District. They said that they tend to be a bit more suspicious of cattle coming from there because they have more anthrax in Mbarara than they do in Sheema district.

Rwenjuba	Kasese	Impacts		
		Poverty (no income)	Home Conflicts	Death
Diseases	Brucellosis	0.17	0.04	0.11
	New Castle	0.22	0.00	0.07
	TRP	0.20	0.06	0.12

Kiganda 1	Kasese	Impacts		
		Deaths of animals	Loss of Milk	Poor quality, loss of value
Diseases	TB	0.52	0.27	0.20
	Brucellosis	0.52	0.32	0.16
	Anthrax	1.00	0.00	0.00

Kiganda 2	Kasese	Impacts		
		Loss of animals	Treatment Costs	Loss of life in human beings
Diseases	Anthrax	0.40	0.20	0.40
	Brucellosis	0.33	0.33	0.33
	Worms	0.30	0.35	0.35

Muhokya 1	Kasese	Impacts			
		Loss of animals	No sale of animal	Poor milk and meat quality	Quarantine
Diseases	FMD	0.21	0.15	0.21	0.43
	Anthrax	0.23	0.30	0.24	0.23
	New Castle	0.29	0.29	0.22	0.20
	TRP	0.35	0.25	0.40	0.00

Muhokya 2	Kasese	Impacts			
		Loss of calves: abortion, delayed estrus	Drugs expenditure	Loss of milk quality	Lost time
Diseases	ECF	0.28	0.25	0.19	0.28
	Worms (Enjoka)	0.39	0.32	0.13	0.16
	TRP	0.14	0.22	0.39	0.25

Table 7: Tables of matrices of disease and disease impacts in all villages from Kasese District. Proportions are listed as proportion of impact per disease, and are expressed as out of 1.00 instead of 100. Colors are coded as follows: Pink $x > 0.50$, Purple $0.49 > x > 0.35$, Yellow $0.34 > x > 0.20$, and White $x < 0.19$.

In Kasese district questionnaire participants asked for sensitization of communities and more veterinary personnel. Focus groups were a more fertile ground for suggestions. In Sheema they suggested free annual vaccinations, more veterinary personnel, better enforcement of outbreak quarantines, and provision of drugs. In Kasese there were requests for veterinary personnel/extension workers at subcounty or parish, routine vaccinations, tsetse fly control, sensitization about disease, compensation by the national park for damages by wild animals, regular

vaccination drives, and regulation to encourage competition amongst the middlemen to provide better prices for the farmers.

DISCUSSION

The final conclusion must wait for the full analysis to be completed. However, some preliminary conclusions may be drawn from the qualitative data that has been presented. There does seem

to be a noticeable difference between the answers received from Sheema and Kasese districts, and may be attributable to the distance from the QENP. There are also noticeable differences between those villages that were immediately adjacent to anthrax outbreaks and those more distant from them. Both of these differences are being explored through GIS spatial evaluation to see if they are significant.

The Uganda Wildlife Authority (UWA) conservation strategy is based on their mission, which is "To conserve, economically develop and sustainably manage the wildlife and protected areas of Uganda in partnership with neighboring communities and other stakeholders for the benefit of the people of Uganda and the global community." UWA has programs in place in many of their areas that tie the successes of tourism with community development initiatives. This does not necessarily include supporting veterinary healthcare in all situations.

However, where such a connection between conservation and human or veterinary public health has been made (in the nonprofit sector), positive reactions have been reported (CTPH 2010). In CTPH 2010 participatory epidemiology (PE) was used to assess the impact of an ongoing anthrax outbreak in villages surrounded by Queen Elisabeth National Park. The Uganda Wildlife Authority (UWA) has an established method for dealing with anthrax outbreaks, and both the CTPH report and this case study were meant to inform the approach used with communities who are affected by the UWA methods.

The original report of anthrax in Uganda was that it was highly sporadic, occurring mostly in QENP amongst hippopotamus, buffalo, and elephants. There was the one outbreak in Sheema district, which prompted us to investigate in that area. Our research, however, has revealed that anthrax is much more widely distributed than

the reported outbreaks would imply. Reports of anthrax outbreaks were located in three places in Sheema district instead of the one place expected. Further, participants suggested that anthrax was still more common in the neighboring Mbarara district. This merits further investigation.

Similarly, our research found that the current use of quarantines is prohibitively expensive for village level individuals, and is presumably preventing them from reporting faithfully. It may be that the quarantines and associated vaccination programs are not well enough compensated to balance the unavoidable costs incurred by all individuals placed under quarantine. Effective quarantine compensation programs might tip the balance the other way. Community individuals might also be more willing to report anthrax cases and deal with the associated quarantines if there was adequate sensitization and education about the consequences of established *B. anthracis* in their soils. Many individuals did not report knowledge of anthrax, how to recognize it, or how to deal with suspected anthrax cases. Further, those that do know how still report choosing to butcher animals they suspect having died of anthrax.

Other important notes to acknowledge are the importance of disease in the context of other livestock rearing challenges and the relative importance of anthrax among other diseases mentioned. Disease was not always the top concern, particularly in Kasese district. The encroachment of wild animals on the villages and their associated damages to crops and livestock is number one on their lists. This places them in conflict with conservation in the area, and must also be addressed along with their disease concerns if conservation is to continue successfully. Of the diseases mentioned, tickborne diseases

and brucellosis seem to be among the most widespread problems. Since they are so widely distributed and commonly dealt with, they are likely as serious as the anthrax problem if not more so.

There are several areas that should be explored as further analysis is completed. Firstly, the issue of whether serious surveillance for anthrax in the environment, livestock, and/or wildlife should be considered. It is possible that such surveillance could help target areas for annual vaccine and education campaigns, if the resources were found. While it does seem that once again PE has been able to reveal a different picture of infection patterns than was previously acknowledged, it still needs to be evaluated beside the questionnaire efforts. This case study was not ideally designed to test questionnaires against PE, since they were conducted consecutively in half of the villages. This style of study may have allowed the effects of each technique to affect the other. Whether PE should become part of periodic surveillance efforts alongside questionnaires seems likely to be answered in the positive. If PE is to join in the epidemiological work in Uganda, the country is unusually well appointed to implement the method. AFENET already functions as an educational group, and may become part of a PE network that could coordinate wider efforts focused on one disease or many. There are established strategies for incorporating PE into existing or standard surveillance (Mariner et al. 2011).

Other strategies should also be considered for the control of anthrax. Another community-based strategy is the employment of community animal health workers (CAHWs). A network of

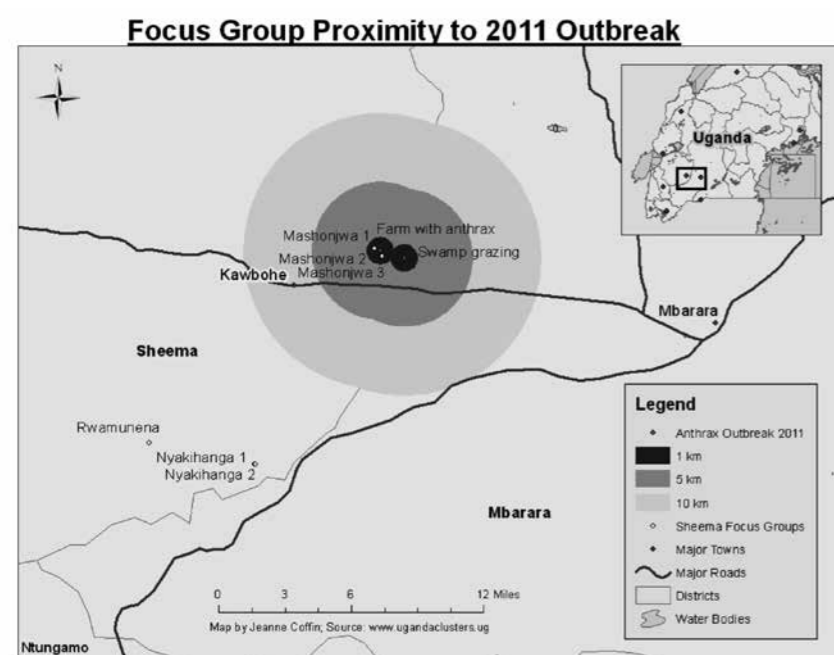


Figure 1: Buffer around 2011 outbreak showing 1, 5, and 10km boundaries surrounding the outbreak. Note that all three focus groups in Rwamunena and Nyakihanga referred to outbreak less than 10km from their villages in directions that did not correspond to the 2011 outbreak.

community animal health workers (CAHWs) might also be an effective way to boost surveillance and control. They have been used to great effect with other diseases in Kenya (Catley 1999). When employed by Conservation Through Public Health (CTPH) they were well received in areas around QENP. Villagers asked for their return to the QENP area, saying that CAHWs associated with CTPH have been less active this last year. A non-community-based approach that might be taken to understand the distribution of anthrax is testing either the soil or animals to determine prevalence in either. Loop-mediated isothermal amplification (LAMP) assay testing is a relatively new technology that has been developed specifically for field-testing of pathogens, including anthrax. A recent effort by Jain et al. 2011 has had success testing soil for anthrax at very high levels of sensitivity. High sensitivity is vital for a soil bacteria like *B. anthracis* that is known to exist over long periods of time in low concentrations. Domestic canines could be used as an indicator species for historically present anthrax through a serology survey as in Lembo et al. 2011.

CRITICISM

Due to the lack of time used to complete the fieldwork, the participatory nature of this mini-study has dropped from a possible level 4 to a low level 3 on Pretty's 1994 topology of participation. The collaboration with local stakeholders and execution of participatory methods used were good, but the actual execution was far short of what had been planned. The lack of time meant that actual fieldwork had to begin immediately, without a practice section to perfect the techniques and refine the questionnaires and check list. The

result of this is that the questionnaires, the check lists, and even the focus group activities had to be remodeled on the fly. Thus, in analysis, only some data is consistent across all groups. The consistent data is what was focused on in the results/confirmation section, but there was some other data that was lost in the process of refining. Unfortunately, in shooting for consistency, we were unable to attain our goal of having focus groups separated by gender. This is very unfortunate because in the one situation we were able to separate groups by gender, we got some interesting information from the women's group that was not reported in the men's group: a long forgotten instance of a case of anthrax, as well as an understanding of some skepticism surrounding the occurrence of anthrax in the area. Without this information, it would have been harder to conclude that anthrax is widely distributed.

The number of questionnaires collected was actually very good considering the short amount of time that we had available for the study. However, there were some weaknesses in collection. For example, in three of the villages, questionnaires were collected after the focus groups were conducted. This meant that the answers would most likely be biased by the topics and conclusions of the focus group discussion. However, we concluded that it would be more time efficient and less of a bias problem if one of the Ugandan student collaborators collected questionnaires while the other facilitated the focus group discussions. This became our dominant strategy. The inclusion of questionnaires taken from the selection of farmers that attended the farmers' workshop also helped to reduce the bias in the questionnaires by disassociating the conclusions

in the questionnaires from those in the focus groups.

CONCLUSION

Participatory epidemiology has given a more complete picture of the situation surrounding anthrax in western Uganda. In the scale of challenges facing the people near the national parks, disease is not the top priority. Within disease, the importance given anthrax varies but is generally high. In order to improve relations between the national park and those living nearby it, any hardships that the park places on the nearby residents should be mitigated, including disease risks. A more complete survey of high risk areas regarding anthrax should include soil sampling and serosurveillance of canines. Knowledge of truly high-risk areas could inform targeted vaccination and risk-mitigation education programs. This should reduce the number of annual anthrax vaccines needed to completely control the disease around the national parks, increasing the efficiency of any such program.

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CHAGAS DISEASE (AMERICAN TRYPANOSOMIASIS)

Caused by a Protozoan *Trypanosoma Cruzi*

Kota YOSHIOKA

CASE STUDY/BACKGROUND PAPER

Chagas disease (American Trypanosomiasis), caused by a protozoan *Trypanosoma cruzi*, is a zoonosis predominantly prevalent in the American continents (Figure 1). The Pan American Health Organization (PAHO/WHO) estimated that 8-9 million people or 1-2% of the Latin American population were infected with Chagas disease in 2005 (PAHO 2006). Serological screening at blood banks in Latin America in 2007 detected <1% of blood units with HIV in all countries, but reported >1% of blood units positive for *T. cruzi* in highly endemic countries (Table 1). The principle forms of human infection are via vector-borne, congenital, transfusional and oral transmission. In the 1990s more than 80% of the human infection was attributable to the vector-borne transmission (Schofield 1994). As a result of the intensified efforts on vector control and serological screening of blood donors, the incidence of Chagas disease has decreased by 70% since the 1980s (Dias 2007, Moncayo and Silveira 2009).

In 1997, the Central American countries with PAHO/WHO launched an initiative with an objective to interrupt Chagas disease transmission by vector control and screening at blood banks.

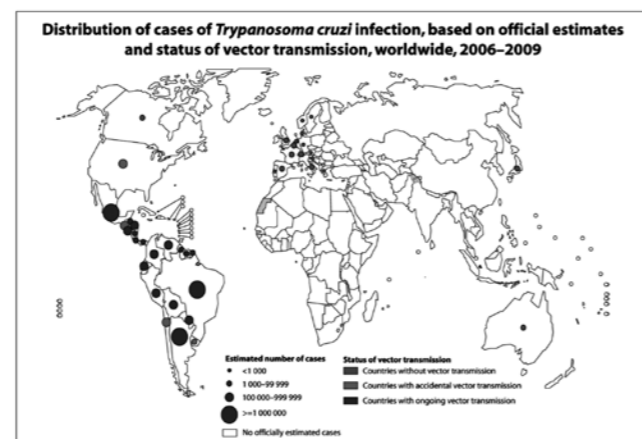


Figure 1: Distribution of Chagas disease infection by WHO

The vector control targeted two main species, *Rhodnius prolixus* and *Triatoma dimidiata*. Extensive indoor insecticide spraying dramatically reduced the distribution of *R. prolixus*. This species is to be eliminated in Central America due to its susceptibility to insecticide and strictly domestic habitats (Hashimoto & Schofield 2012). The current challenge is control of *T. dimidiata*, which is not eliminable because of its wide distribution and sylvatic population. As *T. dimidiata* can repeatedly infest houses even after insecticide spraying, there is a need to establish universal and sustainable

Country	HIV	HBsAg	HCV	Syphilis	<i>T. cruzi</i>
Bolivia	0.10	0.38	0.97	1.01	2.53
Brasil	0.69	0.48	0.53	0.96	0.59
Ecuador	0.43	0.29	0.43	0.57	0.17
El Salvador	0.09	0.24	0.29	1.14	2.09
Guatemala	0.82	1.21	0.69	2.10	0.97
Honduras	0.25	0.43	0.43	0.75	1.06
Mexico	0.28	0.19	0.66	0.32	0.41
Nicaragua	0.26	0.32	0.62	1.02	0.21
Paraguay	0.60	0.49	0.72	8.83	3.27
Peru	0.39	0.49	0.81	1.43	0.77

Source: PAHO 2009

Table 1: Proportion (%) of blood units positive for infections at blood banks in Latin American countries, 2007.

surveillance systems to detect and treat infested houses to prevent the vector-borne transmission of Chagas disease.

Japan International Cooperation Agency (JICA) has provided technical assistance on Chagas disease vector control in Central American countries, including Guatemala, El Salvador, Honduras and Nicaragua since 2000. Following the massive insecticide spraying campaign, JICA supported the Ministries of Health in designing, implementing and managing community-based vector surveillance systems. The community-based vector surveillance is composed of five key functions: 1) health promotion to promote bug reports by the community, 2) bug detection by the community, 3) bug reports from the community to the local health facilities, 4) data analysis for planning actions, and 5) responsive actions to the community bug reports (Figure 2) (Hashimoto & Yoshioka 2012). However, depending on the local settings in terms of vector distribution, access between the community and the local health facilities, availability and characteristics of stakeholders and so forth, the five-function model

of the community-based vector surveillance was to be customized.

Also, the trends in health system reorganization such as decentralization (Tobar 2006) and Renewing Primary Health Care (PHC) (PAHO 2007) have changed the structural and organizational settings including the vector control program in the Central American Ministries of Health. For example, in El Salvador,

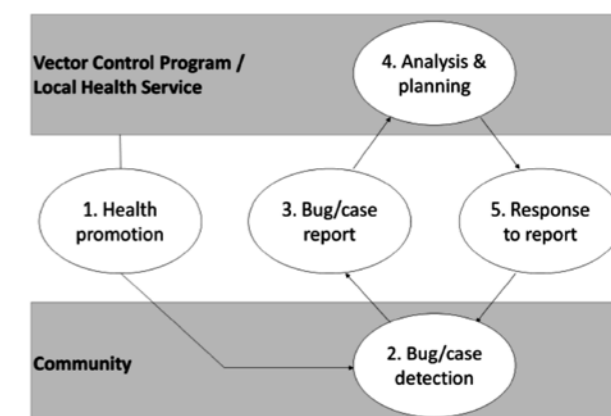


Figure 2: Five key functions of community-based surveillance system (Hashimoto & Yoshioka 2012)

the vector control technicians are concentrated in the Departmental Health Offices with limited opportunities to reach the communities for field activities such as household bug search surveys and indoor insecticide spraying (Figure 3). Such field activities are conducted mainly by multi-purpose (polyvalent) Health Promoters from Local Health Center level. In Honduras, the vector control program was disorganized and integrated into the environmental health program. The Environmental Health Technician is responsible for multiple health issues, including vector control, and can dedicate very limited time for Chagas disease control. To establish the

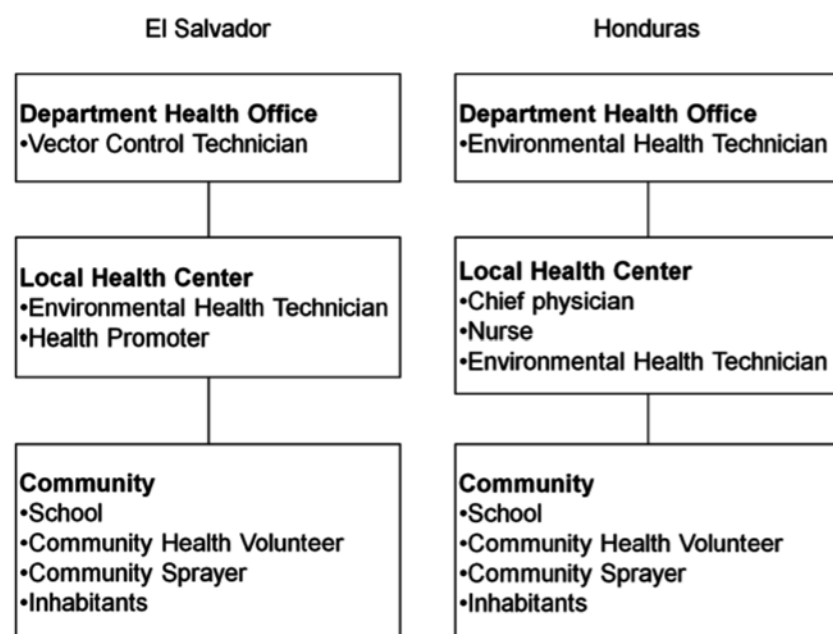


Figure 3: Structure and distribution of stakeholders for community-based surveillance system (Hashimoto & Yoshioka 2012)

functional surveillance systems, it was absolutely necessary to involve not only Vector Control Technician but also other disciplined stakeholders from the designing stage.

From the field experiences of Chagas disease control in Central America, we drew two important lessons for the community-based surveillance systems to be scalable and sustainable. First, task sharing between specialized vector control personnel and non-technical stakeholders could efficiently increase the surveillance coverage. The community inhabitants could effectively detect the vectors and in some cases could learn spraying techniques to treat reportedly infested houses with vectors. Local networks such as community health volunteers, schools and media also promoted bug reporting. Such multi-disciplinary approach contributed to increasing the coverage of vector detection and response only if the motivation and quality assurance were present.

Second, the community-based surveillance systems could be managed better by the local PHC services rather than the vector control program. When the management of surveillance systems was transferred from the district vector control program to the local PHC services, it facilitated organization of locally available capacity and resources. To monitor performance of the community-based surveillance systems in extensive jurisdictional areas, the critical nodes within the surveillance systems were identified as a what-to-do list and its compliance was checked quantitatively in biannual evaluations.

Still, the community-based surveillance systems need to be improved in terms of the coverage and sustainability. The current surveillance does not cover all potentially at-risk areas for vector-borne transmission and not all vector reports are responded by the Ministry of Health (Table 2). Low response coverage could discourage the community inhabitants to continue reporting the bugs, affecting the sustainability

Country	Communities			Houses		
	To be under vector surveillance	Under vector surveillance	%	With vector reports	With institutional response*	%
Guatemala	2,138	482	23%	1,370	1,234	90%
El Salvador	na	12,282	na	5,784	na	na
Honduras	3,223	511	16%	1,228	831	68%
Nicaragua	na	453	na	441	30	7%

* The institutional response could be educational house visit or insecticide spraying
Source: Hashimoto 2012

Table 2: Coverage of community-based surveillance systems in four Central American countries, 2012

of the surveillance systems. In view of scalability and sustainability, we recommend enhancing more community involvement to improve the coverage of response activities. The running cost of community-based surveillance systems should be programmed within the regular budgets of the local health services. Furthermore, the national programs should encourage and facilitate the PHC services especially in the endemic areas to organize annual campaigns to motivate the stakeholders and should monitor the disease transmission levels on a systematic and regular basis.

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THAILAND EMERGING INFECTIOUS DISEASES STRATEGIC PLAN:

A Platform for Improved Preparedness and Response to EIDs Under “One Health” Concept

Dr. Rungrueng KITPHATI

MD, FETP, and One Health Thailand Network

At present, threats from the outbreaks of emerging infectious diseases (EIDs) have increasingly become one of the most pressing issues on a global scale. Every year, several EID outbreaks are reported almost everywhere in the world. Most of these IED outbreaks represent a very challenging task for health authorities to come up with adequate prevention and control strategies since they not only have a serious health impact on the general public but also inevitably create significant social and economic impacts, as well as threatening the national security. Over the past decades Thailand has sporadically been affected by major outbreaks of emerging infectious diseases – for instance, SARS outbreaks in 2003, the resurgence of avian influenza between 2004-2008, influenza pandemic (H1N1) 2009 back in 2009, and most recently the outbreaks of Hand, Foot, and Mouth Disease (HFMD), including other infectious diseases which has been posing a constant health threat. Thailand is susceptible to the threats from new infectious diseases, infectious diseases found in the new geographical areas, and re-emerging infectious diseases. It is highly likely that these diseases can over time be introduced into the kingdom, given the fact that Thailand is a regional hub for international travel and transportation. On another front, we have also been facing an aggravating problem of drug resistance, which so far has been on a steady rise, both in terms of prevalence and complexity. What is alarming is that incidents of drug resistance are constantly being reported both in human and animal populations. In the meantime, we cannot rule out the possibility of the threat of bioterrorism. Most of EIDs are found to be closely linked to domestic animals, wildlife, and environments. Consequently, adequately addressing the problem of this magnitude will fundamentally require multisectoral collaboration. In the past, the responsibilities for the prevention and control of contagious diseases lied principally with public health agencies. The lack of well-coordinated, interagency efforts from other sectors like Animal Health and Wildlife officials had made it difficult for Human Health sector to successfully contain the spread of emerging infectious diseases. The resounding success of Thailand’s effective response to avian influenza over the past several years has been attributable largely to the

implementation of the 1st and the 2nd National Strategic Plan for Preparedness and Response to Avian Influenza and Influenza Pandemic, which were being implemented from 2005-2007 and 2008-2010, respectively. Under this strategic plan, both state agencies and private organizations were made well prepared to deal with the threats of avian influenza and capable of handling public health emergency arising from EIDs. Another important factor contributing to such success is that Thailand currently has in place a well-developed public health infrastructure which enables health authorities to effectively implement disease prevention, control, and surveillance strategies. And, most importantly, the implementation of these national strategic plans had called for interagency efforts, which in turn resulted in a closer collaboration between different agencies and organizations, increased mutual trust, while ensuring the plans are carried out by multisectoral partners network that helps ensure more concerted efforts. This approach is consistent with the introduction of the so-called “One Health Collaboration” concept, which is widely accepted as a more practical approach to addressing EID threats. This One Health concept has clearly stated that addressing health issues can no longer be confined only to the aspect of human health. Nowadays, when it comes to health issues, other aspects other than human health facet will also need to be incorporated into an integrated approach to addressing health threats known as “One Health” concept. Under this universal theme, everything is inextricably linked to one another. Healthy living can only be achieved through concerted efforts from across a range of sectors and genuine compassion to see others happy and free from sufferings. This also includes animal health, wildlife health, and safe environments.

The National Strategic Plan for Emerging Infectious Diseases Preparedness and Response 2013-2016 was developed due mainly to the expiration of the 2nd National Strategic Plan and in response to the resolution of the 2nd National Health Assembly so as to ensure that Thailand is capable of efficiently preventing and containing emerging infectious diseases in compliance with international standards and practices through well-established management system, personnel capacity, and knowledge management. This critical document, which is prepared by the Committee and Working Group appointed to work on the preparations of the plan, has called for active engagement from across a wide range of sectors, and shared purposes and principles, including collaborative efforts to develop the national strategic plan for EIDs. To date more than 26 key meetings have been held and they are well represented by all parties concerned, including representatives from key sectors such as Human Health, Animal Health, Wildlife, Environments, as well as relevant organizations and partners network. In addition, a number of presentations were also given at key meetings, conferences and events. These were subsequently followed by several public hearing sessions, as well as having the plan presented before the meeting of the National Health Assembly. The National Strategic Plan for Emerging Infectious Diseases Preparedness and Response 2013-2016, which is approved by the cabinet, is comprised of five strategic strands, 25 strategies, and 140 implementation measures: The five key strategic strands include:

1. Development of disease surveillance, prevention and control system which is in line

with One Health concept and consists of five strategies and 41 implementation measures;

2. Development and implementation of efficient management system for commercial animal farms, animal health, and wildlife to ensure a disease-free animal sphere. This consists of eight strategies and 36 implementation measures;

3. Development of knowledge management system and encouragement of research and development consisting of three strategies and 19 implementation measures;

4. Development of integrated management system for EID preparedness and emergency response which is comprised of four strategies and 26 implementation measures; AND

5. Risk communications and public awareness campaign relating to the risks from EIDs consisting of five strategies and 18 implementation measures

All five strategic strands are systematically interrelated to one covering the development of disease surveillance, prevention and control system in humans, animals, wildlife, and environments in an efficient, consistent manner so as to ensure a timely response to the outbreaks, thus providing adequate protection for high-risk and general populations alike. To address these challenges, the knowledge management system has been developed in parallel with ongoing research and development efforts to ensure self-reliance in the long run. In the meantime, preparations are also being made to effectively respond to EID outbreaks, which in turn will strengthen Thailand's public health system capabilities and self-reliance and help minimize potential social and economic

impacts arising from the outbreaks. In addition, the development of integrated management system will also help mobilize resources, strengthen capabilities, and share knowledge and expertise from across a wide range of sectors in order to ensure concerted efforts in addressing the threats from EIDs. Furthermore, as there is currently an increased risk of EID outbreaks which can spread across the globe within a short space of time, strong and continued collaboration from the international community, as well as efficient public relations and risk communications strategy, are also indispensable in order to adequately address these challenges.

One of the key approaches to implementing the strategic plan is through the state mechanism (known as a vertical driving). This is done through the guidance and supervision by the National Steering Committee chaired by the Deputy Prime Minister, with the Permanent Secretary of relevant Ministries serving as members, and the Director-General of Department of Disease Control, Department of Disaster Prevention and Mitigation, Department of Livestock Development, and Department of National Parks, Wildlife and Plant Conservation, which are joint Focal Points of One Health Network, serving as co-secretaries. The strategic plan is to be implemented using the state administration plan by ensuring that it is carried out in line with both ad-hoc and national agenda, as well as the existing state monitoring and evaluation system.

Additionally, the strategic plan will also be implemented through the capacity building program of relevant government agencies

and private organizations, while concurrently fostering international cooperation through the implementation of the International Health Regulations (IHR) 2005, the Asia Pacific Strategy for Emerging Diseases (APSED), and the Declaration of ASEAN Concord.

The most tangible success of the development and implementation of the strategic plan is essentially achieved by a horizontal driving approach without a direct engagement of the government sector – but due largely to a close collaboration of members of “One Health Collaboration Network,” particularly those field staff working on the ground from various sectors including human health, animal health, wildlife, environments, local universities, international organizations, and other relevant sectors, who basically have a shared passion for health and are acutely aware of serious threats from EIDs. The success of the strategic plan development and implementation would not have been achieved without active engagement and participation from all parties concerned throughout the entire process of preparation, development, and implementation of the plan – which has recently been approved by the cabinet. In conclusion, the combination of shared goals and principles, as well as sustained engagement from all parties concerned is testament to this success story from Thailand, which will ultimately lead to an efficient horizontal driving of all existing strategies. To take our collaborative efforts to the next level, the National Collaborating Center of One Health has recently been established with the aim to coordinate and foster closer cooperation among members of the network, conduct program activities, and advance the strategic plan so as to collectively achieve the stated goals under “One Health” concept.

RABIES CONTROL INITIATIVE IN TAMIL NADU, INDIA:

A Test Case for the 'One Health' Approach

Syed SHAHID ABBAS & Manish KAKKAR

Public Health Foundation of India

ABSTRACT

Introduction

India accounts for approximately half of the global rabies mortality. There is no organised national rabies control programme. Rabies control interventions are generally limited to small urban localities and do not employ intersectoral co-ordination. Tamil Nadu is the first large state in India to implement a state-wide, multisectoral rabies control initiative.

Objective & Methods

The study aimed to assess the rabies control intervention strategy in Tamil Nadu. The CDC Program Evaluation Framework guided the assessment process. Principle stakeholders were engaged in the planning phase to document policy initiatives, describe the programme and to understand the roles of different departments. Surveillance data on dog bites was triangulated with data on vaccine consumption and dog census to identify trends at the district level in the state. Findings and recommendations were shared at different levels.

Results

Rabies control activities in Tamil Nadu were conducted by separate departments linked by similar objectives. In addition to public health surveillance, animal census and implementation of dog licensing rules, other targeted interventions included waste management, animal birth control and anti-rabies vaccination in select municipalities and widespread availability of anti-rabies vaccine at all public health facilities.

Conclusion

This assessment suggests that it is possible to implement a successful 'One Health' programme in an environment of strong political will, evidence-based policy innovations, clearly defined roles and responsibilities of agencies, co-ordination mechanisms at all levels, and a culture of open information exchange.

INTRODUCTION

The document seeks to describe a set of research and advocacy activities at PHFI around rabies to demonstrate the efforts made by the Public Health

Foundation of India (PHFI) to ensure societal relevance of its research and its uptake making by decision makers. India has been demonstrated to contribute half the global burden of rabies. (1) Yet it continued to be neglected from policy discussions till recently. This paper describes a set of research and advocacy activities conducted by PHFI that have helped influenced the popular discourse related to rabies control in India.

SETTING OF RESEARCH

Public Health Foundation of India hosts a multi-sectoral collaboration on zoonotic diseases, called the Roadmap to Combat Zoonoses in India (RCZI) initiative. The initiative aims to promote dialogue among national stakeholders from animal, human and environment sectors for prevention and control of zoonoses in India. One of the first activities of PHFI researchers in RCZI was to identify research priorities that could help in the prevention and control of zoonoses in a short to medium time frame. The prioritisation exercise identified a list of important zoonotic diseases (topped by rabies) that needed to be addressed and highlighted the importance of systems and policy oriented research in helping to address zoonoses in the immediate future. (2)

METHODS

Given this background, WHO Country team in India, also a key member of the RCZI initiative, commissioned PHFI to examine reports of falling incidence of rabies in Tamil Nadu (3) and describe the interventions put in place. The assessment made use of the CDC framework for program evaluation (4) to inform the assessment. An initial

visit was made to the state to understand the key issues involved from the perspectives of major stakeholders and develop a conceptual understanding of the situation of rabies control in Tamil Nadu. This was followed by an extensive set of visits to approximately one third of the districts representing the entire spectrum of dog bite burden and health facilities availability in the state to get a deeper understanding of the disease situation and status of intervention mechanisms.

FINDINGS

Background to initiative

It was also found that the rabies control efforts in Tamil Nadu built upon several policy changes that occurred in preceding 10-15 years.

- Commitment to assured availability of rabies vaccine at all public health facilities (1994)
- Enactment of state licensing of dog rules (1999)
- Ban on use of neural tissue vaccine (2004)
- Ban on killing of stray dogs and launch of ABC-AR programme (2007)
- District level monitoring committees to monitor district rabies control efforts (2007)
- Constitution of state level coordination committee on rabies (2009)

In addition, Tamil Nadu also had several strong players at the state level that helped push the rabies control agenda towards a more evidence-based approach. The state had local headquarters of the Animal Welfare Board of India and a strong animal welfare movement across major cities. These agencies were associated with several dog population control success stories

and were major players in all discussions related to rabies control. Departments of Public health and Municipal Administration were accorded priority in successive state governments. Therefore, as a problem that affected all these agencies, all four were important actors in the development of a vision for rabies control in the state.

COORDINATION MECHANISMS

Following initial set of interactions with the state and district level programme managers from departments of health, municipal administration and animal husbandry, it became clear that the intervention mechanisms instituted in the state for rabies control were as interesting as the actual epidemiological outcomes.

Because of lack of standard case definitions, the surveillance data was equivocal about the incidence of rabies in the state. However, it was found that the state program managers had developed a multi-institutional coordination mechanism to implement rabies control policies in an integrated fashion. The innovation by the state administrators was not only to develop a coordination committee but in the delineation of the administrative powers, resources and responsibilities of the involved stakeholders in such a manner so as to allow transparent coordination.

ROLE OF PRINCIPLE STAKEHOLDERS IN IMPLEMENTATION

Different directorates within the Departments of Health, Municipal Administration and Animal Husbandry in collaboration with animal welfare organizations implemented different aspects of

the rabies control interventions in the state. (Described in Table 1)

FROM EVIDENCE TO POLICY

In addition to sharing the findings of the assessment through conventional publications (5), informal interactions were also organized with the state managers and national experts. This enabled free discussions outside the traditional bureaucratic and academic silos. It also resulted in a better appreciation of the systemic challenges facing rabies program managers by the researchers and of the latest research by the program managers. (6)

These disparate set of research and advocacy activities helped influence several policy decisions. The state government of Tamil Nadu made a commitment to launch a state-wide rabies control programme once the initial set of planning was completed. The networks developed through the consultation helped recognize the achievements of Sikkim achieve elimination of rabies through canine interventions. Some of the national agencies in human and animal health sectors came together after the consultation to propose a national rabies control programme in the 12th Five year plan. (7)

CONCLUSIONS

The above experience demonstrates the value of strategically engaging with different stakeholders in the health system to promote collaborative decision making for rabies control. It also presents one way of operationalizing complex multise

Table 1: Role of principle stakeholders in rabies control in Tamil Nadu (5)

Stakeholder	Setting	Functions	Data reported
Directorate of Public Health & Preventive Medicine (DPH)	Rural Tamil Nadu (PHCs and Block PHCs)	Provide anti-rabies vaccination through peripheral health facilities Implement disease control programmes, focusing on rural areas Collect disease and dog-bite surveillance data Co-ordinate vaccine delivery	Dog bites by district by year Rabies cases/deaths by district by year District census data
Directorate of Medical Education (DME)	Urban Tamil Nadu	Provide anti-rabies vaccination through medical college hospitals Supervise medical training Collect disease and dog-bite surveillance data Co-ordinate vaccine delivery	Dog bites by district by year Rabies cases/deaths by district by year
Directorate of Rural & Medical Health Services (DHS)	Rural and urban Tamil Nadu (taluka and district hospitals)	Provide anti-rabies vaccination through network of hospitals Collect disease and dog-bite surveillance data Co-ordinate vaccine delivery	Dog bites by district by year Rabies cases/deaths by district by year
Municipal Administration Department (MAD)	Urban Tamil Nadu (corporation/ municipal limits)	Conduct ABC-AR programmes in urban populations Waste management in urban areas Provide anti-rabies vaccination through municipality hospitals	Stray dog population by corporation/municipality (4-year census) Number of ABC-AR procedures conducted per year by corporation/ municipality Municipality census data
Department of Animal Husbandry (DAH)	Rural and urban Tamil Nadu (by district)	Provide animal health services through network of animal health centres Conduct regular livestock census Provide technical assistance to rabies control efforts implemented by MAD	Dog population census by stray/pet (4-year census)
Tamil Nadu Medical Services Corporation (TNMSC)	Rural and urban Tamil Nadu (by health facility at all levels)	Manage procurement and supply chain management of all drugs and vaccines for human and animal health sectors	Vaccine consumption by district by year
Civil society organisations	Urban	Sustained advocacy that facilitated policy changes Promote awareness about animal rights issues Provide oversight to ABC-AR at district and state levels	Policy history

PHC: Primary Health Centre; ABC-AR: animal birth control and anti-rabies vaccination.

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⁷ Planning Commission of India. Report of the Working Group on Disease Burden for the 12th Five Year Plan [Internet]. Planning Commission of India. 2011 [cited 2012 Feb 13]. p. 1–256. Available from: http://planningcommission.nic.in/aboutus/committee/wrkgrp12/health/WG_3_1communicable.pdf

4.2

THE EVOLUTIONARY PROCESS OF RISK DETERMINATION

to Define Surveillance Strategies and Target Resources for Efficient Prevention and Control

BACKGROUND

Emerging diseases are a significant global threat to public health, trade, and economic growth. Among the most significant of these are diseases that emerge from animals, either wildlife (e.g. SARS) or livestock (e.g. influenza A/H1N1). Preventing and controlling emerging diseases requires significant global resources. Targeting the use of these resources requires a deep understanding of the geographical origins of new diseases, the human populations at the highest risk of being infected, and the animal populations with the highest potential for a pathogen to jump host into people. In this session, we will review the very latest techniques and approaches to better understand the high-risk interfaces where surveillance can best be targeted.

MODERATOR

Jonna MAZET

Professor & Director

*One Health Institute
University of California
Davis
USA*

OBJECTIVES

To present different approaches that determine the risk of emerging infectious diseases and how these might be used to best allocate global resources for prevention and control. Each speaker will cover:

- The biological/ecological nature of the risk (e.g. transmission among wildlife or livestock)
- The socio-economic aspects of the risk (e.g. cultural approaches to farming)

SPEAKERS

- *How can we predict, prevent and pay for the next pandemic?*
Peter Daszak, President, EcoHealth Alliance, USA
- *RVC Risk assessment framework for H5N1 avian influenza in SE Asia, with special reference to the human-livestock-wildlife interface*
Dirk Pfeiffer, Professor of Veterinary Epidemiology, Royal Veterinary College, United Kingdom
- *Assessing risk of Rift Valley Fever outbreaks using GIS, vegetation and climate*
Pierre Formenty, Team Lead - Emerging and Dangerous Pathogens, World Health Organization, Switzerland
- *Spatial epidemiology of Highly Pathogenic Avian Influenza H5N1 in poultry: What have we learned? What can be improved?*
Marius Gilbert, Universite Libre de Bruxelles, Belgium



Dr. Peter Daszak is President of EcoHealth Alliance, a US-based organization which conducts research and outreach programs on global health, conservation and international development. Dr. Daszak's research has been instrumental in identifying and predicting the impact of emerging diseases across the globe.

His achievements include identifying the bat origin of SARS, identifying the causes of Nipah and Hendra virus emergence, producing the first ever global emerging disease 'hotspots' map, identifying the first case of a species extinction due to disease, coining the term 'pathogen pollution', and the discovery of the disease chytridiomycosis as the cause global amphibian declines. Dr Daszak is a member of the Institute of Medicine's Forum on Microbial Threats, and served on the IOM Committee on global surveillance for emerging zoonoses, the NRC committee on the future of veterinary research, the International Standing Advisory Board of the Australian Biosecurity CRC, and he has advised the Director for Medical Preparedness Policy on the White House National Security Staff on global health issues.

Dr Daszak won the 2000 CSIRO medal for collaborative research on the discovery of amphibian chytridiomycosis and is Editor-in-Chief of the journal Ecohealth. He has authored over 150 scientific papers, and his work has been the focus of extensive media coverage, ranging from popular press articles to television appearances.

PETER DASZAK

President

EcoHealth Alliance
USA



Dr. Pierre Formenty is a Doctor in Veterinary Medicine with a Master in Public Health. He has been working in global public health with the World Health Organization (WHO) since January 1996. At WHO, within the Department of Pandemic and Epidemic Diseases he is leading the Emerging and Dangerous Pathogens (EDP) team. The EDP team is responsible for global prevention, preparedness and response to emerging infectious diseases epidemics of international public health concern. Dr Formenty and his team are covering a large number of emerging infections: viral emerging pathogens (Ebola, Marburg, Rift valley fever, Crimean-Congo haemorrhagic fever, Lassa and Arenaviruses, Monkeypox, SARS, Hantavirus, Nipah and Hendra,...) and bacterial zoonotic diseases of epidemic importance (Leptospirosis, plague, rickettsiosis, tularemia..). In addition, their research interest include ecological studies on emerging zoonosis at the human-animal interface, viral haemorrhagic fevers, vector borne forecasting models and climate change.

Dr Pierre Formenty is a field epidemiologist specialized in Public Health and in Medical Virology with special focus on viral haemorrhagic fever. He is also a Veterinary officer, specialized in virology and epidemiology for domestic and wild animals. He has more than twenty two years' experience in both tropical animal pathology and tropical medicine.

Since 1996, Dr. Pierre Formenty has participated with WHO in field control activities of more than 35 major outbreaks of international importance. During these missions he supported outbreak response activities for the following diseases: Chikungunya, Cholera, Dengue, Ebola, Marburg, Monkeypox, Nipah, Plague, Rift Valley Fever, SARS and Yellow Fever.

PIERRE FORMENTY

Team Lead - Emerging and Dangerous Pathogens

World Health Organization
Switzerland

He has more than 75 published papers in peer review journals.



Marius Gilbert graduated in Agricultural and Applied Biological Sciences at the “Université Libre de Bruxelles” (ULB, Brussels, Belgium) in 1995. He was a visiting researcher for two years at the department of Zoology, University of Oxford, and finished his PhD on the spatial ecology of the bark beetle *Dendroctonus micans* at the ULB in 2001. He was then a post-doctoral fellow at the “Fonds National de la Recherche Scientifique” (FNRS, Brussels, Belgium) for three years, followed by three years of research at the ULB on contract research. In 2006, he was awarded a “Research Associate” permanent academic position with the Belgian FNRS, hosted at the ULB. His research deals with the spatial epidemiology of harmful organisms, insects and animal diseases, using a range of spatial modeling and spatial statistic tools.

His work initially focused on the spatial ecology of invasive insects. In the last 10 years, he became interested in the way concepts and methods usually applied to invasion ecology could be used to improve our understanding and modeling of epidemiological study systems, and started working on several animal diseases such as Bovine Tuberculosis (BTB), Foot and Mouth Disease (FMD), and Highly Pathogenic Avian Influenza (HPAI). Much of Marius Gilbert’s research over the last few years has focused on HPAI H5N1 in Asia, in close cooperation with the Food and Agriculture Organization (FAO) Animal Health division (J. Slingenbergh, T. Robinson, S. Newman, V. Martin) and those lead to key publications on the spatial epidemiology of the disease across Asia. Other key collaborators are from the University of Oklahoma (Prof. X. Xiao), from the Royal Veterinary College (D. Pfeiffer), CIRAD (F. Roger, J. Cappelle), and the Department of Zoology in Oxford (W. Wint, S. Hay).

MARIUS GILBERT

*Université Libre de
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He is now particularly interested in trying to better understand how changes in agricultural production, in particular intensification of animal production systems, influence the emergence and spread of animal diseases with zoonotic potential.



Jonna Mazet, DVM, MPVM, PhD, is a Professor of Epidemiology and Disease Ecology and Director of the One Health Institute and Wildlife Health Center in the UC Davis School of Veterinary Medicine where she focuses on global health problem solving using research, training, and capacity building. She provides service to government agencies and the public faced with emerging infectious disease challenges, including U.S. Agency for International Development, U.S. Fish and Wildlife Service, U.S. Department of Agriculture, U.S. Geological Survey, OIE, National Oceanic and Atmospheric Administration, California Department of Fish and Game, National Marine Fisheries Service, and the U.S. Marine Mammal Commission. Dr. Mazet is active in international One Health research programs, especially disease transmission among wildlife, domestic animals, and people and the ecological drivers for disease emergence.

Dr. Mazet founded California’s Oiled Wildlife Care Network (OWCN), the premier model wildlife emergency management system worldwide and remains a consulting expert on animal emergency preparedness and response, serving on multiple government and NGO advisory panels. Currently, she is the Principal Investigator and Co-Director of a new viral emergence early warning project, named PREDICT, that is being developed with the US Agency for International Development’s (USAID) Emerging Pandemic Threats Program. PREDICT is a multi-institutional, transdisciplinary project that is establishing global surveillance for zoonotic diseases that could emerge from wildlife. She leads a network of NGOs and governmental agencies to build capacity within the participating countries to develop surveillance systems and complete the necessary research to halt the next pandemic, like influenza, SARS, Ebola, and HIV that have preceded the program. In less than three years, PREDICT has implemented surveillance in 20 developing countries, trained over 1000 professionals in field and laboratory techniques and biosafety, and discovered over 200 novel viruses. In addition, Jonna is active in intensive One Health research programs, such as tuberculosis in Africa and pathogen pollution of California’s coastal waters.

JONNA MAZET

Professor & Director

*One Health Institute,
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DIRK PFEIFFER

Professor of Veterinary
Epidemiology

*Royal Veterinary College
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Dirk Pfeiffer graduated in Veterinary Medicine in Germany in 1984. He obtained his PhD in Veterinary Epidemiology from Massey University, Palmerston North, New Zealand in 1994.

He worked as an academic in New Zealand for 9 years and has been holding the Chair in Veterinary Epidemiology at the Royal Veterinary College (RVC) since 1999. Dirk has been involved in epidemiological research since 1985 and worked on animal health issues in developing as well as developed countries. He has published 175 peer-reviewed publications, and currently holds research grants as principal investigator with a total value of about £5Mill. He currently is the Head of Veterinary Epidemiology & Public Health Group within RVC comprising 11 academic staff and about 35 PhD students and research assistants.

Dirk is also Head of the newly designated FAO Reference Centre for Veterinary Epidemiology at the RVC. He teaches epidemiology at undergraduate and postgraduate levels and has designed and taught international training courses in veterinary epidemiology, risk analysis and spatial analysis in Europe, North America, Australasia and Africa. At RVC, he co-directs an MSc in Veterinary Epidemiology as well as one in Veterinary Epidemiology & Public Health by Distance Learning.

He is the lead author of a textbook on spatial epidemiology, author of the chapter on spatial analysis in the key veterinary epidemiology textbook 'Veterinary Epidemiologic Research' and the author of a new textbook 'Introduction to Veterinary Epidemiology'. His particular interest is the epidemiology and control of infectious diseases, and the science-policy interface.

His technical expertise includes field epidemiological and ecological research methods, advanced epidemiological analysis, spatial and temporal analysis of epidemiological data, risk analysis, computer modelling of animal disease and development of animal health surveillance systems. Dirk provides scientific expertise to various national and international organizations including the European Food Safety Authority, the European Commission, the UK Department of Environment, Food and Rural Affairs, the Food and Agriculture Organization of the United Nations, the World Organisation of Animal Health, as well as various national governments.

RISK ASSESSMENT FRAMEWORK FOR H5N1 AVIAN INFLUENZA

in South-East Asia, with Special Reference to the Human-Livestock-Wildlife Interface

Dirk U. PFEIFFER

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SUMMARY

Risk assessment has been widely used in South-East Asian countries to inform the development of control policies for highly pathogenic avian influenza (HPAI) H5N1. The understanding of the disease's epidemiological parameters can probably now be considered adequate, and broadly effective diagnostics and vaccines have been developed. But the inability to eradicate the infection from the region has led to the realization that the occurrence of HPAI H5N1 is influenced by a complex interaction of environmental, epidemiological and social factors that are spatially heterogeneous and interconnected across the region and beyond. Sustainable and effective control will need to take account of the holistic nature of the system. A major challenge will be to understand the influence of human behaviour and to develop effective mechanisms leading to appropriate behaviour change where necessary.

CONTEXT

Initially large and now small-scale outbreaks of highly pathogenic avian influenza (HPAI) H5N1 have occurred in South-East Asia since late 2003. While some countries, e.g. Thailand, have been able to

eradicate it, others, e.g. Viet Nam, still experience outbreaks on a regular basis. The threat of a global pandemic which justified the major multi-national efforts towards control of HPAI H5N1 in the region is still just as relevant, given the continuing virus spread and the associated risk of genetic change [1]. The current situation is dangerous, in that most stakeholders have become less aware of this still present risk. In addition, the widespread use of vaccination in Viet Nam (and in China) without being able to eradicate the virus due to insufficient vaccination coverage may accelerate the emergence of resistant virus mutations.

RISK MANAGEMENT OF HPAI H5N1

Risk management of infectious diseases such as HPAI H5N1 is ultimately aimed at elimination of infection from a population sub-nationally, nationally, regionally or even globally. Given the presence of the virus in wild waterbird species and domestic poultry in South-East Asia and neighbouring countries which are connected through wild bird migration and poultry-associated trade, elimination from South-East Asia will not be feasible for the foreseeable future with the currently available disease control tools. This reality needs to be recognised and the objectives of risk

management within the region may have to be re-defined in some countries. One objective should be to minimise the risk of genetic change in the virus and if it does indeed occur to detect such changes early. A second objective will be to minimise the risk of human exposure since infection can be fatal. The third objective is to eliminate the virus from defined populations for trade purposes. The fourth objective is to minimise infection risk for domestic poultry to reduce mortality.

The resulting risk management policy needs to be part of an integrated risk governance (or analysis) framework that includes risk assessment, risk communication and surveillance [2, 3]. Given the transboundary nature of the system within which the virus is transmitted, long-term effectiveness of risk management requires a regional approach to the problem. It is also important that the risk management policies are informed by integrated risk assessment taking account of the holistic nature of the underlying system.

RISK ASSESSMENT OF HPAI H5N1

The understanding of the ecological, epidemiological and sociological system within which HPAI H5N1 exists is one of the factors influencing the development of risk management policies. Scientific risk assessments are now widely accepted as the most appropriate tool for synthesizing knowledge about risks such as infectious diseases in a structured way. They also allow expressing the absolute risk in quantitative or qualitative terms and to prioritise different risk pathways which in turn provides guidance for risk mitigation strategies [3].

For HPAI virus (HPAIV) H5N1 in South-East Asia,

structured scientific risk assessments based on the OIE risk analysis framework [3] were conducted in support of national policies, for example in Thailand and Viet Nam. The process was facilitated by a project funded by the UK Department for International Development (DfID) and led to a series of reports tailored to the needs of national policy makers [4, 5]. The risk assessments included a variety of information sources and analytical tools. Data- as well as knowledge-driven modelling approaches were used [6]. The data-driven approaches were based on existing surveillance data, and resulted in identification of many specific but also large numbers of proxy variables for environmental, epidemiological and sociological risk factors [7]. Key outcome of this research was the identification of the importance of rice-paddy production systems with their mix of poultry and ducks connected through live bird markets and free grazing ducks for local maintenance of HPAIV H5N1 [8-11]. Furthermore, cross-border trade played an important role as a source for continued introduction into the region and between countries within the region [1]. Knowledge-based approaches were applied to produce maps of suitability for HPAIV in Asia [12] and to model the infection dynamics [13-15]. The risk assessments were complemented by socio-economic studies which emphasized the importance of economic drivers influencing the occurrence of HPAI H5N1 [16-19].

LESSONS LEARNED

The complexity of systems associated with disease emergence has been recognised for some time now [20-22]. The inability to regionally control HPAI H5N1 in South-East Asia and elsewhere has demonstrated the need for

an interdisciplinary approach towards dealing with infectious disease challenges [23]. Most of the research conducted so far uses a single or multidisciplinary approach, primarily involving the bioscientific disciplines. The resulting very resource-intensive risk management policies have led to a major reduction in HPAI H5N1 outbreak occurrence in SE-Asia control without being able to eradicate HPAIV H5N1 from the region [18, 24-27]. The challenge for now and the future will be to establish more effective and sustainable processes and practices for participatory and cross-sectoral approaches embedded within a sound risk governance framework in SE- Asian countries, and elsewhere [28, 29].

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SPATIAL EPIDEMIOLOGY OF HIGHLY PATHOGENIC AVIAN INFLUENZA H5N1 IN POULTRY:

What have we learned? What can be improved ?

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Highly pathogenic avian influenza (HPAI) H5N1 has spread to more than 60 countries, covering a variety of agro-ecological, economic and environmental conditions. Whilst the disease has been eradicated from most regions to which it was introduced, it persists in others, where it continues to affect the livelihoods of smallholders, to constrain development of the poultry sector, and to cause occasional human fatalities. For several years, the spatio-temporal patterns of HPAI H5N1 outbreaks (or indicators of virus presence such as positive identification) has been studied with two main aims. First, to identify risk factors associating with the presence of the virus such as to guide intervention and changes in prevention measures and policies. Second, to map the geographical distribution of the risk of HPAI H5N1 virus presence, so that surveillance and control could be better targeted.

OF DUCKS, RICE... AND TRUCKS

Some of the first publications on the distribution of HPAI H5N1 risk were produced about the situation

in Thailand (Gilbert et al. 2006) and Vietnam (Pfeiffer et al. 2007) because those countries experienced strong epidemics and quickly established efficient disease surveillance systems allowing those analyses to be done. The analyses identified the density of domestic duck as key risk factors associating with the presence of HPAI H5N1, and this supported the results of previous laboratory work highlighting that domestic duck could make asymptomatic infections (Hulse-Post et al. 2005) and spread the virus silently. Follow-up work showed that domestic duck husbandry was closely associated with intensively cropped rice (Gilbert et al. 2007), and that the remote sensing of those areas with double or triple annual production of rice could be carried out using satellite imagery, and that these data could help better mapping the distribution of HPAI H5N1 risk in the Mekong region (Gilbert et al. 2008 p. 1).

However, follow-up studies carried out in other countries such as Indonesia (Loth et al. 2011), Bangladesh (Loth et al. 2010; Ahmed et al. 2012) and South Asia (Gilbert et al. 2010) showed a

different pattern, with domestic duck density not showing up as a significant risk factor, whilst other factors were found comparatively more important. A plausible explanation, already suggested in Gilbert et al. (2010) was that the difference was caused by differences in duck production systems. This hypothesis was tested by going back to the Thailand data set, separating chicken and duck data extensive and intensive production systems (Van Boeckel et al. 2012b), and testing those new variable against HPAI H5N1 risk in Thailand. In Thailand, it was found that the variable most strongly associated with HPAI H5N1 risk was the duck raised intensively, with large flock having a median of approximately 5000 birds per owner (Van Boeckel et al. 2012a). Those used to be transported by truck over long distance throughout the country to be fed in rice paddy fields (Songserm et al. 2006) at the time of the epidemic, before new policy banned those long-distance movement in the absence of a negative test. In contrast, ducks raised extensively by smallholders with a flock size of 10 birds per owner where not showing a strong association with HPAI H5N1 risk, a situation that resembles that observed in Bangladesh, India and Indonesia where duck farming is largely dominated by backyard production. In China, where duck production was drastically intensified over the last few decades (Fig. 1), and where HPAI H5N1 emerged (Li et al. 2004), a recent study by Martin et al. (2011) showed that factors relating to HPAI H5N1 presence detected through active surveillance in markets also correlated with domestic waterfowls density and typical habitat.

OTHER FACTORS

Many other authors have since analyzed risk factors associating with the presence of HPAI H5N1 virus, and those we recently reviewed in Gilbert & Pfeiffer

(2012). The review aimed to identify common risk factors amongst spatial modelling studies conducted in different agro-ecological systems, and to identify gaps in our understanding of the disease's spatial epidemiology. Three types of variables with similar statistical association with HPAI H5N1 presence across studies and regions were identified: domestic waterfowl, several anthropogenic variables (human population density, distance to roads) and indicators of water presence. Variables on socio-economic conditions, poultry trade, wild bird distribution and movements were comparatively rarely considered. Surprisingly, the density of chicken did not show a consistent association with HPAI H5N1 risk across studies and scales. This variable may cover a diversity of types of farming with extremely variable levels of bio-security, hygiene and disease prevention practices. Differences of the type of chickens (native vs. improved breeds), how they are raised (backyard vs. commercial), and how these differences were, or were not, accounted for in the studies considered in the review likely explains the differences obtained across studies. Here again, better accounting for the difference in production system may shed some light on this effect.

Three types of factors have been poorly addressed in the reviewed studies, especially if one considers their potential impact on disease transmission: i) socio-economic factors, ii) poultry trade factors, and iii) factors related to wild bird distribution. The common feature of all three factors is that there are technical difficulties in data collection. Socio-economic data (e.g. purchasing power per capita, land value, price indices) are often aggregated at a relatively coarse level, and can hence not be easily integrated into spatial modeling.

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Similarly, poultry trade variables are notoriously difficult to obtain. When available, these data ignore illegal trade, which can be very significant within and between countries, and that can be further exacerbated under HPAI H5N1 epidemic conditions. Furthermore, trade patterns are extremely dynamic and can change according to production / demand discrepancies and price differences between geographic regions. A trade flow observed in a year between two regions could stop, or even reverse the following year as a result of changes in price differences between the regions. Difficulty in obtaining pertinent spatial data is also one of the main reasons explaining why so few studies have formally integrated information on wild birds in HPAI H5N1 spatial modeling. In the wild avifauna, migratory water birds of the Anatidae family are those thought to have been implicated in long-distance transmission of HPAI H5N1. However, this family includes a large number of migratory species that have an inherently dynamic distribution. Data on their distribution in space and time are hence difficult to obtain at high resolution. Furthermore, although some sites are known to harbour large wintering populations, the precise locations where birds will actually stay may vary from year to year, depending on the specifics of the water level and food availability. One can then only predict areas where the birds are likely to be, rather than where they actually are. Massive efforts have been directed toward better characterization of waterfowl migration patterns and habitat preference in the context of HPAI H5N1, and this has resulted in important advances in understanding their potential capacity to spread the virus over long distances. However, these data provide information on individuals that cannot easily be used to predict the distribution at the population level at a fine spatial scale.

FUTURE WORK

Future work could improve upon previous findings in several ways.

First, we have highlighted the importance of separating poultry data into production systems, so that the respective role of smallholders, semi-intensive and industrial farming can be better disentangled. What was recently shown for Thailand is probably true also for other countries, i.e. different type of production systems are not associating with the risk equally. The current body of studies that only rarely provides adequate differentiation of poultry data into different production system categories has not provided a robust evidence base to inform the debate about their respective role in the epidemic.

Second, the same can be said about the respective role of wild birds and poultry trade in the spread of HPAI H5N1. We recognize the challenge of integrating these factors within the most commonly used modeling frameworks, and the challenge of obtaining pertinent data. However, with the emergence of the “One health” concept, that aims to more holistically integrate the key factors of the human and animal dimensions influencing emergence of infectious diseases, future work should aim at better integrating those overlooked factors into spatial models.

Third, the integration of two other dimensions of ecological system within which HPAI H5N1 occurs should also be considered in future modeling efforts: time and evolution. With few exceptions, time has been ignored in previous

studies and would deserve to be better accounted for in temporally explicit statistical modeling, where both the dependent variable and the predictors are explicit in space and time. This could help quantifying the space-time association between the distribution of water, cropping or eco-climatic variables and HPAI H5N1 risk, and help developing hypotheses on the seasonality that was observed in HPAI H5N1 epidemic curves. Along those effort, a shift from data-driven statistical modelling to more mechanistic mathematical modeling will be useful so that more explicit hypotheses can be tested. Finally, all HPAI H5N1 cases have been considered molecularly and pathogenetically identical in the spatial modeling studies, whilst the virus has evolved into a number of clades over time that could be linked to variations in pathogenicity and transmission. A better integration of phylogeographic and risk-factor type of studies, whilst methodologically challenging, would also provide much insight into the evolutionary conditions of emergence of this unprecedented panzootic.

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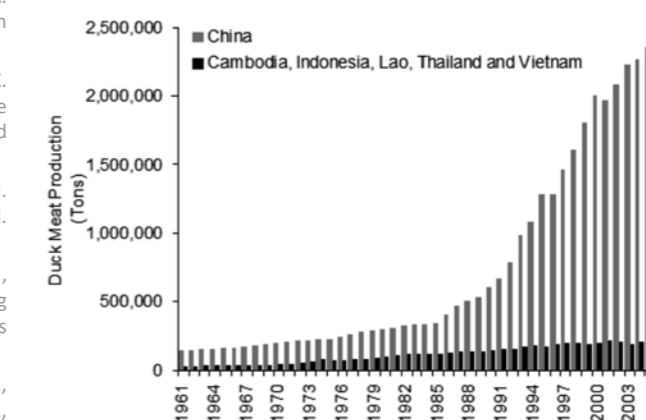


Fig. 1 Total production of duck meat in China (grey) and summed over Cambodia, Indonesia, Lao, Thailand and Vietnam between 1961 and 2006 (source: FAOSTAT 2006)

HOW CAN WE PREDICT, PREVENT AND PAY FOR THE NEXT PANDEMIC?

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SUMMARY

The emergence of novel pandemics causes substantial mortality, morbidity and economic loss. Recent analyses show that disease emergence is linked closely to human activity such as deforestation, agricultural intensification and other forms of rapid economic development. Predictive models show that diseases emerge from EID 'hotspots' in the tropics, and that they gravitate to the richer countries via the global network of travel and trade. Dealing with this threat will require 1) a 'Smart Surveillance' strategy that uses predictive modeling to target hotspots for pathogen identification and programs that alter high risk behaviors; and 2) a way to levy payments to insure against pandemic emergence. This payment system will most likely need to be an insurance program that incurs cost on the high-risk activities responsible for disease emergence and the countries most at risk.

CURRENT REALITIES:

New pandemics have emerged repeatedly in the last few decades causing substantial mortality, morbidity and economic loss. These are caused by pathogens that 'spillover' from their wildlife hosts (e.g. SARS), that evolve resistance to antibiotics

(e.g. XDR TB), that are carried to new regions with their vectors (e.g. West Nile virus), or that emerge from intensive agriculture and global food delivery networks (e.g. influenza A/H1N1 & A/H5N1). Even when these diseases do not lead to significant mortality, they can cause substantial economic damage through disruption of trade networks (e.g. drop in travel to SE Asia during SARS outbreak) or through the public response to the negative publicity surrounding a new pathogen (e.g. the drop in pork consumption during H1N1 'swine' flu outbreak) (Brahmbhatt, 2005).

Analysis of all disease emergence events for the past 6 decades reveals a number of predictable patterns (Jones et al., 2008): 1) Disease emergence is strongly linked to human societal activity on the planet such as land use change, intensification of agriculture and other forms of economic development; 2) The number of new emerging diseases is increasing annually even after correcting for increased surveillance; 3) Diseases with the most potential to become pandemic emerge from regions in the Tropics with high biodiversity and intense human activity.

Using this information, we can develop maps of the regions on the planet most likely to propagate

the next emerging disease. These EID 'hotspots' are the major sources of new pathogens with pandemic potential. However, due to intensely interconnected patterns of global travel and trade, pathogens are able to spread rapidly and threaten lives and economies globally. In fact, emerging pandemics will rapidly gravitate to richer economies with higher levels of trade and air travel (Fig 1, below).

OPPORTUNITIES AND CHALLENGES:

We have two unique opportunities to deal with the pandemic threat in our generation. First, our understanding of the process of disease emergence has developed rapidly so that we can predict the regions on the planet most likely to be the origin of a new disease and the populations most likely to be affected. Second, new methods for pathogen discovery make it possible to identify a substantial proportion of the unknown pathogens harbored by animal hosts before they emerge in people.

However, progress in developing a global strategy to deal with new EIDs is hampered by a lack of international capacity, even following the development of the World Health Organization's International Health Regulations. National surveillance programs in the developing countries where diseases often first emerge are usually less effective than those in the developed countries where their impact is highest. Trade in animals and their products is poorly regulated for the spread of novel emerging pathogens, despite the OIE regulations for known agents. Finally, there is a significant urgency to developing a global program to deal with the pandemic threat. Our analysis of the economic costs of pandemics suggests that, given a continued rise in the annual number of new diseases, there is a window of between 3 and 34 years to address the threat before it becomes too costly.

Disease emergence is therefore a classic tragedy of the commons dilemma whereby their emergence in one country (often a developing country) can have the highest impacts on another country once a pathogen enters the globalized travel and trade network. Developing a global strategy to deal with them will be costly and there is significant uncertainty around who should pay for this and how much it will cost.

One solution to predicting the next emerging zoonosis is a 'Smart Surveillance' strategy that uses predictive models to identify where zoonoses will most likely emerge. Targeting these regions for surveillance of wildlife for new pathogens, food animals and people for antibiotic resistance will enable the best use of scant global resources. These regions would then need to be targeted for programs to develop alternatives to behavior with a high risk of disease emergence.

However, to prevent the next pandemic will require dealing with the underlying drivers of disease emergence which will be costly. For example, road building, deforestation, dam building, trade in livestock, development of intensive farms all involve a modest risk of propagating a new pandemic. Dealing with this risk will levy a cost on these activities, unless local governments or intergovernmental agencies pay. One solution may be an insurance approach whereby a cost is levied by a local government on the private sector involved in these activities. However, if the impact of pandemics is principally on countries distant to the origins, it could be argued that these countries should pay some form of insurance. A workable solution might be a system whereby largescale development projects are required

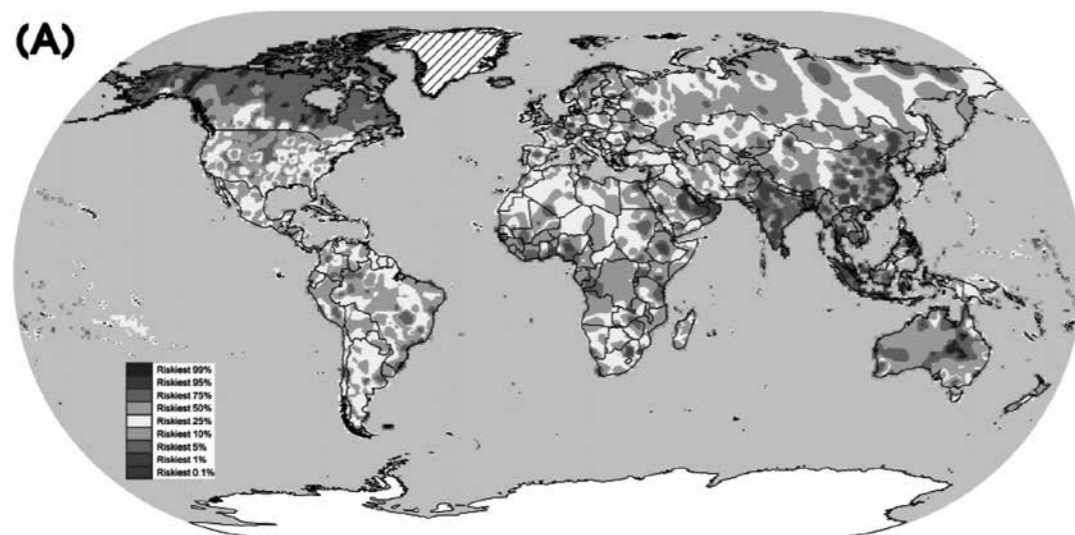


Figure 1: A map of global vulnerability to emerging diseases. This map is based on analyses in Jones et al. (2008) which show that global human activity and biodiversity are the key drivers of novel disease emergence. This map incorporates measures of global travel and trade, and countries' abilities to deal with early outbreaks and prevent them. The red color represents countries where diseases will most readily emerge and spread globally.

to assess the risk of a novel EID as part of a Health Impact Assessment. Measures to deal with the risk could then be put in place as part of the funding for these projects.

POLICY ISSUES:

Recent advances have shown that emerging diseases 1) emerging with increasing frequency; 2) originate in mainly Tropical regions, with high wildlife biodiversity and growing human populations; 3) are causing increasing economic impact; and 4) once they are in the human population rapidly gravitate to those countries with the most active travel and trade networks (North America, Europe, Australia and other high-GDP countries). The critical policy needs are to identify:

- A coordinated global early warning system for EIDs that uses predictive modeling to allocate resources to the regions most likely

to propagate new pandemics, and develops surveillance strategies to identify them rapidly, and behavior change programs to deal with underlying risk.

- Efforts to insure against cost of an EID that allocate the payments fairly among the industries and activities driving novel diseases to emerge (e.g. livestock trade, road building, mining activities) and the countries most at risk (e.g. those where travel and trade routes bring in novel pathogens most effectively).
- A commitment from intergovernmental agencies spanning One Health, International Development, Conservation and Trade. This would mean a wider remit than the tripartite One Health agreements among OIE, WHO and FAO, and bring in UNDP, IUCN and others to address emerging diseases as a complex issue.

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ASSESSING RISK OF RIFT VALLEY FEVER OUTBREAKS USING GIS, VEGETATION AND CLIMATE:

Remapping Rift Valley Fever Outbreaks in Africa and the Middle East

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Rift Valley Fever (RVF), is a viral zoonosis that primarily affects animals but that also has the capacity to infect humans. Infection can cause severe disease in both domestic animals (cattle, sheep, goat, and camels are amplifier hosts during major outbreaks) and humans. Vaccines for animals are available and experimental vaccines have been developed for humans. RVF is endemic throughout sub-Saharan Africa; the disease has occasionally spread to Egypt, Saudi Arabia and Yemen. The major mode of transmission to humans is direct contact with infected animal blood or organs, but the virus can also be transmitted by mosquito bites and laboratory contamination. Several different species of mosquito are able to act as vectors for transmission of the RVF virus. To date, no human-to-human transmission has been documented.

From end 2006 to date, major RVF outbreaks have started in Eastern Africa and are still on-going in Southern Africa. According to WHO, in Kenya, Somalia and Tanzania alone, a total of 100,000 human infections can be estimated. During this wave, RVF transmission has been reported in contrasted eco-epidemiological patterns.

Joint WHO/FAO field investigations in most of the affected countries provided an opportunity to

review the ecology of RVF major outbreaks and to distinguish two ecologically distinct situations: primary and secondary emergence sites. At primary foci sites, RVF virus spread through transmission between vectors and hosts and maintains between outbreaks through vertical transmission in *Aedes* mosquitoes. During major outbreak in primary foci, the disease can spread to secondary foci through livestock movement or passive wind-borne dispersal of mosquitoes. At secondary foci sites RVF virus spreads between naïve ruminants via local competent mosquitoes like *Culex* and *Anopheles* that act as mechanical vectors. Irrigation schemes, where populations of mosquitoes are abundant during long periods of the year, are highly favourable places for secondary disease transmission.

An innovative RVF primary versus secondary area map is proposed, based on expert opinions and review of historical and recent outbreaks. A joint FAO/WHO database including approximately 2000 records from official and unpublished data has been developed. These data are now used to improve the models for the determination of RVF suitable areas and real-time monitoring developed by collaborative centres, with the final objective of improving RVF outbreak forecasting and early warning.

1. World Health Organization, Pandemic and Epidemic Diseases Department, Geneva, Switzerland.

2. World Health Organization, Global Capacity Alert and Response Department, Geneva, Switzerland.

* speaker

4.3

UNPRECEDENTED MOVE TOWARD A MORE COHERENT APPROACH

Among Sectors for the Strengthening of National Human-Animal-Ecosystem Health Capacities

BACKGROUND

The WHO International Health Regulations (2005) (IHR) is a framework to prevent the international spread of disease and includes obligations for States Parties to review and strengthen their national public health capacities. The OIE Performance of Veterinary Services Pathway (PVS) is a framework to assess the performance of Veterinary Services and its compliance with the international standards on quality linked to a capacity building pathway. The application of these evaluation processes jointly at the country level can optimize strengths and reduce gaps in the control of zoonotic diseases, and increase the benefits of capacity building investments in both sectors. OIE and WHO have initiated efforts to harmonize these tools, and present the efforts for greater synergy between WHO and OIE, at headquarters and national levels. More than just the adjustment of tools, this reflects the sharing of concept and strategies, also supported by FAO in implementation projects at country and regional settings as well as policies, as described in a tripartite concept note published in 2010. To add to this discussion, FAO promotes the incorporation of environment, a fundamental part of the One Health concept, into this governance discussion. This session will present the last developments in this efforts, also use example from the countries to highlight the benefits of synergies between sectors, and will open a discussion between the floor and the key players.

MODERATOR

Maged YOUNES

Senior Policy Advisor

Committee on World Food Security at FAO Italy

The session is intended to address the following questions:

- How can the PVS and IHR offer a more coherent approach to the development of national core capacities?
- How can they contribute to country-level governance at the human-animal interface?
- What is the contribution of the Tripartite (FAO, OIE, WHO) to One Health and its role in establishing key principles and actions at the international level and in supporting countries in development of practical policies and programs?

OBJECTIVES

Through the description of the current effort to bridge the approaches and methods used in the respective sectors, the main objective is to increase awareness on some of the fundamental principles guiding the collaborative work between FAO, OIE, WHO, i.e. the importance of strengthening human and animal institutions as well as partnership, alignment and coherence in standards and protocols when appropriate, “good governance and (strengthening of) official services, since they ensure an early detection and a rapid response to biological threats, facilitate trade flows and contribute to global food security” (G20 Agriculture Ministers, Paris, 22-23 June 2011).

The discussion should provide recommendations to the establishment of key principles and actions and the support to develop and implement practical national policies and programs. This would address particularly the importance of strengthening human and animal institutions and health systems and the partnerships among them; the central role of the national strategies in the approach and the alignment and coherence in standards and protocols.

OPENING

- **Brief introduction – What are we talking about, what is the challenge? Challenges that have previously identified**
- **How to find a common ground? The development of the One Health strategy and the National Program for the Prevention and Control of Emerging and Re-Emerging Zoonotic Diseases in Cameroun**
Severin Loul, Committee Zoonoses Member, Ministry of Livestock, Cameroon
- **Brief overview of IHR and OIE Standards/PVS**
Alejandro Thiermann, President, Code Commission, World Organisation for Animal Health, France

PANEL PRESENTATIONS

- **IHR and implementation framework and experience of a member country**
Rajesh Sreedharan, Medical Officer, World Health Organization, Switzerland
Stela Gheorghita, Deputy Director, National Center for Public Health, Republic of Moldova
- **OIE standards and the PVS Pathway and experience of a member country**
Herbert Schneider, Senior OIE PVS Evaluator & Consultant, Agrivet International Consultants, Namibia
Simeon S. Amurao, Jr, DVM, MBA, Officer-In-Charge, Office of the Assistant Director, Bureau of Animal Industry, Philippines
- **Toward a more coherent approach in national capacity assessment for zoonotic disease management using the IHR and PVS frameworks**
Stephane De La Rocque, Technical Officer, World Organization for Animal Health, Belgium
- **Approaches related to environmental health and governance**
Scott Newman, Wildlife Health & Ecology Unit Coordinator and Co-Convener of the Scientific Task Force on Wildlife & Ecosystem Health, Food and Agriculture Organization of the United Nations, Italy
- **Strategies for filling financial gaps**
Francoise Le Gall, Livestock Advisor, World Bank, USA



Dr. Simeon S. Amurao Jr. is a graduate of Doctor of Veterinary Medicine from the University of the Philippines and Master of Business Administration from the Ateneo de Manila University. He started his career as a Farm Veterinarian in a government poultry farm. Later, he was appointed in various veterinary positions at the Department of Agriculture (DA).

In 1989, he was assigned as Quarantine Officer at the Ninoy Aquino International Airport. This started his career and extensive involvement in crafting policies related to Sanitary and Phytosanitary (SPS) Measures implemented by the Department of Agriculture.

Earning the expertise on SPS, he became a member of the DA SPS Focal Group specifically for the Livestock Sector. He also represented the Philippines in many international forums on SPS measures and became a member of several DA Mission Teams responsible in accrediting foreign meat establishments which export their products to the Philippines. These accreditations include the evaluation of the Veterinary Services of the exporting country based on OIE guidelines.

At present Dr. Amurao is the Assistant Director of the DA - Bureau of Animal Industry.

SIMEON S. AMURAO

Officer-In-Charge
Office of the Assistant
Director

*Bureau of Animal Industry
Philippines*



Stéphane de La Rocque, DVM, graduated at the veterinary school of Lyon, France and PhD in Parasitology. He has over 20 years of experience in the field of disease ecology, spatial epidemiology, early warning and control of outbreaks, with a specific expertise on animal and zoonotic vector borne diseases. He spend about 15 years on the field, from French Guyana to West Africa (Burkina Faso, Senegal), with trypanosomosis as study model, but latter also developed expertise for other vector-borne diseases such as bluetongue, Rift Valley Fever or West Nile Fever. He initiated and then coordinated the EDEN project, a 25 countries project supported by European Commission on the impact of environmental changes of human and zoonotic diseases. In 2006, in the epizootic context of avian influenza, he joined the Animal Health Division of the Food and Agriculture Organisation (FAO) in Rome, to support the Global early warning system (GLEWS) established by OIE, FAO and WHO. Since the beginning of 2012, with the support of the French Ministry of Foreign European Affairs, he is working for the OIE for a special mission with WHO to further develop initiatives at the animal-human interface, especially through the international health Regulation.

STEPHANE DE LA ROCQUE

Technical Officer

*World Organization
for Animal Health
Belgium*



The main domain of professional activity includes surveillance of communicable disease (cholera and diarrhoeal diseases, zoonosis and vector borne diseases) and outbreak response. I'm responsible for coordination of national surveillance system on communicable diseases and public health event. We have to organize public health intervention according national procedures in case of outbreak (shigellosis, salmonellosis,) or in a single case (anthrax, tularemia etc). I represent the Focal Point for IHR implementation in the Republic of Moldova. After announcement of influenza pandemic alert phase I participated to enhance the national surveillance system capacities of pandemic influenza and as well prepared the notifications to WHO about trends of diseases cases and death.

According to the Governmental Decree competent authorities at points of entry are Border Police and Customs Services, using the WHO Assessment tool for core capacity requirements at designated airports, ports and ground crossings we evaluated in 2010 national capacity at points of entry and started to implement requirements in order to strengthen the capacity to detect, notify, and control of public health events. In 2009 ministries of Health and Agriculture established a protocol for information exchanging regarding zoonotic diseases. I continue to work on scientific researches in the field of communicable vector-borne diseases.

STELA GHEORGHITA

Deputy Director

*National Center for
Public Health
Republic of Moldova*



FRANCOISE LE GALL

Livestock Advisor
World Bank
USA

François Le Gall graduated from Ecole nationale vétérinaire de Toulouse (France) in 1987. He obtained post-graduate diplomas in tropical veterinary medicine (IEMVT, 1987), medical virology (Institut Pasteur, 1988) and veterinary public health (French Ministry of Agriculture, 1989). He received his Veterinary Doctorat in 1989 and, the same year, his status of Veterinary Public Health Inspector. After joining the World Bank in 1993, his training continued with the World Bank learning program on Economics, Operations, and Management.

From 1989 to 1993, he served with the French Cooperation as co-Director of Animal Health and Applied Research at the Agence Nationale de Développement de l'Élevage in Central African Republic.

From 1993 to 1997, he was a secondee to the World Bank in Washington DC as a livestock expert in the Agriculture and Rural Development Central Unit.

From 1997 to 2006, he served as a livestock specialist in the Africa Region of the World Bank. In this capacity he supported operations promoting livestock sector development in the region and participated in the formulation of policy and strategy. In 2004 he created the multi-stakeholder partnerships for the development of livestock in Africa, ALive. He led the multi-disciplinary operational task force for AHI in the Africa region until 2006.

In addition to his geographic responsibilities, he has participated in a number of corporate thematic initiatives, including the Livestock Thematic Group (to which he was elected president in 2000) and the Sustainable Agriculture Systems Thematic Group (elected president in 2003). He was in charge of veterinary issues in the Global Emergency Response to the Avian and Human Influenza (AHI). In 2005, he established the Global Partnership for Animal Health with the World Organization for Animal Health (OIE). He has been the Chairman of the advisory committee to the OIE World Animal Health and Welfare Fund since its creation in 2006.

From 2006 to 2011, he held several managerial positions, including:

- Acting Sector Manager for Agriculture and Rural Development for Central African countries (July 2006 to June 2007).
- Program Coordinator for Agriculture and Rural Development in the Francophone countries of sub-Saharan Africa (July 2007 to June 2009)
- Operational Adviser of the Sustainable Development Department of the East Asia and Pacific Region (July 2009 to August 2011).

In September 2011, he was appointed Livestock Adviser of the World Bank, in the Agriculture and Rural Development Department of the Sustainable Development Network.

He is author or co-author of several technical and scientific publications in the area of agriculture and rural development, and livestock and animal health. He is an alumni of the Institut Pasteur de Paris since 1989.



SEVERIN LOUL

Committee Zoonoses
Member

Ministry of Livestock
Cameroon

Mr. Severin LOUL is a Veterinary Doctor, holder of a Doctorate of Veterinary Medicine degree obtained in 1998 from the Inter States School of Science and Veterinary Medicine of Dakar in Senegal.

He also holds a Post-graduate Certificate in Business Administration obtained in 1997 from the Faculty of Science and Management of the Cheick Anta Diop University, Dakar, Senegal. In addition, he is holder of two other Post-graduate Certificates; a Post-graduate Diploma in Animal Epidemiology obtained in 2006 from the National School of Veterinary Medicine, Alfort, France and a Master of Science in Tropical Animal Health obtained in 2009 from the Institute of Tropical Medicine Antwerp, Belgium.

He has 12 years (2000-2012) experience in animal diseases monitoring and particularly in the area of zoonoses and emerging diseases, fields in which he has dedicated 8 years (2000-2008) in wildlife diseases research, especially in the collection of data related to wildlife and primates, monkeys in particular. He has co-authored about a dozen of publications in this domain. He was the Animal World Health Organization (OIE) focal point for wildlife disease reporting in Cameroon for 2 years (2007-2008). Based on his rich experience in wildlife-related issues he conceived a National Multi-sectorial Program for the prevention and fight against emerging and re-emerging zoonoses and Cameroon's ONE HEALTH implementation Strategy. He is a member of the ad hoc committee in charge of developing the national program for prevention and control against emerging and re-emerging zoonotic diseases. He masters of several computer software programs (word, excel, power point and publisher) and some specialized statistics and Geographic Information System, GIS softwares (Stata, R, Sphinx, Arcviews, Manifold).

Since 2010, he is the chief of service in charge of epidemiological surveys of animal diseases in the Ministry of Livestock, Fisheries and Animal Industries (MINEPIA) in his home Country. He is also the focal point for the program "Zoonoses and ONE HEALTH strategy" at the ministerial level and has unilaterally championed the implementation of the National Program for the prevention and fight against emerging and re-emerging diseases in Cameroon.

He serves as an interface between MINEPIA, other administrations and partners in the implementation of the program "Zoonoses and ONE HEALTH strategy" in Cameroon.



Scott Newman recently took up the position as the Food and Agriculture Organization of the United Nations (FAO) Senior Technical Coordinator for the Emergency Center for Transboundary Animal Diseases (ECTAD) in Vietnam.

Scott is a veterinarian, wildlife epidemiologist and biologist receiving his Doctor of Veterinary Medicine from Cummings School of Veterinary Medicine at Tufts University (Massachusetts) in 1992, and his PhD from the University of California Davis in 1998 where he studied disease ecology, ecotoxicology and comparative pathology. Between 1998 and 2007 Scott has worked at the Wildlife Health Center and Oiled Wildlife Care Network in California, Wildlife Trust (now called Ecohealth Alliance) in New York as Senior Conservation Medicine Scientist, and as the Liaison to the United Nations and Wildlife Health Specialist for the Wildlife Conservation Society. Since 2007, Scott has worked as an Animal Health Officer in the Animal Production & Health Division where he developed and led the EMPRES Animal Health - Wildlife Health & Ecology Unit. Scott has extensive international experience working on more than 40 countries focused on One Health, disease ecology and disease management at the livestock-wildlife-human-environment interfaces.

Scott will lead the FAO Country ECTAD Team in Vietnam supporting the HPAI and other zoonotic and non-zoonotic diseases, and facilitate a One Health approach to agriculture, public health, forestry, fisheries and natural resource management issues, as well as supporting broader mandates of FAO including food safety, food security, and sustainable development.

SCOTT NEWMAN

Wildlife Health & Ecology Unit Coordinator and Co-Convener of the Scientific Task Force on Wildlife & Ecosystem Health

*Food and Agriculture Organization of the United Nations
Italy*



Herbert Schneider was born in 1942 in Wiesbaden/Germany, emigrated with his parents to South-West-Africa (today Namibia) in 1950 and grew up on a farm in the Karibib district of Namibia, where he is part-time farming with indigenous African Sanga cattle, Damara sheep and wildlife. He studied veterinary medicine at the University of Pretoria (Onderstepoort, South Africa), obtaining the degree BVSc degree in 1965. Post graduate qualifications are: DVSM (Dip. State Vet. Med) University of Edinburgh (Scotland) 1973; Dr.med.vet, University of Giessen (Germany) 1977; and Specialist veterinarian in Tropical Veterinary Medicine, State of Hessen (Germany) 1981 (FTA-TVM)..

He was employed for 42 years in the veterinary department of Namibia and inter alia held the posts of Director of Veterinary Services and Principal Secretary for Agriculture, Nature Conservation, Veterinary Services and Sea Fisheries. In 1990 he established a veterinary specialist consultancy in Windhoek which is a consultancy in the field of veterinary medicine, with special expertise in the field of tropical animal health, veterinary epidemiology, veterinary legislation, food hygiene & safety and veterinary public health.

He served the World Veterinary Association as Vice-President AFRICA, President and Immediate Past-President. Recent activities include being Chairman of the OIE Ad Hoc Group on Evaluation of Veterinary Services (PVS) (since 2003), Chairman of the OIE ad hoc Expert Group on Antimicrobial Resistance (since 2010), Member of the OIE Ad Hoc Group on the Evaluation of Aquatic Veterinary Services (PVS) (since 2012 and being Member of the OIE ad Hoc Group on CBPP (since 2008). He is a Member of the Veterinary Medicines Committee of Namibia Medicines Regulatory Council (2010 – 2013) and a Member of the Namibia Qualifications Regulatory Authority (2011 – 2014).

HERBERT SCHNEIDER

Senior OIE PVS Evaluator & Consultant

*Agrivet International
Consultants
Namibia*

Recent honorary citations include Honary Member of the World Veterinary Association; Certificate of Merit for Extraordinary contributions to Veterinary Medicine in Namibia by the Veterinary Association of Namibia; AGRI-STER Award for Dedicated Service to Agriculture in Namibia and Honary Life Member of the South African Veterinary Association.



Dr Rajesh Sreedharan is a Medical Officer for the World Health Organization. He is part of the International Health Regulations (IHR) Monitoring, Procedures and Information team within the Global Capacities Alert and Response department at WHO Headquarters in Geneva, Switzerland.

A 194 States Parties to the IHR have been implementing these global rules to enhance national, regional and global public health security. As part of his work, he is responsible developing and maintaining cross-cutting global guidance and tools on IHR assessment, planning and monitoring along with implementing, monitoring, strengthening and evaluation of IHR core capacities in WHO States Parties and WHO Regional Offices in this regard.

Dr Sreedharan is trained as a physician and has a degree in Public Health. Before working at WHO HQ, he was with the emergency preparedness and humanitarian action (EHA) programme in the WHO Eastern Mediterranean Region (EMRO). He was based in Sudan as an epidemiologist responsible for communicable disease outbreak alert and response operations and worked extensively in Darfur and South Sudan. His next posting was to the WHO office in West Bank and Gaza office as programme manager. The EHA programme works closely with Member States, international partners and local institutions to help communities prepare for, respond to, and recover from emergencies, disasters and crises. Prior to his work in the Eastern Mediterranean Region, he worked as an epidemiologist in the communicable disease surveillance and response team in WHO South East Asian Regional Office responding to the 2004 Tsunami.

RAJESH SREEDHARAN

Medical Officer

*World Health Organization
Switzerland*



ALEJANDRO THIERMANN

President
Code Commission
*World Organisation
for Animal Health
France*

Dr. Thiermann is president of the standard setting committee for the OIE, at its headquarters in Paris, France. He has been seconded to the OIE by the U.S. Department of Agriculture, Animal and Plant Health Inspection Services (USDA-APHIS) to devote most of his time to the work of the OIE, serving as the senior advisor to the Director General.

Prior to coming to Paris, from October 1996 and until September 2001, he served as Senior Trade Coordinator and Regional

Director for USDA-APHIS in Brussels, with responsibility over Europe, Africa, Middle East, Russia and the former Soviet Republics.

During 1997 to 1999 he was twice elected Chairman of the World Trade Organisation, Sanitary and Phytosanitary (WTO-SPS) Committee. In 1994 he was elected vice-president of the Code Commission of the OIE. In 2000 he was elected, and since 2003 re-elected president of this important standard-setting committee.

He was also an active member of U.S. delegations to the negotiation of the Uruguay Round of the WTO, the drafting of the new International Plant Protection Convention (IPPC), also served for two years as the U.S. Coordinator for the Codex Alimentarius.

Dr. Thiermann joined USDA-APHIS in 1989 as the Deputy Administrator for International Services. In this capacity, he promoted APHIS' role in trade facilitation, he also led the overseas animal and plant health eradication and control programs such as the screwworm, foot-and-mouth disease, and Mediterranean fruit fly.

Before joining APHIS, he was the National Program Leader for animal health research under the USDA Agriculture Research Service (ARS). He began his career with the U.S. Government in 1979 as the research leader for the leptospirosis and the mycobacterioses research laboratories in Ames, Iowa.

From 1973 to 1979 he worked at Wayne State University's School of Medicine as an instructor and veterinary clinician for the university's Laboratory Animal Unit. Where he obtained his PhD degree at the Department of Medical Immunology.

From 1972 to 1973 Dr. Thiermann worked at NASA's Manned Spacecraft Center in Houston, Texas in the Health Application's Office applying remote sensing techniques for the utilization of satellite data in animal and plant health projects.

A native of Chile, Dr. Thiermann received his doctorate of veterinary medicine degree from the University of Chile at Santiago, and a PhD degree in microbiology and immunology from the School of Medicine at Wayne State University in Michigan.



Maged Younes is currently Senior Policy Adviser at the Committee on World Food Security on loan from the German government. Following an academic career as Professor of Toxicology at the Medical University of Lübeck, Germany, and as Director and Professor at the German Federal Health Office, Maged joined the World Health Organization in 1991. He held various key roles both at the WHO European Centre for Environment and Health and at WHO Headquarters, in particular in the fields chemical and food safety as well as environmental and occupational health. From 2006 to 2007, he served as Head of the Chemicals Branch of the United Nations Environmental Programme (UNEP) and Acting Executive Secretary of the Rotterdam and Stockholm Conventions. He returned to WHO as Director of Governing Bodies and External Relations, Office of the Director-General, before taking on the Directorship of the Department of Food Safety and Zoonoses until his retirement from WHO in May of this year. He holds a Doctor's and a Master's degree in Biochemistry and Physiological Chemistry from the University of Tübingen and a degree of Dr. habil. in Toxicology and Biochemical Pharmacology from the Medical University of Lübeck in Germany. Maged is Adjunct Professor of Toxicology and Biochemical Pharmacology, Medical University of Lübeck, Germany, and Visiting Professor for Risk assessment and management, Chulabhorn research Institute, Bangkok, Thailand.

MAGED YOUNES

Senior Policy Advisor

*Committee on World Food
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HOW TO FIND A COMMON GROUND?

The Development of the One Health Strategy and the National Program for the Prevention and Control of Emerging and Re-Emerging Zoonotic Diseases in Cameroun

Severin LOUL

BACKGROUND AND JUSTIFICATION

Cameroon is located in the Congo Basin, one of the five areas at high risk of disease emergence in the world. During the last decade, its animal and human populations have been at risk of or affected by several zoonotic diseases emerging or re-emerging. Some events mentioned below have been instrumental in leading the Government of Cameroon to better prepare for the emergence of zoonotic diseases. These events include:

- The fear of a possible occurrence of haemorrhagic fever virus such as Ebola and Marburg, already emerging in neighboring countries (Gabon, Congo and Democratic Republic of Congo) which share the same ecosystem with Cameroon (Congo Basin forest).

- The circulation of several simian immunodeficiency virus (SIV) in monkeys in Cameroon (Peeters. M.; 2002) and the discovery of the SIVcpztt in the chimpanzee (*Pan troglodytes troglodytes*) species have been speculated linked to the HIV pandemic

(Keele, BF, 2006). The occurrence of a fatal outbreak of anthrax in great apes (gorillas and chimpanzees) in late 2004 and early 2005 in the Dja Biosphere Reserve has also impressed the opinion of the public (Leendertz, F, 2006). This outbreak revealed the lack of coordination between animal health, human health and environmental health. As a result, it was recommended by the Government to improve the trans-sectoral collaboration for the response to such emergence and to put this supervision under the Prime Minister (Loul S. 2005).

In 2006 the detection of three H5N1 avian influenza outbreaks in the North of the country created panic (Baschirou, MD 2006). This was used as an opportunity for the Government to implement the "Limbe recommendations" for the control of avian influenza H5N1. A "strategic plan for the prevention and control of human and animal flu" was developed, supporting cross-sectoral actions (human health, animal and environmental health). A Common Fund Project (CFP) was created to support the implementation of the strategic plan.

The Steering Committee of the CFP was chaired by the Prime Minister and includes thirteen ministers as members. Avian Flu was rapidly controlled.

Building on the success in the control of Avian Influenza H5N1 and with the perspective to develop an approach to prevent and control all zoonotic diseases, the Prime Minister, Head of Government has established an Ad Hoc Committee (PM decree, 2008) in charge of the development of a "National Program for the prevention and the control of zoonoses". This program is based on multisectoral and interdisciplinary connections between human, animal and environmental health and therefore the development of a National "One Health" Strategy was a prerequisite.

OBJECTIVES

The main objective of this paper is to describe the steps outlined to meet the animal health (domestic and wild), human health and environmental health sectors and to develop a participatory and consensual "One Health" National Strategy and the associated "National Program for the Prevention and Control of Emerging and Re-emerging Zoonoses".

DEVELOPMENT OF THE PROGRAM FOR THE PREVENTION AND THE CONTROL OF ZOOONOTIC DISEASES

Context

In Cameroon, human health, animal health (domestic and wild) and environmental health are under the mandate of four different ministries: Minister of Health (MINSANTE), Minister of Animal Health (MINEPIA), Minister of Wildlife Conservation (MINFOF) and Minister for the Management of the

Environment (MINEPDED). Effective control of zoonoses requires a consensus between these main actors.

Building process

As Head of the Government, the Prime Minister has the power to bring together several ministries and to deliver guidance for harmonized action and collaboration between sectors. He has played an important role in the development of the OH strategy and the associated national program for prevention and fight against zoonoses. This development included six steps :

- The first step was the establishment of an Ad Hoc Inter-Ministerial Committee in charge of the development of the Programme for the Prevention and Fight against Zoonoses. The Committee was established through an Order from the Prime Minister. The eight ministries involved are: the Ministries in charge of Human Health (MINSANTE), Animal Health (MINEPIA), Wildlife (MINFOF), Environment (MINEPDED) Tourism (MINTOUR), Research (MINRESI), Economy (MINEPAT) and Finance (MINFI). Are also included in the Committee NGO on biodiversity conservation (WWF, WCS, IUCN) and regulatory bodies of doctors, pharmacists and veterinarians. The MINEPIA was mandated to chair this committee.
- The second step was to train and increase awareness of the members of the Committee on the OH approach. The objective was to provide minimum information on the concept so that the value of the multisectoral collaboration was understood and used for the development of the National Program for the Prevention and Control of Emerging

Re-emerging Zoonoses;

- The third step included the strengthening of the Committee through the creation of a Technical Secretariat in charge of the development of the strategy and associated National Program for the Prevention and Control of Emerging Re-emerging Zoonoses. Additional actors have been included at this: laboratories (CPC; CREMER; GVFI; LANAVET), Universities, other organizations such as USAID-EPT (MINEPIA, 2011b).
- The fourth step of the process was the adoption of a working method and a timetable. The main guiding points were:
 - a) the analysis of the situation: surveillance systems for animal and human diseases, regulatory texts in various departments and areas of collaboration between ministries;
 - b) the development of the National OH Strategy;
 - c) the development of the Program for the Prevention and Control of Emerging Re-emerging Zoonoses.
- The presentation of the results from the analysis and the identification of the key elements to guide the development of the OH strategy of "Health" and the Program for the Prevention and Control of Emerging Re-emerging Zoonoses were in the fifth step.
- Through a participatory and consensual process involving all stakeholders, a document was developed (step Six) which included:

- Preparation of a draft document of the national OH strategy;
- Preparation of a draft Program for the Prevention and Control of Emerging Re-emerging Zoonoses ;
- Pre-validation of the draft of the National Program for the Prevention and Control of Emerging Re-emerging Zoonoses (NPPFERZ)
- Validation of the National Program for the Prevention and Control of Emerging Re-emerging Zoonoses through the joint signing of four heads of key ministerial departments

At the end of this process, the Committee has successfully delivered two documents: the National OH Strategy chaired by the Prime Minister and with eleven ministers as members and the National Program for the Prevention and Control of Emerging and Re-emerging Zoonoses which is part of the implementation of the OH strategy (figure below).



LESSONS LEARNED

- A Coordination structure at a high level of decision (decision of the Prime Minister) facilitates the strengthening of multisectoral collaboration and process control;
- A preliminary analysis of the scope and expectations of stakeholders was instrumental to develop a methodology for which the participation and inclusion of all stakeholders views was ensured.
- A better understanding of the concept of “One Health” and its added value for policy makers and members of the Committee in charge of the process through training and awareness is a prerequisite to minimize divergences of views
- The regulatory rules establishing the committee in charge of drafting the strategy and program should be flexible enough for adjustments when needed.;
- The regular sessions between actors from different sectors facilitated the understanding of a common lexicon;
- The involvement of laboratories, universities and training schools in the process has been beneficial

PERSPECTIVES FOR THE IMPLEMENTATION OF THE NATIONAL PROGRAM FOR THE PREVENTION AND CONTROL OF EMERGING AND RE-EMERGING ZOOSES

The launch of the program was planned for early 2013 with a specific budget line for each of the four main ministries. In the meantime, since

the official agreement in March 2012, some preparatory activities were conducted to initiate the strengthening of the collaboration:

- Endorsement of a cooperative agreement between the CPC and GVF laboratories and MINEPIA (previously limited to GVFI, MOH and MINFOF);
- Investigation of two outbreaks of rabies by a joint team MINEPIA-MOH (Amban: Southern Region and Ntui: Central Region in August 2012);
- Integrated public awareness actions between MOH and MINEPIA during the World Day against rabies (24-28 September 2012);
- Designation of OH Focal Points in the Ministries in charge of Public Health, Livestock, Wildlife and Environment;
- Development of the Joint Action Plan Health and Environment, validated the 19th of October 2012;

CONCLUSION

To launch the OH approach and implement the National Program for the Prevention and Control of Emerging and Re-emerging Zoonoses in 2013, the Government of Cameroon, through the MINEPIA, made available a budget of about \$ 225,000. Some of the priority activities are mentioned around the following pillars.

1. For the strengthening of the surveillance, early detection and rapid response:

- Develop an integrated approach for the monitoring for the collection, management, analysis and dissemination of data on zoonoses.
 - Establish a system for the surveillance of diseases in wildlife within the protected areas of the country;
 - Capacity building in risk analysis, surveillance, investigation and integrated response for zoonotic diseases
 - Practice exercises to develop and / or improve the preparedness plans
 - Carry out integrated activities for the prevention and control of rabies
2. For the strengthening of research on zoonoses, the objective is to promote basic research and operational activities:
 - A study on the situation regarding zoonoses, establishing the list of priority zoonoses and mapping their area of risk;
 - Early detection of emerging zoonotic pathogens in wildlife from animals legally hunted;

- The establishment of a national network of laboratories in the human and animal sectors and the strengthening of intersectoral collaboration and exchange of information also with the authorities
3. Training of the actors for animal health, human and environment:
 - Inclusion of OH approach related skills in the curricula of environmental health, animal and human training (technical schools, universities, etc.);
 - Increase of awareness of decentralized decision makers sectors (animal, human and environmental sectors) on the OH approach;
 - Increase of awareness of the OH concept in training schools (school of wildlife, forestry, veterinary schools, nursing, health administration, etc.) and universities for human and veterinary medicine.

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Risk to human health from a plethora of simian immunodeficiency viruses in primate bush meat CDC

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4.4

GOING VIRAL #STRATEGIC PUBLIC COMMUNICATION

To Affect Practices and Livelihoods: <http://PMAC>

BACKGROUND

Reports of an *e.coli* outbreak in Germany went viral even though the virus was contained leading to drops in food product sales in several countries and loss of consumer confidence; 2009 H1N1 influenza virus in Mexico led to mandated quarantines that kept tourist and business travelers away thus devastating the Mexico economy; and social media are under fire and are being scrutinized by governments and international organization over privacy and ownership issues. Germany and Mexico's strategic public communication were integral in managing volatile situations and providing the correct information to respond to rumors and misinformation as well as redirect the conversation to what to do to safeguard health and livelihoods. What we belatedly learned during Mexico and Germany outbreaks is that social media are now mainstream communication strategies although underutilized in public health planning and response. For emergency it is an excellent method of communication with a major down-side is social media are loosely regulated and there are critical policy issues that need to be considered as public health officials begin to integrate it into their communication strategies. Parallel Session 16 hears from an expert in the social media field about its positives and its dark side; a policy expert on ramifications of the underregulated media; and two seasoned health communication professionals that managed the *e.coli* and H1N1 influenza outbreaks. The panel will be moderated by an expert in program management in Southeast Asia that included social media applications.

MODERATOR

Anton SCHNEIDER

Social Marketing and
Communication Advisor

*FHI 360
Indonesia*

OBJECTIVES

Social media have gone mainstream and strategic communication as an integral component of any successful One Health Program needs to strategically embrace it but with eyes' wide open.

PANELISTS

- **Ljubica Latinovic**, Social Marketing & Health Communication Coordinator, Ministry of Health, Mexico
- **Dee Bennett**, Director, Another Option, LLC, USA
- **Monika Gehner**, Team Leader, Social Media, World Health Organization, Switzerland
- **Keri Lubell**, Behavioral Scientist, Centers for Disease Control and Prevention, USA



Ms. Bennett is a seasoned communication and marketing professional with more than 30 years of experience in strategic planning and designing health, nutrition, population, energy and environment communication and social marketing initiative including 20 years in international development. She is the founder and managing partner of Another Option (www.another-option.com) a small business woman owned marketing and communication firm. Previously for the last 13 years, she was Vice-President at AED where she also was the project director and senior technical expert in communication and social marketing for several USAID projects related to Avian and Pandemic Influenza and Emerging Pandemic Threats. These projects AI.COMM, PREVENT, Avian Influenza-Behavior Change and Communication and Mekong Infectious Diseases- Behavior Change and Communication were designed to effect behavior change among at risk audiences to minimize and prevent the spread of the H5N1 virus and H1N1 pandemic influenza disease. A component of these integrated communication activities was the introduction of various emerging technology to share information, conduct surveillance and reporting, and keep actors connected during outbreak responses and prevention activities. Ms. Bennett also was involved in the communication planning for the World Food Programme's Toward a Safer World held in Rome in 2011. Prior to working in international development she worked in Public Relations and New Product Marketing which included the introduction to the US market of Smart Cards and on-line banking and consumer retail. Yes, when swipes were introduced at every check-out counter in the US. She also worked at The Smithsonian Institution and in policy affairs in the US Senate. Ms. Bennett lives in metropolitan Washington, DC.

DEE BENNETT

Director

Another Option, LLC
USA



Mr. Hall currently serves as News Director for the U.S. Department of Health and Human Services. In this position, Mr. Hall manages the daily news flow across the Department, coordinating media activities at the department's 11 agencies and multiple headquarters offices. Mr. Hall has more than 32 years of public affairs experience in HHS, including 18 years of various media relations work at the National Institutes of Health, and 14 years of handling press activities at the Department level for the HHS Secretary and other senior officials.

Mr. Hall works closely with the HHS Office of Preparedness and Response on crisis and risk communications and serves as the HHS incident communications liaison with the Department of Homeland Security and other Federal agencies.

Mr. Hall has deployed on site to manage incident communications for HHS at a variety of national emergencies and special events, including assignments to New York City immediately after September 11, to Capitol Hill during the 2001 anthrax attacks, to Salt Lake City for the 2002 Winter Olympics. Mr. Hall also was actively involved in the Department's response to SARS, multiple hurricanes, including Katrina and Sandy, and the Federal government's pandemic influenza planning activities. As Acting Assistant Secretary for Public Affairs, Mr. Hall led HHS' early communications response to the H1N1 influenza pandemic in 2009.

Mr. Hall also serves as the international liaison for HHS public affairs and as an expert in international emergency risk communications, working closely with foreign government health and public safety communications officers in partner nations and in international organizations such as the World Health Organization, the World Bank and the Pan American Health Organization. He has directly advised health ministers and other senior health officials in numerous countries on emergency and crisis risk communications, and he serves as the founding co-chair of the Communicators Network of the Global Health Security Initiative.

Mr. Hall led the development of a number of risk and crisis communications reference documents, including "Terrorism and Other Public Health Emergencies: A Guide for Media" and has worked closely with the Centers for Disease Control and Prevention in the development of risk communications curricula, including "Crisis and Emergency Risk Communications: By Leaders for Leaders."

WILLIAM HALL

Director
News Division

*U.S. Department of Health
& Human Services*
USA



Dr. Latinovic, originally from Serbia, since 1999 lives in Mexico City. She graduated from Medical School, University of Belgrade, Serbia. Before moving to Mexico, Dr. Latinovic worked as Teaching Assistant at Microbiology Department at Faculty of Medicine as well as a primary physician at private pediatrics clinic. Dr. Latinovic received her Master's Degree in Health Administration with honors from Universidad la Salle, Mexico. She is trained in risk communication from PanAmerican Health Organization, public health and health promotion.

Since 2006 she has been working at General Directorate of Health Promotion of Mexico Ministry of Health, as head of health marketing and communication department, designing, planning and implementing social marketing strategies to health promotion and disease prevention programs. She also participates in Health Emergency Response of Mexican Ministry Of Health. In 2009 she was one of the leading persons in risk communication response during the H1N1 pandemics in Mexico. She is working on new technologies and social media implementation for public health issues.

She is part of different working groups between CDC and Mexico, as well as the communicators group of Global Health Security Initiative (GHSI). She participated in WHO expert group on Risk Communication on Influenza Research Agenda.

Dr. Latinovic has been speaker on various international conferences and meetings and has published articles.

She is also a professor of Health Promotion at National Institute of Public Health.

LJUBICA LATINOVIC

Social Marketing &
Health Communication
Coordinator

*Ministry of Health
Mexico*



Keri M. Lubell, PhD, is the Senior Scientist for Research and Evaluation in the Emergency Risk Communication Branch (ERCB), Division of Emergency Operations (DEO), Office of Public Health Preparedness and Response (OPHPR) at the U. S. Centers for Disease Control and Prevention (CDC) in Atlanta, GA. Her current work focuses on developing efficient and effective methods for gathering and analyzing information from social media to inform communication strategy during public health emergencies. During the 2012 Fungal Meningitis Outbreak response, her team tracked nearly 300,000 social media posts and over 400,000 traditional news media stories, using them to identify and address rumors and misinformation about appropriate health protection steps for clinicians, affected groups, and the general public.

As the lead evaluator for CDC's Emergency Communication System, she also oversees several projects to evaluate CDC's communication and outreach activities during health emergencies, including the 2009 H1N1 influenza pandemic. She serves as scientific advisor for a CDC program with the Harvard School of Public Health that conducts surveys to assess public knowledge, attitudes, and behaviors in response to a wide range of health threats.

Before joining ERCB, she spent 10 years in CDC's Division of Violence Prevention conducting research on violence-related issues and topics. Dr. Lubell received her Ph.D. in sociology from Indiana University, Bloomington, IN, where her dissertation research focused on gender differences in the impact of social isolation and mental health problems on suicide mortality.

KERI LUBELL

Behavioral Scientist

*Centers for Disease
Control and Prevention
USA*



ANTON SCHNEIDER is FHI360's Social Marketing and Communication Advisor based in Jakarta, Indonesia. Prior to this assignment, he was Regional Behavior Change and Communication Specialist based in FHI 360's Asia-Pacific regional office (APRO) in Bangkok, Thailand, where he supported the communication and behavior change aspects of infectious disease projects, including Avian Influenza and H1N1, in Asia region, including Indonesia, Vietnam, Lao PDR, Nepal, and Bangladesh. He has over 20 years of experience designing, managing, and evaluating social marketing and behavior change and communication programs in Asia, Latin America/Caribbean and Africa. Drawing on extensive experience from commercial marketing communication, Mr. Schneider has designed and managed the media and behavior change aspects of programs in diverse issue areas in health and development. He also has extensive experience in commercial, behavior change and communication research including various qualitative approaches. He is currently directing a motivational research study in Java, Indonesia, as well as overseeing a large-scale Integrated Biological and Behavioral Study (IBBS) in Papua, Indonesia. Anton joined AED in 2000 as co-director of CHANGE, USAID's project to develop and test innovative communication approaches. When the avian influenza outbreak occurred in Asia, Anton moved to Lao PDR as the country coordinator for the Avian Influenza Behavior Change Communication (AI-BCC) Project in 2006 and joined the regional office in Bangkok in early 2009, where he worked on the AI.COMM, Mekong Infectious Disease and Emerging Pandemic Threats (EPT) - PREVENT Projects. Anton has provided technical assistance and training in more than 20 countries, focusing on Asia where he has spent 12 of the last 17 years. He directed social marketing projects in Indonesia, India, Nepal and Philippines as Asia regional manager for SOMARC's social marketing project from 1995-2000, based in Jakarta. He has created a variety of innovative communication campaigns using mass media, digital and social media, media relations, community-based communication, interpersonal communication and social mobilization. He has worked with a wide variety of partners including government, NGOs, commercial manufacturers, and media throughout Asia.

ANTON SCHNEIDER

Social Marketing and
Communication Advisor

*FHI 360
Indonesia*

4.5

CONTROLLING ANTIBIOTIC RESISTANCE

through the One Health Approach

BACKGROUND

Antibiotic resistance is a threat to the efficacy of medical and veterinary care, especially in view of the declining flow of new antibiotics. There is widespread evidence of the overuse and inappropriate use of antibiotics in both human and veterinary medicine. There is debate over the use of antibiotics for non-clinical purposes in agriculture.

The rational and prudent use of antibiotics in medicine and agriculture is a 'global public good' in the sense that the implications of irrational and imprudent use extend beyond national boundaries and effective strategies for controlling antibiotic use require international coherence.

The stakeholders who have interests in antibiotic use and antibiotic resistance include powerful corporations, the medical and veterinary professions, farmers and communities.

We propose to examine the role of civil society and the private sector in responding to the One Health Challenge through a case study of the governance of antibiotic use in medicine and agriculture.

MODERATOR

David LEGGE

Associate Professor

*School of Public Health
La Trobe University
Australia*

OBJECTIVES

We propose to explore the need and strategies for a more rational and prudent governance regime regarding antibiotic use in medicine and agriculture and to explore the role of civil society and the private sector in related disciplines, based on One Health concept, in working together towards such a regime.

SPEAKERS

- **Li Yang Hsu**, Assistant Professor, National University Health System, Singapore
- **David Wallinga**, Senior Advisor in Science, Food and Health, Institute for Agriculture and Trade Policy, USA
- **Maria Virginia Ala**, Director IV, National Center for Pharmaceutical Access to Medicine, Philippines
- **Andri Jatikusumah**, Executive Director, Center for Indonesian Veterinary Analytical Studies (CIVAS), Indonesia

PANELISTS

- **Mira Shiva**, Steering Committee Member, People's Health Movement, India
- **Carmem Pessoa-Silva**, Team Lead, World Health Organization, Switzerland



MARIA VIRGINIA ALA

Director IV
National Center for
Pharmaceutical Access to
Medicine
Philippines

Director IV
Health Policy Development
and Planning Bureau
October 22, 2008 to
present

Officer-in-Charge
Bureau of International
Health Cooperation
January 18, 2005 to
October 21, 2008

Medical Officer VII
Bureau of International
Health Cooperation
Department of Health,
Manila
January 2001 to present

Project Manager IV

Women’s Health and Safe Motherhood Project
Department of Health
November 1995 to December 2000

- Reviews detailed implementation plan and updates this annually.
- Coordinates with and integrates all project participants – DOH program managers, consultants, suppliers/contractors into a smooth working group.
- Coordinates the establishment of management structures consistent with donor and government executives of participating LGU’s to ensure effective project implementation.
- Provides periodic updates to the Project Director on policy and project implementation and provide briefing/updates to other officials and participating agencies.
- Act as resource person, facilitator and trainer during consultation meetings, workshops and training/seminars.
- Assist DOH and LGUs in developing performance monitoring systems and other management information system.
- Established reporting procedures and coordinates submission and review of progress reports to DOH and donor agencies.
- Coordinates WHSMP activities with other DOH initiatives which promotes interests of the local government and promote local management and expansion of health programs/projects.
- Supervises the performance of the technical and administrative staff of the PMO.
- Act as Secretary to the PSC and implements commendations/decisions of PSC.
- Performs other functions assigned by the Project Director.

Medical Specialist III

Office for Special Concerns/Office for Public Health Services
Department of Health
November 1992 to October 1995

Designated Acting Project Manager

Women’s Health and Safe Motherhood Project
August 1994 to October 1995

- Pre-implementation activities of the Women’s Health and Safe Motherhood Project



LI YANG HSU

Assistant Professor

National University
Health System
Singapore

Dr Li Yang Hsu, MBBS (Singapore), MPH (Harvard), is an infectious diseases physician who is currently working as a clinician-scientist in the Department of Medicine, Yong Loo Lin School of Medicine, National University Health System, Singapore. He has concurrent appointments as the director of the Centre for Infectious Disease Epidemiology & Research (CIDER) at the Saw Swee Hock School of Public Health, and adjunct clinician-scientist at the Institute of Bioengineering & Nanotechnology. His areas of research include the epidemiology of methicillin-resistant Staphylococcus aureus as well as the clinical and socioeconomic impact of antimicrobial resistance.



Andri Jatikusumah earned bachelor degree from Faculty of Veterinary Medicine, Bogor Agricultural University and her Master degree in Veterinary Epidemiology and Economics from Utrecht University, The Netherlands.

He started his career in pharmaceutical company and decided to work with NGO because of his passion in action research and community engagement for animal disease or zoonotic disease, animal welfare and food safety and apply it for the society since 2006. He has been involved in many research and community engagements program during his career in NGO. In his professional career he has being involved in veterinary organization such as Indonesian Veterinary Medical Association (IVMA), Indonesian Veterinary Epidemiology Association (IVEA)

Currently, He assign as an Executive Director in Centre for Indonesian Veterinary Analytical Studies (CIVAS) since 2011, Non-Government Organization that focused in animal welfare, animal health and food safety.

ANDRI JATIKUSUMAH

Executive Director

*Center for Indonesian
Veterinary Analytical
Studies (CIVAS)
Indonesia*



David Legge started his career as a physician but early on moved into health services research, health policy and planning and public health. He has been based in the La Trobe School of Public Health since 1995 from whence he has developed his research interests and teaching in the political economy of health, comparative health systems, primary health care and international health policy. Since 1996 David has been teaching health policy and management in China and researching the health challenges associated with China's economic and political transition. From 1998 to 2006 David was academic coordinator for the Victorian Public Health Training Scheme, a broadly based in service training program for public health practice. David has been active in the global People's Health Movement since 2000 when it was formed and since 2005 has been academic coordinator of the International People's Health University which is a short course program in the political economy of health for health activists, offered through the People's Health Movement.

DAVID LEGGE

Associate Professor

*School of Public Health
La Trobe University
Australia*



Dr Carmem L. PESSOA-SILVA is Brazilian, joined the World Health Organization (WHO) in 2005. From January 2005 to November 2011 Dr Pessoa-Silva was the team leader for the WHO programme “Infection Prevention and Control in Health Care”. In the context of renewed efforts to combat antimicrobial drug resistance, WHO established the programme “Antimicrobial Drug Resistance” in December 2011 and appointed Dr Pessoa-Silva to lead the new programme.

Prior to WHO, Dr Pessoa-Silva was an Associate Professor of Infectious Diseases for 12 years at the Federal University of Rio de Janeiro, Rio de Janeiro, Brazil.

She is also the main author to several abstracts and publications including:

- Reduction of health care associated infection risk in neonates by successful hand hygiene promotion. *Pediatrics*, 2007.
- Behavioural considerations for hand hygiene practices: the basic building blocks. *J Hosp Infection*, 2007.
- The WHO policy package to combat antimicrobial resistance. *Bull World Health Organ* 2011;89:390–392.
- Control of community-associated methicillin-resistant *Staphylococcus aureus* in neonatology. *J Hosp Infect.* 2006;63:93-100.
- Epidemiology of endemic extended-Spectrum beta-lactamase producing *Klebsiella pneumoniae* at an intensive care unit in Rio de Janeiro. *Microb Drug Resist.* 2006;12:50-8.
- Genetic relatedness among extended-spectrum β -lactamase producing *Klebsiella pneumoniae* outbreak isolates associated with colonization and invasive disease in a neonatal intensive care unit. *Microb Drug Resist.* 2005;11:21-5.
- Extended-spectrum beta-lactamase-producing *Klebsiella pneumoniae* in a Neonatal Intensive Care Unit: Outbreak Description and Risk Factors for Infection and Colonization. *J Hosp Infection.* 2003;53:198-206.

CARMEM PESSOA-SILVA

Team Lead
World Health Organization
Switzerland



MIRA SHIVA

Steering Committee
Member
*People's Health Movement
India*

Dr Mira Shiva did her Post graduation in Medicine from Christian Medical College Ludhiana, Punjab in 1978, the year of the Alma Ata, then a Community Health & Development Residency. For over 3 decades she has been engaged with Comprehensive Primary Health Care, issues of Gender justice, social & health equity. She was involved in relief work & health impact studies after Bhopal Gas Tragedy.

She has been involved with issues of Rational Drug Policy & Rational use of Drugs, Women & Child health, Food & Nutrition security, Food Safety & Biosafety, Environment & Health, Using law for Public Health.

She is a Founder Member of Peoples Health Movement, & its Steering Committee Member.

She is Founder Member & former Chairperson of Health Action International (Asia Pacific)

She is Coordinator Initiative for Health & Equity in Society, Founder Coordinator & Co-Convenor All India Drug Action Network. She was member Central Council for Health, Chairperson Consumer Education Task Force on Safety of Food & Medicine, Health Committee of National Human Rights Commission,

She was Head of Public Policy & Director Women Health & Development & Rational Drug Policy on Voluntary Health Association of India. She is steering Committee Member Right to Food Campaign, Diverse Women for Diversity, Indian Alliance for Child Rights, National Alliance for Maternal Health & Human Rights

She was member Working Group on Regulations for Food & Drugs, Founding member Doctors for Food Safety & Biosafety, Founder Member & Co-coordinator Indian Initiative for Management of Antibiotic Resistance.

She was the National Focal Point for National Profile for Women Health & Development 2001 & Co-editor of the Publication by same name by WHO & VHAI.

She has Co-authored & Co-edited Banned & Bannable Drugs, Essential Drugs & Rational Use of Drugs, Comprehensive Policies & Programs for Women's Health, Darkness at noon, Poison in our Foods.

She is recipient of the first Dr Olle Hansson award for showing Moral Courage & for contribution Nationally & Globally for Rational Use of. She is also recipient of the Women Scientists Award in 2006 by Science & Society, Dept of Science & Technology for “prevention of misuse of Medicines & Medical Technologies”



David Wallinga, M.D., M.P.A., is Senior Advisor in Science, Food and Health at the Institute for Agriculture and Trade Policy, Minneapolis, MN. Dr. Wallinga applies medical science and a systems lens to analyze the risk and health impacts of our industrialized meat production and other food systems. IATP advocates for public policies to help build food systems that are healthier, less obesogenic, less polluting and less wasteful of antibiotics, while supporting farmers and rural communities. IATP is a founder and steering committee member of Keep Antibiotics Working: the Campaign to End Antibiotic Overuse in Animal Agriculture.

From 2009 through 2010, Dr. Wallinga was a William T. Grant Foundation Distinguished Fellow in Food Systems and Public Health at University of Minnesota, School of Public Health. He received a medical degree from the University of Minnesota Medical School, a master's degree from Princeton University and a bachelor's from Dartmouth College.

DAVID WALLINGA

Senior Advisor in Science
Food and Health

*Institute for Agriculture
and Trade Policy
USA*

CONTROLLING ANTIBIOTIC RESISTANCE THROUGH THE ONE HEALTH APPROACH

Antimicrobial Resistance: Fundamental Basis and Issues with Control

Li Yang HSU (for ReACT)

Antimicrobial resistance is the most evident manifestation of bacterial evolution. The mechanisms of resistance are ancient and many were probably selected out millions of years ago – bacteria from the Lechuguilla cave being the case in point, with resistance to multiple different modern antibiotics despite the bacteria being isolated for almost 4 million years [1]. Soon after the development of penicillin, Alexander Fleming noted that formerly susceptible bacteria could develop resistance to the compound in the petri dish, and gave one of the earliest warnings of its implications during his Nobel lecture [2]. However, the development and proliferation of multiple classes of antibiotics in the subsequent 3 decades, coupled with the excellent safety profiles of most antibiotics, resulted in lax human antibiotic prescribing standards and significant inappropriate antibiotic prescription in many parts of the world [3]. In the 1950s, the use of sub-therapeutic quantities of antibiotics was found to enhance the feed-to-weight ratio of food animals, and the practice of using antibiotics as growth promoters quickly escalated globally [4]. In the past two decades, there is accumulating evidence linking levels of human antibiotic prescription to resistance [5,6], and also nontherapeutic use in animals to antimicrobial resistance in pathogenic human bacteria [4]. Coupled with a dramatic

decline in the development of novel antibiotics [7], a paradigm shift framing antibiotics as precious and potentially finite rather than limitless resources was inevitable.

The negative impact of antimicrobial resistance in humans is enormous, resulting in increased healthcare costs, higher mortality and morbidity, and productivity losses [3,4,8]. Multiple professional and civic organizations, including the World Health Organization, have put forward position papers and recommendations on how to preserve the beneficial impact of antibiotics [8]. Superficially, the way forward is clear – the recommendations are largely similar and can be broadly classified as follows:

1. More transparent, better and global surveillance of antimicrobial usage and resistance.
2. Improving the “antibiotic pipeline” – facilitating and increasing the development of novel classes of antibiotics.
3. Improving the appropriate prescription of antibiotics in both humans and animals – including reducing the use of antibiotics as growth promoters in animal husbandry and aquaculture.

4. Better infection control practices and regulation to limit the spread of antimicrobial-resistant pathogens within institutions and cross-borders, and also in animal husbandry.
5. Better education at all levels on the issues of antimicrobial resistance.

Nonetheless, progress on the control of antimicrobial resistance has been slow, and it is perhaps apt that the issue of antimicrobial resistance in recent times is increasingly being re-framed as a wicked problem. The term 'wicked problem' was originally used to describe social issues that are complex, ill defined and subject to multiple interpretations, and are virtually impossible to completely solve – "solutions" often result in making things better (or worse), the implementation of which frequently results in trade-offs and unanticipated complications [9]. Antimicrobial resistance – embedded within the complexity and scale of human and animal medicine and interactions – can no longer be viewed as a purely scientific puzzle to be overcome, but involves sociopolitical and cultural initiatives in order for progress to be made. And given the evolutionary capability of bacteria, the issue can perhaps never be completely resolved.

In the hospital setting, particularly public hospitals in less developed countries and Asia, the high patient-to-healthcare staff ratio and high hospital occupancy results in difficulties in improving compliance to infection control practices, including basic hand hygiene and isolation/cohorting of patients infected or colonized by antimicrobial-resistant bacteria. The drive for medical tourism dollars has as an indirect consequence enhanced the spread of multidrug-resistant bacteria such as the

carbapenem-resistant Enterobacteriaceae [10]. Advances in medical care especially in the areas of transplantation and cancer chemotherapy have resulted in a steadily growing cohort of severely immunocompromised patients where broad-spectrum antibiotics are routinely prescribed at the first sign of infection – practices that are endorsed by professional guidelines [11]. Attempts at antimicrobial stewardship in the hospital setting not infrequently result in conflict with physicians whose perspective is in providing 'best' care for their patients, and who view antimicrobial stewardship as an encroachment on their right to prescribe [2]. In each of the abovementioned examples, competing priorities render it difficult to implement practices that can effectively bring down antimicrobial resistance rates in many institutions worldwide.

Similarly, in the case of animal husbandry and aquaculture, competing priorities and razor-thin profit margins in some cases are deterrents against stopping the practice of antibiotics as growth promoters or even withholding mass antibiotic treatment at the appearance of the first ill animal or fish [4,8]. The significance of antimicrobial resistance in animal bacteria with respect to human health is also repeatedly challenged despite the accumulated evidence [4]. The World Health Organization had comprehensively highlighted major gaps and challenges in the control of antimicrobial resistance globally, including the lack of comprehensive multidisciplinary strategies, lack of adequate regulatory frameworks, insufficient awareness and education at all levels, and the presence of incentives that encourage abuse of antibiotics [8].

Seen in the perspective of a wicked problem, how and whether antimicrobial resistance can eventually be brought under control appears unclear. Nonetheless, it is important to note the major advancements and improvements made (and that continue to be made) with other issues listed as wicked problems, including gender inequality, poverty, ethnic inequality, etc. From this perspective, any improvement is good, and continued progress better. Taking a 'One Health' approach to antimicrobial resistance in order to try to align all concerns and interests, gaining political will and commitment for the right regulatory and cross-border cooperative frameworks, education at all levels – including framing the issue in ways that people will care about, are all logical and necessary steps. Encouragement of action at all levels along with greater collection and transparency of data – while messy – is an approach that has also worked well with other issues of similar or greater complexity.

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PRESERVING EFFECTIVE ANTIBIOTICS:

Strong Public Health Action Needed
to Avoid the 'Tragedy of the Commons'

Dr David WALLINGA

Senior Advisor in Science, Food and Health
Institute for Agriculture and Trade Policy, Minneapolis, MN
Steering Committee and Co-founder, Keep Antibiotics Working,
the Campaign to End Antibiotic Overuse in Animal Agriculture

Abstract: In 1968, ecologist Garrett Hardin described "The Tragedy of the Commons"¹, the notion that individuals will deplete a shared resource by acting short-term out of self-interest, despite everyone's understanding that to do so runs contrary to their long-term best interests. So it is with effective antibiotics.

The overall usage of antibiotics is perhaps the major factor in driving bacteria to become resistant to them. That is fundamental to microbiology. Yet in much of the world today, there is routine and enormous use of antibacterials in animal agriculture. This usage ensures farm environments are replete with both the residues of antibiotics and the genetic determinants of antibiotic resistance. These conditions have helped to create what some call a "perfect storm", i.e. conditions ripe for the formation and spread of resistance that is then transmitted via various routes to the human population. In short, the overuse of animal antibiotics by some few parties, acting out of their own self-interest, is undercutting the effectiveness of antibiotics for the rest of us.

This talk employs the very active debate about the scale and impact of this antibiotic usage in U.S. animal agriculture to illuminate possible better policies and practices that can support public health as well as better animal health. In the United States, it was only when Congress passed the 2008 amendments to the Animal Drug User Fee Act that data on sales of antimicrobials were first collected and publicly reported by the U.S. Food and Drug Administration. Today, these data indicate over 80% of all U.S. antimicrobials are sold for use in animal agriculture – more than 29 million pounds each year (Tables 1&2) – most of them from medically important antibiotic classes, including penicillins, tetracyclines, macrolides, cephalosporins, etc. Ninety percent of animal antimicrobials are added to animal feed or drinking water, for what are often non-therapeutic, economic purposes such as growth promotion and feed efficiency.²

Aside from the recent collection of data on antibiotic sales, federal agencies regulating animal antibiotics in the United States have demonstrated little action to date to restrict or reduce such use. In

**Table 1. Antimicrobial Drugs FDA-Approved for Use in Food-Producing Animals
2010 Sales and Distribution Data Reported by Drug Class**

	Antimicrobial Class	Annual Totals ¹	
		Kilograms	pounds
Domestic	Aminoglycosides	200,794	441,747
	Cephalosporins ²	24,588	54,094
	Ionophores	3,821,138	8,406,504
	Lincosamides ²	154,653	340,237
	Macrolides ²	553,229	1,217,104
	Penicillins ²	870,948	1,916,086
	Sulfas ²	506,218	1,113,680
	Tetracyclines ²	5,592,123	12,302,671
	NIRE ^{2,3}	1,517,447	3,338,383
Export⁴	Tetracyclines ²	9,968	21,930
	NIRE ^{2,5}	206,566	454,445
Total		13,457,672	29,606,878

Source: U.S. Food and Drug Administration, ADUFA Reports: 2010 Summary Report on Antimicrobials Sold or Distributed for Use in Food-Producing Animals. Accessed December 28, 2012 at www.fda.gov.

¹ kilograms or pounds of active ingredient.

² Includes products labeled for use in multiple species, including both food- and nonfood-producing animals.

³ NIR = Not Independently Reported. Antimicrobial classes for which there were less than three distinct sponsors (companies) actively marketing products were not independently reported, including: Aminocoumarins, Amphenicols, Diaminopyrimidines, Fluoroquinolones, Glycolipids, Pleuromutilins, Polypeptides, Quinoxalines, Streptogramins.

⁴ Only includes exports of FDA-approved, US-labeled antimicrobial drugs approved for use in food-producing animals. Export totals from 2009 summary report inadvertently included some non-FDA-approved antimicrobial drug products, which resulted in an incorrect, larger number.

⁵ NIRE = Not Independently Reported Export. Antimicrobial Classes for which there were less than three distinct sponsors exporting products were not independently reported. These classes include: Aminocoumarins, Aminoglycosides, Amphenicols, Cephalosporins, Diaminopyrimidines, fluoroquinolones, Glycolipids, Ionophores, Lincosamides, Macrolides, Penicillins, Pleuromutilins, polypeptides, Sulfas, Quinoxalines, Streptogramins.

2012, there was limited action to end the off-label injection of cephalosporins into hatchery eggs, for example³; and, in 2005 the FDA successfully removed fluoroquinolones from therapeutic use in poultry flocks (albeit not from swine production). However, despite the bulk of antibiotics being used in animal feed, no FDA-approved feed antibiotics has ever been removed from the market. In

mid-2012, the FDA announced a framework for pharmaceutical companies to voluntarily withdraw their non-therapeutic feed antibiotic products from the market, reducing sales and profits, while putting remaining products solely under veterinary control; it remains unclear what motivation the pharmaceutical industry has for doing so. Even the changes to antibiotics

Table 2. Marketed Antimicrobial Drugs and Drug Classes FDA-Approved for Use in Food-Producing Animals in the United States

Aminocoumarins Novobiocin	Fluoroquinolones Danofloxacin Enrofloxacin	Macrolides Carbomycin Erythromycin Oleandomycin Tilmicosin Tulathromycin Tylosin	Quinoxalines Carbadox
Aminoglycosides Apramycin Gentamicin Neomycin Spectinomycin	Glycolipids Bambermycins	Streptogramins Virginiamycin	
Amphenicols Florfenicol	Ionophores Laidlomycin Lasalocid Monensin Narasin Salinomycin Semduramicin	Penicillins Amoxicillin Ampicillin Cloxacillin Penicillin	Sulfas Sulfachlorpyridazine Sulfadiazine Sulfadimethoxine Sulfamerazine Sulfamethazine Sulfaquinoxaline
Cephalosporins Ceftiofur Cephapirin	Lincosamides Lincomycin Pirlimycin	Pleuromutilins Tiamulin	Tetracyclines Chlortetracycline Oxytetracycline Tetracycline
Diaminopyrimidines Ormetoprim		Polypeptides Bacitracin Polymixin B	

Source: U.S. Food and Drug Administration, ADUFA Reports: 2010 Summary Report on Antimicrobials Sold or Distributed for Use in Food-Producing Animals. Accessed December 28, 2012 at www.fda.gov.

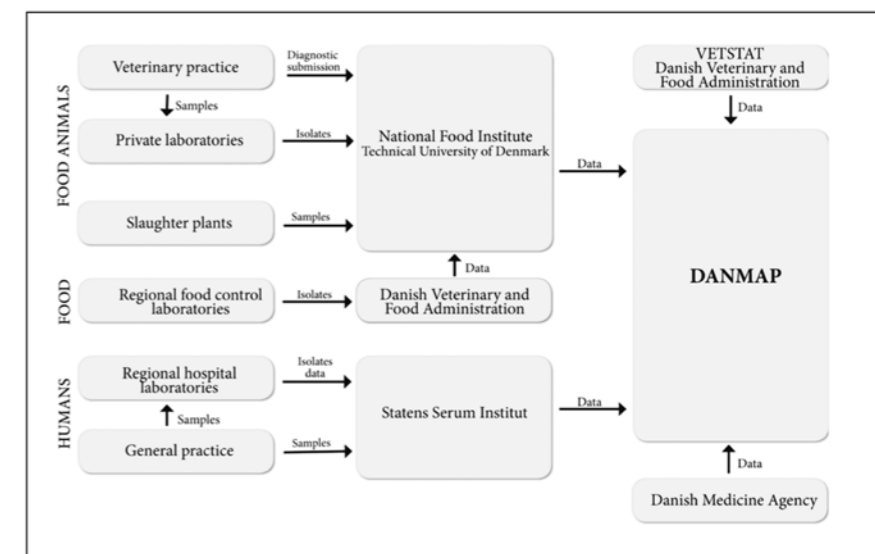
sales and usage optimistically envisioned by the FDA would only take place several years in the future.

Denmark offers a contrasting example – one where public policy has better reflected effective antibiotics as a part of the public commons. In Denmark, a major meat producer and the world’s largest exporter of pork, there has been nearly 15 years of deliberate public policy focused on reducing the overall usage of antibiotics, in both human and animal settings. An announced phase-out of antibiotic growth promoters, first in poultry and then in swine was accompanied by government monitoring, research and assistance to farmers to help accomplish the phase-out.

In 1995, the Danish Ministry of Food, Agriculture and Fisheries and the Danish Ministry of Health jointly began DANMAP, the Danish Integrated Antimicrobial Resistance Monitoring and Research Programme. The timing, three years before the poultry phase out had even begun, was so that

a programme would be in place to follow the eventual impact of the growth promotion phase out. As its name suggests, DANMAP integrates information about the consumption of antimicrobials in human, veterinary and food production settings, as well as the occurrence of antimicrobial resistance in humans, in animals and on food.

Dr. Frank Aarestrup, head of the EU Reference Laboratory for Antimicrobial Resistance and the WHO Collaborating Centre for Antimicrobial Resistance in Foodborne Pathogens at the National Food Institute, Technical University of Denmark, states that Denmark’s subsequent use of antimicrobials dropped by 60 percent, measured by the amount of antimicrobials used per unit of meat produced⁴. According to a 2002 expert panel convened by the World Health Organization, the Danish antimicrobial growth promoter phase-out accomplished a reduction in public health risk due to resistance but no or minimal consequence to animal health, to farm



Source: DANMAP Organization and workflow www.DANMAP.org

productivity or earnings, or to consumer prices. Today, the United States uses what is estimated as about five times more antimicrobials per pound of meat produced than does Denmark, and ten times more than Norway or Sweden⁵.

Another key early change in Denmark was the restriction on veterinary profits from the sales of antibiotics beginning in 1995; it was a change supported by the Danish Veterinary Association, possibly in part because larger hog and cattle producers were then required to receive monthly veterinary visits. In effect, the veterinary profession adopted a changed role as advisors rather than as drug providers. To our knowledge, the FDA is not considering any restrictions on veterinarian sales or profits from drug sales at this time.

More broadly, the global epidemic of antibiotic resistance is an ecological problem. And the microbial ecosystem respects neither the borders

of the United States nor of Denmark. Because trade in pharmaceuticals, in animal feeds, in meat products and, to a lesser extent, in food animals, has become increasingly global, the risk is the Tragedy of the Commons with respect to effective antibiotics will increasingly be a supranational rather than a national problem. Much of this trade is conducted by global corporations with a fiduciary duty to their shareholders to maximize profit without regard for the public health consequences. In addition, the impact of bilateral and multilateral trade agreements over the last three decades has been to decrease the ability of national entities to impose public health-based restrictions on corporate activities. The lack of any supranational public health authority with any regulatory powers lends further pessimism to the prospect of preserving a global commons of available antibiotics effective for sick animals and people who need them.

¹ Hardin G, Hardin, G. (1968). The Tragedy of the Commons. Science 162 (3859): 1243–1248.

² Office of Congresswoman Louise Slaughter, US House of Representatives, Press release dated May 11, 2011. Accessed December 28, 2012 at <http://bit.ly/TnU5SY>.

³ Food and Drug Administration. Cephalosporin Order of Prohibition Goes Into Effect. April 4, 2012. Accessed December 28, 2012 at www.fda.gov/AnimalVeterinary/NewsEvents/CVMUpdates/ucm299054.htm.

⁴ Aarestrup FM. Sustainable farming: Get pigs off antibiotics. Nature 2012.486: 465–466.

⁵ Testimony of Dr. Frank Møller Aarestrup and Dr. Henrik Wegener, U.S. House of Representatives Committee on Rules, Hearing on H.R. 1549, the Preservation of Antibiotics for Medical Treatment Act of 2009, JULY 13, 2009. Page 72. Available at http://democrats.rules.house.gov/111/0jhearings/111_hr1549_oj.pdf.

PHILIPPINE COUNTRY SITUATION

On Antimicrobial Resistance

Madeleine DE ROSAS-VALERA, MD, MScIH (Heidelberg)

The problem of antimicrobial resistance (AMR) has been recognized worldwide. Multidrug resistant pathogens such as MRSA, MDR-TB, XDR-TB and the third generation cephalosporin-resistant extended-spectrum beta-lactamases have been noted. Currently, new pathogens such as *Klebsiella pneumoniae*, *Pseudomonas aeruginosa*, and *Vibrio cholerae* O1 which possess the ability to resist almost all available antibiotics are emerging.

WHO has been spearheading the global containment initiatives on AMR in humans since 2001, with its publication of the WHO Global Strategy outlining the six-point policy package that sets the framework for critical actions to be undertaken by the government to stimulate change by stakeholders. (1) The Food and Agriculture Organization of the United Nations (FAO) and the World Organization for Animal Health (OIE), on the other hand, have been cooperating with each other to address the AMR issues in the animal sector. As early as 2004, in recognition of the multifactorial problem of antimicrobial usage and resistance in the agriculture and veterinary field including aquaculture, OIE has convened an ad hoc committee on Antimicrobial Resistance responsible

for the development of specific chapters tackling this problem in the Terrestrial Code and Terrestrial Manual. (2)

In the Philippines, although many in the health sector are aware of the existence of antimicrobial resistance, the current efforts have not been enough to directly address the situation and consider that the problem is like a time bomb ready to explode.

The presence of antimicrobial resistant strains in the country has been monitored by the Research Institute for Tropical Medicine (RITM), the Department of Health (DOH) designated reference laboratory responsible for the Antimicrobial Resistance Surveillance Program or ARSP (DO No. 339J), since 1988. RITM, together with the 21 bacteriology laboratory (sentinel sites) in tertiary care hospitals which are mostly government owned, located in the 14 regions nationwide conduct the laboratory-based AMR surveillance of the pathogens from clinical cases.

Most of the bacterial pathogens which are in the surveillance list are those which are causing

infections in the ten leading causes of morbidity, namely acute lower respiratory tract infection and pneumonia, bronchitis/bronchiolitis, and acute watery diarrhea. The surveillance also take account of organisms which are commonly associated with HAIs, and the sexually transmitted infection, i.e. *N. gonorrhoea*, and *Escherichia coli*, an enteric pathogen, as well as a common cause of urinary tract infections. (3) The ARSP does not include though all diseases of interest like tuberculosis and HIV. For tuberculosis, the surveillance of the MDR-TB and XDR-TB is done by the National Tuberculosis Research Laboratory which is also in RITM, and some private laboratories while resistance in HIV is detected by the STD AIDS Cooperative Central Laboratory or SACCL of DOH.

Unfortunately, ARSP does not have a counterpart in the animal sector. The laboratory surveillance of antimicrobial resistance in animal husbandry and aquaculture is not in place. The only activity that may indirectly relate to AMR in the animal sector is the drug residue monitoring as required under AO No. 24 s. 2009 otherwise known as the National Veterinary Drug Residues Control Program in food. This policy likewise provides the implementing guidelines on the manufacture, importation, exportation, distribution, administration, regulation, control and rational use of veterinary drugs in food producing animals. Currently pending in the Senate is the Food Safety Act bill which will ensure the quality of food throughout the food chain for human consumption.

Majority of the information on AMR in animals can be gathered from researches that have been conducted by undergraduate and graduate

students. The most common isolates in these studies were *Escherichia coli* and the non-typhoidal salmonella. Most of these studies found 100% of the isolates exhibiting AMR to one antimicrobial and most of them showed it to be tetracycline. It was also shown that in a lot of these cases more than 90% exhibited multiple drug resistance. Other antimicrobials to which high resistance were registered are trimethoprim-sulfamethoxazole, penicillin, ampicillin and chloramphenicol. The isolates which was found to have high resistance to antimicrobials was *Escherichia coli*. In other researches, they have provided evidences regarding conjugative transferability of drug resistance (4, 5, 7) and have attributed the development of AMR to the use of antibiotics in feeds in the farm where the samples were taken. (4) Similarly, in a study conducted Morales in 2000, it was shown that antibiotic residues increased AMR and allergic reactions to antibiotics in humans. (6)

Based on the country situation analysis that was recently conducted, it shows that the critical role of the laboratory in the surveillance of AMR has not been fully recognized. This is evident by the limited number of participating laboratories to the program since its inception, inadequate manpower and funding support to expand the scope of the testing, absence of information on correlation between laboratory-based data with clinical data or antibiotic use surveillance and the lack of integration of all AMR data. (8)

There have been several factors identified as contributory to the emergence of antimicrobial

resistance and problems in access to essential medicines and use of poor quality drugs are some of them. The Philippines has established early a regulatory body to monitor drugs and medicines from procurement to ensuring their quality through the creation of the Food and Drug Administration (RA 3720 or the Food, Drug, Devices and Cosmetics Act). As an additional mechanism to safeguard the drug supply in the country, the Philippine Medicines Policy was created in 2010 (formerly the Philippine National Drug Policy) in order to ensure equitable availability and affordability of safe, efficacious and quality (Phil Medicines Policy 2010) under the guidance of the DOH- National Center for Pharmaceutical Access and Management (NCPAM) established by AO 2010-0005. A key strategy in implementing this policy is the development of the Philippine National Drug Formulary (PNDF) which contains the essential drugs list or drugs that are essential for diseases and conditions of the majority in the Philippines.

There is, however, a gap in completely looking at the AMR picture on these areas as there is still inadequate system in the veterinary field to complement efforts in human health. Both animal husbandry and aquaculture have no essential medicines list to guide stakeholders on the acceptable drugs/medicines. Furthermore, presence of two regulatory bodies for drug regulation, feed additives and water soluble drugs under Bureau of Animal Industry (BAI) while pharmaceutical preparation with FDA, creates some confusion to manufacturers which affects the supply of these medicines in the market. (8)

The gap further expands to the concern in monitoring the rational drug use or medicines in

the veterinary sector and in patient care. For both human and animal sectors, implementation of the monitoring system on drug prescription, dispensing and use is insufficient, if not totally missing. Information on antibiotic use on a national level has always been found to be scanty, and hospital consumption contributes little in total drug use information. At best, conclusions can be inferred only from data/trends noted in tertiary training hospitals in Metro Manila. Much is desired when it comes to monitoring in the veterinary field.

Moreover, there are no standard treatment guidelines (STGs) for animals and some drugs needed to treat a specific disease are not registered in the Philippines. Veterinarians are left without a choice but to find a substitute for those antibiotics and antimicrobials for humans are normally selected even if available packaging is not appropriate for veterinary use. Another issue is the non-compliance of farm owners to the withdrawal period recommended in administering drugs to food animals. If this withdrawal period is not followed, there will be drug residues in foods sold in the market. One major challenge to the Department of Agriculture is the practice of drug companies to go directly to farm owners and sell drugs which is difficult to monitor. (8)

On a positive note, policies exist that provide rules and regulations in the implementation of prescribing and dispensing requirements in both humans (AO No. 62 s. 1989 and AO No. 63 s. 1989) and animals (AO No. 111b s. 1991 and AO No. 40). It is noteworthy to mention that the animal sector has demonstrated a strong

will when they banned the use of chloramphenicol, beta antagonist drugs and nitrofurans in food producing animals. But this same resolve is now being challenged in the light of uncontrolled practice of using antibiotics as growth promoters in animals.

In view of the magnitude of the problem of AMR, the government needs to make AMR control a national priority by creating a national plan that shall integrate, coordinate, strengthen and develop sustainable, well financed, collaborative systems and mechanisms to combat AMR in the Philippines.

¹ <http://www.who.int/world-health-day/2011/en/>

² http://www.oie.int/fileadmin/Home/eng/Media_Center/docs/pdf/AMR_OIE.pdf

³ ARSP Annual Report in 1993 and 2011

⁴ Canto, E., Valdez, S., Caduhada, J. 2001. Antibiotic susceptibility patterns and conjugative transferability of the multiple drug resistance in *Escherichia coli* isolates from chickens. Undergrad Thesis, De La Salle University Manila

⁵ Ciceron, M., del Prado, J. and Echaz, J. 2005. Antibigrams and conjugative transferability of antibiotic resistance of *Escherichia coli* isolates from chicken and fish grown in integrated fish farms. Undergrad Thesis, De La Salle University Manila.

⁶ Morales, R.L. 2000. Isolation of manganese and copper tolerant bacteria from Laguna de Bay and their antibiotic resistance patterns. Undergraduate Thesis, College of Arts and Sciences, University of the Philippines, Los Banos, Laguna.

⁷ Nepomuceno, J., Nido, MT, Solis, L. 2001. Antimicrobial Susceptibility Patterns and Conjugative Transferability of Multiple Drug Resistance in *Escherichia coli* isolated from Swines raised at the International Training Center on Pig Husbandry in Lipa City Batangas. Undergrad Thesis, De La Salle

⁸ Country Situation Analysis on Antimicrobial (CSA-AMR) Study

A COLLABORATIVE PROJECT ON DEVELOPING A STRATEGY

for the Prudent Use of Antimicrobial Agents to Control Antimicrobial Resistance in Humans, Animals and the Environment in Selected Asian Countries

Dr. Visanu THAMLIKITKUL & Andri JATIKUSUMAH

The burden of Antimicrobial resistance (AMR) in many Asian countries is enormous since the assessment and use of antibiotics are not well controlled due to a lack of national policies and enforcement of regulations on AMR containment in this region. AMR is a complex, multi-dimensional and multi-factorial problem which involves various stakeholders at local, regional, national and international levels. Therefore, a trans-disciplinary approach and a wide range of stakeholders must be involved to solve this problem. The integration of veterinary science and human public health, epidemiology and socioeconomics are important elements for AMR containment. Therefore, it is essential to develop an appropriate AMR containment strategy that is acceptable to multiple stakeholders, simple and practical, and adaptable to each country's situation.

The project entitled "An Ecohealth Approach to Develop a Strategy for the Prudent Use of Antimicrobials to Control Antimicrobial Resistance in Human, Animal, and Environmental Health in Selected Asian Countries" is a collaborative project among 5 Asian countries: China, Indonesia, Lao PDR, Thailand and Vietnam. These participating

countries are members of the Asia Partnership on Emerging Infectious Diseases Research (APEIR). The proposal has been developed by the investigators of the participating countries and submitted to the International Development Research Centre (IDRC), Canada for funding consideration.

This project will be conducted using an ecohealth approach that perceives the social, political, economic, human health and environmental components as an integrated system instead of separate systems. The project will be carried out through three interlinked sequential phases. (1) AMR Containment Strategy Formulation Phase – Baseline data on antimicrobial accessibility and usage, AMR situation and AMR burden, and relevant laws and regulations related to veterinary and human medicine in each participating country will be collected and analyzed. The potentially effective and appropriate AMR containment strategy will be formulated according to each participating country's situation based on the observed baseline data and applicable local and global relevant evidence. (2) AMR Containment Strategy Implementation Phase – The formulated AMR containment strategy will be implemented

in selected animal farms and healthcare facilities as the prototypes in each participating country. The data on antimicrobial usage and AMR of the selected study sites in each participating country after implementation of the AMR containment strategy will be collected, analyzed and compared with the baseline data. Measures of the effectiveness of the AMR containment strategy will then be available. (3) AMR Containment Strategy Dissemination and Advocacy Phase – The AMR containment strategy will be reviewed and revised according to the results from the AMR containment strategy implementation. Recommendations on policies and practices pertaining to AMR containment will be shared with relevant key stakeholders and policy makers who can influence policy decisions to endorse, disseminate and advocate for such policies and practices on AMR containment to the target sectors in each participating country.

The outputs of the project are expected to result in smarter use of antimicrobials in farm animals and in humans and, therefore, reduce the risk of AMR development without adversely affecting profitability from livestock or animal and human health. The experiences from the study sites will be used to influence and change policies and practices on antimicrobial use and AMR containment in selected Asian countries.

4.6

ENABLING POLICY ENVIRONMENTS

for a One Health Approach

BACKGROUND

Over the last several decades, tens of thousands of people have died from emerging pandemic zoonotic diseases, including over 18,000 human deaths from the 2009-H1N1 influenza pandemic, with over \$200 billion economic losses incurred. Disease emergence is facilitated by increased human, wildlife, domestic animal and ecosystem interactions. Strategic points of intervention are under multiple jurisdictions: public and private, health, agriculture, environment, labor, transportation, tourism, and other sectors.

Despite growing recognition that closer collaboration among sectors is necessary and often despite having leaders with the competencies and skills needed for such collaboration (See parallel session 6) obstacles (jurisdictional organizational lines, competing agendas, struggles for limited resources, and being steeped in differing disciplinary cultures) still exist. “Siloed” approaches to detecting, and responding early and effectively to these threats have often proved to be ineffective and disease outbreaks continue to emerge with humans, all too frequently, serving as sentinels. This has resulted in continued loss of human life and livelihoods, compromised nutrition, stressed health delivery systems, and threatened wildlife and ecosystem health.

This session is aimed at stimulating a frank and robust discussion among public health, animal health, and environmental health, and other officials and experts on innovative approaches and policy tools (see Appendix 1 for examples) that the public and private sectors can employ to achieve a strategic and robust multi-sectoral response.

MODERATOR

Marguerite PAPPAYOANOU

Senior One Health
Technical Advisor
DAI, Inc.
USA

OBJECTIVES

To identify and discuss:

- barriers to multisectoral collaboration
- strategic approaches, policy interventions, instruments and tools that have been used to overcome these barriers
- essential characteristics of a one health workforce that will seek to develop political will and create new environments that enable and reward multi-sectoral collaborations

PANEL PRESENTATIONS

PANEL 1

Enabling One Health Policy Environments – Views from the Public Sector

- **Santanu K Bandyopadhyay**
former Animal Husbandry Commissioner,
Department of Animal Husbandry, Dairying and Fisheries, India and currently Member,
Agriculture Scientists Recruitment Board, India
Overview of effectiveness of multisectoral collaboration around detection and response to highly pathogenic H5N1 avian influenza virus outbreaks in West Bengal—challenges and opportunities for promoting One Health following the emergence of Bird-flu in the developing world: Policy perspectives.
- **Gervais Ondobo Andze**
Inspector in charge of health and former Director of Disease Control,
Ministry of Public Health, Cameroon
Development of a National Program to Control and Fight against Emerging and Re-emerging Zoonoses in Cameroon, based on multisectoral collaboration— The Cameroonian experience, an example of multi-sector collaboration.
- **Ruben Donis**
Chief of the Molecular Virology and Vaccines Branch,
Centers for Disease Control and Prevention, USA
- **Joseph Anelli**
Director, One Health Coordination Office, Office of the Deputy Administrator Veterinary Services, Animal and Plant Health Inspection Service (APHIS), US Department of Agriculture, USA
Achieving improved collaboration across human and animal health sectors to address complex health problems, including global zoonotic diseases, food safety, and other disease threats — Views from the Public Sector.

PANEL 2

Enabling One Health Policy Environments

—Perspectives from Public–Public Sector Partnerships

- **Michael Robach,**
Vice President, Corporate Food Safety & Regulatory Affairs,
Cargill, USA
Issues around promoting stronger public-private sector policies for improved risk reduction, early reporting, and enhanced response— One Health and Food Safety.
- **Theerapat Prayurasiddhi,**
Deputy Director General, Department of National Parks,
Wildlife and Plant Conservation,
Ministry of Environment and Natural Resources, Thailand
Policies that reinforce best practices in preventing risks of human exposure to emerging zoonotic disease threats in SE Asia.
- **Steven Phillips,**
Senior Fellow, Chatham House
(Royal Institute of International Affairs), United Kingdom
Extractive Industries Infectious Diseases Risk Assessment and Management. Formerly Medical Director for Global Projects at Exxon Mobil Corporation. A recap of the challenges and lessons learned—steps to move policies ahead that enable multisectoral collaborations for improved human, animal, environmental health.

MODERATOR**Joseph ANNELLI**

Director

*One Health Coordination Office, Office of the Deputy Administrator Veterinary Services, Animal and Plant Health Inspection Service (APHIS), US Department of Agriculture
USA*

**SANTANU K
BANDYOPADHYAY**

Member

*Agriculture Scientists
Recruitment Board
India*

Indian Graduate in Veterinary Science with Masters in Microbiology. PhD from Cambridge University in UK on regulation of Gene Expression in Bovine Herpes virus-1 infection. Exclusive 20 years of research experience on animal viruses, e.g., FMD, rinderpest, PPR, Bluetongue, particularly in epidemiology and development of diagnostics and prophylactics. Was involved in teaching graduate students in the discipline of Microbiology and supervised 5 PhD students as Chairman and also worked as Head of the Faculty. As Project Director of FMD Epidemiology Programme in India between 2000 to 2004 coordinated activities of 22 laboratories in India involved in laboratory diagnosis and field epidemiology of FMD in India. Worked as Dean of Graduate programme in a National University from 2002 to 2004 in India.

Worked as Animal Husbandry Commissioner of the Government of India from 2004 to 2009. Besides CVO, this job also involved development and regulation of the livestock sector in the country with about 550 million livestock and 300 million poultry. The biggest challenge faced during the period is the emergence of bird-flu in India, which was successfully contained and subsequently confined to a small endemic zone in the eastern part of the country. As CVO also monitored the official FMD control programme fully sponsored by the Government in specific and defined areas of the country. Represented India as the Chief of Delegation in OIE General Sessions several times during this period and managed to secure freedom from rinderpest disease and infection for India. Also obtained OIE status of International HPAI Reference Laboratory for the national referral laboratory in India. Was elected a Member of the OIE Biological Standards Commission from 2006 to 2009.

Between 2009 and 2012 worked as Senior Technical Coordinator and Team Leader for the FAO's HPAI programme in Viet Nam. The CVO experience of India was helpful in facing a different set of challenges in Viet Nam including the challenges of constantly evolving new strains of HPAI, particularly in northern region and the issue of vaccination of poultry against HPAI.

Presently working as Member of the Agriculture Scientists Recruitment Board in India. The job involves recruitment of Scientists and Science Managers in about 85 research establishments of the Indian Council of Agriculture Research, with particular reference to animal and fishery science research.



Professor Gervais Ondobo Andze is a Professor of Pediatric surgery since his brilliant success at the competitive examination of aggregation of the African and Malagasy Council for Higher Education (AMCHE) in 1998.

After medical studies between 1978 and 1984, in October 1984 he was made Doctor of Medicine from the Yaounde University Teaching Hospital (YUTH), notably after defending a thesis which advocated the DUHAMEL operation in the surgical treatment of Hirschsprung Disease in children in Cameroon.

Thereafter, he furthered his post-graduate surgical training at the Cheikh Anta Diop University of Dakar from late October 1984 where he obtained the Certificate of Special Studies (CSS) in General Surgery in October 1988, and at the University of Montreal from December 1988 to December 1990 where he obtained the Diploma of Special Studies (DSS) in General Pediatric Surgery.

Upon his return to Cameroon in late December 1990, he was recruited in early 1991 in the Ministry of Public Health, and posted as a surgeon in the Surgical Unit of the Yaounde General Hospital where he worked for 10 years before being appointed in 2002 as Head of the Paediatric Surgical Unit of the Yaounde Gynaeco-Obstetrics and Pediatric Hospital.

In the meantime, he served as Secretary General to the organization of the Cameroon National Medical Conference from 1992 to 1997 and as such, he played a vital role in the field of Continuing Medical Education of health professionals from the Ministry of Public Health of Cameroon. He contributed over time to make the National Medical Conference of Cameroon at that period the most important annual Medical Forum in the Central African sub-region. This earned him the privilege of organizing many other international scientific meetings, particularly in the field of laparoscopic surgery and telemedicine.

In June 2008, he was appointed Director of Disease Control in the Ministry of Public Health and cumulatively, Chairperson of the National Onchocerciasis Technical Group (NOTG). This was the beginning of a career at high levels in the Cameroon Administration where he distinguished himself by numerous reforms in the field of disease control, including the development of several national strategic plans

to prevent and control certain diseases, as well as a political statement by the highest authorities of the country resolved to eliminate onchocerciasis in the national territory.

Between 2010 and March 2012, as Director of Disease Control, he chaired the Malaria Control Steering Committee along the Chad-Cameroon pipeline corridor and the SURVAC Project Committee (Strengthening Epidemiological Surveillance in Central Africa) funded by the Bill and Melinda Gates Foundation. He also participated in several statutory government missions in the field of public health with multinational institutions (WHO, UN) and took part in many international ministerial conferences, particularly in Europe and Africa on health issues of current concern, especially cross-border cooperation in the fight against cholera and other emerging / re-emerging diseases.

As a result of performing such duties he became an actor in strengthening the Integrated Disease Surveillance and Response (IDSR) in his country, including the EPT component with USAID/RESPOND. At the same time, he became an African stakeholder in the implementation of the "One Health" approach in collaboration with the African Union Interafrican Bureau for Animal Resources (AU-IBAR).

In April 2012, he was appointed Inspector of Medical and Paramedical Services in the Ministry of Public Health, by Decree of the Prime Minister, Head of Government, a position he holds to this day.

He has published hundreds of scientific papers as author or co-author in national and international medical journals and is a member of several learned societies in the world.

GERVAIS ONDOBO ANDZE

Inspector in charge
of health and former
Director

*Disease Control
Ministry of Public Health
Cameroon*



Dr. Joseph Anelli is the Director of the US Department of Agriculture's (USDA) Animal and Plant Health Inspection Service's (APHIS) Veterinary Services One Health Coordination Office. As such he assists Veterinary Services, APHIS and USDA in implementing the One-Health principles of applying joint strategies at the human-animal-ecosystem. The core of his work involves providing senior level leadership and coordination for USDA One Health Joint Working Group in addition to VS. This working group is responsible for coordinating strategic policy, plans and actions for all USDA Agencies and Offices as they relate to the interrelationships of the human-animal-ecosystem interface and its impact on agriculture and public health.

Dr. Anelli comes to this position with a rich background in addressing diseases at the human animal interface. He has been in private practice in Tennessee and New York before joining USDA APHIS in 1985. His first position was section veterinarian for New York City and Long Island where he ran a number of task forces to eradicate Avian Influenza from live bird markets. In 1988 he was selected for a graduate degree program in public health and swine medicine at the University of Minnesota where he was awarded a Masters of Veterinary Medicine in Epidemiology. He served as National Swine Epidemiologist and Chief of Swine Health Staff where he was successful at reducing the number of known swine brucellosis infected herds to zero, initiating discussions on trichina reduction projects, and began a revision of the swine health protection program. Dr. Anelli was asked to combine Swine Health Staff with the former Miscellaneous Diseases Staff and so began the National Animal Health Programs Staff (NAHPS). As Chief of NAHPS his worked covered 23 programs affecting all species. In 1996 Dr. Anelli was appointed Chief of Emergency Programs. Since that time he has worked closely with State and industry officials to redefine our beliefs regarding emergencies and our response to them. He has been instrumental in the rewriting of the Federal Response Plan into the National Response Plan and is one of the primary authors of Emergency Support Function 11 for Agriculture. As a result of this interagency coordination Dr. Anelli headed the division of Emergency Management responsible for interagency coordination and liaisons with the Department of Homeland Security, the Federal Emergency

Management Agency, the Department of Defense, and the Department of Health and Human Services and other federal, State and local emergency management functions across the United State.

When global concerns for highly pathogenic H5N1 avian influenza and the possibility of an emerging pandemic began he started in a new role at the APHIS and Departmental levels. Dr. Anelli was detailed to the Office of the Secretary as liaison to the White House's Homeland Security Council on Avian Influenza and also served as Director of the International Avian Influenza Coordination Center before returning to Veterinary Services in his current position. He was ideally positioned to continue in this role through the 2009-H1N1 Influenza Pandemic building upon the networks and partnerships developed through the National Strategy for Pandemic Influenza and the response to highly pathogenic H5N1 avian influenza.

JOSEPH ANELLI

Director

*One Health Coordination
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Animal and Plant Health
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Dr. Ruben Donis is a molecular virologist, specialized on vaccines and public health. He earned his Veterinary Medicine degree from the University of Buenos Aires, Argentina, in 1978 and his Ph.D. in Virology from Cornell University, Ithaca, New York, in 1986. He trained on influenza virology as a postdoctoral fellow at St. Jude Children's Research Hospital, in Memphis, Tennessee, under the supervision of Dr. Robert Webster.

Dr. Donis began his career as assistant professor of virology at the University of Nebraska-Lincoln, in the United States in 1989. Dr. Donis was a professor at the University of Nebraska-Lincoln, where he conducted research on influenza and flavivirus molecular biology, taught courses on virology and bioinformatics and coordinated the Intercampus Virology Meetings. After his promotion to Professor he also participated in the leadership of the UNL Center for Biotechnology and served as virology consultant to government and industry organizations.

Dr. Donis joined the Influenza Branch of the Centers for Disease Control in 2003 as Chief of the Molecular Genetics Section, to lead influenza molecular biology research and vaccine development and contribute to the terms of reference of the World Health Organization Collaborating Center for the Surveillance, Epidemiology and Control of Influenza in Atlanta, Georgia, USA. From 2007 to 2012 he served as Chief of the Molecular Virology and Vaccines Branch of the Influenza Division with responsibility to develop expanded risk assessment capacity at the animal-human interface in the Division. In this period, he contributed to the discovery of canine influenza virus (2005) and bat influenza virus (2012). In 2012, Dr. Donis became Associate Director for Policy, Evaluation and Preparedness at the Influenza Division. In this capacity, he oversees programs related to influenza vaccines and pandemic preparedness and policy, including risk assessments based on the properties of emerging viruses and their evolution.

Since 2004, Dr. Donis serves as adjunct Professor of Microbiology at Emory University School of Medicine. Dr. Donis is member of the Editorial Board of Virology and Plos Currents and contributes to the mission of the Biomedical Advanced Research and Development Authority and Public Health Emergency Countermeasures Enterprise of the Department of Health and Human Services, the OIE-FAO Network of Expertise on Influenza (OFFLU) Swine Influenza Virus Surveillance Group, and the World Health Organization Consultation on the Composition of Influenza Vaccines.

RUBEN DONIS

Chief of the Molecular
Virology and Vaccines
Branch

*Centers for Disease Control
and Prevention
USA*



Dr. Marguerite Pappaioanou is a veterinarian and epidemiologist with over 30 years' experience working in global and U.S. public health. She joined the Bethesda-based Development Alternatives, Inc. (DAI) in January 2012, as Senior One Health Technical Advisor to the USAID funded Respond Project, Emerging Pandemic Threats Program. From 1983-2005 she served at the U.S. Centers for Disease Control and Prevention (CDC), beginning as an Epidemic Intelligence Service officer, assessing the effectiveness of malaria drugs in African national malaria control programs, and then as a staff epidemiologist, designing and implementing the family of HIV seroprevalence surveys, directing the USAID funded global capacity building Data for Decision Making Project to strengthen evidence based policies and programs in Africa and South America, supporting field epidemiology training programs, designing emerging infectious disease surveillance, prevention and control programs, and as Associate Director for Science and Policy in CDC's Office of Global Health during 1999-2005, coordinating CDC's programs in Africa and Asia. From February 2005 to October 2007, as Professor, Infectious Disease Epidemiology, University of Minnesota, she led research programs focused on surveillance for emerging zoonotic infectious diseases at the human-animal interface, particularly avian influenza. From 2007-2011, she served as Executive Director of the Association of American Veterinary Colleges. During 2008-2009, she co-chaired the Institute of Medicine, National Research Council Committee on Sustaining Global Surveillance and Response for Emerging Zoonotic Diseases. She received her Doctor of Veterinary Medicine degree from Michigan State University in 1972, Master of Preventive Veterinary Medicine and Doctor of Philosophy degrees from the University of California, Davis, in 1976 and 1982, respectively.

MARGUERITE PAPPAIOANOU

Senior One Health
Technical Advisor

*DAI, Inc.
USA*



Senior Fellow at Chatham House and Project Manager for the IDRAM initiative (Extractive Industries Infectious Diseases Risk Assessment and Management), a global policy-level discussion among the extraction industry, international development and finance institutions, national government stakeholders and science leaders addressing the risks and management of infectious disease outbreaks in global transmission hot zones. Dr. Phillips was formerly Medical Director for Global Projects at Exxon Mobil Corporation. His career there included managing the \$110 million ExxonMobil Malaria Initiative. He has worked closely with governments, NGOs, foundations, UN agencies, multilateral, and faith-based organizations, and the private sector in fostering public-private partnerships as a development platform to address urgent global health priorities. He has served two terms as private sector representative on the Board and Executive Committee of the Roll Back Malaria partnership in Geneva.

He currently serves on the boards of malaria NO MORE™, the World Economic Forum's Global Health Advisory Board, and as an advisor to the United Nations Special Envoy for Millenium Development Goals (MDGs), as well as the Global Health Programs of Harvard's Massachusetts General Hospital and the University of California at San Francisco.

STEVEN PHILLIPS

Senior Fellow

*Chatham House (Royal
Institute of International
Affairs)
United Kingdom*



Mike Robach leads Cargill's efforts across food safety, quality assurance, animal health and regulatory compliance. Mike graduated from Michigan State and Virginia Tech. He is a board member of the Global Food Safety Initiative, Safe Supply of Affordable Food Everywhere, the American Meat Institute, the National Turkey Federation, GMA's Science Institute Executive Board, U.S Poultry and Egg Association, International Association of Food Protection, Institute of Food Technologists, and American Society for Microbiology. He has worked with the OIE, FAO, USDA, FDA and global governments regarding food safety policy, HACCP, and regulatory reform based on science.

From 1995 through 2000, Mike was a member of the National Advisory Committee for Microbiological Criteria in Foods.

MICHAEL ROBACH

Vice President

*Corporate Food Safety &
Regulatory Affairs
Cargill
USA*



Theerapat born in Bangkok on September 29, 1962. He is a graduate of BSc. Forestry Science at Kasetsart University, Thailand in 1984, Msc. Forestry Science at Kasetsart University, Thailand in 1987, and PhD. Conservation Biology at the University of Minnesota, USA in 1997.

From 2006 to 2007 he served as the Director of the Minister of the Natural Resources and Environment Office, after which, in 2008, he was promoted to the Director of the Planning and Information Bureau for the Department of National Parks, Wildlife and Plant Conservation. In 2011, he worked as the Deputy Director General of the Royal Forest Department.

Theerapat, a former chief of the Royal Forest Department's Wildlife Research Station at Huai Kha Khaeng Wildlife Sanctuary, is well-known both in Thailand and abroad for his strong commitment on research and public awareness activities for wildlife in Thailand. For his doctoral dissertation, Theerapat chose to study gaur and banteng, which are two endangered species in Thailand. The importance of his work comes from the fact that not many large wild animals are systematically researched in Thailand. "Thailand's forest and wildlife policy has been emphasized on the protection side," said Theerapat. "Now I think it's time that we invest more on research, for both small and large wild animals. I know the large ones have not been the subject of studies because of all the difficulties, danger and diseases associated in the wild." For his dissertation, Theerapat installed radio transmitters on gaur and banteng for the purpose of monitoring their biology behaviors. The technology is still costly and not prevalent in Thailand. "I also want to adapt some forest management concepts here to use in our country. Adapt, not adopt. The situation here may not be the same as to other countries," said Theerapat.

For most Thai people, having an animal named after one is a real insult, particularly if that animal is a water buffalo, which is often made fun of as stupid, but environmentalist Theerapat Prayurasiddhi considers it an honor. Since 1996, the subspecies of wild water buffaloes in Thailand have been known internationally as *Bubalus arnee theerapati*. Australian taxonomist Dr. C.P. Groves named the endangered animals after Theerapat, who took the first photo of the live wild animals in

1987 in Thailand's Huai Kha Khaeng Wildlife Sanctuary. Wild Water Buffaloes had not been seen alive at all in Thailand for decades.

"The name (theerapati) honors Mr. Theerapat Prayurasiddhi, whose continuing fieldwork in Huai Kha Khaeng has added notably to our understanding of the ecology of gaur, banteng, and the 50-100 remaining wild buffaloes, laying a sound basis for their conservation," wrote Groves in his article on "The Taxonomy of the Asian Wild Buffalo." It was published in the International Journal of Mammalian Biology -- a Germany-based publication.

While working as the Deputy Direct General of the Department of National Parks, Wildlife and Plant Conservation, Theerapat intensifies his efforts to suppress the wildlife trade, especially at international airports and border checkpoints. "CITES has faulted us for being a hub for wildlife smuggling. Unfortunately, Thailand is a hub for regional transportation. What we can do right now is to come up with tougher wildlife trade inspection measures, especially at Suvarnabhumi Airport, where confiscations of wildlife have been increasing. Thailand will closely work with ASEAN – WEN and CITES to combat on illegal wildlife trade. In addition, he has established 30 wildlife operation units to monitor on emerging zoonotic disease threat in Thailand and worked with the Ministry of Agriculture and Cooperative and the Ministry of Public Health.

THEERAPAT PRAYURASIDDHI

Deputy Director General
Department of National
Parks, Wildlife and Plant
Conservation

*Ministry of Environment
and Natural Resources
Thailand*

ENABLING POLICY ENVIRONMENTS FOR A "ONE HEALTH" APPROACH:

The Cameroonian Experience, An Example of Multi-Sector Collaboration.

Gervais ONDOBO ANDZE, PHD

INTRODUCTION

The first decade of the 21st century was marked by the emergence of global pandemics such as HIV/AIDS, the influenza A (H1N1) pandemic in 2009, the highly pathogenic avian influenza A (H5N1), or severe acute respiratory syndrome. About 75% of these zoonotic diseases have a significant public health and socio-economic impact. Lessons learned from the strategies put in place, for the prevention and fight against these diseases of animal origin have highlighted the need for an inter-sector collaboration, particularly in the human health, animal health and environmental domains.

For long, we have completely separated the human health, animal health and even environmental health domains. This separation should be resolved, because the interaction between the environment, animals and human life is inevitable. Thus, men are constantly exposed to risks associated with this Human-Animal-Ecosystem interface. Indeed, according to the World Organization for Animal Health (OIE), 60% of human pathogens are of zoonotic origin and 80% of the agents which may have potential bioterrorist use are zoonotic

pathogens. The development of a holistic approach here therefore has all its importance and relevance, hence, the need to develop principles and set objectives to facilitate this inter-sector collaboration.

Promoting a collaborative approach like the "One Health" type at the national level will confer an enhanced political support over time, to ensure coordinated disease prevention with major impact on public health and animal health in the man-animal-ecosystem (OIE) interface. That is why, we should insist on the importance of continuous improvement of inter-sector collaboration of all actors working for the well-being of the ecosystem (human-animal-environment).

II- THE CAMEROONIAN EXPERIENCE OF MULTI-SECTOR COLLABORATION

II-1. The Common Fund Project (2006-2010)

During the management of zoonotic risks that the country has faced in recent years, the Cameroon Government fully integrated the principle of multi-sector participation in the response to epidemics, notably with the Common Fund Project for the

Prevention and Control of Avian Influenza in Cameroon. To facilitate this operation, the project consists of:

- An Ad Hoc Inter-ministerial Committee (IMC) in charge of administrative coordination: 13 Ministries were involved;
- The UNDP ensured the financial management of funds allocated by the various donors in accordance with the management procedures of the United Nations system;
- A Steering Committee co-chaired by the Chairperson of the IMC and the UNDP Resident Representative;
- The Coordination Unit based in the Prime Minister's Office: it was the centre of operations and the communication link between the various stakeholders;
- A Technical Committee (housed in the Prime Minister's office) and Focal Points designated in each ministry;
- A National Brigade.

The Inter-ministerial Committee has shown its effectiveness in the management of health risks associated with avian influenza A(H5N1) and mobilized all forces of the country against this phenomenon. The partnership that was within the Government has not only proven its effectiveness in crisis and disaster management, but also in the rational use of resources, through the establishing of a common fund with efficient financial management procedures.

II-2. The development of the Integrated Disease Surveillance and Response (IDSR) guide and the management of rabies

The IDSR Guide for Cameroon was developed in 2005 by the Ministry of Health with support from

WHO, and revised in 2011. The revision of the IDSR Guide was carried out while integrating the "One Health" concept with a strong involvement of livestock, fisheries and animal industries.

Moreover, interventions in the management of certain diseases such as rabies are carried out in conjunction with the Ministry of Fisheries and Animal Industries, the Ministry of Territorial Administration and Decentralization and even Communities. Indeed, the investigation teams of suspected cases of canine and/or human rabies are multi-sector, and this therefore provides an opportunity for all sectors to better identify or target interventions and carry out appropriate responses in a coordinated manner.

II-3. The National Programme for Prevention and Control of Emerging and Re-emerging Zoonosis (NPPCERZ)

Lessons learned from the Common Fund Project were enhanced by the creation of an Ad Hoc Inter-Ministerial Committee responsible for developing and implementing the NPPCERZ in accordance with Decree No.070 of April 28th 2008 of the Prime Minister, Head of Government.

Through a participatory and consensual approach, the Committee, composed of representatives of 8 ministries under the supervision of two consultants, developed the programme from September 2011 to February 2012.

In its execution, this programme aims to implement the multi-sector and inter-disciplinary approach based on three axes:

- Epidemiological surveillance and response, notably establishing a network of

epidemiological surveillance of wildlife at the level of protected areas. In this perspective, it involves initiating a common agreement with hunting guides, collecting samples from wildlife animals legally hunted within the context of strengthening epidemiological surveillance and even epidemiological vigilance;

- Training;
- Research.

Institutionally, it consists of three main organs, namely:

- The Steering Committee;
- The Technical Committee Orientation;
- The National Coordination.

The lessons learned from this measure clearly reveal that the “One Health” concept which materializes through inter-sector collaboration in the fields of human health, animal health and the environment health is not a new phenomenon in Cameroon. Moreover, this collaboration needs to be operationalized, so that it is no longer only a reactive approach but rather an anticipatory and proactive approach faced with the potential health risks associated with interactions between recurring human life, animal life and global warming.

This means that the lessons learned from the Cameroonian experience mentioned above allow us to assert that the success of a multi-sector and even inter-sector collaboration greatly relies among other things, on good multi-sector system coordination and the existence of an integrated national policy document.

III- BASIC PILLARS OF AN EFFECTIVE MULTI-SECTOR COLLABORATION

III-1. 1st pillar: One Coordination

Coordination is defined as the harmonious management of the actions of several persons towards a common goal. There are several types of coordination systems, it is therefore necessary to adopt a coordination system that best suits the socio-political environment, that is to say, a system which respects the administrative and political structure of the country.

In the case of Cameroon, the Government is headed by the Prime Minister. The coordination strategy of inter-ministerial and / or multi-sector places him at the head of intervention mechanisms. A regulatory text signed by him obligatorily commits all ministers concerned, on behalf of the principle of subordination. Similarly, coordination at the intermediate level (regional and divisional) of multi-sector activities is ensured by the Governor and Senior Divisional Officer, local authorities and representatives of the Government.

• III-1.1 The sharing of Information and knowledge between different sectors of human health, animal health and the environment.

This involves breaking down the barriers between the different disciplines of human health, animal health and environmental health (general medicine, human biology, public health, zoology, animal biology, nutritionists, veterinarians, eco-guards, environmentalists, etc...). It is therefore necessary to set up a platform and /or a network that will allow

information sharing and data harmonization, to optimize prevention, Human-Wildlife conflict management in Protected Areas and management of potential epidemics. This network should be a group of persons and structures established throughout the country that constantly carry out monitoring, in order to detect any occurrence of priority diseases and inform the central level for quick decisions and consequent actions. The establishment of such an inter-sector network to monitor health, based on the use of a multi-sector coordinated dynamic mapping of geo-referenced potential health risks (diseases and their vectors) will thus facilitate the development of a common language between experts of different sectors.

• III-1.2. An Appropriate Institutional Framework

Health risks management, associated with the Human-Animal Interface, through inter-sector collaboration in the fields of human health, animal health and environmental health, needs to be legally framed. This legal framework is achieved through the creation of a multi-sector structure by the highest authority of the country if necessary, with regulations governing the organization and operation. This is about giving that structure the legal characteristics necessary for an effective implementation of its recommendations in the community. All this would de facto enable each entity of the structure to fully play its complementary role in relation with the other entities. This institutional framework would primarily aim at harmonizing the coordination of various interventions.

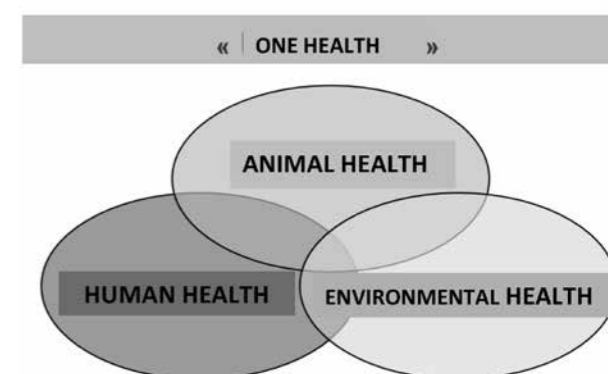
In addition, this regulatory framework aims in a short-term at ensuring the follow-up of activities registration related to the National Programme for

Prevention and fight against emerging and re-emerging zoonosis in budget lines (programme budget 2013-2015) of key sectors (Health, Forest and Wildlife, Environment, Research, Livestock and Animal Industries) for the implementation of this programme from 2013.

Finally, it is planned to conduct awareness campaigns on the concept of “One Health” in training schools and faculties of human and veterinary medicine, wildlife and forests, public health administration.

• III-1.3. The designation of Focal Points in different sectors of human health, animal and environmental health.

To avoid the dispersion of energy and create an atmosphere of confusion in the work of different sectors, resource persons should be designated to collect and disseminate data and/or information for the benefit of these sectors: they are Focal Points. They are chosen within each ministry involved in the management of health risks.



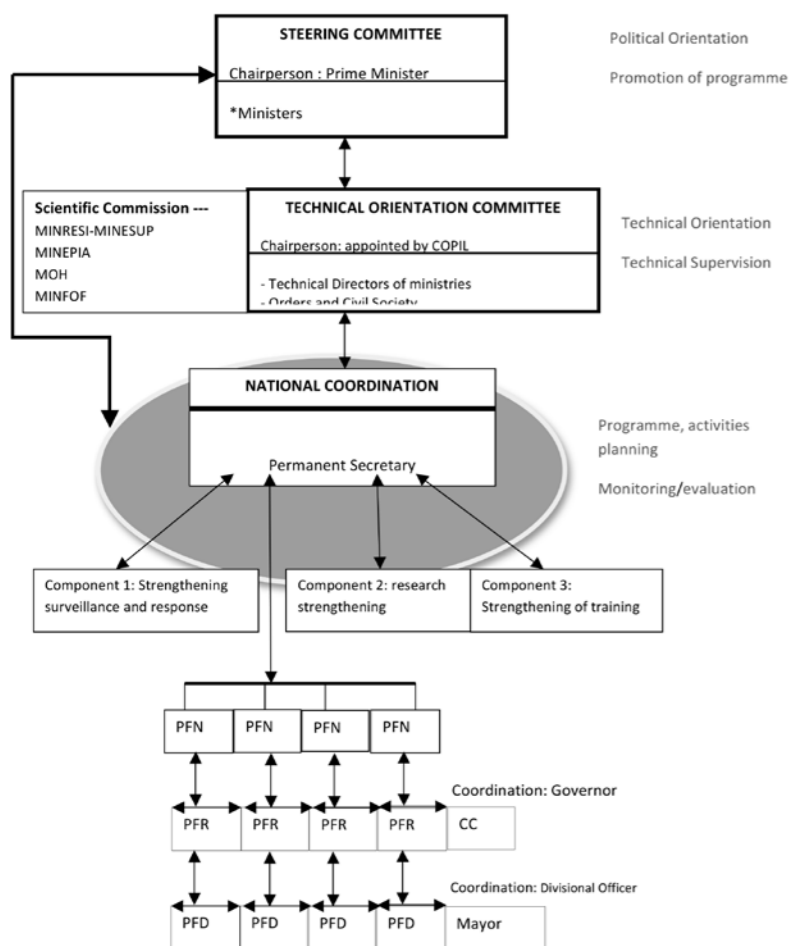


Figure 1: Diagram of PNPLZER Coordination System

III-2. 2nd pillar: A single integrated national strategy document

The philosopher Ludwig Wittgenstein said that: “The strategy comes when forecasts are no longer possible.” The existence of a national strategy is essential in the resolution of health risks related to the emergence of infectious diseases in a country, because of their unpredictability. A national strategy is therefore a detailed plan to achieve success, all decisions and activities selected to achieve long-term goals. It is in this perspective that Cameroon has developed its “One Health” national strategy.

The “One Health” national strategy is the result of efforts to be produced by the health animal sectors themselves (domestic and wildlife), human

health and Cameroon environmental health to now work together, in an inter-sector and synergic manner for the management of health security of human and animal species. This is the operational framework within which all programmes and projects related to animal, human and ecosystem health must be registered.

III-3. 3rd pillar: Capacity building and awareness of human resources of human health, animal and the environmental health.

Human resources from different sectors should be sensitized on the need for dialogue between the actors from these sectors for the well-being of humans, the preservation of animal species and the preservation of ecosystem or environmental health.

Capacity building through training of staff and organization of refresher seminars are essential for the acquisition of key concepts relating to the Human-Animal-ecosystem interface by the different actors. All this would contribute to a good mastery of decisions taken collectively and coordinated for effective and efficient inter-sector collaboration.

III-4. 4th pillar: Broadening the dialogue platform to other related sectors

Health risks management related to the Human-Animal-Environment interface do not only challenge the human, animal and environmental health sectors, but also all other related activities sectors which suffer little or no consequences of abnormalities of this interface. This is the case for example of the economy and town planning, social housing, tourism, education, higher education, water and energy sectors with structural projects or industrial development. All these sectors should actually participate in the multi-sector collaboration network at the research, prevention level as well as response level to the abnormalities of the interface.

CONCLUSION

In the context of multi-sector and inter-sector collaboration mentioned above, the implementation of a single integrated national



Figure 2 : Diagram of the “One Health” strategy approach in Cameroon.

strategy is essential to the success of any national programme for the prevention and control of zoonosis and emerging/re-emerging diseases under the leadership of an efficient centralized coordination with decentralized organized and operational multi-sector structures.

The national multi-sector collaboration should invest in baptismal fonts of a more active international cooperation in the field of prevention and control of any zoonotic risks, for the purpose of protecting the entire planet against the adverse health effects related to such risks on public health worldwide, while also preserving the inherent hazards and scourges that threaten global food security and the survival of the human race.

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 MINEPIA: Decision No ----- to create a Secretariat of the Committee in charge of the development of the National Programme for the Prevention and Control of emerging and re-emerging Zoonosis 2011.
 PM: Order No. 070/PM of April 28th 2008 establishing a Committee on the development of the National Prevention Programme and emerging and re-emerging Zoonosis control, Prime Minister, Head of Government;
 Website:
 -WHO: [http://www.who.int/fr:Document RSI \(2005\) ;](http://www.who.int/fr:Document RSI (2005) ;)
 -OIE : <http://www.oie.int/fr: «une seule santé » en bref.>

ENABLING ONE HEALTH POLICY ENVIRONMENTS – VIEWS FROM THE PUBLIC SECTOR:

Centers for Disease Control and Prevention
and the United State Department of Agriculture

Ruben O. DONIS, PHD and Joseph F. ANNELLI, DVM, MS

This conference focuses on interdisciplinary collaborations and communications, otherwise known as a “One Health” approach, in all aspects of policy and actions for human, animal and environmental health. Influenza epitomizes the Conference theme of “A world united against infectious disease: cross-sectoral solutions”. The world’s human and animal health officials have been galvanized since the emergence of and recognition that the highly pathogenic H5N1 avian influenza virus was not only lethal to birds but also to people (WHO report on the cumulative number of cases and deaths as of December 17, 2012 was 610 cases with 360 fatalities). Over the last several decades, tens of thousands of people have died from emerging pandemic zoonotic diseases, including over 18,000 who died from the 2009 H1N1 influenza pandemic which also caused over \$200 billion in economic losses.

Recently it was discovered that people were infected with a variant of the H3N2 virus found in swine at state and county fairs in the United States. This situation, described in detail in various Morbidity and Mortality Weekly Report articles

(an example below) will be used as the “case study” for how various public sector organizations worked together to identify cases, characterize the situation, develop options for mitigation, and implement intervention strategies that minimized both disease transmission and economic impact.

Morbidity Mortality Weekly Report. 2012 Jul 27;61(29):561.

Notes from the field: Outbreak of influenza A (H3N2) virus among persons and swine at a county fair—Indiana, July 2012. Centers for Disease Control and Prevention (CDC).

During July 12-16, 2012, the Indiana State Department of Health and the Indiana

Board of Animal Health identified respiratory illness among swine and persons at a county fair held July 8-14. On July 16, specimens were collected from four persons with respiratory illness; two had become ill on July 12 and sought care at an emergency department, and two were identified as part of the subsequent public health investigation. All four persons were swine exhibitors or family

members of swine exhibitors and had close contact with swine. On July 18, reverse transcription-polymerase chain reaction testing at the Indiana State Department of Health laboratory identified suspected influenza A (H3N2) variant (H3N2v) virus* in all four specimens. On July 21, partial genome sequencing at CDC confirmed H3N2v virus with the influenza A (H1N1)pdm09 virus M gene; the viruses detected in the four specimens are similar to 12 viruses detected in 2011 and one detected earlier this year. None of the four persons were hospitalized, and all have fully recovered. PMID: 22832938 [PubMed - indexed for MEDLINE]

Some of the policies and factors that enabled effective cross-sectoral collaboration to investigate these influenza infections at fairs were: 1) Establishment of a plan or framework for zoonotic disease case investigations engaging public and private organizations, 2) High level and flexible plans for all aspects of the investigation: epidemiologic and virologic studies, sample collection, testing, reporting results, communication plan, identification of key personnel, 3) Effective and timely communication, including frequent teleconferences, 4) Transparent data sharing, and perhaps most important; 5) Trust. One of the constraints that was removed was the provision of funding to meet the expectations of the plan.

This session will address both the enablers and barriers to multi-sectoral collaboration and strategic approaches, policy interventions, instruments and tools that we have used to improve the outcomes of these situations. We will also identify some of the essential characteristics of a one health workforce that is necessary to develop political will and create new environments that enable and reward multi-sectoral collaborations.

ONE HEALTH AND FOOD SAFETY

Mike ROBACH

Cargill is an international producer and marketer of food, agricultural, financial and industrial products and services. Founded in 1865, our privately held company employs 140,000 people in 65 countries. We help customers succeed through collaboration and innovation, and are committed to sharing our global knowledge and experience to help meet economic, environmental and social challenges.

In fiscal year 2011, Cargill had \$119.5 billion in sales and other revenues. Earnings from continuing operations were \$2.69 billion. The company also realized \$1.55 billion in income from discontinued operations.

Cargill's purpose is to be the global leader in nourishing people. That takes into account health and nutrition, as well as food safety and food security. We have a mission to create distinctive value, and our approach is to be trustworthy, creative, and enterprising.

As an agricultural and food company, food safety is fundamental to Cargill's ongoing business. Our goal is to provide high quality, safe food every time, everywhere. We recognize that our work in this important area is never done. Every day we work to earn the trust of our customers and consumers,

beginning with the safety of the products we produce and extending to improving food safety around the world.

Our definition of food safety is simple -- protecting people and animals from illness or injury from handling or consuming our food products. Our efforts to ensure this—all along the vast supply chain, from production to consumption—are much more complex. Because we touch the global food supply chain in so many ways and in so many places, we take a broad, comprehensive, science and risk-based approach to ensure the safety and integrity of all of our products. This comprehensive approach is designed to address biological, chemical and physical hazards.

Because we recognize that food safety practices, legislation and regulatory oversight vary between and even within nations, we have adopted one global systems approach to which we hold ourselves accountable across all of our business, in all of our geographies.

It's everyone's responsibility, and we take a very holistic approach from the farm all the way to the plate. We embrace the concept of One Health.

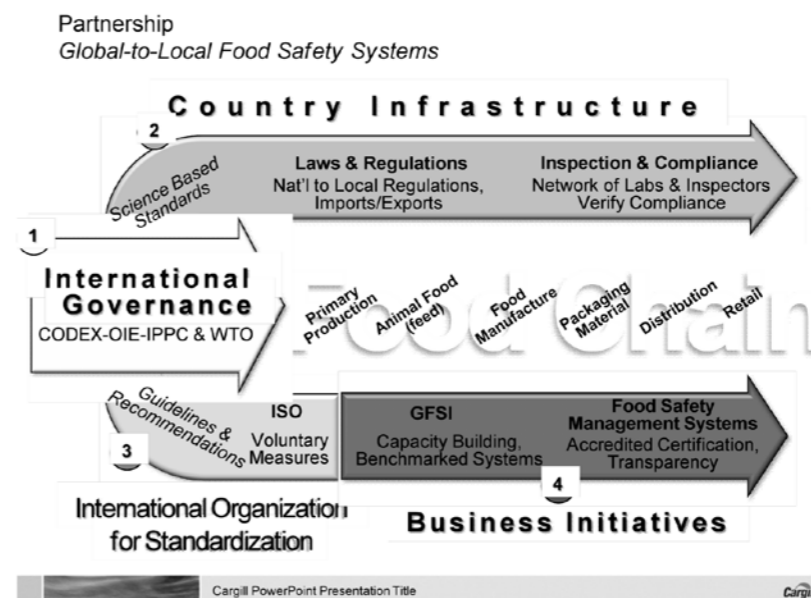


FIGURE 1 Roadmap for the components of global food safety.

I want to share this as a roadmap. It is an example of what One Health is all about. We've worked on this with a number of other colleagues in the food industry and through Michigan State University to create this map for the components around global food safety (Figure 1).

We begin with international governance on the left. There is a track that goes across the top around how governments can adopt the principles, guidelines and recommendations coming out of Codex Alimentarius, the OIE (World Organization for Animal Health) and the International Plant Protection Commission as a basis for the regulatory oversight programs. These organizations are the international standard setting bodies prescribed by the World Trade Organization's Sanitary and Phytosanitary Agreement.

The bottom track outlines how industry has taken those same principles, guidelines, and

recommendations and through an ISO framework, and transformed them into food safety systems that can be implemented and then audited against to assure that the systems have been appropriately deployed. These systems can cover the entire food network going from the farm on the left all the way through to the consumer on the right. It's a shared responsibility, shared accountability thought process through the whole thing.

National governments established the WTO and the SPS agreements, and use CODEX, OIE, and IPPC, for the process for setting international food safety standards. Out of these organizations you have science-based standards that have been internationally vetted, discussed and adopted. From this process guidelines and recommendations are developed that can be utilized by both the public and the private sector in global food safety.

From a government standpoint we all know that strong systems are going to protect customers and consumers, and will also facilitate trade. A number of countries already used CODEX as a basis for a number of their regulations. Many of them reference ISO as voluntary measures, and as suggestions for the industry in terms of adoption. Regarding government inspections and compliance, if a regulatory agency is verifying compliance and evaluating a firm's preventative measures, and the focus is on the elements that come out of international governance, you will have industry and government looking at the same criteria and thus aligned as to what it is that is important as it relates to the safety of our food system.

On the private sector side, the rationale is to build on science-based standards coming out of Codex, OIE, and IPPC. A strategic partnership exists between ISO and WTO to facilitate market requirements. They're working together to make sure that there's a framework available for the private sector to adopt these principles.

The process standardizes implementation, provides harmonization, alignment and consistency across the food chain from origination through consumption. In some cases there may be a market requirement, or it may be referred to in regulations and legislation. For the industry it's a good framework, using the guidelines, recommendations and principles out of Codex, OIE, and IPPC and putting them into a framework that can be adopted then by facilities in their food safety systems.

Within the industry there has been a lot of discussion about food safety being competitive issue. Back in the mid '90s the US beef industry got together as they were struggling with E. coli

O157:H7 and how to deal with the situation. The industry made a decision that food safety would not be a competitive issue.

Companies together shared insight, best practices, and data. Together we've driven O157 presence down significantly focusing in on what were the important elements of a food safety system and getting alignment over how to address the challenge..

We work through an organization called the Global Food Safety Initiative. GFSI is a multi-stakeholder group that benchmarks food safety systems. We just came out with guidance document six earlier this year. It is based on the principles of good hygiene and HACCP from CODEX.

The guidance document has requirements for food safety systems and their delivery. It also has a component around capacity-building that allows these principles to be implemented in emerging markets where the capacity might not be there. There's a process that takes countries or individual facilities in countries through a step-wise progression so that they can achieve this certification process.

We think food safety management systems are really the way to go in terms of having a robust program, and an accredited certification gives us third-party assurances that we're doing the right thing. We strive to create transparency, and confidence in the supply chain. This has to be done through a partnership. We believe it's effective and efficient. We believe that it protects consumers around the globe. This has been implemented within Cargill (Figure 2).



Cargill Food Safety Policy

Cargill is committed to providing safe food and animal feed products and services. We will use only those product development, procurement, supply chain, transportation, storage, production, manufacturing, and distribution systems and suppliers that ensure the safety and regulatory compliance of our products. We will communicate relevant food safety matters both internally and externally. We will adhere to the food safety requirements we have mutually agreed to with our customers. Every Cargill Business Unit, Function, and employee has a responsibility to ensure the production of safe products that comply with the applicable laws, regulations and Corporate Food Safety and Regulatory Affairs requirements. Cargill management will provide the resources and support necessary to enable our employees to fulfill this responsibility and continually improve our programs and processes.

Greg Page
Chairman and Chief Executive Officer

Mike Robach
Vice President
Corporate Food Safety & Regulatory Affairs

FIGURE 2 Cargill
Food Safety Policy.

This document is in every one of our facilities around the world. Everybody is aware of it. Everybody knows it and understands it. In most places around the world you're going to have both the business unit leader and the plant manager also signing this document. It's a true reflection of both top-down and bottom-up commitment to the policy.

We have based our policy and procedures on CODEX. It's a focus on food safety management systems. We have general requirements that are required to be documented. The next section describes management responsibility. Every business unit leader, every plant manager has a responsibility that they must achieve in order to be compliant with the policy.

We also have a resource management section. We have a section describing planning and realization of safe products. These may sound like strange section titles to you, but they're taken from ISO, coming right out of CODEX. These are

very consistent all the way through. In fact, we just this past year renumbered our policy and procedures manual to be in line with CODEX, so it's quite clear.

In looking at planning and realization of safe products, the key is prerequisite programs, steps you must take to enable a hazard analysis, doing the hazard analysis, and then putting in your operational prerequisite programs and establishing your HACCP plan.

Plans are updated on a regular basis, and reassessed annually. Traceability is required, as is control of any nonconforming products. The next essential section includes validation and verification as well as continuous improvement of the management system.

You've got to be able to validate that what you've put in place is effective. Then you've got to verify that you're doing what you said you were going to do over time. These all become

important components. It's important for us to remain outcome-based so that we can drive continuous improvement.

When new technology becomes available, new interventions become available, we want to be able to take advantage of those and not be constrained by a regulatory construct that is prescriptive and telling me how to do it. Let's focus on outcomes. Let's agree on what those performance standards need to be. Let's agree what the outcome needs to be, and then let industry move forward and innovate and continuously improve and share that information across the supply chain.

In summary, I believe that we do have a path forward I think the One Health approach makes a lot of sense. Breaking down the silos between animal health, plant health, food safety, and public health are mandatory. We believe that we have a structure and a mechanism for effective global partnerships in place. We work closely not only with our supply chain and our competitors in the industry, but also with our customers and with the regulatory agencies. Working with academia, consumer groups, government, and industry is the way forward. We've all tried to do it alone. The private sector has tried to do it alone. Government has tried to do it alone. It doesn't work. We've got to work together. We've got to get on the same page. We've got to get aligned around some of these issues.

We believe that resources must be deployed based on risk. You must have a science base and a risk base to apply resources. We're all operating with reduced resources.

We're trying to do more with less, so it becomes even more important that we're focused on the science, we're focused on the risk, and we're applying resources against the areas of greatest need. Focus has to be on prevention. It has to be on preventing issues from happening in order to maintain confidence in the food supply and to have a shared goal of safe, affordable food.

Food security plays into this in a major way, and the more preventative measures we can have in place around the world, the more assurance we're going to have of an abundant, safe food supply. It builds confidence in food safety, enhances global trade. It enhances food security. It enhances people's enjoyment of their nutrition.

Lastly, I have to finish with this last statement. Business shoulders the responsibility for safe food. I know a lot of times government thinks they have the responsibility. They don't. We do. It's our product. It's our brand. They're our customers. We want to work together, and we want to work collaboratively. But at the end of the day, we're the ones who have the responsibility to produce safe food and protect public health, and we accept that.

CHALLENGES AND OPPORTUNITIES FOR PROMOTING ONE HEALTH

Following the Emergence of Bird-Flu in the Developing World: Policy Perspectives

Santanu BANDYOPADHYAY

While largely ignoring the events of 1997 in Hong Kong, South Asia in general and India in particular became concerned about the emerging HPAI in SE Asia only in 2004. There were a couple of scares, before it truly struck India for the first time in 2006 in Central West region. This was also the time when HPAI was reported globally from almost 58 countries covering continents of Asia, Europe and Africa. Two independent outbreaks covering a converging pockets shared by three different states were quickly stamped out with a well laid out Government Action Plan. HPAI never returned in that area. The disease though returned with a vengeance in 2007 and 2008 in the eastern and north-eastern region of India, which also included three countries sharing international borders in that very small region. Since then the disease got entrenched in that small geographical region referred also as Indo-Gangetic plateau but covering four countries, India, Bangladesh, Nepal and Bhutan. It is of interest to note that the H5N1 virus that struck in 2006 in West India is different from the one that subsequently emerged in the Indo-Gangetic Plateau since 2007.

Keeping within the action points relating to India,

the major policy issues that evolved almost from the beginning of bird-flu episodes and which are continuing till date with periodical revisions are largely described as follows:

1. In a Federal System of Governance, acceptance of a uniform Action Plan by all constituent states for the control and containment of HPAI. This Action Plan in the animal health sector is well integrated in to the human flu Action Plan.
2. An agreement on equal cost-sharing between the federal government and the local government for all expenses related to surveillance, control and containment of bird-flu.
3. Constitution of a Joint Working Group on the wake of emergence of bird-flu even before it struck the country involved Ministries of Agriculture, Health and Environment of the Government at the very highest level, which continue to function till date.
4. A stamping out policy for control and containment with an instant compensation mechanism. Other measures, e.g., movement control, market closures etc., are integral

- components of this policy.
5. Policy not to vaccinate poultry against HPAI though the option has been kept open in the event of wide-spread occurrence, which never happened.
 6. Coordination between health, veterinary, agriculture, revenue, police and administration at the lowest administrative division at the site of any suspected/confirmed outbreaks of bird-flu.
 7. Strengthening the AI diagnostic capacity. Recognition of the HPAI National Laboratory as OIE International Reference Laboratory in 2009 and Human Influenza National Laboratory as WHO Regional Reference Laboratory in 2008. More national laboratories established now.
 8. Training of Veterinary and para-veterinary staff in detection, diagnosis, surveillance and management of HPAI. Almost 100% in the endemic region and about 60% of the total veterinary work force in India are now trained.
 9. Ensure adequate stockpile of PPE, Tamiflu, disinfectants and other consumables at any time of the year in each of the State capitals.
 10. A joint cross-border dialogue between India and Bangladesh opened and continuing to monitor cross-border movement of poultry and other livestock and the risks involved due to such movements. This initiative is apart from the FAO study on risks associated with cross-border trade in poultry between India, Bangladesh and Nepal.
 11. A new veterinary legislation was passed through an Act of Indian Parliament in 2009 for the Prevention and Control of Infectious Diseases of Animals.
 12. The Inter-Ministerial Conference on Animal and Human Influenza in New Delhi in 2006 was a real reckoner among the politicians and the administrators in India about the threat to the civilization emerging at the animal-human interface.

There are also policy decisions which do not always work well and could be counter-productive. A very common policy decision in the face of an outbreak in sporadic incidence countries is to clamp an immediate ban on import of livestock and products as soon as an outbreak is reported. In a situation, where cross-border trade, formal or informal, is a norm such clamp down has little effect. It actually increases the risks as it encourages illegal trade through often porous borders. Such illegally traded animals are not cleared through any health inspection at either side of the international borders as it would, if traded legally.

The 1997 episodes of HPAI were mostly ignored in South Asia. The alarm bells started really ringing from the beginning of 2004 in the whole of Asia with reports of HPAI emerging from Indonesia, Thailand, China and Vietnam. No other diseases of animals brought the focus on the concept of One Health as much as HPAI did. The murmurs arose in the developing countries with the emergence of SARS, which transformed in to action with HPAI and got further strengthened with pH1N1 or swine-flu. Until then the zoonoses was mostly restricted to rabies and food-borne salmonellosis. It is also to be appreciated that the veterinary service delivery capacity, particularly the capacity in diagnostic laboratories increased several folds following the threat of HPAI and a possible

pandemic human flu. The contributions of the Governments, international donor agencies and the financial institutions were significant in this respect. Training of the veterinary and para-veterinary staff to face and manage bird-flu will go a long way in managing similar disease emergencies arising in future in the human-animal interface.

The policy constraints that the developing countries face in the developing world are too many to count. The most important among those is the financial resources. The most dilapidated building in the lowest administrative division of a developing country belongs to the Veterinary Department with matching infra-structure. In a federal system of governance, veterinary service delivery is the responsibility of the provincial or local government, which are often fund-strapped. Veterinary service has the lowest priority even in agriculture based economies of the developing world.

Veterinary training for the field veterinarians is not always equipped to sense anything unusual at the animal-human interface except the classical zoonotic infections, e.g., rabies or anthrax. There is very little interaction at ground zero between the human health specialists and veterinarians. The threat to wild life or from the wild life vis-à-vis domestic animal is not fully appreciated by the custodians of welfare of either sector. Bird-flu indeed provided an opportunity for these two sectors to come closer in the affected countries and realize the importance of working together.

A cause for concern is the capacity of the public health professional at the field level to identify unusual disease syndrome appearing among human, which could be a newly emerging zoonotic

disease. Brucellosis is a very common cause of reproductive disorders in livestock in many developing countries with a covert capacity to cause serious health implication to animal handlers or people in regular contact with carrier of the infection or acutely infected animals. The medical practitioners or the para-medics are often not equipped to diagnose this infection and pass on as PUO (pyrexia of unknown origin) unless they are fully alert about the professional hazards and the risks associated with animal handlers. With H5N1, poultry handlers were possibly lucky as the human infection with this virus detected so far could not clearly establish if they were at any higher risks than those unfortunates who got the infection.

However, there are improvements in the thinking process at the policy level, particularly in those developing countries which bore the brunt of HPAI, SARS, Hendra-Nipah or similar newly emerging infections. It is now getting across to people at large and the administrators and political class in particular that the microbial world is changing fast with every attempt to exploit the environment for more physical benefits through development of industry or infra-structure. Possibilities of emergence of new pathogens at the human, animal and ecosystem interface are no longer within the pages of scientific fictions or plot of a blockbuster movie. The world of the microbes is evolving fast with increasing capacity to involve multiple species. Appropriate policies and enabling environment for pursuing One Health is not trendy but an absolute necessity. Concerted efforts will be needed to promote One Health involving all the stake holders. Particular focus is required for the emergence of any unusual disease events at the identified global hot-spots.

POLICY THAT REINFORCE BEST PRACTICES IN PREVENTING RISKS of Human Exposure to Emerging Zoonotic Disease Threats in SE Asia

Dr.Theerapat PRAYURASIDDHI

Southeast Asia is a hub of the international wildlife trade, functioning as supplier, consumer and import-export center. The increased demand for wildlife species as pets, medicines and food from many countries leading to increase number of wildlife disease and facilitate additional infectious disease emergence. Emerging zoonotic diseases in Thailand enhance the interface between humans and wildlife both native and alien species.

Emerging diseases are dealt with in the environment with three major challenges including wildlife without border, ASEAN Economic Community and illegal wildlife trade. Department of National Parks, Wildlife and Plant Conservation (DNP) strategies consist of Illegal wildlife trade control, develops wildlife health control unit and monitoring emerging disease.

According to Surveillance and Monitoring Emerging Diseases Planning, DNP set up 31 mobile units to surveillance, prevent and control emerging diseases from wildlife in protected areas with coordination from Ministry of Agriculture and Cooperatives and Ministry of Health. In addition, DNP ranger will be educated on occupational health and safety, personal health and hygiene.

Human health checkups and vaccination programs (e.g. Rabies, Tetanus and Influenza vaccine) are required to prevent and control zoonosis from wildlife.

DNP research and monitoring program include avian influenza surveillance program in wild birds are ongoing activities. Bird migration are studied by using satellite transmitter e.g. Brown headed gull, Asian opened bill and migratory routes from birds banding. Emerging infectious disease surveillance program in wildlife in 2013 research for emerging diseases such as Avian influenza and Nipah virus, study on the viral pathogen in non human primate and surveillance of Salmonella spp. isolated from illegal reptiles trade. Moreover, study on wildlife ecology such as bird migration study, mapping of migratory water bird population, mapping of roosting sites and breeding, study colony of water birds and surveying of bat caves and roosting sites in Thailand are important to prevent movement of diseases.

Management of diseases on wildlife usually requires a change in human activities. However, the most important way is by controlling translocation of wild animals to prevent movement of diseases and promote awareness on wildlife zoonosis to public.

4.7

ENHANCING ONE HEALTH:

To Cultures, Add Culture

BACKGROUND

What we know about risks of transmission of zoonoses across the animal-human interface comes from epidemiologic investigations of outbreaks or of endemic disease. These investigations focus primarily on characterization of the pathogen and description of the standard epidemiologic triad of time, place, and person. Unfortunately, most have restricted inquiries about person to general characteristics – age, sex, and overall reported exposure to sick or infected animals. The consequence of this very general level of inquiry is exemplified by the case of avian influenza, one of the most commonly occurring emerging zoonotic diseases. Despite more than 600 cases and more than 350 deaths from avian influenza worldwide since 2003, a recent systematic review of pathways of exposure states that “...the extent and frequency of risk behaviors and the relative risk of different behaviors is currently unknown” (Kerkhove et al., 2011). This lack of knowledge is a serious deterrent to development of effective preventive programs.

There are, however, a few examples of investigations and of containment that benefited from including social scientists on the team. We will ask several scientists involved in some of these investigations to share their experiences and discuss how One Health investigations might regularly benefit from including social scientists.

MODERATOR

Stephen LUBY
Professor
Stanford University
USA

Susan ZIMICKI
Director
Infectious Diseases
FHI360
USA

OBJECTIVES

This session will make the case for

- Specific attention to prevention, and to characterizing the environmental, social, behavioral, and systems context in which disease transmission and amplification occur as means of identifying important preventive measures
- Explicitly including a broader, social science perspective in outbreak investigation and containment as well as in assessing risks of transmission of endemic diseases
- Identifying policy and systems changes needed to integrate this social science perspective as an integral part of a One Health approach

PANELISTS

- **Jeffrey Mariner**, Research Scientist, International Livestock Research Institute, Kenya
- **Saiful Islam**, Assistant Scientist, ICDDR, B, Bangladesh
- **Julienne Ngoundoung Anoko**, Free Lance consultant, Niger
- **Lertrak Srikitjakarn**, Dean Faculty of Veterinary Medicine, Chiang Mai University, Thailand
- **Cynthia Hunter**, Senior Lecturer, Anthropology and International Public Health, University of Sydney, Australia



Cynthia Hunter (PhD) a medical anthropologist and senior lecturer in International Public Health, School of Public Health and the Department of Anthropology, School of Social and Political Sciences at Sydney University teaches in two Masters Programs - International Public Health, and Development Studies. Her research interests focus on illness and healing ethnography and the delivery and quality of health care, particularly the interface between medicine and culture. She has worked in the Asia-Pacific, Australia, and lived in Indonesia conducting ethnographic research of village folk's access to health care. Recent researches include failed asylum seekers and forced migration, tertiary hospital ethnographies of clinicians' interactions with each other in Australia, and Jakarta, Indonesia. Currently she works on World Health Organization (WHO) funded research on Highly Pathogenic Avian Influenza (HPAI, H5N1) - a community response in Bali and Lombok, Indonesia.

CYNTHIA HUNTER

Senior Lecturer
Anthropology and
International Public
Health

*University of Sydney
Australia*



Md. (Mohammed) Saiful Islam works as an Assistant Scientist in the Surveillance and Outbreak Investigation research group of the Centre for Communicable Diseases at icddr,b. A native of Bangladesh, he completed his Bachelor and Masters of Social Science in Sociology at the University of Dhaka in 2005. In April 2006, he joined icddr,b as a Research Fellow in the Health System and Infectious Diseases Division. During his fellowship, he concentrated his research on issues in reproductive health and HIV/AIDS with a focus on qualitative and quantitative research methods. This experience stimulated his interest in the role of social science in epidemiology and public health. In 2007, Mr. Islam joined the Centre for Communicable Diseases (CCD) at icddr,b and has since contributed to numerous outbreak investigations including Nipah virus, H5N1, Anthrax, Hepatitis E, mass psychogenic illness, and various unintentional poisonings. He has also involved in Nosocomial infection in Bangladeshi tertiary care hospitals, Backyard poultry raising practices in Bangladesh and contributed to the design of culturally appropriate interventions for communities and hospitals from a social science perspective. In 2009, he completed a social science research course at the University of California, Berkeley and also studied Cultural Epidemiology short course at the Australia National University. In 2011, he attended a special training course in Tropical Epidemiology at the Institute of Tropical Medicine, in Antwerp, Belgium.

Mr. Islam has several publications in international peer-reviewed journals. His most recent manuscript was in the American Journal of Tropical Medicine and Hygiene, which focused on using a social-ecological model in the investigation of deaths associated with puffer fish ingestion (Month, 2012). Mr. Islam teaches at the James P Grant School of Public Health, BRAC University where he focuses on the role of anthropology in outbreak investigation.

SAIFUL ISLAM

Assistant Scientist

*ICDDR, B
Bangladesh*



Stephen Luby is Professor of Medicine with the Division of Infectious Diseases and Geographic Medicine; Deputy Director for Research at the Center for Global Health Innovation; Senior Fellow at the Woods Institute and Senior Fellow at the Freeman Spogli Institute for International Studies at Stanford University.

Prior to his current appointment, Dr. Luby served for eight years at the International Center for Diarrheal Diseases Research, Bangladesh (ICDDR,B), where he directed the Centre for Communicable Diseases. Dr. Luby was seconded from the US Centers for Disease Control and Prevention (CDC) and was the Country Director for CDC in Bangladesh.

Dr. Luby studied philosophy and earned a Bachelor of Arts summa cum laude from Creighton University in 1981. Dr. Luby earned his medical degree from the University of Texas Southwestern Medical School at Dallas in 1986 and completed his internship and residency in internal medicine at the University of Rochester-Strong Memorial Hospital. He studied epidemiology and public health in the Epidemic Intelligence Service (EIS) and the Preventive Medicine Residency of the Centers for Disease Control and Prevention.

Dr. Luby's career has included an EIS assignment to the South Carolina Department of Health and Environmental Control 1990-91; work with the CDC Malaria Branch in 1992; from 1993-98 Dr. Luby directed the Epidemiology Unit of the Community Health Sciences Department at the Aga Khan University in Karachi, Pakistan; and from 1998-2004 worked as a Medical Epidemiologist in the Foodborne and Diarrheal Diseases Branch of the CDC in Atlanta exploring causes and prevention of diarrheal disease in settings where diarrhea is a leading cause of childhood death.

Dr. Luby's research has addressed a number of public health issues. During his time in Bangladesh he lead a research group that explored the epidemiology of Nipah virus including detailed studies of villager's perspective on and response to the outbreaks and studies of virus circulation in its bat reservoir and spillover into domestic animals and humans. He has published over 200 scientific manuscripts.

STEPHEN LUBY

Professor

*Stanford University
USA*



Dr. Jeffrey C. Mariner is a veterinary epidemiologist currently working at the International Livestock Research Institute. While working at Tufts Cummings School of Veterinary Medicine in the 1980s and 90s, he developed a thermostable rinderpest vaccine that was subsequently adopted by the Global Rinderpest Eradication Program (GREP) as the vaccine of choice in the rinderpest eradication. As part of the field implementation of control programs, Dr. Mariner championed community-based approaches to vaccination and participatory approaches disease surveillance that addressed key constraints to disease control in remote and often politically unstable areas of the world. The integration of thermostable vaccine biotechnology and innovation in animal health institutions were key contributions to the eradication of rinderpest in 2011, only the second disease to be globally eradicated.

Dr. Mariner currently coordinates the Participatory Epidemiology Network for Animal and Public Health and conducts action research on appropriate surveillance and control measures for Peste des Petits Ruminants (PPR or small ruminant plague) in preparation for the progressive control of PPR.

JEFFREY MARINER

Research Scientist

*International Livestock
Research Institute
Kenya*



Julienne Ngoundoung Anoko was born in Yaoundé (Cameroon). Socio-anthropologist of the Sorbonne University, her research focus on understanding the inter relations between human and environment, through the social, religious and economic uses of wildlife and its impact of local communities development. As culture and health implementer/operator she has worked as World Health Organization (WHO) consultant in resource-limited settings to support the Marburg and H1N1 outbreaks response by enhancing affected community's participation, identifying socio-cultural practices and attitudes that can expand and or be benefit to outbreaks control, investigating contexts in which outbreaks occur and adapting communication material to fit the socio-cultural contexts.

She has contributed in the development of several WHO guides. She has also completed masters in epidemiology and public health, and gender and health, and published several papers both in scientific magazines and collective books. She has worked in Latin America, Africa and Europe for multilateral, bilateral agencies and public administrations.

**JULIENNE
NGOUNDOUNG
ANOKO**

Consultant

Niger



In 1979, Lertrak Srikitjakarn graduated Doctor of Veterinary Medicine from the Faculty of Veterinary Medicine, Chulalongkorn University, Thailand. After graduation, he started work as a veterinarian in a world bank supported project aiming to increase cattle production, then 8 years as a field veterinary investigator in Epidemiology section of Thai-German, Regional Veterinary Diagnostic Centre in northeastern Thailand. In 1986 he completed the Dr.med.vet study, on Helminthosis and Fasciolosis control in Buffalo population in northeastern Thailand, at Free University Berlin, Germany. After resignation from government position, he run a private mix practice in dairy production area of Chiangmai for 10 years and become a lecturer of Division of Veterinary Public Health after joined the Faculty of Veterinary Medicine, Chiang Mai University and also Acting Associate Dean of Planning and Research in 1995. In 2003 he was a founder director of Regional Centre for Veterinary Public Health. His research interests are zoonoses control and VPH system.

Dr. Lertrak Srikitjakarn is currently dean of Faculty of Veterinary Medicine, Chiang Mai University since 2006.

**LERTRAK
SRIKITJAKARN**

Dean
Faculty of Veterinary
Medicine

*Chiang Mai University
Thailand*



Dr Zimicki is a demographer and epidemiologist with almost 35 years of experience in child health, infectious diseases and health behavior change. She currently works at FHI360 (formerly AED), where she is Technical Director of the USAID PREVENT Project, which focuses on emerging pandemic threats.

Dr Zimicki has been director of two global USAID projects and has managed the provision of technical assistance in behavior change and communications approaches to more than 20 countries. She currently chairs the STH Advisory Committee of Children Without Worms, a partnership between GlaxoSmithKline, Johnson & Johnson, and The Task Force for Global Health; previously she served as Chair of the WHO/TDR Steering Committee on Implementation Research and the Task Force on Operational Research on Bednets. She has worked in more than 25 countries in Africa and Asia, with long stints in Bangladesh (5 years) and Uganda (3 years) and lengthy assignments (6-8 months) in Senegal, The Gambia and the Philippines.

She received her PhD in Demography from the University of Pennsylvania and her Masters in Epidemiology and Tropical Public Health from Harvard School of Public Health.

SUSAN ZIMICKI

Director
Infectious Diseases

FHI360
USA

PLENARY | 5 SESSION

**SUSTAINABLE EFFECTIVE
CROSS-SECTORAL
COLLABORATION
FOR BIO-SECURED WORLD**

SUSTAINABLE EFFECTIVE CROSS-SECTORAL

Collaboration for Bio-secured World

BACKGROUND

After four days of conference, side events, and field visits, this session will confirm the commitment from leaders in various sectors to work together. It will discuss the ways towards 'sustainable effective cross-sectoral collaboration'. It discusses the approaches to long term effectiveness, efficiencies and sustainability of One Health strategies (policy, financing, systems competencies, risk stratification, civil society and private sector roles).

MODERATOR

Mark SMOLINSKI

Director
Global Health Threats

Skoll Global Threats Fund
USA

PANELISTS

- **Om Kim Sir**, Secretary of State of Ministry for Agriculture, Forestry and Fisheries, Cambodia
- **Hasan Mahmud**, Minister of Environment and Forests, Bangladesh
- **Ali Ghufroon Mukti**, Vice Minister of Health, Indonesia
- **Keiji Fukuda**, Assistant Director-General, Health Security and Environment, World Health Organization, Switzerland
- **Mark Rweynemamu**, Executive Director, Southern African Centre for Infectious Disease Surveillance (SACIDS), Tanzania
- **Ariel Pablos-Mendez**, Assistant Administrator, U.S. Agency for International Development, USA



Dr Keiji Fukuda is the Assistant Director-General for Health Security and Environment, World Health Organization (WHO), since 1 September 2010. He was Special Adviser on Pandemic Influenza to the Director-General from October 2009 and prior to that he was the Assistant Director-General for Health Security and Environment ad interim. In 2005, he came to WHO as a Scientist in the Global Influenza Programme, then was Coordinator from 2006 to 2008 and then was appointed its Director. Under his guidance, the Programme greatly expanded its global role in providing technical leadership and guidance related to seasonal, avian and pandemic influenza.

Dr Fukuda has extensive public health and research experience working on influenza. At WHO, he has helped shape the global approach to pandemic preparedness, helped manage the response to the influenza H1N1 pandemic, strengthened surveillance, and played an instrumental role in facilitating intergovernmental discussions over the sharing of influenza viruses and related benefits. He has participated in many field investigations including the earliest outbreaks of avian H5N1 influenza and the emergence of SARS.

Before coming to WHO, Dr Fukuda was Chief of the Epidemiology Unit, Influenza Branch at the Centers for Disease Control and Prevention in the United States. He is a physician and received his BA from Oberlin College, MD from the University of Vermont and MPH from the University of California, Berkeley

KEIJI FUKUDA

Assistant Director-General
for Health Security and
Environment

*World Health Organization
Switzerland*



Dr. Om Kim Sir graduated medicine science in Poland in 1997. He became a medical doctor and also involved with the policy from 1998 to 2008.

At the present, Dr. Om Kim Sir is the Secretary of State of the Ministry of Agriculture, Forestry and Fisheries in Cambodia and he serves at high rank of the ministry. He is responsible for field of animal health and production, a chief of veterinary law committee, a member of bio-safety committee, a member of National HIV Authorities; and a member of National Committee for Women. In the field of animal health and production, he involves in many activities such as avian influenza control program, rabies vaccination program in targeted sites; and biogas project.

OM KIM SIR

Secretary of State

*Ministry for Agriculture
Forestry and Fisheries
Cambodia*



Dr. Mohammed Hasan Mahmud is a Member of Bangladesh National Parliament elected from the constituency 283 Chittagong-6 (Rangunia Upazila and part of Boalkhali Upazila) and, at present, he is the Minister for Environment and Forests of the People's Republic of Bangladesh. Prior to his appointment as Minister, Dr Mahmud served in the Cabinet of Bangladesh Government as State Minister for Environment and Forests and State Minister for Foreign affairs. He bears a very diverse academic and political background. Dr. Mahmud did his Bachelor (with honours) and Master's degrees in Chemistry respectively in 1988 and 1989 from the Chittagong University, Bangladesh. He again obtained his Second Masters in International Politics from Universite Libre des Bruxelles in 1996. In the same year, he obtained his Third Master's degree in Advanced Studies in Human Ecology (Environmental Science) from Vrije University of Brussels. Dr. Mahmud completed his Ph.D in Environmental Chemistry from Limburg University Centrum, Belgium in 2001. Dr. Mahmud has attended a number of learned international conferences across the world in areas such as global climate change issues, ecology, environment, environmental analytical chemistry, arsenic contamination, environmental law, nutrition and food security, human rights, information technology. Dr. Mahmud takes profound interest in academia and he used to be an Adjacent Faculty member of a number of reputed universities in home and abroad including East West University (Bangladesh), People's University of Bangladesh, and European Institute for Strategic Studies (Belgium). Currently, he teaches environmental science part-time at the North South University in Bangladesh.

HASAN MAHMUD

Minister of Environment
and Forests

Bangladesh

For the last three years, Dr. Mahmud has been leading the delegation of Bangladesh in the UNFCCC negotiation process. He played a vital role in COP15, COP16 and COP17 showing his courageous and competent leadership among the Least Developing Countries. In COP16, he was appointed co-chair along with the Australian Environment Minister to facilitate the negotiation process on finance and capacity building. Recently, Dr. Mahmud attended an 'Expedition to Antarctica' being accompanied by the former US Vice President Mr Al Gore in order to experience the climate change impacts in the polar region. Dr. Mahmud was nominated as one of the five co-chairs at Rio+20 and chaired the first plenary session of Rio+20 that was held in Brazil in June 2012. Dr. Mahmud is widely recognized and well appreciated internationally for his very prominent role and global leadership on climate change issues.



Dr. Ariel Pablos-Méndez is Assistant Administrator for Global Health at the U.S. Agency for International Development (USAID), a position he assumed in August 2011. Nominated by President Obama in March, Dr. Pablos-Méndez joined the USAID leadership team with a vision to shape the Bureau for Global Health's programmatic efforts to accomplish scalable, sustainable and measurable impact on the lives of people in developing countries as envisioned in President Obama's Global Health Initiative. In his capacity as Assistant Administrator for Global Health, he will focus his efforts to further advance the goals and reformatory recommendations expressed in the Presidential Policy Directives, Quadrennial Diplomacy and Development Review, and USAID Forward. By fostering new working relationships and maintaining existing partnerships, Dr. Pablos-Méndez will direct the Bureau's activities and approach toward a standard of technical excellence in implementation science.

Dr. Pablos-Méndez is an experienced public health physician who most recently served as Managing Director at The Rockefeller Foundation where he led the Foundation's global health strategy on the transformation of health systems in Africa and Asia. He first joined the Rockefeller Foundation in 1998, spearheading public-private partnerships in research and development for diseases of poverty, the Foundation's strategy on AIDS care in Africa, and the Joint Learning Initiative on Human Resources for Health. He also served as Director of Knowledge Management at the World Health Organization (WHO) in Geneva, where he established WHO's first eHealth unit.

Dr. Pablos-Méndez is a Board-certified internist and until recently was practicing as a Professor of Clinical Medicine and Epidemiology at Columbia University. He has served in various Boards and international commissions and received his M.D. from the University of Guadalajara's School of Medicine and his MPH from Columbia University.

ARIEL PABLOS-MENDEZ

Assistant Administrator

*U.S. Agency for
International
Development
USA*



Prof. Dr. Ali Ghufron Mukti, MSc., PhD, an expert who is well known for his great involvement, mainly in health insurance, was recently appointed as vice-minister of health of the Republic of Indonesia on October 2011 by President of The Republic of Indonesia.

Besides health and financing/ health insurance, Prof. Ghufron also has expertise in the field of health service quality, family medicine, and epidemiology.

As for his educational background, after earn his medical degree from University of Gadjah Mada, Prof. Ghufron took his master degree at University of Mahidol, Bangkok with MSc degree on tropical hygiene. After completing his master degree, on 2000 Prof. Ghufron finished his doctoral degree on public health from University of Newcastle, Australia. As part of his educational history, Prof. Ghufron has received an award as a research fellow from Brown Unversity.

During his professional career, Prof. Ghufron has been appointed to several important positions. As an academician, some of the academic positions trusted to Prof. Ghufron are Head of Public Health Division, Director of Gadjah Mada Medical Centre (University Health Plan), and Director of Gadjah Mada Graduate Program on Health Financing and Health Insurance Management in the Faculty of Medicine, University of Gadjah Mada Jogjakarta.

On 2008, at the age of 46, Prof. Ghufron was appointed to take the dean position in the faculty of medicine, University of Gadjah Mada and became the youngest dean of the Faculty of Medicine of the University of Gadjah Mada. Other than academic position, Prof. Ghufron was also have professional career as consultant for international agencies in the area of social protection, health finance, and health insurance.

Prof. Ghufron is quite productive as a writer and an experienced speaker. Since the 90's, Prof. Ghufron has published more than 30 publications and wrote several books. His publication consist several disciplines,

not only about health financing/insurance, but also in the field of public health and healthcare management, clinical epidemiology, etc. He was invited as lecturer and examiner in prominent national and international universities such as: University of Indonesia, University of Tokai in Japan, Asia University in Taiwan, and University Kebangsaan Malaysia, University of Newcastle, Vriey University, Netherland.

Besides his professional career and academic activities, Prof. Ghufron is actively involved in many professional organizations both in the national and international scale. In some of the organization, such as the Indonesian Community and Public Health Doctor Association (PDK3MI), Indonesian Health Insurance and Social Security Expert (PAMJAKI), and Indonesian Health Economics Association (IHEA), Prof. Ghufron was appointed as Chairman of the organization. Internationally, Prof. Ghufron was appointed as Indonesian country representative for the South East Asian Public Health Institutes Network (SEAPHEIN) on 2007 and designated as Chairman of the ASEAN "One Health" on 2011.

ALI GHUFRON MUKTI

Vice Minister of Health

Indonesia



Mark Rweynemamu is the Executive Director of the Southern African Centre for Infectious Disease Surveillance (SACIDS), which is a One Health Virtual Centre linking academic and research institutions in Southern Africa (primarily the DRC, Mozambique, South Africa, Tanzania and Zambia) in smart partnership with centres of science in industrialised countries, especially the Royal Veterinary College and the London School of Hygiene and Tropical Medicine. He manages grants from the Wellcome Trust, Rockefeller Foundation and Google Foundation which total approximates USDollar 11 million. The SACIDS Headquarters is located at Sokoine University of Agriculture (SUA), Morogoro, Tanzania where it is associated with the Faculty of Veterinary Medicine.

He is a Visiting Professor at the RVC, London and the Sokoine University of Agriculture, Morogoro, Tanzania. Previously he headed the FAO programme on infectious diseases including the coordination of global rinderpest eradication. He has worked in government, industry and academia. He has consulted widely for national governments and international organisations. He was a member of the EFSA Working Group on assessing the risk of Foot and Mouth Disease introduction into the EU from developing countries, and The Foresight study on Infectious Diseases – Preparing for the Future.

He is a member of the Scientific Advisory Board of the UK Institute for Animal Health and the Chairperson of the Scientific Advisory Committee of the GALVmed, a public-private partnership that focuses on supporting the development of biologicals and therapeutics for orphan diseases in developing countries. He is Chair of CORDS, a One Health focused global network that connects organizations for regional disease surveillance. He has published over 100 papers in peer reviewed journals.

MARK RWEYNEMAMU

Executive Director

*Southern African Centre
for Infectious Disease
Surveillance (SACIDS)
Tanzania*



Mark has led global efforts toward early detection and rapid response to emerging threats. His work has brought together governments, NGOs, academia, and private industry in partnerships across national borders in Southern Africa, the Middle East, Asia, Russia, and SE Asia.

In 2006, Mark joined the start-up team at Google.org as the director of the Predict and Prevent Initiative. Prior to Google, Mark served as Vice President for Biological Programs at the Nuclear Threat Initiative, a public charity directed by CNN founder Ted Turner and former U.S. Senator Sam Nunn. While at NTI, Mark led the development of a regional disease surveillance system linking Israel, Jordan, and the Palestinian Authority, demonstrating the power of health as a diplomatic tool even in areas of longstanding conflict.

In 2003, the Institute of Medicine of the National Academy of Sciences released a landmark report, the Emergence, Detection, and Response to Microbial Threats to Health for which Mark was the study director. He has also served as an advisor to the World Health Organization, Senior Advisor to the U.S. Surgeon General and Assistant Secretary of Health, and an Epidemic Intelligence Officer at the U.S. Centers for Disease Control and Prevention. Mark was a member of the investigation team that discovered hantavirus in 1993 in Southwestern United States.

A native of Michigan, Mark holds a B.S. from the University of Michigan in Ann Arbor where he also received his M.D. He received his M.P.H. from the University of Arizona. Mark is a trained Internist and board certified in Preventive Medicine and Public Health. WIRED magazine's 2008 Smart List of 15 people the next president should listen to included Mark, a.k.a., the threat detective.

MARK SMOLINSKI

Director
Global Health Threats

*Skoll Global Threats Fund
USA*

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