PMAC | PRINCE MAHIDOL AWARD CONFERENCE 2018

REPORT

ON THE 2018 CONFERENCE ON

MAKING THE WORLD SAFE FROM THE THREATS OF EMERGING INFECTIOUS DISEASES

29 JANUARY - 3 FEBRUARY 2018 I 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


Dedicated
to
Thai

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PRINCE MAHIDOL AWARD

The Prince Mahidol Award was established in 1992 to commemorate the 100th birthday anniversary of Prince 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 resource 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 of 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 an international award- the Prince Mahidol Award, 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 laureates 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 any one 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 Prince 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.

In the past 26 years, 74 individuals, groups of individuals, and institutions had received the Prince Mahidol Award. Among them, 4 subsequently received the Nobel Prize. More importantly, 2 of the most the recent Nobel Prize (2015) laureates in physiology or medicine were conferred the Prince Mahidol Award prior to their continual prestigious recognition namely:

Professor Dr. Satoshi Omura
Prince Mahidol Award in the field of Medicine in 1997
Nobel Prize in Physiology or Medicine 2015

Professor Dr. Satoshi Omura was conferred the Prince Mahidol Award in the field of Medicine in 1997. He is known for the discovery and development of various pharmaceuticals originally occurring in microorganisms. His research group isolated a strain of Streptomyces avermitilis that produce the anti-parasitical compound avermectin-which contributed to the development of the drug ivermectin that is today used against river blindness, lymphatic filariasis and other parasitic infections.

Professor Tu YouYou
A member of The China Cooperative Research Group on Qinghaosu and its Derivatives as Antimalarials

Prince Mahidol Award in the field of Medicine in 2005
Nobel Prize in Physiology or Medicine 2015

Professor Tu You You, a member of The China Cooperative Research Group on Qinghaosu and its Derivatives as Antimalarials, was conferred the Prince Mahidol Award in the field of Medicine in 2003 as an organizational category—for the discovery of qinghaosu as a new drug for treatment of the P.falciparum malaria.

Honorable Mention of the Prince Mahidol Award Laureates, who later received further recognition:

Professor Barry J. Marshall

Prince Mahidol Award
in the field of Public Health in 2001

Nobel Prize in Physiology
or Medicine 2005

Professor Barry J. Marshall from Australia was conferred the Prince Mahidol Award in the field of Public Health in 2001 for the discovery of the new bacterium identified as Helicobacter pylori that caused severe gastritis, and its sensitivity to particular antibacterial drugs. He later received the Nobel Prize in the field of Medicine in 2005 for the same discovery.

Professor Harald Zur Hausen

Prince Mahidol Award
in the field of Medicine in 2005

Nobel Prize in Physiology
or Medicine 2008

Professor Harald Zur Hausen from Germany was conferred the Prince Mahidol Award in the field of Medicine |in 2005 for the discovery of the virus, namely human papilloma virus HPV16 and HPV18, from the cancer tissue and elucidated the mechanism that the viruses turn the normal cell into cancer cells. He later received the Nobel Prize in the field of Medicine in 2008 for the same discovery.

Dr. Margaret F.C. Chan, M.D.

Prince Mahidol Award
in the field of Public Health in 1998

Former Director General of
the World Health Organizatiion

Dr. Margaret F.C. Chan, the former Director-General of the World Health Organization, was conferred the Prince Mahidol Award in the field of Public Health in 2006.

Honorable Mention of the Thai laureates of the Prince Mahidol Award:

Professor Dr. Prasong Tuchinda
Prince Mahidol Award
in the field of Public Health in 1996

Dr. Suchitra Nimmannitya
Prince Mahidol Award
in the field of Medicine in 1996

Dr. Wiwat Rojanapithayakorn, M.D.
Prince Mahidol Award
in the field of Public Health in 2009

Mr. Mechai Viravaidya
Prince Mahidol Award
in the field of Public Health in 2009

For more information: www.princemahidolaward.org

Wednesday, January 31, 2018

Her Royal Highness Princess Maha Chakri Sirindhorn, represented His Majesty the King, presented the Prince Mahidol Award for the year 2017 in the field of Medicine to The Human Genome Project, Dr. Eric Green, Director, National Human Genome Research Institute, National Institutes of Health, in the field of Public Health to Professor Porter W. Anderson Jr., Dr. John B. Robbins, Dr. Rachel Schneerson, Professor Mathuram Santosham, at the Chakri Throne Hall, Grand Palace.

Prince Mahidol Award Laureate 2017
In the Field of Medicine

The Human Genome Project

National Human Genome Research Institute
National Institutes of Health
The United States of America

The Human Genome Project (HGP) was a large research project that significantly advanced knowledge in genetics and the human genome. The project, launched in 1990, was led by the National Human Genome Research Institute (NHGRI), National Institutes of Health (NIH), USA. It was a collaborative task involving many researchers from 20 institutes in 6 countries (USA, France, Germany, United Kingdom, Japan and China). The project announced its success in 2000. The collected human genetic codes became a mega biological database publicly available for scientists worldwide.

The main mission of the HGP was to decipher human genetic codes. These codes are the core elements that determine biological life. The HGP thus contributed to the better understanding of cellular and organ functions, mutation processes and the mechanisms of diseases. Knowledge of the human genome, including technology used to analyze and interpret genetic codes, facilitated the evolution of medicine in many aspects, from understanding rare hereditary diseases to common illnesses (e.g. cancers, infectious diseases). Screenings for at risk patients and early detection are critical in the control and prevention of the aggravation of diseases. In addition, knowing personal genetic information helps improve drug development that can be tailored to individual patients, so called precision medicine, for highly efficient treatment.

The information provided by the HGP has helped make significant progress in medical science, a branch of science essential to the comprehension of how diseases occur. It has changed the medical paradigm, shifting focus on diagnosis and treatment to the investigation of the causes and identification of the related genetic risks of diseases.

The Prince Mahidol Award (in the Field of Medicine 2017) recognizes the Human Genome Project for its collaborative success that has contributed to the remarkable advancement of medicine to the enormous benefit of mankind.

Prince Mahidol Award Laureate 2017
in the Field of Public Health

Professor Porter W. Anderson, Jr.
Dr. John B. Robbins
Dr. Rachel Schneerson
Professor Mathuram Santosham

The United States of America

Since 1970, Professor Porter W. Anderson, Jr. and Dr. David H. Smith of the Harvard University (USA), and Dr. John B. Robbins and Dr. Rachel Schneerson of the National Institute of Child Health and Human Development (NICHD), focused on research to understand the mechanisms of disease and vaccine development for Haemophilus influenzae type b (Hib) as a part of the National Institutes of Health (USA). Hib is one of the core causes of meningitis, particularly in children under the age of five. The disease has a high mortality rate and if not fatal, could result in permanent disabilities.

The research teams were the first to introduce the polysaccharide vaccine which is based on a sugar molecule derived from a part of the Hib's capsule. It was, however, shown that this vaccine was not effective among children younger than 18 months old, the group at most risk of contracting the disease. This is in part was due to the fact that polysaccharides are a weak inducer to boost immunity. They then developed conjugate vaccines, a technique that linked a protein with the polysaccharide to strengthen its immune inducing capacity. The Hib conjugate vaccine was much more effective in younger children and was licensed in 1989 for use on children at the age of 2 months old.

Professor Mathuram Santosham of the Johns Hopkins University studied the epidemiology of Hib. He demonstrated clinically that Hib disease was preventable by immunization and conducted several vaccine trials, which included Hib conjugate vaccines. The results of his studies had a great impact on encouraging the use of Hib conjugate vaccines for all children. Later, he became the leader of the "Hib Initiative" funded by the Global Alliance for Vaccines and Immunization (GAVI). This project has supported the Hib conjugate vaccine as a part of national immunization programs in up to 190 countries.

After the Hib conjugate vaccine was made available worldwide, the incidence of Hib disease and its mortality among young children has dropped as much as 95 – 99%. Millions of children have been saved from Hib disease. Few would have anticipated that by the year 2020, over 7 million lives would been saved due to the use of Hib vaccine.

Prince Mahidol Award (in the Field of Public Health 2017) recognizes the successful efforts of Professor Anderson, Dr. Robbins and Dr. Schneerson in developing the Hib vaccine, from research in polysaccharides to conjugate vaccines which is now being used as a standard for vaccination (Dr. Smith passed away in 1999). The Award also recognizes Professor Santosham as a leader of the Hib Initiative who elevated his scientific discovery into a widely used vaccine among children, especially in many developing countries.

Prince Mahidol Award Laureate 2017
in the Field of Public Health

Professor Porter W. Anderson, Jr.

The United States of America

Professor Porter W. Anderson, Jr. received his PhD in Bacteriology from Harvard University. His current position is Professor Emeritus at the Department of Pediatric Infectious Diseases, University of Rochester Medical Center. He was previously Associate Professor at Boston Children's Hospital Harvard Medical School.

Prince Mahidol Award Laureate 2017
in the Field of Public Health

Dr. John B. Robbins

The United States of America

Dr. John B. Robbins received his MD from New York University Medical School. He had Clinical Training at Massachusetts General Hospital, Harvard University in 1961 – 1964, and Graduate Training in Infectious Disease and Immunology at University of Florida. He was Associate Professor of Pediatrics and Immunology at Albert Einstein College of Medicine for 3 years before beginning his career at the Eunice Kennedy Shriver National Institute of Child Health and Human Development, National Institutes of Health, in 1970. He retired in 2012.

Prince Mahidol Award Laureate 2017
in the Field of Public Health

Dr. Rachel Schneerson

The United States of America

Dr. Rachel Schneerson received her MD from Hebrew University, Jerusalem, Israel, in 1958. She did her pediatrics residency in Israel and later came to the United States to work for the Eunice Kennedy Shriver National Institute of Child Health and Human Development until her retirement in 2012.

Prince Mahidol Award Laureate 2017
in the Field of Public Health

Professor Mathuram Santosham

The United States of America

Professor Mathuram Santosham received his MD from Madras University, India, in 1970. He subsequently moved to the US and obtained an MPH degree from the Johns Hopkins University in 1975. He also completed a Fellowship in Pediatric Infectious Diseases at Johns Hopkins Hospital. He is currently the Director Emeritus of Johns Hopkins Center for American Indian Health (CIAH). He holds Professorships in the Departments of International Health and Pediatrics at Johns Hopkins University.

MESSAGE

from the Chairs of the International Organizing Committee

2018 marks the centenary of the Great Influenza Pandemic of 1918/1919 – an event that resulted in an estimated 50 to 80 million deaths, more than 5% of the world's population. Despite extraordinary advances over the past century in science, particularly in the areas of pharmaceuticals and vaccines, and unprecedented improvements in global health standards, we still live in a world where an infectious agent could emerge and spread rapidly to every community and every household with no regard to national borders or to social and economic standing. At the same time the effectiveness of many of the life-saving pharmaceuticals, such as antivirals and antibiotics, that were not available in 1918 but would represent first-line responses to a similar event today, are increasingly becoming less effective in the face of drug-resistant microbes. In addition, the increasing failure of antimicrobials to treat common pathogens is creating the prospect of a 'post-antibiotic' world. These trends underscore the singular importance of forging a comprehensive global vision for accelerating progress in the adoption of multi-sectoral, evidence-based approaches for addressing zoonotic diseases and antimicrobial resistance (AMR), including strengthening medicines regulation and stewardship programs to ensure the quality and safety of medicines and preserve the effectiveness of existing and new therapies, and fostering research in infectious diseases and in the development of new antimicrobial agents, point of care diagnostics and new vaccines for both human and animal sectors.

The development and commercialization of antimicrobials and vaccines stand as a defining achievement of 20th century medical practice. Both antimicrobials and vaccines heralded an era of expanded life expectancy, paved the way for advanced medical and surgical treatments, improved animal health and welfare, and made possible curative therapy for and prevention of once fatal infections. Decades of superfluous and inattentive use of antimicrobials and failure to maximally use available vaccines across the human and animal health sectors, along with the threat posed by substandard and falsified medicines, now threaten these advancements.

The emergence of SARS, pandemic influenza, MERS, and the spread of Ebola and Zika reflect the world's increasing vulnerability to novel zoonotic threats. Even in the absence of significant global mortality, epidemics and pandemics can cost tens of billions of dollars, reversing development gains and pushing communities and households into poverty.

Protecting the world from the threat of zoonotic diseases and ensuring effective stewardship of antimicrobials and vaccines in both human and animals requires a common and well-coordinated multi-sectoral effort. While there has been significant progress in building multi-sectoral One

Health action against zoonotic diseases, AMR efforts remain highly siloed with an unequal focus on the respective contributions made by the inappropriate use and poor quality of antibiotics in clinical care and animal production, as well as limited opportunities for bringing human, animal and environmental health sectors together to forge a common strategy. Further, local, regional, and global human mobility driven by social and political instability can amplify the spread of communicable disease, and coupled with obstacles faced by migrants in accessing essential health services, result in emergence or reemergence of infectious disease or spread of drug resistance, and globalize public health threats. There is an urgent need to bring a comprehensive One Health risk mitigation approach that is in alignment with the International Health Regulations, to address zoonotic and AMR-related diseases.

This year's Prince Mahidol Awards Conference will provide an important setting for fostering policy and strategic action by engaging multi-sectoral experts in zoonosis and AMR, as well as climate change and related environmental fields from across the public and private sectors, international organizations, foundations, academics and non-governmental organizations, as well as critical players in Global Health Security. PMAC 2018 will also be an opportunity to reinforce the commitments made in the 2030 Agenda for Sustainable Development, including to leave no one behind, and the UN Political Declaration on AMR of 2016.

As Chairs of the International Organizing Committee, we are delighted to be able to contribute to the global discussion to address the threats posed by zoonosis and AMR and to welcome you to Bangkok, Thailand.

Collectively, we have a unique opportunity to forge a bold path forward for "Making the World Safe from the Threats of Emerging Infectious Diseases". We encourage your active participation in the plenary and parallel sessions to share your experiences, challenges and ideas. We also invite you to actively participate in an exciting range of pre-conference side meetings where many of the topics covered during the conference will be discussed in greater detail.

We would like to extend our appreciation to the many individuals and organizations that have worked to bring this conference into being. In particular, we would like thank the Prince Mahidol Award Foundation and the Royal Thai Government for their exceptional support and leadership.

Dr. Vicharn PANICH
Chair
Prince Mahidol
Award Conference

Dr. Peter SALAMA
Co-Chair
World Health Organization

Dr. Timothy EVANS
Co-Chair
The World Bank

Mr. Magdy MARTÍNEZ-SOLIMÁN
Co-Chair
United Nations Development
Programme

Dr. Michel SIDIBÉ
Co-Chair
Joint United Nations
Programme on HIV/AIDS

Ambassador William Lacy SWING
Co-Chair
International Organization
of Migration

Prof. Osamu KUNII
Co-Chair
The Global Fund to Fight AIDS,
Tuberculosis and Malaria

Dr. Irene KOEK
Co-Chair
U.S. Agency for
International Development

Dr. Roger GLASS
Co-Chair
National Institutes
of Health

Dr. Takao TODA
Co-Chair
Japan International
Cooperation Agency

Mr. Michael MYERS
Co-Chair
The Rockefeller Foundation

Dr. Lincoln C. CHEN
Co-Chair
China Medical Board

Dr. David HEYMANN
Co-Chair
Chatham House

Dr. Trevor MUNDEL
Co-Chair
Bill & Melinda Gates
Foundation

Prince Mahidol Award Conference 2018 International Organizing Committee and Scientific Committee Members

A full list of the PMAC 2018 Organizing Committee Members is given in ANNEX I, and Scientific Committee Members in ANNEX II.

Conference Co-hosts and Supporting Organizations

Prince Mahidol Award Foundation under the Royal Patronage, World Health Organization, The World Bank, United Nations Development Programme, Joint United Nations Programme on HIV/AIDS, International Organization of Migration, The Global Fund to Fight AIDS, Tuberculosis and Malaria, United States Agency for International Development, National Institutes of Health, Japan International Cooperation Agency, China Medical Board, The Rockefeller Foundation, Chatham House, Bill & Melinda Gates Foundation, Food and Agriculture Organization of the United Nations, World Organisation for Animal Health, The United Nations Children's Fund (UNICEF), Smithsonian Institute, U.S. Pharmacopeia, The National Academies of Sciences, Engineering, and Medicine, International Society for Infectious Diseases, Chinese Center for Disease Control and Prevention, Skoll Global Threats Fund, Public Health Agency of Sweden, Asian Development Bank, British Medical Journal, People's Health Movement

CONFERENCE PROGRAM

Pre-conference

29-31 January 2018

There were 40 side meetings held during the conference (ANNEX III), and 6 field visit sites (ANNEX IV).

Main conference

1-3 February 2018

At the Conference, there were

- 4 Keynote addresses
- 4 Plenary sessions
- 20 Parallel sessions
- 5 Book launches
- 60 E-poster presentations
- World Art Contest: there were 468 entries from 14 countries

85
countries

1,263
participants

Total registered participants

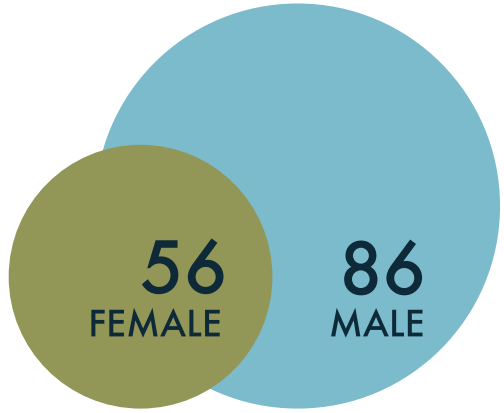
There were 1,263 participants from 85 countries. Gender balance very nearly achieved (Female 48%, Male 52%).

Profile of moderators, speakers and panelists

There are a total of 142 moderators/speakers/ panelists for 24 plenary and parallel sessions. This is not quite a gender balance (56 females, 86 males), but certainly improve compared with previous years gender profile. Speakers were One Health partners and good mix of expertises: human health, animal health, environmental health and others.

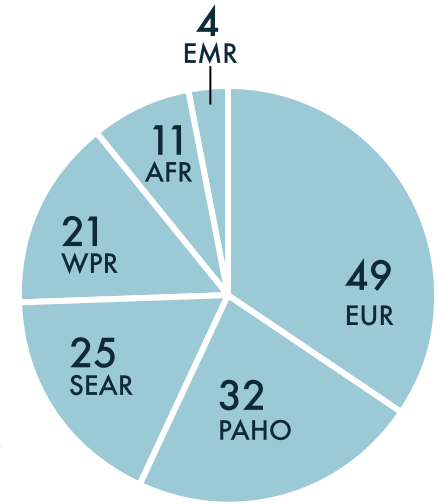
List of Speakers, Panelists, Chairs, Moderators and Rapporteurs

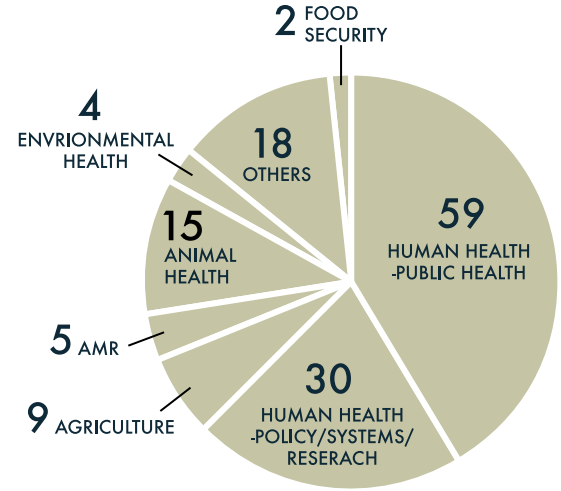
A full list of the PMAC 2018 Conference Speakers, Panelists, Chairs, Moderators and Rapporteurs is shown in ANNEX



Number of moderators, speakers and panelists by gender

Country of origin of moderators, speakers and panelists by six WHO regions





Expertises of moderators, speakers and panelists

PMAC 2018

MAKING THE WORLD SAFE FROM
THE THREATS OF EMERGING INFECTIOUS DISEASES

BACKGROUND

The Prince Mahidol Award Conference (PMAC) is an annual international conference focusing on policy-related health issues. The Prince Mahidol Award Conference 2018 is co-hosted by the Prince Mahidol Award Foundation, the Thai Ministry of Public Health, Mahidol University, the World Health Organization, The World Bank, U.S Agency for International Development, Japan International Cooperation Agency, The Rockefeller Foundation, with support from other key related partners. The Conference will be held in Bangkok, Thailand, from 29 January-3 February 2018. The theme for PMAC 2018 is "Making the World Safe from the Threats of Emerging Infectious Diseases".

We live in an era when the emergence of novel infectious disease agents is posing an increasing threat to global health and security. The threat from novel infectious diseases is accelerating at a pace and with an intensity unprecedented in human history, driven by increasing human populations, climate change and surging global travel. The possibility that a single lethal microbe could suddenly emerge and sweep through every household, through every community without regard to national borders or social and economic standing is a shared fear across the globe. Just the fear can cost billions, as illustrated by recent Ebola and Zika virus panics in little-affected countries. But the reality of the threat is all too clear, proven by the decades of response to the HIV-AIDS pandemic. Yet the world is not prepared to either mitigate the impact of an emergent disease threat or prevent its emergence.

Zoonotic and AMR related diseases account for more than 95% of all emerging infectious diseases reported during the second half of the 20th century[1]. In this century the emergence of SARS, pandemic influenza, MERS, and the spread of Ebola and Zika reflect the world's increasing vulnerability to novel zoonotic threats. The simultaneous emergence of pathogens resistant to antibiotic therapies raises the prospect of a "post antibiotic" world. While the drivers underlying the emergence of zoonotic and antibiotic resistant diseases are complex, human behaviours and their impact on animal populations and the environment are understood to be central to the emergence of both disease threats. The role of increasing animal-human contact

[1] K. E. Jones et al., Global trends in emerging infectious diseases. Nature 451, 990–993 (2008).

in the emergence of zoonotic diseases has been well documented and been increasingly the focus of One Health initiatives across the globe. The contribution made by the inappropriate use of antibiotics in animal husbandry to AMR is less well documented but in recent years has been increasingly understood to be a core driver behind the emergence and global spread of antibiotic resistant organisms, along with inappropriate "prescriber-user" practices associated with antibiotic use in clinical care. Changing environmental and climatic conditions have also been closely linked to the emergence of novel infectious diseases. That infectious disease emergence is closely associated with practices and behaviours at the animal-human-environment interface speak to the importance of an expanded multi-sectoral alliance across the animal, human and environmental sectors to address the threats posed by both zoonosis and AMR. The Global Health Security Agenda and related One Health movement provide important frameworks for mobilizing international action.

The Rising Threat of Zoonotic Diseases

Since the Influenza Pandemic of 1918 when between 50-100 million died (5-10% of the human population) we have been fully aware of how vulnerable our place on this planet is.

Even in the absence of significant global mortality, epidemics and pandemics can cost tens of billions of dollars, reversing development gains and pushing communities and households into poverty. The SARS outbreak in 2003 cost the economies of East Asia between $30-50 billion and estimates of the global economic cost of an influenza pandemic range from $374 billion, for a mild pandemic, to $7.3 trillion, for a severe pandemic - with a 12.6% loss of gross domestic product.

Strategically, policies to address a potential pandemic threat are constrained by an unresolved debate over the use of adaptive measures - that aim through the use of technological measures to reduce the impact of diseases after they have emerged vs mitigation measures - that focus on the underlying causes of disease emergence. The adaptive tools we traditionally rely on to protect us from the world of infectious diseases

– vaccine and therapeutics – too often are shown ineffective against a novel threat; and, the timely development and deployment of new and effective biomedical countermeasures is undercut by the speed at which the threat spreads.

Similarly, our ability to mitigate the emergence of new threats is undermined by a lack of knowledge about the viral ecology and the drivers, including human behaviors, which propel the emergence of a new threat. It is at these moments we realize just how few our adaptive and mitigation options are – and how vulnerable the global community is. After each episode the world admonishes itself for being ill prepared to deal with a global threat – but after decades of largely reacting adaptively to each event, with only a tangential focus on mitigation, we are only marginally better able to deal with the next one.

A Post Antibiotic World

The development and commercialization of antimicrobials stands as a defining achievement of 20th century medical practice. Antimicrobials heralded an era of expanded life expectancy, paved the way for advanced medical and surgical treatments, improved animal health and welfare, and made possible curative therapy for once fatal infections. Decades of superfluous and inattentive use of antimicrobials across the human and animal health sectors now threaten these advancements. The pace of reported treatment failures and antimicrobial resistance (AMR) in common pathogens is increasing, with multi-drug resistant pathogens creating the prospect of a 'post antibiotic' world. In the absence of interventions, AMR-associated human mortality is projected to soar from a current rate of 700 000 to over 10 million annually by 2050—as readily treatable infections become life threatening, and routine procedures are rendered unsafe.[2] Asia is expected to account for half of this projected global mortality. The impact of AMR on morbidity and mortality is matched by a substantial economic burden, with resistance linked to aggregate losses anticipated to exceed USD 100 trillion by 2050.

Antimicrobial resistance is exacerbated by the unregulated use of antimicrobials across both the human health and animal health sectors. A particular concern is the shared use of same classes of antibiotics in humans and in animals, potentially exacerbating the selection pressures on pathogen populations in animals and humans that encourage the development of resistance and exchange of resistance genes. By example, in the United States the livestock production industry accounts for 80% of the total use of antibiotics used for treatment of human infections.

Antimicrobial resistance is one of the three flagship topics for the tripartite (FAO, OIE and WHO) collaboration. At the Sixty-eight World Health Assembly in May 2015, the World Health Assembly endorsed the Global Action Plan (GAP)[3] on AMR and requested to strengthen the tripartite collaboration between FAO, OIE and WHO for combating antimicrobial resistance in the spirit of the "One Health" approach. The Global Action Plan, which ensured a One Health approach and consistency with Codex Alimentarius and OIE inter-governmental standards and guidelines, aims to ensure continuity of successful treatment and prevention of infectious diseases with effective and safe medicines that are quality-assured, used in a responsible way, and accessible to all who need them. Guided by this global action plan, the Member States, the Secretariat, and their international and national partners aim to: (1) improve awareness and understanding of antimicrobial resistance; (2) strengthen knowledge through surveillance and research; (3) reduce the incidence of infection; (4) optimize the use of antimicrobial agents;

and (5) develop the economic case for sustainable investment that takes account of the needs of all countries, and increase investment in new medicines, diagnostic tools, vaccines and other interventions.

A high level meeting on anti-microbial resistance was held in September 2016 at the United Nations General Assembly, generating a statement of global commitment to address AMR through a multi-disciplinary approach.[4]

[2] O'Neill, J. Review on Antimicrobial Resistance. Tackling a Global Health Crisis: Initial Steps. 2015

[3] Global Action Plan on Antimicrobial Resistance, http://www.who.int/drugresistance/global_action_plan/en/

[4] http://www.un.org/pga/71/2016/09/21/press-release-hl-meeting-on-antimicrobial-resistance/

PMAC 2018
Will Be Action Focused

Protecting the world from the threat of zoonotic diseases and ensuring effective stewardship of antibiotics requires a common and well-coordinated multi-sectoral effort. While there has been significant progress in building multi-sectoral One Health action against zoonotic diseases, AMR efforts remain highly siloed with an unequal focus on the respective contributions made by the inappropriate use of antibiotics in clinical care and animal production, as well as limited opportunities for bringing human, animal and environmental health sectors together to forge a common strategy. There is an urgent need to bring a comprehensive One Health risk mitigation approach to address zoonotic and AMR related diseases that addresses the direct consequences of animal-human interactions and contributory pressures related to environmental and climate changes.

PMAC 2018 will provide an important setting for fostering policy and strategic action by engaging multi-sectoral experts in zoonosis and AMR, as well as climate change and related environmental fields from across the public and private sectors, international organizations, foundations, academics and non-governmental organizations, as well as critical players in Global Health Security Agenda (GHSA). Importantly, a PMAC sponsored "Making the World Safe from the Threats of Emerging Infectious Diseases" would build on PMAC 13's highly successful conference on One Health and lead to real change.

PMAC 2018
Will Build On Past PMAC Themes

Since 2007, the Prince Mahidol Award Conference has been organized as an annual international conference focusing on policy-related public health issues of global significance – including, Universal Health Coverage, Health Equity, Meeting the Needs of Vulnerable Populations, and addressing the threats posed by infectious diseases. Each of these meeting has brought together leading public health leaders and stakeholders from around the world to propose concrete solutions and recommendations. PMAC 2018 will explicitly look to build on the successes of past PMACs and to identify opportunities to further contribute to the systems and capacities required to address the comprehensive health needs of the world's populations

OBJECTIVES

1. To accelerate progress in the adoption of multi-sectoral approaches for addressing zoonotic diseases and antimicrobial resistance
2. To advocate for evidence-based priority setting and policy decisions for zoonotic diseases and antimicrobial resistance
3. To share knowledge and experience in addressing the challenges posed by zoonotic diseases and antimicrobial resistance
4. To promote a greater understanding of the range and nature of the "drivers" underlying the emergence of new disease threats and options for their mitigation
5. To highlight emerging demographic, climatic and travel trends to better understand how disease emergence will evolve over the course of this century
6. To underscore the collateral socio-economic and development benefits associated with a One Health Agenda

Sub-Theme 1

Learning from the Past: Towards Effective and Sustainable Policies, Practices and Capacities for "Prevention, Detection and Response" to Emerging Zoonosis and Antimicrobial Resistance

This sub-theme is focused on presenting evidence for how efforts across the globe over the past two decades to address zoonotic and AMR related threats are contributing to more effective policies, practices and capacities for “prevention, detection and response” to EIDs. Given the inherent multi-sectoral aspects of disease emergence this is an opportunity to learn from recent experience with efforts such as the Global Health Security Agenda (GHSA), International Health Regulations, the One Health movement, and other platforms illustrating challenges and solutions for building effective partnerships for addressing zoonosis and AMR.

Issues to be discussed under this sub-theme are:

1.

Evidence for optimal policies, regulations and systems for addressing EIDs

What we have learned from country, regional and global level experiences in addressing EIDs

- Case studies illustrating successes and failures; how well do we manage and mitigate present threats (e.g. MERS CoV, Nipah virus, Zika virus, Zoonotic Influenza, Ebola virus, AMR, and others)
- Organizational options for building sustainable national-level partnerships across multi-ministerial groups, including Health, Agriculture, Environment, Finance and Education
  - What are the policy requirements
  - What are the human resource requirements
  - What are the organization requirements
  - What are resource requirements
- How are these experiences translated to the sub-national level
  - What are the equivalent requirements for provincial/county level operations

2.

Evidence for optimal global and regional level structures for addressing EIDs

What are the lessons learned on building global and regional level partnerships, including the GHSA, One Health and Planetary Health, to address EIDs

- How effective have global and regional partnerships been in building multi-sectoral alliances to enable country level actions
  - What are the policy requirements
  - What are the human resource requirements
  - What are the organization requirements
  - What are resource requirements

What is the evidence for proactive, flexible structures that enhance capacities and preparedness across the prevention-detection-response continuum?

- What have we learned from the pandemic vaccine development banks; consortia for conservation of antimicrobials?
- What can we learn from parallel efforts, such as those addressing global climate change and carbon emissions?
- What examples demonstrate the ability to bridge the apparent dichotomy between capacity building and a research agenda concerning emerging zoonoses and AMR?

3.

Evidence of novel, upstream approaches to earlier detection and trends monitoring, including but not limited to:

- Novel surveillance postures and strategies,
- digital diseases detection,
- crowdsourcing big data,
- predictive analytics on disease distribution

4.

Evidence for more sustainable approaches for "prevention, detection and response"

What are examples of sustainable financing structures? What have we learned from:

- The World Bank Pandemic Emergency Financing Facility?
- Evolving schemes for engaging insurance companies to "share" pandemic risk?
- Efforts to quantify cost attributable to zoonotic disease and AMR burden, project pandemic influenza economic impact, and make a credible investment case for prevention and risk mitigation?

What are examples of "preparedness" activities that address long-term sustainability?

- What have we learned from the World Bank and WHO's joint effort to develop strategies for both pandemic and "all hazards" preparedness and related long-term financing schemes?

Which financing models have proven utility in employing an evidence driven approach to discouraging high risk practices and incentivizing risk mitigation in approaching pandemic prevention as a global public good?

Sub-Theme 2

Harnessing the Power of Public-Private-Community (PPC) Partnerships for "Preventing, Detecting, and Responding" to Zoonosis and AMR

This sub-theme is focused on examining the evidence for building effective partnerships that bring together community, private sector and public sector resources for sustainably addressing the threats posed by zoonosis and AMR. As with the previous sub-theme, the inherently multi-sectoral nature of zoonosis and AMR requires active engagement across multiple stakeholders. In addition to the Public sector, Private sector actors who may be directly engaged in activities that inadvertently contribute to "drivers" for EIDs will need to be actively involved in any efforts to better mitigate the consequences of their activities. Similarly, communities are key stakeholders, both as consumers and potential contributors to some of the drivers that underlie disease emergence (e.g. inappropriate use of antibiotics in rearing of livestock and aquaculture)

Issues to be discussed under this sub-theme are:

1.

Evidence for strong PPC partnerships that have contributed to "prevention, detection and response" to Zoonosis and AMR

What are the lessons from PPC partnerships in addressing EIDs

- Country, regional or global examples of how PPC partnerships have been able to harness across each of the constituencies to address EIDs in ways that greatly enhanced the overall impact

  - What were the incentives for PPC partnerships
  - What were the roles and responsibilities of each group
  - What were the metrics for valuing the PPC partnerships
  - What were the operational factors for sustainability of PPC parnterships

2.

Evidence of successful outreach and community empowerment

What are examples of how risk communications have successfully affected community and/or individual level practices and behaviors on a scale significant enough to reduce the risk from zoonotic threats and/or AMR

3.

Evidence for an active and sustainable engagement of the private sector

What are examples of how private sector partners have been actively and sustainably engaged in efforts to address zoonotic threats and/or AMR

What can be learned from partnerships with biomedical industry in developing and marketing vaccines and medical countermeasures? Employing novel diagnostic platforms enabling rapid detection and response to emerging threats?

What are examples of partnerships with industry in the use of non-medical countermeasures within communities to help mitigate, prevent, and control infectious disease threats? Employing new technologies and platforms for health communication and the application of non-pharmaceutical interventions.

4.

Evidence for how consumer advocacy can contribute to change policies and practices

5.

Evidence of economic benefits from PPC

Sub-Theme 3

Understanding the Selection Pressures Underlying Emergence of Zoonotic Diseases and Antimicrobial Resistance and the Broad Benefits Realized From Promoting Healthy Animals and Healthy People

This sub-theme is focused on both:

A.

Exploring the contributions made by climate change, population growth, global travel, habitat change, expanding settlements, resource extraction, increased livestock and crop production and other underlying drivers that contribute to the emergence of new zoonotic and anti-microbial disease threats, and

B.

Examining the broad benefits that are accrued from promoting practices across multiple sectors that aim at reducing these drivers and the risk of zoonotic diseases and antimicrobial resistance.

There has been a general recognition that the adoption of a core set of best practices that are designed to directly target the drivers associated with zoonosis and AMR are likely to simultaneously contribute to positive outcomes across a range of “other” domains and the achievement of the United Nations Sustainable Development Goals, such as food security, household wealth and economic growth, as well as healthier environments and sustainable communities.

A.

Issues to be discussed under this sub-theme will allow a presentation of the evidence for the drivers of EID emergence:

1. Evidence for Climate Change in Increasing Infectious Disease threats and models projecting future impact

How does climate change contribute to spread of infectious disease threats

- Topics to be considered could include: impact on vector ecology, animal migration, altered range and distribution of reservoir host species;
- variance in freshwater availability, sanitation, and waterborne disease

2.

Evidence for demographic and population change on increasing Infectious Disease threats, including how settlement patterns (peri-urbanization), population movement (increased air travel, trade etc), habitat change (impact on animal bio-diversity) contribute to disease emergence and spread

3.

Evidence for how increased economic activity impacts on increased Infectious Disease risk, including how expanded incursions of extractive industry operations and agricultural intensification into wildlife domains increase risk for "spillover" and spread of novel diseases

Options for how "risk" can be mitigated at the site of industry operations or in planning/selecting where industry operations occur

4.

Evidence for how increased livestock production and marketing in geographic "hot spots" for disease emergence may increase risk of pathogen "spillover" and spread

How projected increases in livestock production in Africa and shifting production contexts in Asia over the 21st century will impact on the risk of disease emergence, including zoonosis and AMR

- Models for likely changes in terrestrial and aquatic animal production and marketing patterns over the coming century
- Models for potential increased environmental impact that could elevate risk
- Options for minimizing risks associated with increased livestock production and marketing
- Considering the impact of a global supply chain of agricultural commodities and production inputs (e.g. animal feed), and trans-continental risk management strategies

B.

Issues to be discussed under this sub-theme also will allow a presentation of the evidence to broad collateral benefits accrued from targeting the drivers of EID emergence:

5. Evidence that adoption of practices to reduce zoonotic and AMR risks associated with livestock production would also contribute to more efficient and more profitable operations.

How do improved biosecurity and husbandry practices that strengthen control of pathogenic zoonotic viruses improve the overall health of livestock and the environment

- Reduced animal diseases
- Improved animal health can lead to increased livestock productivity and reduced input costs for production
- Enhanced productivity and yield per animal production unit
- Reduction in prophylactic antibiotic use

How does proper management of antimicrobials in livestock production and aquaculture improve economic returns

- Improved hygienic conditions, nutrition, and vaccination in animal husbandry associated with reduced use of antibiotics and corresponding returns on investment
- What can be learned from the experience of countries that have phased out and enacted regulatory controls on use of antimicrobials in animal production
- AMR reduces potency of veterinary drugs and negatively affects animal health
- Consumer demand for antimicrobial residue free animal source foods
- Market based incentives and penalties for reduced antimicrobial use and enhanced adherence to drug withholding periods, minimizing residues in products entering the food chain
- Best practices in strengthening antimicrobial usage regulatory and enforcement structures in animal production

6.

Evidence that reduction in habitat fragmentation has led to the control of zoonosis

How does habitat fragmentation impact
on both vector-borne and non vector-borne diseases

- Evidence that changes in habitat leads to changes (increase/ decrease) the transmission dynamics of infectious diseases (e.g. chikungunya, malaria)

7.

Evidence that that the real and/or projected economic impact from emerging zoonoses and AMR has informed resource allocation policies and an investment case for prevention

What practices and approaches have shown promise in fostering decision making informed by economic analyses

What novel structures have proven utility in transcending the challenge of inequitable sectoral
cost and benefit distribution

- Evidence for one or more sectors bearing the cost for benefits accruing to different sectors/stakeholders (e.g. H7N9 control in China: costs borne by producers and markets, but benefits accrue to health sector; or resource extraction and disease emergence: costs borne by health sector, but benefits accrue to industry and land planning/mining/forestry entities)

SUMMARY

OF THE OPENING SESSION & KEYNOTE ADDRESSES

OPENING SESSION

by Her Royal Highness Princess Maha Chakri Sirindhorn

As the Chair of the Prince Mahidol Award Foundation, it is my privilege to be here at the opening of the twelfth annual Prince Mahidol Award Conference 2018 on the theme "Making the World Safe from the Threats of Emerging Infectious Diseases".

We are honored to host this conference on this very important issue and to be part of the global policy movement to fight infectious diseases which know no borders. With the constant evolution of infectious diseases, we need to build capabilities and strengthen our partnerships to develop better coordination and support in the control of infectious diseases. A comprehensive One Health approach bringing the human, animal and environmental health sectors together is key to protecting the world from infectious diseases and ensuring effective stewardship of antibiotics. I believe that this conference will provide a good platform for inter-government agencies, countries, and the global community to discuss and further contribute to the systems and capacities required to improve the well-being of humans, animals and the environment that are inextricably linked.

I would sincerely like to thank our co-hosts, the World Health Organization, the World Bank, the United Nations Development Programme, the Joint United Nations Programme on HIV/AIDS, the International Organization for Migration, the Global Fund to Fight AIDS, Tuberculosis and Malaria, the United States Agency for International Development, the National Institutes of Health, the Japan International Cooperation Agency, The Rockefeller Foundation, the China Medical Board, the Chatham House, the Bill & Melinda Gates Foundation, the Food and Agriculture Organization of the United Nations, the World Organisation for Animal Health, the United Nations Children's Fund, the Smithsonian Institution, U.S. Pharmacopeia, the National Academies of Sciences, Engineering, and Medicine, the International Society for Infectious Diseases, the Chinese Center for Disease Control and Prevention, the Skoll Global Threats Fund, the Public Health Agency of Sweden, the Asian Development Bank, the British Medical Journal, and the People's Health Movement – for their great contributions to the conference.

May this conference create fruitful discussions to gain new insights on the latest developments in our fight against infectious diseases and further foster joint efforts to achieve our goal of making the world safe from the threat of infectious diseases.

I now declare the Prince Mahidol Award Conference 2018 open.

KEYNOTE
ADDRESSES

Eric Green

Director
The National Human Genome Research Institute (NHGRI) at the National Institute of Health (NIH)

United States of America

Dr.Eric Green stated the important on studying of human genome that helps to understand the different of the diseases and individual mechanisms, which could lead to better treatment. In the past, studying on the human genome sequences cost a lot of budget ($1,000,000,000) and took a long time (6-8 years) to see the results. Now, with the new technology, the cost of the human genome sequences is reduced ($1,000), less time consuming (1-3 days), and easier to use – just a small device which is recently used in the Africa for the Ebola outbreak. Moreover, the development of the human genome sequence is profound advance in understanding gene function and environmental of gene activation and unraveling the genomic bases of human diseases.

The human genome is developed and used in the genomic medicine. The human genome project is six-country collaboration, which was during 1990-2003. The human genome project is used to understand the individual diseases, cells, and mechanisms, in advance of medicines. The hot areas of genomic medicines are focusing on areas of cancer, pharmacogenomics, rare diseases, and prenatal genome testing.

However, the diseases are not all about the genomics, in fact there are many factors to which can contribute. Health and environmental factors play an important role in causing the diseases. Regarding this, a new way to understand health and environment is needed. With the development of new technology, there are physiological tools which help to precisely monitor and measure health status of each individual.

Dr.Eric Green suggested the future project on this area that will focus on the integration of genome analysis, environmental health records and technologies. Furthermore, precision medicine should be employed in order to be accountable for individual variability. There is a need on collaboration between involved sectors, for example, the 'All of us research cohort' was established in the US with the main aim to find the better future (from average curing to individual treatment). The main components of this research cohort include a numerous of volunteers, participants are responsible to share genomic data with privacy protection.

> We will not stop here at human genomics… study includes information beyond genetics and other information about our life.
>
> And if we can capture that information and understand it, we can one day have much more precise way to practice medicine
>
> Dr.Eric Green

Peter Sands

The Incoming Executive Director
The Global Fund for AIDS, Tuberculosis and Malaria

Switzerland

First of all, it is a huge privilege to be speaking at the Prince Mahidol Award Conference in front of such a distinguished audience. My thanks to the organisers for inviting me to do so.

As I am sure most of you know, I am relatively new to the world of global health, having spent most of my career in business and finance. Yet starting in 2015 I spent a good portion of my time at Harvard working on issues relating global health security with the US National Academy of Medicine and with the World Bank. And with my new role as Executive Director the Global Fund to fight AIDS, Tuberculosis and Malaria, the career switch is complete – from banking to global health in under three years!

This background brings advantages and disadvantages. The obvious disadvantage is that I have much to learn, about the pathogens themselves, about prophylactic and therapeutic strategies, and

Few risks could cause the loss of millions of lives in the way a highly contagious and virulent influenza pandemic could.

Few risks can cause as much economic damage as the fear sparked by a major infectious disease outbreak.

Peter Sands

about the intricacies of global health institutions and mechanisms. The advantage is that I can bring a fresh perspective, ask stupid questions and can help connect the world of global health with the worlds of business and finance – a connection that often seems quite flimsy.

My view on the infectious disease threat that we are focusing on at this wonderful conference can be summed up by the phrase "the neglected dimension of global security" – which also happened to be the title of the report on pandemics produced by the international commission I chaired on behalf of the US National Academy of Medicine. When you frame the risk of infectious disease threats as a human and economic security issue, it seems clear that we haven't got our act together sufficiently to protect mankind from such threats.

Few risks could cause the loss of millions of lives in the way a highly contagious and virulent influenza pandemic could. Few risks can cause as much economic damage as the fear sparked by a major infectious disease outbreak. Yet we devote a fraction of the resources we deploy to other risks – of war, financial crises, nuclear disasters, even climate change – to preventing, preparing for and responding to infectious disease threats.

The point is not that we do too much to counter these other threats, but that we do too little on this one. We have simply neglected this dimension of global security.

This is not to diminish the things that have been and are being done to make the world safer from such threats. There have been many positive steps in the wake of the Ebola crisis, including the launch of the Joint External Evaluation process, the establishment of the WHO's Emergency Programme and the creation of CEPI. Yet we all know that if we rigorously scrutinise the three crucial domains - national preparedness, our scientific tools (vaccines, diagnostics, therapeutics), and our global coordination capabilities through WHO, the World Bank and others - there are still yawning gaps.

Moreover, we tolerate a base level of human loss and economic burden that shouldn't be acceptable. AIDS, TB and Malaria alone killed 3 million people in 2015. These are infectious diseases we have the tools to prevent and treat. And the economic burden on the hardest afflicted countries is enormous – those who are sick and the carers looking after them cannot contribute to economic development.

Now I know that most discussion of global health security focuses on emerging infectious diseases with epidemic or pandemic potential, rather than on the endemic infectious diseases. And in fact I myself been guilty of this. But I think we need to rethink this way of framing the discussion about global security. It's an odd definition of security that only focuses on the things that might kill you and excludes those that are actually killing you. Asking political leaders in poor countries to do more to counter potential threats from infectious diseases seems perverse, and arguably immoral, when actual threats from existing infectious diseases are already killing tens or hundreds of thousands of their citizens.

Of course, it does make sense to protect against tail risk events, and the constellation of threats to lives and livelihoods does look very different if you're sitting in London or New York, where the likes of Malaria, cholera, yellow fever and dengue are absent and TB and AIDS increasingly well controlled, rather than if you're sitting in a village in the DRC or the Mekong. But my view is clear: strengthening health security has to start from tackling the infectious diseases that are killing people now.

Consider the example of AIDS. Emerging in the 70s AIDS was an infectious disease threat that went on to be a global pandemic that has killed thirty five million people – and despite massive reductions in mortality rates, AIDS still kills about one million people per year. But nowadays we don't typically include AIDS in discussions on health security. To someone approaching the topic of global health security for the first time, it might seem slightly bizarre that the biggest pandemic afflicting mankind in recent decades is rarely mentioned in discussions about pandemic threats.

Taking a more integrated approach to health security, encompassing both endemic and emerging diseases, makes sense from a practical perspective. Too often the multiple agendas, initiatives and institutions that characterise the global health space compete rather than collaborate and sometimes only accidentally leverage the synergies between them. Yet much of what we do to tackle individual diseases involves building capabilities and infrastructure that can serve multiple purposes – community health workers, supply chains, diagnostic labs, disease surveillance, diagnostic labs, vector control. Without diluting our focus and accountability for our respective missions we can get

smarter about working together to help build stronger and more resilient health systems that can achieve multiple purposes and respond to multiple challenges.

Another practical reason for taking an integrated approach is that the roots of the next emerging threat can emerge from or be intertwined in today's problem. Drug-resistant TB is a good example. About a third of total antibiotic resistant deaths are caused by MDR/XDR TB. So if we want to address the AMR challenge we have to tackle the TB challenge. More generally, the increasing incidence of resistance – whether to ARVs in AIDS, or to artemisinin or pyrethroids in Malaria – poses threats that could take us backwards if we don't address them. And given the scale of these diseases, any slip up is measured in tens or hundreds of thousands of lives.

So I have Four Messages...

First, the global health community has to get better at articulating what's at stake in making the world safer from infectious disease threats – both in terms of lives and economics. At a time when many of our public leaders and much of our media seem afflicted by tunnel vision – seemingly only interested in what's within their borders and what's happening within their term of office – we need to be pointing out that viruses don't need visas and don't respect election timetables. And we shouldn't be competing with the climate change agenda, but combining with it. From what I've read – and I don't pretend to be an expert - the degradation of habitats and shifting climate patterns powerfully exacerbates the potential threats from infectious diseases. Winning the argument means we have to spend more time talking to people outside the global health arena, not preaching to the converted. And we have to use their language, their ways of thinking about risks, if we're to persuade them. For example, we need to recognise that some of the distinctions we make – between epidemic and endemic, or between bacteria and a virus – are just confusing to some of the policymakers whose support we need.

Second, we need to talk about health security in a way that makes sense both to taxpayers in rich countries and to the people most at risk from infectious diseases – those living in poor often marginalised communities, in slums, in border areas, in zones of conflict. Making these people safer from the diseases they haven't got makes little sense to them when they are dying from the diseases they have.

I understand that people living in rich countries are inevitably going to be most interested in being protected against new threats that might affect them directly. But to exaggerate to make the point, if global health security is seen as code for making only those who live in the rich world safer from infectious disease threats then it's both dodgy morally and won't be effective as a strategy. It ignores the fact that new threats are most likely to emerge in the places and amongst the populations where endemic diseases are most prevalent, and that by tackling one, we build better defences against the other.

Third, we need to get better at working together to tackle specific diseases and to build stronger, more resilient health systems. Although there is fabulous work being done by dedicated professionals across every aspect of global health, the impact of such efforts can be sometimes diminished or eroded by fragmentation, duplication and poor coordination. And this need for effective collaboration stretches beyond those focused on human health into animal health, housing and education. We need to minimise institutional turf battles and find better models of collaborating with the private sector. I don't have a magic wand to achieve this, but I can promise that under my leadership the Global Fund will take a big picture view of its mission, and a collaborative approach towards achieving its goals.

Finally, we need to ensure that gender considerations inform health security strategies in a powerful, practical – and effective - way. You only have to look at HIV infection rates amongst young women and girls in certain parts of Africa to realise that women often get the short end of the stick when it comes to protection from health risks. And this despite the fact that protecting women's health is arguably more important than protecting men's, given the knock-on impact on child health.

So on that note, I'll stop. This is a very timely conference on an incredibly important topic, for which I congratulate the organisers. I look forward to our discussions.

Mercedes Tatay

International Medical Secretary
Medecins Sans Frontères

France

Dr.Mercedes Tatay suggested the strategies to consider the infectious disease management. Those include ‘who’, ‘what’, ‘where’, ‘when’, and ‘why & how’. First of all, there is a need to identify the risk groups and the threats and next is to understand the specific areas and context of the threats. She rightly points out that the vulnerable population are most affected by infectious diseases, neglected tropical diseases as well as emerging infectious diseases. Once the threats are identified, real time response or action is important in managing the spread the infectious diseases and prevents epidemics. It is critical to understand how to contain health threats in limited areas. It is not at the global, regional and national levels need to tack action but also local or community should play a leading role and engage in the action as they are close to the events. Additionally, morally wealthy countries

should support the most vulnerable countries in their capacities to contain infectious and emerging infectious diseases. Effective defensive mechanism through “prevention, detection and response” in all UN Member States are critical to ensure health security for all human kind. So “Need to transform threats and fears into opportunity”. The Chinese word for crisis 危机 (weije) is a combination of danger or threats and opportunity. This means we must see opportunities in the threats.

Need to transform threats and fears into opportunity.

The Chinese word for crisis

危机

is a combination of danger or threats and opportunity.

Mercedes Tatay

Tedros Adhanom Ghebreyesus

Director-General
World Health Organization

Switzerland

Your Royal Highness Princess Maha Chakri Sirindhorn, Excellencies, ladies and gentlemen,

I would like to start by congratulating all laureates of PMAC who are with us today: Dr Eric Green, Professor Porter Anderson, Dr Rachel Schneerson, Dr John Robbins, and Professor Mathuram Santosham. I would like to really congratulate you. You're going to change the future of health. You're going to establish the future of health. That's what I have seen, actually, from the presentation.

As Dr Green said, just the mapping took six to eight years, and now you're able to do it in 1 to 3 days. It used to cost 1 million U.S. dollars, now it's a matter of 1000 U.S. dollars. This is really amazing progress.

I fully agree with what you said: the future of health begins with you. I look forward to working with you very closely, because in what we do, and what WHO does, I know your work will have a significant impact.

So to all laureates, please accept my greatest respect and appreciation for your dedication and commitment.

As you know, this year marks the 100th anniversary of Spanish flu, the deadliest outbreak in recorded history. Up to 50 million people were killed, more than the death toll from the First World War. The revised estimate actually is between 50 to 100 million people were killed.

Thankfully, we have not seen a public health emergency on that scale since then. But we may at any time. Outbreaks are as you know a fact of life, and we're still in vulnerable.

You know that only too well. Even here in Thailand, you have experienced outbreaks of H5N1, SARS, dengue and more, just in the last few years, but you have responded effectively. I would also like to commend Thailand in being a leader in supporting other countries in times of emergencies and outbreaks, as we have seen recently in Nepal and Sri Lanka.

Of course, none of us will ever forget the West African Ebola outbreak in 2014. Apart from its terrible human cost, Ebola also had a devastating economic impact. The IMF reduced its growth projections for sub-Saharan Africa by 10%. Commodity prices plunged, while unemployment and fiscal deficits rose. Ebola taught us a valuable lesson: global health security is only as strong as its weakest link. No-one is safe until everyone is safe.

As you know, WHO was sharply criticized for its performance during Ebola. Some of the criticism was fair, some was not. But it did prompt us to overhaul the way we respond to emergencies.

This work began under my predecessor, Dr Margaret Chan, and since becoming Director-General last year, I have taken further steps to make our emergency operations more like a national security setup, because it's a serious security issue.

I now receive a daily briefing note on the status of all ongoing emergencies globally, and we have also established the WHO Health Security Council, a fortnightly meeting co-chaired by me and my Deputy Director-General for Emergencies, Dr Peter Salama, to review all emergencies in detail.

Recently we also begun an exercise with the Wellcome Trust of mapping the capacities of all countries, developed and developing, to contribute to a global "health reserve force" or "health reserve army" that can be deployed anywhere in the world within 72 hours to respond to emergencies.

I would like to quote what Dr Eric Green said: not one life; all lives. Not one country; all countries. That's why working together is very important, and we have started the mapping exercise to map the capacities we have globally in terms of research and development, and also the capacities we have in terms of emergency preparedness and response.

In the past six months, WHO has responded to 50 emergencies in 48 countries, including 9 grade 3 emergencies, which is the highest level in our grading system. One of the most severe was the outbreak of plague in Madagascar last year that killed 207 people. But it could have been much worse. Prompt action by the government, with support from WHO and other partners, meant that we were able to bring the outbreak under

control very quickly. I visited Madagascar just a few weeks ago to meet the President of the Republic, and we discussed the plague response, but also the need to take action to prevent the next outbreak now by taking action, especially on vector control. The reality is that 70% of new pathogens come from animals.

Increasing demand for food and land, and the intensive farming and transport of animals, all increase the risk of diseases spreading from animals to humans. So it's obvious that we cannot address human health in isolation. We can only improve human health with a "One Health" approach that recognizes that the health of humans, animals and ecosystems are linked, as Her Royal Highness said in her speech.

This is especially true to address the growing threat of antimicrobial resistance. On Monday here in Bangkok, WHO launched the first report from our new Global Antimicrobial Surveillance System (known as GLASS). The findings are alarming. In some countries, up to 82% of bacterial infections are resistant to at least one of the most commonly-used antibiotics. Resistance to ciprofloxacin is as high as 65% in some countries. For penicillin it's 51%.

One of the most important actions for every country is to set up a robust surveillance system that can track and detect trends in drug-resistance. I am encouraged to say that 52 countries are now enrolled in this system and more are on the way to joining. But we also need to take cross-sectoral action to address the root causes of the problem.

Together with our friends at OIE and FAO, we have a tripartite agreement to work on One Health. For example, together we are fostering research to understand how MERS is crossing from camels into humans. We also collaborate with the agriculture sector to detect, monitor and respond to influenza viruses with pandemic potential. This cross-sectoral collaboration cannot only happen at the global level. It must also happen on the ground, which is why I'm very encouraged that here in Thailand you have worked successfully across sectors to develop a national strategic plan on antimicrobial resistance.

Your Highness, Excellencies, Ladies and gentlemen,

Keeping the world safe is one of WHO's three top strategic priorities in our new five-year strategic plan, which was endorsed by the Executive Board of WHO last week.

We are setting ourselves a goal that over the next five years, 1 billion more people will be better protected from epidemics and other health emergencies. I was very happy when I saw "Making the World Safe" here. It exactly fits with what we have put in our strategic plan. We are currently developing the tools to measure this, but we already know what we need to do to make people safe.

First, we must build and sustain resilient capacities at national, regional and global levels to prevent, detect and respond to outbreaks, in accordance with the International Health Regulations. As Her Highness also underlined, capacities and coordination. That's how she summarized it. And second, we must ensure that populations affected by emergencies have rapid access to essential life-saving health services, including medicines and vaccines.

Not one life;
All lives.
Not one country;
All countries.
Not in Isolation,
but Together
we can make
A Big Difference.

Tedros Adhanom Ghebreyesus

That requires investments in the fabric of health systems, especially in people-centred primary care, to ensure that people can access the services they need, when and where they need them.

Ultimately, universal health coverage and health security are two sides of the same coin. That's why we say all roads should lead to universal health coverage, whose centre of gravity should be primary health care -- back to the basics of health promotion and disease prevention, whose dividend is great, but which is neglected.

Outbreaks are inevitable, but epidemics are preventable. If epidemics happen, it's our mistake. This is not a job, of course, for WHO alone or for the health sector alone. In fact, we cannot succeed unless we all work together. This is what I am seeking to do at WHO, with my colleagues. I look forward to your partnership as we work together to keep the world safe.

When Dr Green presented, he said imagination is sky high. I think with the advance we have seen, making the world safe is possible, especially if we keep our imagination high.

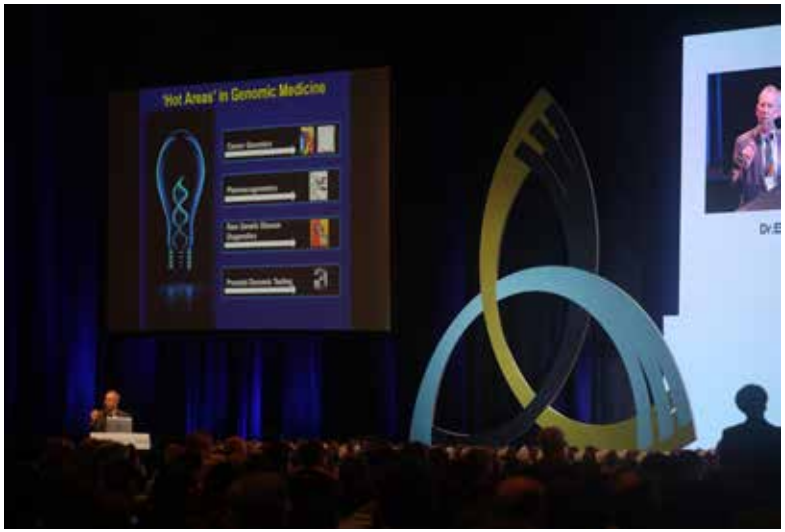
I really enjoyed his presentation. Not one life; all lives. Not one country; all countries. Not in isolation, but together we can make a big difference.

Thank you so much. Khob khun krab.

CONFERENCE SESSIONS

AT A GLANCE

THURSDAY
1 FEBRUARY 2018



Opening Session
by Her Royal Highness Princess Maha Chakri Sirindhorn

Keynote Speeches

Plenary Session 0
Vision 2100: Re-Imagining the End Game for the End of the Pandemic Era

Plenary Session 1
Leadership Needed for Managing Emerging Infectious Diseases of the 21st Century

Parallel Session 1.1
Lessons Learned in Managing Emerging Infectious Diseases (EIDs)

Parallel Session 1.2
Strategic Information and the Evolution of Emerging Infectious Diseases: Lessons from the Past and New Opportunities

Parallel Session 1.3
Safeguarding Medicines in the Era of AMR: What Do We Know? What Works?

Parallel Session 1.4
Financing Pandemic Preparedness: Where is the Money?

Parallel Session 1.5
One Health on the Move: Nomadic Communities

Plenary Session 2

Futures of Partnerships for a Safer World

Plenary Session 3

Managing Emerging Infectious Disease and AMR Risk across the Livestock Revolution

Parallel Session 2.1

Beyond MERS and Zika: Are we Prepared for the Next Big Epidemic?

Parallel Session 2.2

AMR: Addressing Excessive and Inappropriate Use of Antibiotics

Parallel Session 2.3

Dealing with an Inter-Connected World: Partnerships for Preparedness, Detection and Response during High Visibility Events

Parallel Session 2.4

Changing Dynamics: Emerging Infectious Diseases and Antimicrobial Resistance in an Era of Expanding Global Human Population Growth and Movement

Parallel Session 2.5

Reducing the Gap: Addressing Neglected Disease; Neglected Populations

FRIDAY
2 FEBRUARY 2018

Parallel Session 3.1
Global Partnerships for Country Outcomes

Parallel Session 3.2
Lessons Learned from a One Health Approach to AMR

Parallel Session 3.3
Climate Change and Emerging Diseases: The Importance of Resilient Societies

Parallel Session 3.4
Shifting Landscapes – Real and Figurative: Understanding How Altered Land Use is Driving Disease Emergence

Parallel Session 3.5
Policy Coherence: Effective Partnerships for Global Health

Parallel Session 4.1
Moving Forward and Outward: Progress in Implementation of Global Frameworks and Initiatives

Parallel Session 4.2
Multi-sectoral Partnerships for Action on AMR

Parallel Session 4.3
Community Systems: the Bedrock of Responses to EID and AMR

Parallel Session 4.4
Finding the Win-Win Solutions for Better Health from Better Food Systems

Parallel Session 4.5
Bringing Solutions into Focus: Harnessing the Power of an Economic Lens

SATURDAY
3 FEBRUARY 2018

Statement
& Closing Session

Synthesis: Summary,
Conclusion &
Recommendations

CONFERENCE
SYNTHESIS

STRUCTURE OF THE CONTENT SYNTHESIS

This synthesis matches the objectives of PMAC 2018 which was intended to be ACTION FOCUSED addressing both emerging infectious diseases (EIDs) and antimicrobial resistance (AMR). There were three main elements to the content.

I.

PROBLEM STREAM

Understand the drivers of EIDs and AMR

II.

SOLUTION STREAM

- Accelerate progress on multi-sectoral actions
- Advocate evidence-based priority setting and policies
- Using PMAC as learning and sharing platform among partners

III.

EVIDENCE FOR POLICY DECISION

Underscore the security, socio-economic and development benefits from a One Health approach

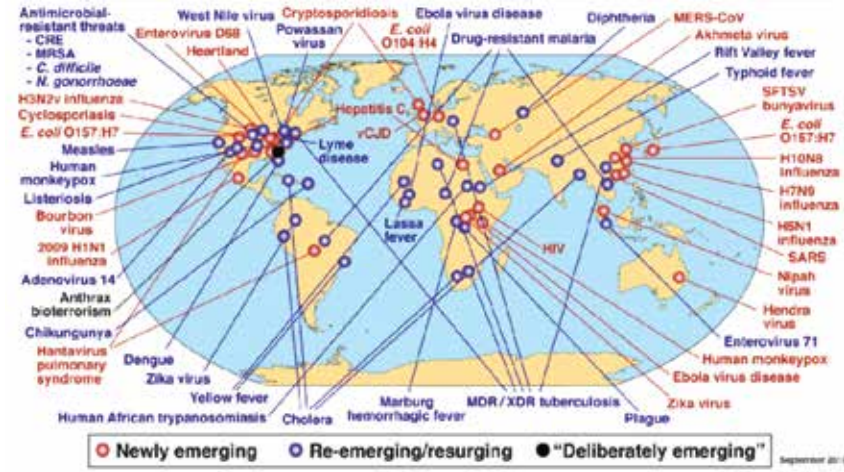
Therefore, the synthesis is structured as follows. It starts with problem streams and then illustrates the drivers of EIDs and AMR, their negative consequences on health security, human toll and economic impacts, cost of inaction and specific solutions and wraps up with cross cutting recommendations.

I

PROBLEM STREAMS

To set the context for this conference, the figure below shows global threats from emerging and re-emerging infectious diseases-showing the newly emerging, the re-emerging and resurging and the deliberately emerging. It also shows the scale of the problems were being discussed and addressed in this conference.

GLOBAL EXAMPLES OF EMERGING AND RE-EMERGING INFECTIOUS DISEASES



Source: Slide from Parallel Session 2.4 presented by Katrin Kohl.

Some recent examples are illustrated here; yellow fever outbreaks in Angola in 2016, multidrug resistance tuberculosis (MDR TB), artemisinin-resistant malaria, drug resistance to anti-retroviral therapies (ART).

YELLOW FEVER, ANGOLA 2016

2016 (January – July): 3,552 yellow fever cases from all provinces of Angola were confirmed with a total of 355 deaths.

International spread was alarming: it spread from Angola to the DRC (59 confirmed cases), to Kenya (2 confirmed cases) and to China (11 confirmed cases). Similar to SARS outbreaks, rapid and massive international travel facilitated such global spread across continents.

MDR TB

MDR-TB is a public health crisis and a protracted unresolved human security threat. WHO estimates 600,000 new cases globally with resistance to rifampicin—the most effective first-line drug, of which 490,000 are MDR-TB. The root cause of MDR is the failure of effective detection and management through tuberculosis Directly Observed Treatment Short course (TB DOTS).

The table below shows the cost of treatment of drug sensitive TB and MDR TB (US dollars per full treatment of one patient) across high, middle, and low-income countries. It demonstrates how much of a cost burden MDR TB adds to the treatment of TB. For example, in Lower Middle-Income Countries (LMICs), the cost of treating multidrug resistance TB is 23 times that of treating drug sensitive TB.

	HIC High- Income Countries	UMIC Upper Middle-Income Countries	LMIC Lower Middle-Income Countries	LIC Low-Income Countries
Drug sensitive TB	14,659	840	273	258
Multi drug resistant TB	83,365	5,284	6,313	1,218
Ratio of cost of MDR to drug sensitive TB	5.7	6.3	23.1	4.7

Source: PharmacoEconomics (2015) 33:939–955 https://goo.gl/H8QxxQ

ARTEMISININ-RESISTANT MALARIA

Southeast Asia is not only the epi-centre of anti-malarial drug resistance but also one of the most popular travel destinations: 104 million international travellers in 2015. This movement facilitates international spread of artemisinin-resistant malaria.

The figure below shows the prevalence of K13 mutations in the Southeast Asia region, indicating the growth of resistance to artemisinin medications.

It is extremely alarming in a WHO report that 38-90% of samples of artemisinin-containing medications sold in drug shops were substandard or falsified. This deficiency not only results in failure of treatment but also encourages rapid resistance.[5, 6, 7]

Figure A map of prevalence of K13 mutations from K13 Molecular Survey as accessed on 16 November 2016.

Source: Lancet Infect Dis 2017; 17: 491–97 https://goo.gl/3uYa9w

[5] Newton P, et al. Lancet. 2001;357: 1948–50.
[6] Newton PN, et al. PLoS Med. 2008;5: e32.
[7] Sengaloundeth S, et al. Malar J. 2009;8:172.

ART DRUG RESISTANCE

The prevalence of virological failure was 10.4% after one year of antiviral treatment in China.[8]

The overall prevalence of primary HIV Drug Resistance was 7.9% in Thailand. [9]

AMR CHALLENGES

In 2014, in the rich countries (OECD countries), 15% of overall admissions had an AMR infection, and for the top three countries, it was 25% which is 11 times higher than the lowest three countries.[10]

The most common pathogens were third generation cephalosporin-resistant Escherichia coli and carbapenem-resistant Klebsiella pneumoniae.

[8] BioMed Research International, 2016, http://dx.doi.org/10.1155/2016/1752437
[9] PLOS One https://doi.org/10.1371/journal.pone.0147945
[10] OECD 2016 http://www.oecd.org/health/antimicrobial-resistance.htm

It is vital that countries should monitor not just antimicrobial resistance and surveillance of consumption of antibiotics, but should extend this to cover

A | Anti-Malarial Treatments

B | Anti-Mycobacterium Tuberculosis Therapies

C | Antiviral Agents

as recommended by WHO.

II

EMERGING INFECTIOUS DISEASES (EIDs)

The main drivers of EIDs are

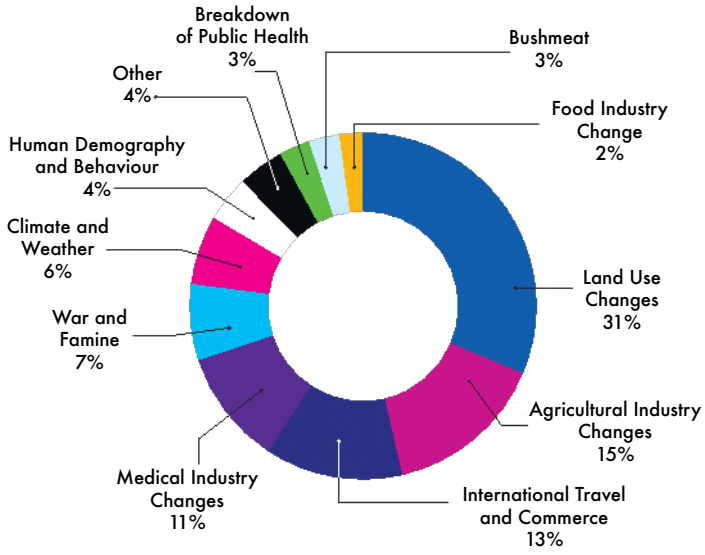
1. Urbanization
2. Global warming
3. Increasing domestic and international travel and migration
4. Increasing population density
5. Expanded agriculture and intensive husbandry practices

This is shown in the figure below

INTENSIFYING DRIVERS OF EMERGING INFECTIONS

Source: Slide from Plenary 0 presented by Fineberg H.

All these drivers of EIDs increase the contacts between humans, animals and pathogens. More outbreaks of emerging or re-emerging infectious diseases affect more people. Urbanization leads to more urban outbreaks (e.g. yellow fever in Angola) which pose significant challenges in terms of scale of response and potential international amplification. EIDs particularly affect the poor and marginalized population, e.g. people on the move—internal, international displaced persons, pastoralists.



Source: Terrolio Z. et al. 2015; presented in Parallel Session 4.5

See UNICEF's response to potential cholera outbreak https://youtu.be/FvCexK18hiU [0.42 minute]

VDO message

Rohingya refugees from Myanmar are pouring into Bangladesh every day. Over a half millions are living in these makeshifts settlements. There is a severe shortage of food, water and sanitation. The risk of diseases such as diarrhea and cholera is high. 900,000 cholera vaccines are on the way. Mass immunization is planned. UNICEF is responding urgently, but the needs are immense. You can help: support.UNICEF.org

COST OF INADEQUATE SURVEILLANCE AND RESPONSE

The cost of inadequate surveillance and response is enormous. The cost of preparedness is estimated as at least ten times less than the cost of inadequate surveillance and response.

> **Preparedness costs millions, response costs hundreds of millions and recovery costs billions.**

The impact is not only financial or economic but also social and political. For example, in the MERS-CoV outbreak in the Republic of Korea in 2015, a total 186 persons were infected, 38 of whom died. In terms of economic impact, foreign tourist visits decreased by 41% compared to May 2014. The total economic loss was US$10 billion with a 0.1% reduction in GDP growth in 2015.[11]

[11] Euro Surveill. 2015; 20(25):pii=21163. https://goo.gl/cQaa7g

INADEQUATE CAPACITY TO RESPOND: FRAGILE HEALTH SYSTEMS IN EBOLA AFFECTED COUNTRIES

Ebola affected Guinea, Liberia and Sierra Leone between 2014 and 2016. The figure below shows the pre-Ebola status of human development and the fragile health systems in these three Western African countries. As a result of the pandemic, there were more than 11 thousand estimated deaths from Ebola. Since Ebola was diagnosed first in 1976, it might have been expected that the world would be better prepared to deal with an outbreak. Unfortunately, there was very in adequate capacity to respond because of fragile health systems, lack of investment in the health and delivery systems, poor health delivery infrastructure and the fact that no vaccine had been developed, although Ebola had been a risk for a long time. The scientific communitiesand vaccine industry had failed to develop Ebola vaccines, diagnostics or effective medicines due to the limited market.

HEALTH SYSTEM
PRE-EBOLA STATUS OF THE AFFECTED COUNTRIES

	Guinea	Liberia	Sierra Leone
Human Development Index (2014 total of 187)	179th	175th	183th
No. of Physicians per 10,000 population	1.4	0.3	0.3
Child Mortality per 1,000 live births (2013)	100	80	160
Gov. Expenditure / Capita for health including ODA (2012)	US$ 9	US$ 20	US$ 20

Source: Slide from Parallel Session 1.4 presented by Yamamoto N.

THAILAND'S RESPONSES TO
MERS-COV[12]

An Omani patient was treated in a hospital in Bangkok in 2015. On Day 1, the patient who had a heart condition was diagnosed with pneumonia on hospital admission. On Days 2 and 3 there were two false negative tests on upper respiratory tract samples. It was not until Day 3 that the subsequent sputum exam confirmed MERS corona virus. The patient was immediately moved back into the negative pressure unit and transferred to the Ministry of Health's Infectious Disease Institute for proper management, quarantine and contact tracing according to the national protocol.

In order to contain the spread, over 170 contacts were traced; 48 were quarantined and 122 self-monitored their symptoms and reported to the health authority. High-risk close contacts with no symptoms and those with a negative lab test on day 12 were released on the 14th day.

The Omani Ministry of Health was notified using the International Health Regulation 2005 mechanisms. An outbreak investigation in Oman was conducted and findings were published on the WHO intranet and shared with Thailand.

The key to successful infection control and avoiding secondary transmission was collaborative efforts among hospitals, laboratories and MOHs of both countries.

[12]Euro Surveill. 2017 Aug 17; 22(33): 30598

SOLUTIONS TO EIDs

The conference deliberations generated several key solutions

IHR core capacities

Improve and sustain the IHR core capacities.

Human-Animal Interface

Strengthen the human-animal interface interventions: One Health workforce, biosecurity in animal production facilities, preventive measures at the interface (e.g. vaccination of animals to prevent spill-over to humans)

People-Centered

People-centered responses including improved clinical care, community engagement, civil society inclusion in global discussions on health security, leaving no one behind, focus on the most vulnerable population.

Renewed Governance

Renewed governance transparency and national governments' accountability for preparedness and response, building trust and collective commitment from all nations. Foster coordination acknowledging the challenge of multi-partner, multidisciplinary and multicultural response teams.

Optimize Partnerships

Optimize partnerships: incentivize collaboration, clarify joint objectives based on local needs, develop governance structure acknowledging individual partner interests as well as common objectives and goals, develop metrics for greater accountability.

Build capacities

Build capacities dealing with existing threats and epidemics to ensure adequate systems. Systems of animal, human and environmental health need to be strengthened.

Approaches

Invest in systems, not projects;

Emphasize health security and primary care which are 2 faces of the same coin;

Engage politicians and financial stakeholders, increase their awareness before and during outbreaks.

LESSONS OF EXPERIENCE AND GOOD PRACTICES

Some of the lessons, experiences and good practices are to engage the media proactively and at an early stage of the response to shape the narrative and remain flexible, as in the effective response to the yellow fever outbreaks in Brazil.

There is great value in preparing the health system to respond, training health workers to cope with unexpected outbreaks and improving infection prevention and control on an ongoing basis. The importance of improving general public literacy about risks and prevention measures was highlighted in the presentation of Swedish experiences.

Learning from other countries' experiences provides mutual benefit. There is a need to integrate surveillance data sources covering humans, animals and communities. The potential of big data for surveillance was highlighted but there is need to improve data integrity. There is value in producing economic metrics on health systems preparedness in order to raise and sustain the awareness of politicians and decision makers.

The private sector should be included in preparedness and response to challenges faced by pastoralists.

Pastoralists are likely to be affected by EIDs but they are not included in the policies or interventions for health security. It was suggested that pastoralist and nomadic populations should be covered by the surveillance, biosecurity and policy dialogue in order to find innovative and cost efficient solutions in settings that are very different relative to stable populations. These might involve human and animal health service that are adapted to pastoralism through a capacity building programme; mobile health and veterinary services; and provision of institutional and legal status to pastoralists to give them a collective voice. In addition, in response to the commitment to Universal Health Coverage (UHC) as one of the SDG targets, governments should ensure that pastoralists and agriculturists have access to health services and protection from financial hardship from medical bills. Other policies should cover insurance against animal losses due to drought and disease outbreaks.

Source: Slide from Parallel Session 1.5 presented by Velasco-Gil G.

III

ANTIMICROBIAL RESISTANCE (AMR)

The key drivers of AMR[13]

Although the bacteria develops naturally its own resistance to antibiotics; the main drivers of AMR are the excessive and inappropriate uses of antimicrobials.[14]

Inappropriate uses can be determined by the sub-optimal use due to lack of sufficient access to quality antimicrobials and uncontrolled sub-standard and falsified antimicrobials. The environmental contamination of antibiotics put a pressure to the pathogens in the environment to develop resistance. Inadequate dose from self-medicated antibiotics is prevalent in developing countries. The unavailability of rapid diagnostic tests to distinguish viral from bacterial infection in humans result in unnecessary use of antibiotics for viral infections.

The transmission in healthcare setting of AMR pathogens between healthcare personnel and patients further exacerbate the AMR problems requires strong infection prevention and control strategies.

The use of antibiotic as growth promoter, administered at a low, sub-therapeutic dose has increased with the intensification of livestock farming can stimulate resistance of pathogens in food animal. Of these fact, many European countries had totally banned its use as growth promoter.

[13] Holmes, et al. Lancet 2016; 387: 176–87 https://goo.gl/d38e1C
[14] Holmes et al 2016

GLOBAL CONSUMPTION OF ANTIMICROBIAL AGENTS IN FOOD ANIMAL PRODUCTION[15]

There was an estimation of the consumption of antimicrobial agents in the food animal production system at 63,151 (±1,560) tonnes in 2010 and this consumption was projected to rise by 67%, to 105,596 (±3,605) tonnes by 2030. The increased consumption is driven by the growth in consumer demand for livestock products especially in middle-income countries, and an associated shift to large-scale farms where antimicrobials are used routinely.

[15] PNAS 2015 May, 112 (18) 5649-5654. https://doi.org/10.1073/pnas.1503141112

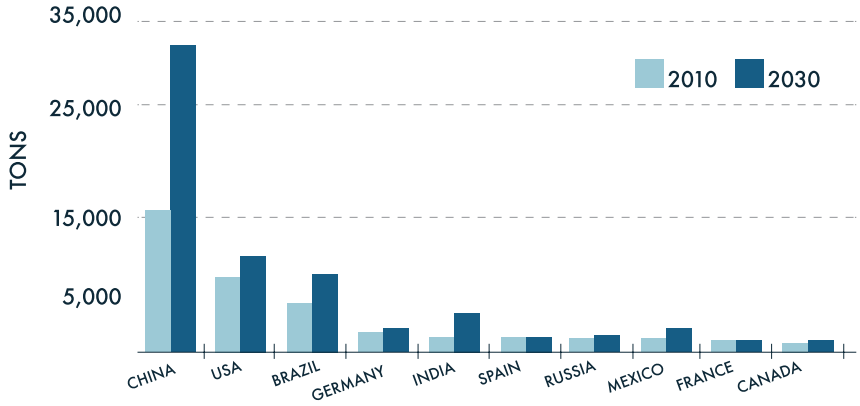
The map shows hotspots, in term of intensity of antimicrobial consumption. For example, in India, the consumption was 30 kg per km^2 for industrial poultry production.

A MAP SHOWING CONSUMPTION OF ANTIMICROBIAL AGENTS IN FOOD ANIMAL

Source: Slide from Plenary 0 presented by Fineberg H. Van Boeckel, et al. Science, 2017

The figure below shows expected growth by 2030 in antibiotic consumption for livestock use, top ten countries only. It demonstrates major increases, for example in China where consumption is expected to double.

ANTIBIOTIC CONSUMPTION IN LIVESTOCK, TOP TEN COUNTRIES 2010–2030 (PROJECTED FOR 2030)



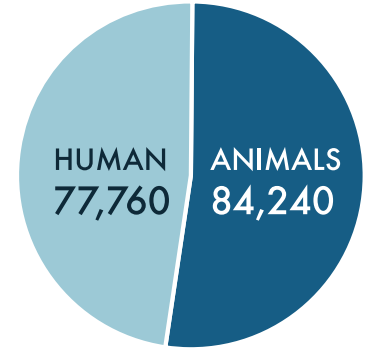
Source: Van Boeckel et al., 2015, PNAS, www.pnas.org/cgi/doi/10.1073/pnas.1503141112 presented by Laxminarayan R in Parallel Session 4.5

The figure below shows that more antimicrobial agents are consumed by animals than by humans due to the number of animals and demand for animal meat and products. This is the case in China, for example, and elsewhere.

China consumes half the worLd's antibiotics, with the majority administered to animals

162,000

OF ANTIBIOTICS USED IN TOTAL

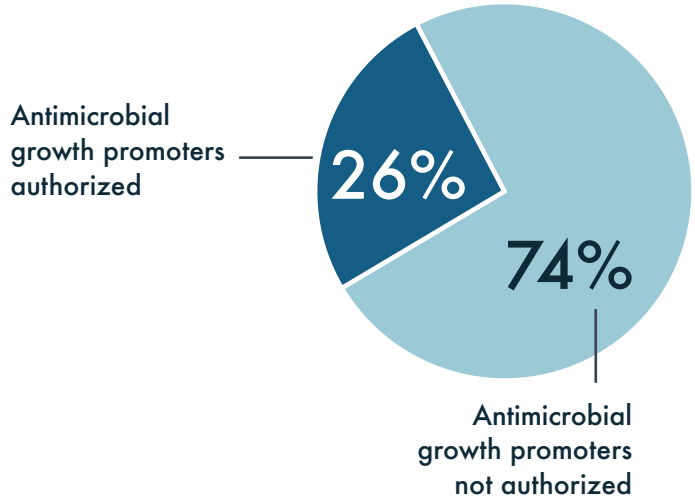


Source: Ying Guang-Guo et al in Environment Science & Technology, 2015 presented in Parallel Session 4.5 by Laxminarayan R.

USE OF ANTIMICROBIAL AGENTS FOR GROWTH PROMOTION[16]

The use of antimicrobial agents for growth promotion is a particular concern. Some improvement was pointed out: there was an increase in the number of countries that do not authorize antimicrobial agents for growth promotion in animals. In 2015, a total of 96 out of 130 (74%) OIE Member Countries did not authorize antimicrobial agents for growth promotion in animals.

AUTHORISATION OF ANTIMICROBIAL GROWTH PROMOTERS IN 130 OIE MEMBER COUNTRIES IN 2015



[16] OIE 2016 https://goo.gl/MpDM6E

COST OF INACTION: CHALLENGES FROM SUB-STANDARD AND FALSIFIED MEDICINES

What is the extent of the cost of inaction in relation to sub-standard and falsified medicines? Of 48,000 samples of medicines tested for quality, of which 66% were antimicrobial agents, there was a 10.6% failure rate, equivalent to an annual cost of $30.5 billion on substandard and falsified products.[17] Unfortunately, the problem of substandard and falsified antibiotics has not so far been adequately addressed by the Global Action Plan (GAP) on AMR.

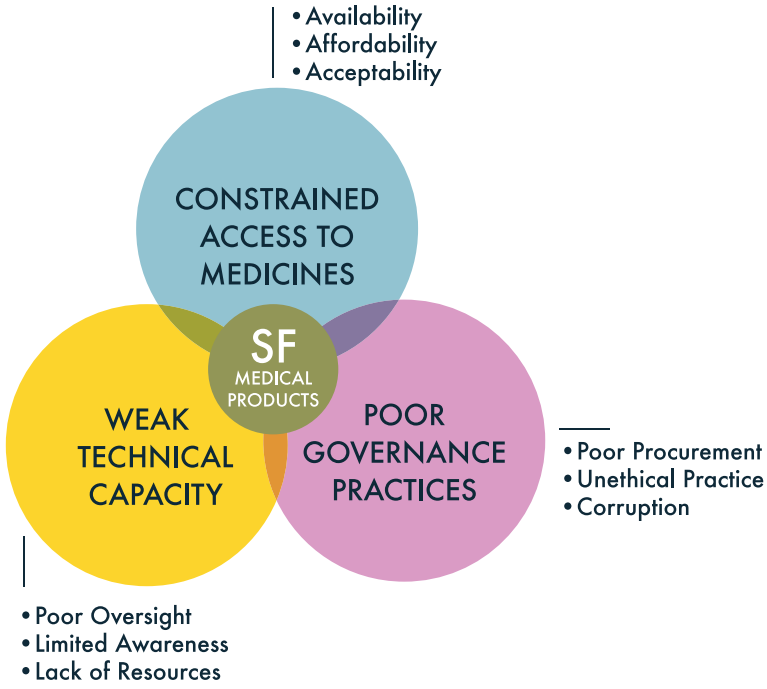
The negative health impacts of substandard and falsified antibiotics and antimicrobial agents were estimated at 72,430–169,271 deaths from childhood pneumonia. An additional 116,000 deaths from malaria in Sub-Saharan Africa were estimated to be due to substandard and falsified antimalarial drugs, with a huge additional treatment cost of $38.5 million associated with initial treatment failure.

Some of the root causes of sub-standard and falsified antimicrobial agents were identified (see figure below) as poor governance in particular corruption, unethical practices and poor procurement and weak national regulatory authority capacity to oversee and combat substandard and falsified antimicrobial agents, as well as insufficient governance surrounding imports, exports or internet sales.

[17] WHO 2017 https://goo.gl/ZCsXX1

CAUSES OF SUBSTANDARD AND FALSIFIED MEDICAL PRODUCTS

WHAT DO WE KNOW?



Source: Slide from Parallel Session 1.3 presented by Bond K.

SOLUTIONS FOR AMR

Efforts on active implementation of national action plans on AMR and strengthened institutional capacities should focus on two major strands: monitoring and action.

The monitoring strand is needed for surveillance to inform policy. Surveillance should cover the following:

- Antimicrobial consumption in the human and animal sectors, including in plants and other crop productions.
- AMR in humans and animals,
- Integrated surveillance of AMR throughout in the food chain and food borne diseases,
- Residues and AMR in the environment,
- Point prevalence survey to capture the prevalence of healthcare associated infections and AMR in health facilities and antimicrobial use in health facilities,

- AMR attributed mortality and economic loss as percentage of Gross Domestic Product (GDP),
- Unethical market promotion by the pharmaceutical industry and regulatory capture in the import, export and procurement of substandard and falsified medical products,
- Post-marketing surveillance of quality of medicines followed by the recall of substandard and falsified medical products and legal action, and
- Monitoring proper disposal of expired antibiotics.

THE SECOND STRAND ON ACTIONS CAN BE CATEGORIZED INTO FOUR ACTION POINTS.

Redesigning livestock and aquaculture production systems

First is the importance of redesigning livestock and aquaculture production systems covering immunology relating to breeds and vaccines; animal husbandry on stocking densities and weaning age; human skills; quality of water and feed; for which countries can apply. There is a need to take opportunities to the shift in consumer preferences such as organic food; and reduction of meat where consumption exceeds the daily recommended amounts. The guidelines produced by FAO "Hazard Analysis And Critical Control Point (HACCP) System and Guidelines" can be used to strengthening the food safety.

Improving antimicrobial medicines stewardship

Second is the importance of improving antimicrobial medicines stewardship which could be done within the healthcare setting by enforcing clinical practice guidelines, dispensing and prescription audits, ensuring peer support and counseling and continued professional education. At national level the regulatory capacities in the national regulatory authority need to be strengthened. Improved antibiotic literacy and AMR awareness is indispensable, and could be done by improving antibiotic literacy in the population at large and amongst professionals and then encouraging good practice in the use of antimicrobial agents. Antibiotics should be reclassified into three groups: access, watch and reserve, with limited use of the reserve group. Importantly, regulation by capping antimicrobial agent usage per population correction unit (PCU) should be adopted.

Strengthening infection prevention and control in healthcare facilities

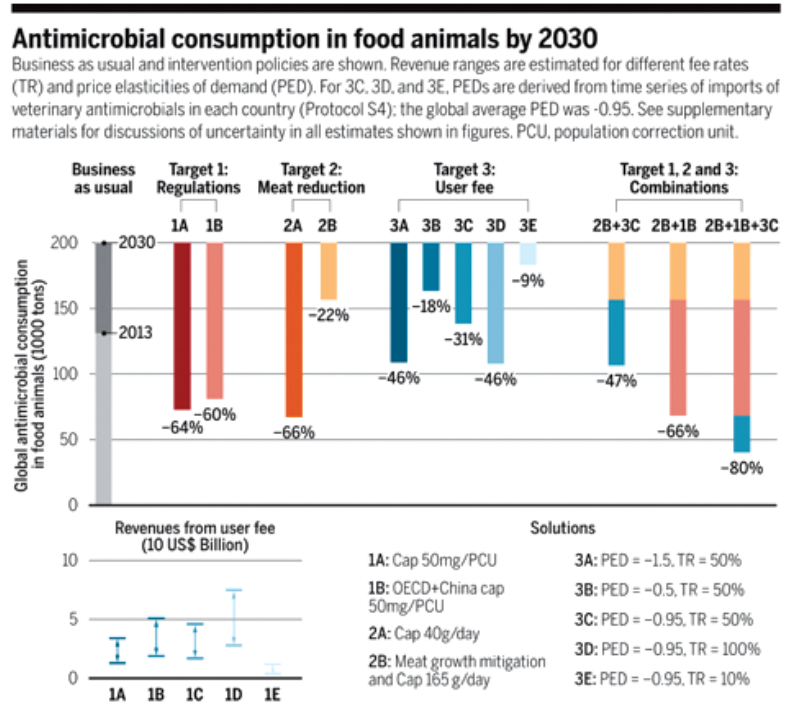
Third is the importance of strengthening infection prevention and control in healthcare facilities, including improved alcohol-based handrub practice and compliance among healthcare workers and patients to ensure prevention of nosocomial infections. This would protect health workers also.

Research and development (R&D)

Finally research and development (R&D) is needed in various areas related to AMR with an emphasis on health policy and systems research to gain a better understanding of how to intervene within health systems to reduce the problem of AMR. There is a need for public investment: 1) R&D in novel molecules and diagnostics; 2) research for alternatives such as autogenous vaccines; and 3) research on innovations such as genomic technology to improve our knowledge of resistance, and digital technologies or mobile phones for detection, reporting and verification and cross-checking the label in products at customer/patient level.

The conference recognised the real challenges of the implementation capacities gap in many countries and called for support to strengthen implementation capacity, in particular in low and middle-income countries and engaging the animal feed industry (terrestrial and aquatic).

The graph below demonstrates how antimicrobial consumption in food animals by 2030 might be decreased in different scenarios through interventions related to regulations, reduction in meat consumption and user fees on veterinary antimicrobial use.



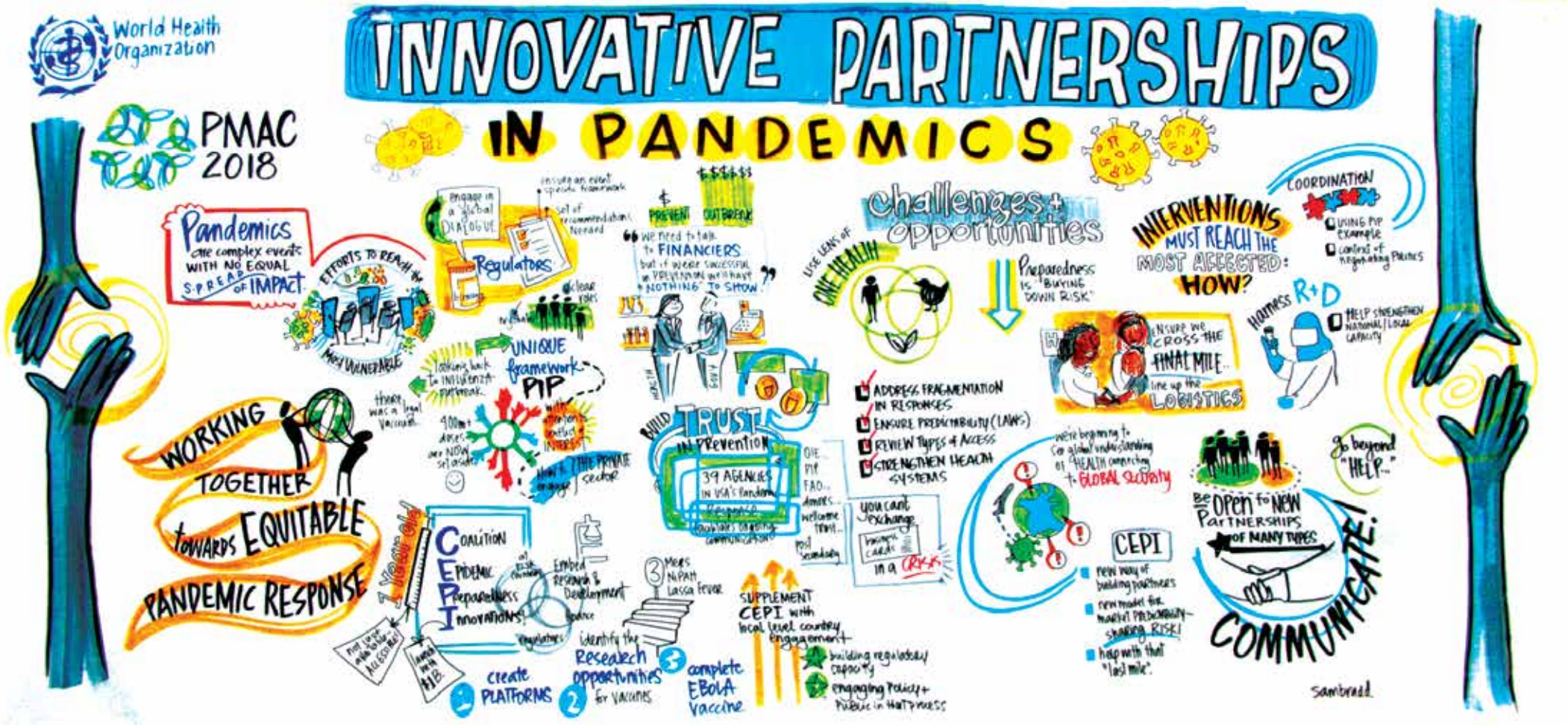
Source: Van Boeckel et al, Science 2017. 357:1350-1352 presented in Plenary Session 3 by Carroll D.

IV

CROSS CUTTING RECOMMENDATIONS AND SUMMARY

CROSS CUTTING RECOMMENDATIONS

Many cross cutting recommendations were identified during the Conference. The Conference had incredibly rich discussions, and cross cutting recommendations for both EIDs and AMR were captured in the infographics below. The recommendations are then listed.



FIRST

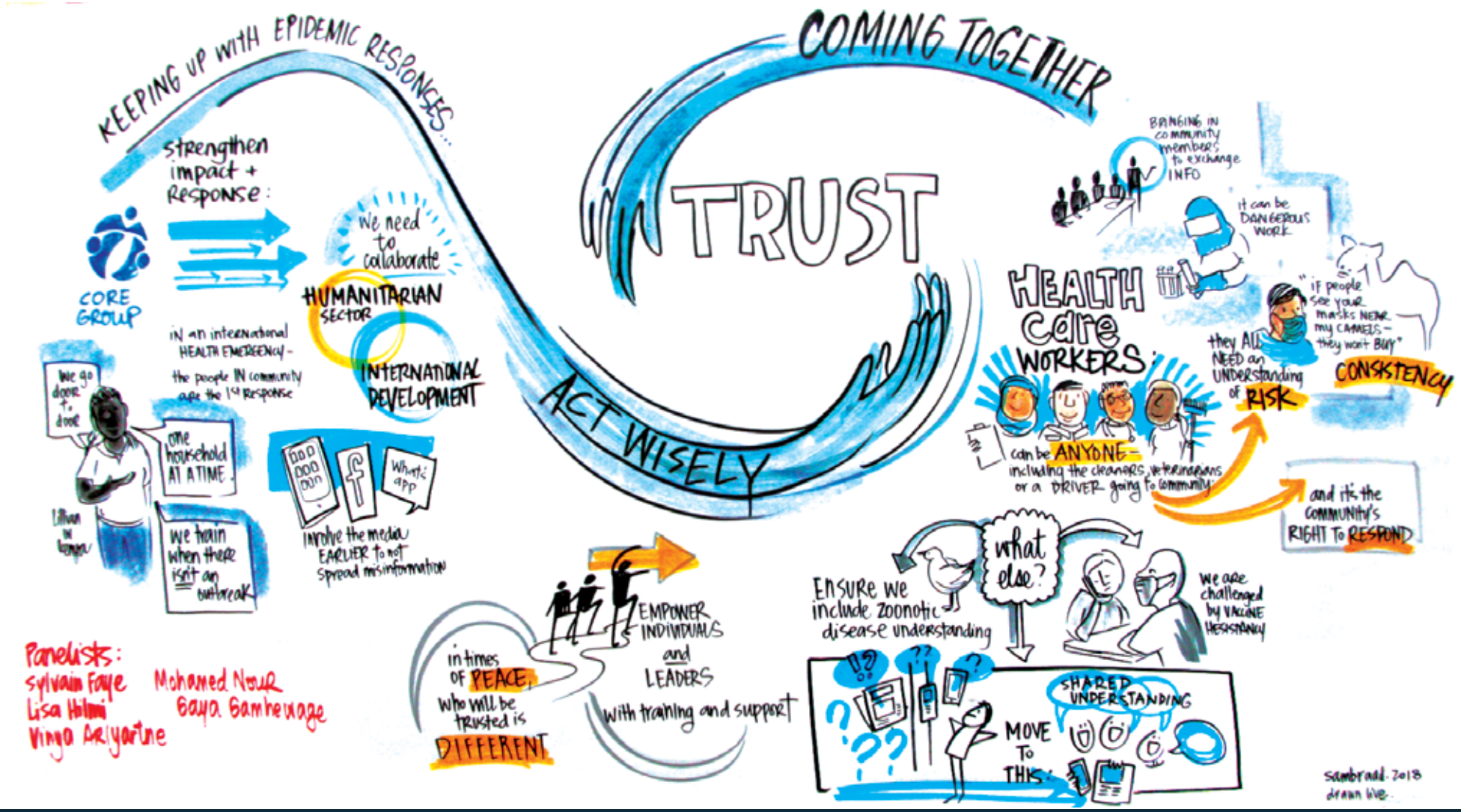
to ensure that EIDs and AMR are placed adequately and suitably into the **national security agenda** in all countries.

SECOND

to ensure **good governance**, accountability and transparency to address corruption and involving multi-sectoral actions for health covering all its dimensions (animal, human and environment) which require public-private-community-civil society engagement.

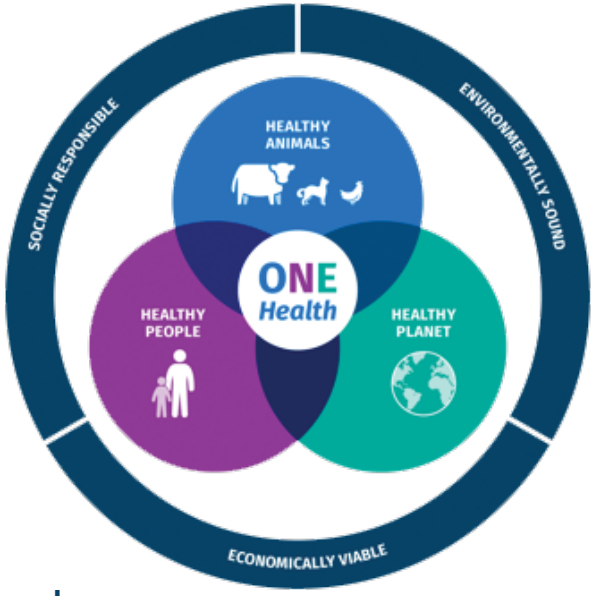
THIRD

the critical role of **leadership** which is necessary across both EIDs and AMR, that goes beyond the health sector and requires high level engagement of presidents, prime ministers, and financiers.



FOURTH

the need to build **trust among partners**. Trust could be built before disease outbreaks to encourage shared vision, shared understanding and common values among partners from various sectors in order to collectively and wisely act on EIDs and AMR.



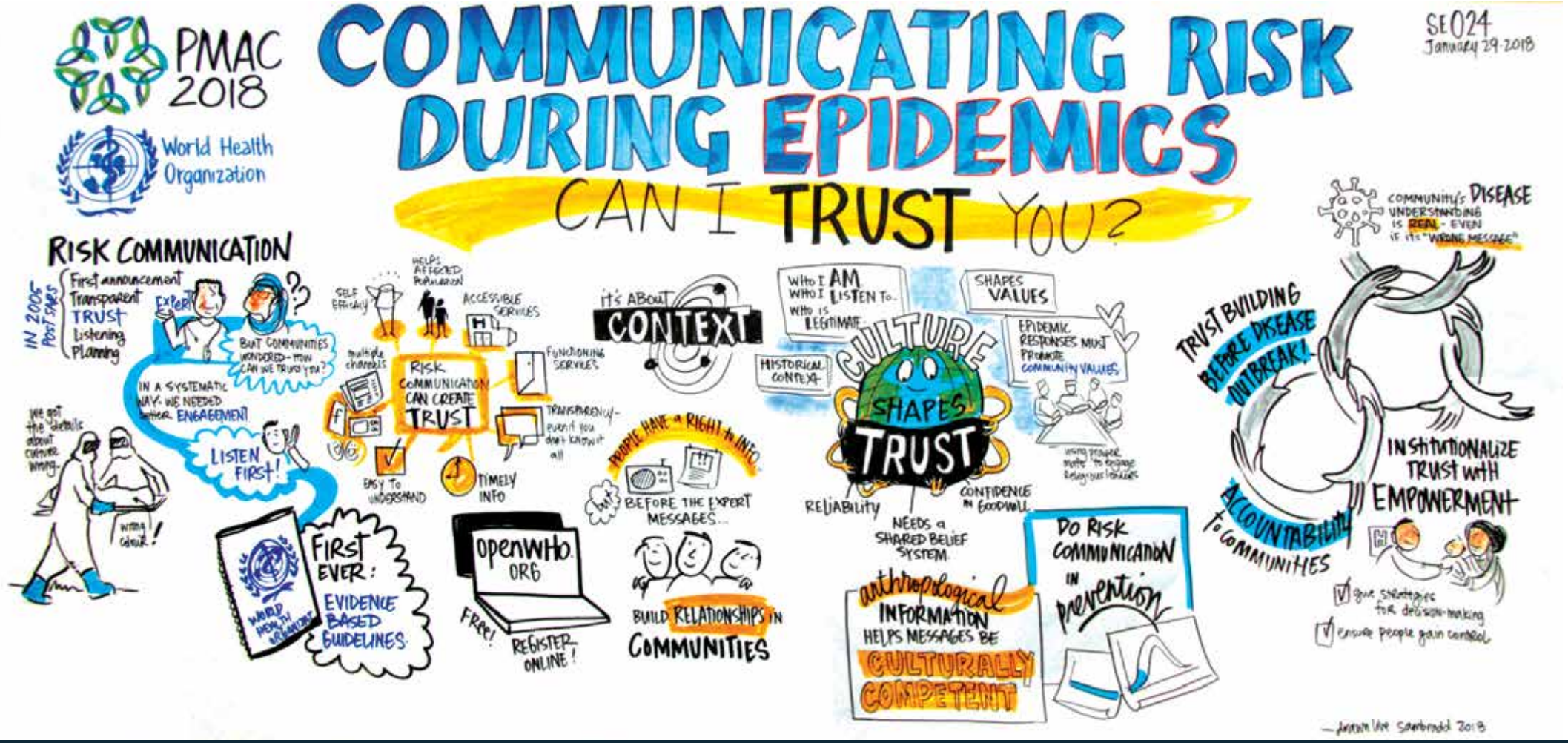
Efficiently raised, healthy animals are critical to healthy people and a healthy planet.

Source: Slide from Parallel Session 4.4 presented by Policarpio S.L.

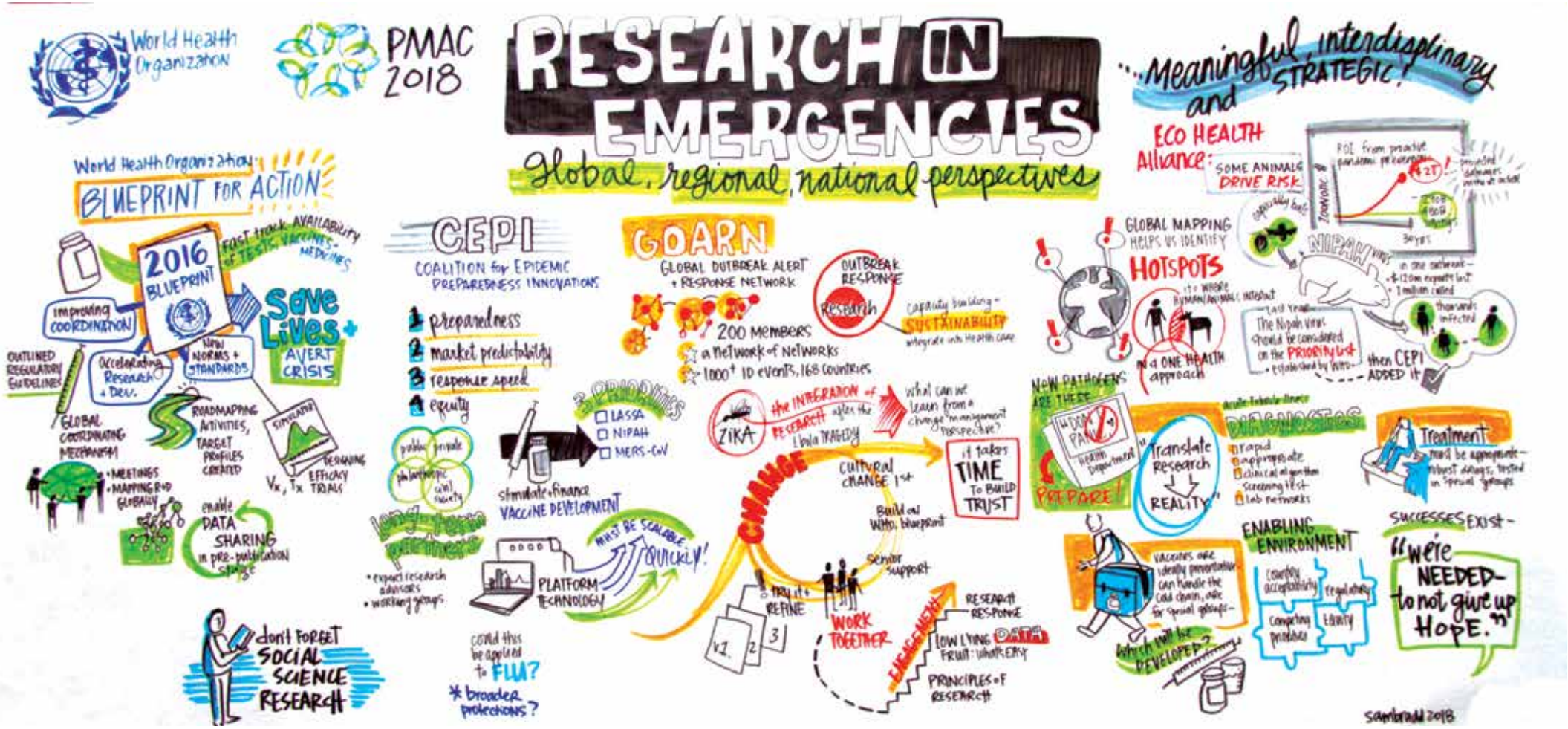
System strengthening is critical. The three interlocking systems of human health, animal health and environmental health, including wildlife, need to be improved and integrated using the One Health Approach. Importantly, physicians, nurses and other healthcare workers, veterinarians and auxiliary staff, wildlife specialists, and several other groups of professionals who are at the frontline and exposed to EIDs must be protected: for example rabies vaccination needs to be provided. Prevention and infection control relating to infection of healthcare workers by patients should be seriously and effectively implemented. The occupational hazards of health professionals are often overlooked: for example there are sporadic reports of nurses infected with MDR TB by patients.

FIFTH

to strengthen the **One Health System** encompassing the human-animal-environment dimensions and look for win-win solutions. It was said in Parallel Session 4.4 that “efficiently raised, healthy animals are critical to healthy people and a healthy planet.”



SIXTH is on **risk communication** during epidemics and pandemics which has enormous importance in the digital world today. This should be effectively managed.

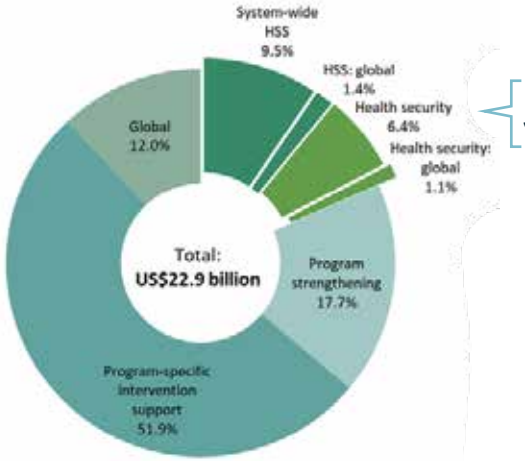


SEVENTH

is on Research and Development and **evidence based policy**. R&D findings must be transformed into messages to inform policy. There is a need to build the evidence for policy action and to develop the new tools that are needed to address these problems of EIDs and AMR.

Finally, financing for health security: what are the size, sources and flows of fund. A study in Vietnam showed health security financing to be 16.25% of health sector expenditure (Vietnam, estimate 2016) and found that donors did not invest in national preparedness. Middle income countries should invest their own preparedness while donors need to support preparedness in low income countries and there need to be innovative approaches to maximize the efficiency of spending—applying digital and other new technologies and building on the human genome project could be new approaches. In parallel, the national level needs to ensure political commitment to secure domestic resources. Also, the health security financing process should be integrated into the country budget process. Some of the work that is going on to look at the degree of investment in national preparedness and make the case for greater investment in preparedness prior to problems arising is presented in the figure below.

OUR STUDY: DONORS ARE UNDER-INVESTING IN NATIONAL PREPAREDNESS



Constant US$, 2015 prices

$1.5 Billion

Most of this funding, however, was for emergency programs in response to health crises rather than investment in proactive preparedness efforts

DAH to achieve universal health coverage. Study commissioned by International Health Partnership for UHC2030. Geneva: WHO (forthcoming)

Source: Slide from Parallel Session 4.5 presented by Yamey G.

FINALLY

financing for health security:

what are the size, sources and flows of fund.

Acknowledgement

The conference gains benefit from the able contributions by Sam Bradd, from "Drawing Change" for his wonderful info-graphic during the deliberation

IN SUMMARY

The most important key points that come out from the Conference are

Economic investment for preventing EIDs

as the cost of inaction, human tolls, social and economic disruptions are beyond imagination[14]

Strengthen economic evidence base

There is a need to strengthen economic evidence base to demonstrate the cost of inaction (“hidden losses”) and to calculate the return on investment that addressed the problem.

Scale economically informed innovations

There is a need to scale economically informed innovations such as land-use planning that accounts for economic impact of disease emergence from disrupted landscape.

Incentivize risk mitigation

There is a need to incentivize risk mitigation such as to incorporate epidemic risk profiles into macro-economic analyses and bond ratings.

[14] Bull WHO 2018; 96:138-140

Mobilize funds

Resource mobilization from both domestic and Official Development Assistance (ODA) is crucial. At the global level, it needs to ensure adequate funding of WHO emergency fund and the proper management of the program in areas important to human health. If tackling the disease at source is a cost-effective approach, more is required to the ministries of livestock/agriculture to support and strengthen the veterinary systems.

Keep pandemics at top of global and national agenda

In order to keep the momentum of moving forward, EIDs and AMR should be kept at the top of the agenda of the G7 and the G20, embodied in the Global Health Security Agenda and connected to regular global forums e.g. World Health Assembly. Regular progress updates on the IHR core-capacity development are critical to hold countries accountable for building a common defensive mechanism that then ensures health security for all global citizens. There is a need to strengthen and support the OIE PVS Pathway[15] and make the findings publically available and promote food safety and consumer protection by ensuring Codex Alimentarius guidelines are adhered to and to foster, the FAO, OIE and WHO Research and Development Initiatives and the Global Framework for the Elimination of Dog-Mediated Human Rabies.

[15] The OIE PVS Pathway is a global programme for sustainable improvement of a country's Veterinary Services' compliance with OIE standards. This is an important foundation for improving animal health and public health and improving compliance with the Agreement on the Application of Sanitary and Phytosanitary Measures (SPS) standard, at the national, regional and international levels. It should be remembered that the activities of the Veterinary Services are an international public good and are consequently eligible for appropriate national, regional or international funding support. [OIE website http://www.oie.int/support-to-oie-members/pvs-pathway/)

BANGKOK STATEMENT

The Bangkok Statement was proposed and endorsed by all co-host agencies; and was adopted in consensus by all participants before the closure of the PMAC 2018.

A CALL TO ACTION ON MAKING THE WORLD SAFE FROM THE THREATS OF EMERGING INFECTIOUS DISEASES

On the centenary of the Great Influenza Pandemic of 1918, representatives from across the globe – high-level policy and decision makers, thought leaders, subject matter experts, researchers, representatives from international organizations (including those involved with human, animal, and environmental health), academia, donors, foundations, civil society and the private sector – gathered at the Prince Mahidol Award Conference 2018 in Bangkok between January 29 and February 3, 2018 to develop a shared vision for making to the world safe from the threats of emerging infectious diseases, including the threats posed by antimicrobial resistance.

We, the attendees,

1. Note that despite extraordinary advances over the past century in science and unprecedented improvement in global health standards, we still live in a world where an infectious agent could emerge without warning and spread rapidly to every community and every household with no regard to national borders or to social and economic standing. This remains a real and present threat.
2. Recognize that over the course of the coming century, the likely threat of epidemics and pandemics will continue to increase, driven to a large extent by demographic trends, including urbanization, increased activities by the extractive industries, environmental degradation and climate change, persistent inequalities, and globalized trade and extensive international travel.
3. Are concerned that the devastation caused by emerging infectious diseases can be catastrophic. The pandemic of 1918-19 infected 500 million people—about one-third of global population, and killed approximately 50 million people (5% of the human population), and, more recently, the HIV pandemic has caused 39 million deaths.
4. Are aware that even in the absence of significant mortality, the economic and social impact can be staggering: the SARS epidemic in 2003, which killed less than 1000 people, cost the economies of Asia at least USD 16 billion global.
5. Appreciate that the development and commercialization of antimicrobials and vaccines stand as a defining achievement of 20th century medical practice. Both antimicrobials and vaccines heralded an era of expanded life expectancy, paved the way for advanced medical and surgical treatments, improved animal health and welfare, and made possible curative therapy for and prevention of once fatal infections.
6. We note that only two new classes of antibiotics were developed after 1962; though analogue development had kept pace with the emergence of resistant bacteria. The stagnation of research and development of new classes of antibiotic threatens global human security.
7. Recognize that the decades of superfluous and inappropriate use of antimicrobials and failure to maximally use available vaccines across the human and animal health sectors, along with the threat posed by substandard and falsified antimicrobial, now threaten these advancements.

8. Further that the pace of reported treatment failures and antimicrobial resistance (AMR) in common pathogens is increasing, with multi-drug resistant pathogens creating the prospect of a 'post-antibiotic' world. Multi-drug resistant tuberculosis, for example, with some 490,000 new cases and 1.8 million deaths annually, is viewed as a public health crisis and health security challenge. In the absence of interventions, AMR-associated human mortality is projected to soar from a current rate of 700 000 to over 10 million annually by 2050—as readily treatable infections become life threatening, and routine procedures are rendered unsafe. Asia is expected to account for half of this projected global mortality.

9. Are also aware that antimicrobial resistance extends to many of the life-saving antivirals and antibiotics that represent first-line responses to an emergent pandemic virus leaving the world increasingly vulnerable should a novel influenza or other virus emerge again.

10. Accept that the impact of AMR on morbidity and mortality is matched by a substantial economic burden, with resistance linked to aggregate economic losses anticipated to exceed USD 100 trillion by 2050.

11. Stress that the burden of these diseases is not equally distributed across the world – with economically disenfranchised, displaced populations and people living with pre-existing conditions disproportionately affected by these diseases, these are the great threats to human security

12. Further, that local, regional, and global human mobility and displacement driven by social and political instability can amplify the spread of communicable disease, and coupled with obstacles faced by migrants in accessing essential health services, result in emergence or reemergence of infectious disease or spread of drug resistance, and globalize public health threats.

13. Recognize that health events themselves can constitute "humanitarian emergencies", as we witnessed with the Ebola epidemic in West Africa, and that effective response to these events require "whole of society" engagement to help reduce the consequences of these events across sectors, not only for the health and well-being of communities, but also for economies, livelihoods, and critical services within the entirety of society.

14. Understand that while the drivers underlying the emergence of zoonotic and antibiotic resistant diseases are complex, human behaviours and their impact on animal populations and the environment are central to their emergence. We also recognize that changing environmental and climatic conditions have been closely linked to the emergence of novel infectious disease and the redistribution of those already existing. Their aggregate impact will continue to increase over the course of this century.

15. Note that the upgrading of the health security apparatus over the last 2-3 years is welcome, but that the processes and institutional arrangements are either untested or incomplete. Strengthening the core capacities in compliance with the International Health Regulations (2005), that provide a normative framework for surveillance, preparedness, notification and international support coordination, is inadequate.

16. Acknowledge that new efforts are needed to craft global policies and regulations that more directly address these multisectoral aspects of disease emergence in order to improve capacity of governments to prevent and appropriately respond to threats by strengthening health systems, increasing policy coherence, including access to health technologies and innovations, and reducing risks of both new zoonotic threats and antimicrobial resistant organisms.

17. While welcoming the significant progress in building multi-sectoral 'one health' action against zoonotic diseases and the emerging work on planetary health, are concerned that AMR efforts remain highly fragmented. The respective contributions made by the inappropriate use of antibiotics in clinical care and animal production, the lack of access to prevention and treatments in many parts of the world, as well as limited opportunities for bringing human, animal and environmental health sectors to work together demand combination within a common strategy.

18. Underline that innovation in the development of and access to health technologies is key to prevent, diagnose and appropriately treat infectious diseases.

A GLOBAL VISION FOR ACTION

In the face of such challenges, we the attendees at PMAC 2018 call for unified global actions that;

- Is built on a bold vision that embraces not only a renewed commitment to address the threats posed by emerging infectious diseases and antimicrobial resistance and is fully aligned and reinforcing of the commitments made in the 2030 Agenda for Sustainable Development, including to leave no one behind, and the UN Political Declaration on AMR in 2016
- Facilitates full, universal and sustained compliance with the International Health Regulations (2005) and aggressively adopts strategies and approaches that recognize that multi-sectoral responses are vital

- Removes the professional, bureaucratic and cultural barriers, as well as the obstacles inherent within social, economic and political processes, that silo human health, animal health and the environmental sectors from effective multi-sectoral partnership and actions
- Renews efforts to craft policies and regulatory frameworks to address more directly the multi-sectoral responses to emerging infectious diseases and antimicrobial resistance
- Invests in building an evidence base to improve our understanding of the drivers of disease emergence, including climate change, environmental degradation and urbanization, and for tracking progress towards control of these threats
- Strengthens medicines regulation and stewardship programs across the human and animal health sectors to ensure the quality and safety of medicines and preserve the effectiveness of existing and new therapies
- Fosters research in infectious diseases and in the development of new class of antimicrobial agents, point of care diagnostics and new vaccines for both human and animal sectors
- Reaches across the public and private sectors and civil society to fully harness their collective power for change, and invests in research to develop new, affordable, available and more effective countermeasures and health technologies to prevent, diagnose, treat and minimize the impact of these threats ensuring a full social return on public investments, safeguarding human secuirty for everyone especially the vulnerable population

- Invests in strengthening the multi-sectoral systems required for the prevention, early detection and effective response and treatment to emerging infectious disease threats and antimicrobial resistance. The universal health coverage is the solid platform for achieving this objective
- Invests in and promote “whole of society” approaches to ensure preparedness strategies and capacities are in place to detect, responses and mitigate the effects of emergent health threats across the entirety of society by establishing and strengthening relationships between health and non-health sectors, establishing multi-sectoral policies and practices for effective preparedness and response to health emergencies, and strategically utilizing technical and financial resources to support systems strengthening and social resilience.
- Builds a workforce in all relevant fields, including in health, agriculture, food production and environmental sectors that demonstrates the core competencies necessary to meet the future challenges posed by these emerging threats.

ANNEX

Prince Mahidol Award Conference 2018

International Organizing Committee

NAME – SURNAME	POSITION	ORGANIZATION	ROLE
Dr. Vicharn Panich	Chair, International Award Committee	Prince Mahidol Award Foundation, Thailand	Chair
Dr. Peter Salama	Executive Director, Health Emergencies Programme	World Health Organization, Switzerland	Co-Chair
Dr. Timothy Evans	Senior Director for Health, Nutrition and Population (HNP)	The World Bank, USA	Co-Chair
Mr. Magdy Martínez-Solimán	Assistant Secretary General, Assistant Administrator, and Director, Bureau for Policy and Programme Support	United Nation Development Programme, USA	Co-Chair
Dr. Michel Sidibé	Executive Director	Joint United Nations Programme on HIV/AIDS, Switzerland	Co-Chair
Ambassador William Lacy Swing	Director General	International Organization of Migration, Switzerland	Co-Chair
Dr. Osamu Kunii	Head, Strategy, Investment and Impact Division (SIID)	The Global Fund to Fight AIDS, Tuberculosis and Malaria, Switzerland	Co-Chair
Dr. Irene Koek	Acting Assistant Administrator	United States Agency for International Development, USA	Co-Chair
Dr. Roger Glass	Director, Fogarty International Center Associate Director for International Research	National Institutes of Health, USA	Co-Chair
Dr. Takao Toda	Vice President for Human Security and Global Health	Japan International Cooperation Agency, Japan	Co-Chair
Dr. Lincoln C. Chen	President	China Medical Board, USA	Co-Chair
Mr. Michael Myers	Managing Director	The Rockefeller Foundation, USA	Co-Chair
Dr. David Heymann	Head of the Centre on Global Health Security	Chatham House, United Kingdom	Co-Chair
Dr. Trevor Mundel	President of the Global Health Division	Bill & Melinda Gates Foundation, USA	Co-Chair
Dr. Kazuaki Miyagishima	Director, Department of Food Safety and Zoonoses (Tripartite Secretariat)	World Health Organization, Switzerland	Member
Dr. Juan Lubroth	Chief Veterinary Officer	Food and Agriculture Organization of the United Nations, Italy	Member

NAME – SURNAME	POSITION	ORGANIZATION	ROLE
Dr. Tianna Brand	Head, Biological Threats reduction and operational partnerships	World Organisation for Animal Health, France	Member
Ms. Karin Hulshof	Regional Director, East Asia and the Pacific Regional Office	UNICEF, Thailand	Member
Dr. Sabrina Sholts	Curator, National Museum of Natural History	Smithsonian Institution, USA	Member
Dr. Katherine Bond	Vice President, International Regulatory Affairs	U.S. Pharmacopeia, USA	Member
Dr. Ceci Mundaca-Shah	Director, Forum on Microbial Threats	The National Academies of Sciences, Engineering, and Medicine, USA	Member
Dr. Larry Madoff	Editor, ProMED-mail	International Society for Infectious Diseases, USA	Member
Dr. George Gao	Deputy Director-General	Chinese Center for Disease Control and Prevention, China	Member
Dr. Mark Smolinski	Chief Medical Officer and Director, Global Health Threats	Skoll Global Threats Fund, USA	Member
Dr. Anette Hulth	International coordinator, Unit for Antibiotics and Infection Control	Public Health Agency of Sweden, Sweden	Member

NAME – SURNAME	POSITION	ORGANIZATION	ROLE
Dr. Soonman Kwon	Technical Advisor (Health)	Asian Development Bank, Philippines	Member
Dr. Kamran Abbasi	Executive Editor	British Medical Journal, United Kingdom	Member
Dr. David Sanders	Founding Director of the School of Public Health	University of the Western Cape and People's Health Movement, South Africa	Member
Mrs. Busaya Mathelin	Permanent Secretary	Ministry of Foreign Affairs, Thailand	Member
Dr. Jedsada Chokdamrongsuk	Permanent Secretary	Ministry of Public Health, Thailand	Member
Dr. Supat Vanichakarn	Secretary General	Prince Mahidol Award Foundation, Thailand	Member
Dr. Sakchai Kanjanawatana	Secretary General	National Health Security Office, Thailand	Member
Dr. Peerapol Sutiwisesak	Director	Health Systems Research Institute, Thailand	Member
Dr. Banchong Mahaisavariya	President	Mahidol University, Thailand	Member
Dr. Prasit Watanapa	Dean, Faculty of Medicine Siriraj Hospital	Mahidol University, Thailand	Member

NAME – SURNAME	POSITION	ORGANIZATION	ROLE
Dr. Piyamitr Sritara	Dean, Faculty of Medicine Ramathibodi Hospital	Mahidol University, Thailand	Member
Dr. Suwit Wibulpolprasert	Vice Chair	International Health Policy Program Foundation, Thailand	Member
Dr. Viroj Tangcharoensathien	Senior Advisor	International Health Policy Program, Thailand	Member
Dr. Attaya Limwattanayingyong	Director, Global Health Division	Ministry of Public Health, Thailand	Member
Dr. Sylvie Briand	Director, Pandemics and Epidemic Diseases	World Health Organization, Switzerland	Member & Joint Secretary
Dr. Toomas Palu	Sector Manager for Health, Nutrition and Population East Asia and Pacific Region	The World Bank, Thailand	Member & Joint Secretary
Dr. Douglas Webb	Cluster Leader, Mainstreaming, Gender and MDGs, HIV, Health and Development Group	United Nations Development Programme, USA	Member & Joint Secretary
Dr. Eamonn Murphy	Director, UNAIDS Asia Pacific Regional Support Team	Joint United Nations Programme on HIV/AIDS, Thailand	Member & Joint Secretary
Dr. Davide Mosca	Director of the Migration Health Division	International Organization for Migration, Switzerland	Member & Joint Secretary

NAME – SURNAME	POSITION	ORGANIZATION	ROLE
Dr. Dennis Carroll	Pandemic Influenza and Other Emerging Threats Unit Director	United States Agency for International Development, USA	Member & Joint Secretary
Mr. Ikuo Takizawa	Deputy Director General	Japan International Cooperation Agency, Japan	Member & Joint Secretary
Dr. Piya Hanvoravongchai	Southeast Asian Regional Coordinator	China Medical Board, Thailand	Member & Joint Secretary
Ms. Natalie Phaholyothin	Associate Director	The Rockefeller Foundation, Thailand	Member & Joint Secretary
Dr. David Harper	Deputy Head of the Centre on Global Health Security	Chatham House, United Kingdom	Member & Joint Secretary
Dr. James Platts	Strategy Advisor	Bill & Melinda Gates Foundation, USA	Member & Joint Secretary
Dr. Manee Rattanachaiyanont	Deputy Dean for Academic Affairs	Faculty of Medicine Siriraj Hospital, Mahidol University, Thailand	Member & Joint Secretary
Dr. Pongpisut Jongudomsuk	Senior Expert	National Health Security Office, Thailand	Member & Joint Secretary
Dr. Churnrurtai Kanchanachitra	Professor	Institute for Population and Social Research, Mahidol University, Thailand	Member & Joint Secretary


PMAC








DINNER DEBATE

Peering into the future, the world will be safer from infectious diseases in 2068

Moderator: Dr. Suwit Wibulpolprasert

Debaters: Dr. Larry Brilliant, Dr. Timothy Evans

Prof. Dame Sally Davies, Dr. Subhash Morzaria

Prince Mahidol Award Conference 2018

Scientific Committee Members

NAME – SURNAME	POSITION & ORGANIZATION	ROLE
Dr. Tangcharoensathien, Viroj	Senior Advisor, International Health Policy Program, Thailand	Chair
Dr. Benyahia, Amina	Scientist, Department of Food Safety and Zoonoses, World Health Organization, Switzerland	Member
Dr. Briand, Sylvie	Director, Pandemics and Epidemic Diseases, World Health Organization, Switzerland	Member
Dr. Carroll, Dennis	Pandemic Influenza and Other Emerging Threats Unit Director, United States Agency for International Development, USA	Member
Dr. Gao, George	Deputy Director-General, Chinese Center for Disease Control and Prevention, China	Member
Mrs. Garnier, Sandra	Technical Officer, World Health Organization, Switzerland	Member
Dr. Gollogly, Laragh	Editor, Bulletin of the World Health Organization, Switzerland	Member
Dr. Harper, David	Senior Consulting Fellow and Deputy Head of the Centre on Global Health Security, Chatham House, United Kingdom	Member
Dr. Inkochasan, Montira	Regional Migration Health Programme Support Officer, International Organization for Migration, Regional Office for Asia and the Pacific, Thailand	Member
Dr. Inoue, Hajime	Senior Advisor to the Director-General and Special Representative for Antimicrobial Resistance, World Health Organization, Switzerland	Member
Dr. Isono, Mitsuo	Senior Advisor, Japan International Cooperation Agency, Japan	Member
Dr. Kanchanachitra, Churnrurtai	Associate Professor, Institute for Population and Social Research, Mahidol University, Thailand	Member
Dr. Limwattanayingyong, Attaya	Deputy Director, Bureau of International Health, Ministry of Public Health, Thailand	Member
Dr. Luangon, Woraya	Director Bureau of Emerging Infectious Diseases, Department of Disease Control, Ministry of Public Health, Thailand	Member
Dr. Lubroth, Juan	Chief Veterinary Officer, Food and Agriculture Organization of the United Nations, Italy	Member

NAME – SURNAME	POSITION & ORGANIZATION	ROLE
Dr. Madoff, Larry	Editor, ProMED-mail, International Society for Infectious Diseases, USA	Member
Dr. Mundaca-Shah, Ceci	Director, Forum on Microbial Threats, The National Academies of Sciences, Engineering, and Medicine, USA	Member
Mr. Osewe, Patrick	Lead Health Specialist, The World Bank, USA	Member
Dr. Patcharanarumol, Walaiporn	Senior Researcher, International Health Policy Program, Thailand	Member
Ms. Phaholyothin, Natalie	Associate Director, The Rockefeller Foundation, Thailand	Member
Ms. Shoumilina, Tatiana	Country Director, Joint United Nations Programme on HIV/AIDS, Thailand	Member
Dr. Sinclair, Julie	World Organisation for Animal Health, France	Member
Dr. Suphanchaimat, Rapeepong	Research Fellow, International Health Policy Programme, Thailand	Member
Dr. Talungchit, Pattarawalai	Director of Siriraj Health Policy Unit, Faculty of Medicine, Siriraj Hospital, Thailand	Member
Ms. Thompson, Kate	Head of the Critical Enablers and Civil Society hub, The Global Fund to Fight AIDS, Tuberculosis and Malaria, Switzerland	Member
Mr. Uji, Kazuyuki	Policy Specialist, HIV, Health and Inclusive Development, Bangkok Regional Hub, United Nations Development Programme	Member
Dr. Vathesatogkit, Prin	Doctor, Lecturer, Faculty of Medicine Ramathibodi Hospital, Mahidol University, Thailand	Member
Dr. Wilson, Mary	Adjunct Professor of Global Health and Population, Harvard T.H. Chan School of Public Health, USA	Member

List of Side Meetings and Workshops

TITLE	ORGANIZATION
Prince Mahidol Award Youth Program Conference 2018	Prince Mahidol Award Youth Program
Futures thinking and strategy development for One Health practitioners	Food and Agriculture Organization of the United Nations
Knowledge Management on EIDs/AMR in Thailand	Health Systems Research Institute (HSRI), Thailand, WHO Collaborating Centre for Antimicrobial Resistance Prevention and Containment, National Science and Technology Development Agency (NSTDA)
CORDS 2018 All Networks CONFERENCE Advancing Regional Collaboration for Improved Global Health Security	Skoll Global Threats Fund, CORDS (Connecting Organizations for Regional Disease Surveillance); Rockefeller Foundation
Sixth meeting of the Interagency Coordination Group on Antimicrobial Resistance	World Health Organization
A One Health Approach for Tackling Antimicrobial Resistance: Moving from Knowledge to Action	The National Academies of Sciences, Engineering, and Medicine, USAID Headquarters and USAID Regional Development Mission - Asia and USAID/ GH/ID,Wellcome Trust; Merck; FAO
Operationalizing One Health: From Assessment to Action	United States Agency for International Development
Surveillance of Antimicrobial Consumption: Transfer international experiences to national level	International Health Policy Program (IHPP), Thailand, United States Agency for International Development,Food and Agriculture Organization of the United Nations,World Health Organization South East Asia Regional Office
Epidemic and Pandemic Preparedness at Community Level: From Rhetoric to Action	United States Agency for International Development, George Washington Milken Institute School of Public Health,International Federation of Red Cross and Red Crescent Societies (IFRC)
Getting ahead of outbreaks through data partnerships and predictive technology	The United Nations Children's Fund (UNICEF), Asian Development Bank
Learning for Action Across Health Systems: Initial findings from research for the Bill and Melinda Gates Foundation by Oxford Policy Management.	Bill & Melinda Gates Foundation, London School of Hygiene and Tropical Medicine,Nossal Institute for Global Health, University of Melbourne,Institute for Global Health and Development, Queen Margaret University,Development Policy Centre, Australian National University,International Health Policy Program, Ministry of Public Health, Thailand


CORDS
CONFERENCE
"A World United Against Infectious Disease"
Bangkok, Thailand | 29-30 January 2018

TITLE	ORGANIZATION
Addressing Emerging Infectious Diseases and Antimicrobial Resistance in the Context of Human Mobility Promoting Healthy Migration within Healthy Communities	International Organization of Migration, Joint United Nations Initiative on Migration and Health in Asia (JUNIMA),Asian Development Bank (ADB)
People's Health Movement Steering Council: identifying current and emerging threats to people's health – mobilizing towards People's Health Assembly4, Bangladesh!	People's Health Movement
A safer fairer world: exploring political economy perspectives on emerging infectious diseases; their prevention and control	People's Health Movement
Redefining the One Health worker: Eight years of lessons learned on the frontlines of workforce development	United States Agency for International Development
The Value of Multilateral Engagement and a Global Health Security Index in Reducing the Threat Posed by Emerging Infectious Diseases	Johns Hopkins Center for Health Security
Strategies and Solutions for a Sustainable Society: Unveiling Opportunities for Planetary Health Research in Southeast Asia in the era of the Sustainable Development Goals	Mahidol University, Global Health Asia Institute

TITLE	ORGANIZATION
Five reasons why global surveillance of antimicrobial resistance matters to you – WHO's first GLASS report from local and national perspectives	Public Health Agency of Sweden, WHO Headquarters, Geneva,WHO Collaborating Centre for Antimicrobial Resistance/ National Institute for Communicable Disease, South Africa,WHO Collaborating Centre for Antimicrobial Resistance (AMR) Prevention and Containment/Mahidol University, Thailand
Innovate Interventions and Researches for END TB strategy	Japan International Cooperation Agency, Japan Agency for Medical Research and Development (AMED),Department of Medical Science center (DMSc), Ministry of Public Health
Japan's experiences in EID control through international scientific joint research activities	Japan International Cooperation Agency
Monitoring and Improving Medicines Quality through AMR National Action Plans	U.S. Pharmacopeia, Thailand FDA and DMsc and USAID
Innovative partnerships for pandemics (session time: 14:30 - 16:30 hrs)	World Health Organization
Communicating risk during epidemics: Can I trust you? (Session time: 11:00-12:30 hrs)	World Health Organization
First National Forum on Antimicrobial Resistance	Ministry of Public Health, Thailand, National Committee on AMR Policy, Thailand

TITLE	ORGANIZATION
Building sustainable financing and resilient systems for health security	The World Bank, Government of Australia – Department of Foreign Affairs and Trade,Asian Development Bank,U.S. Centers for Disease Control and Prevention,World Health Organization
Beyond the health sectors...Towards the new health paradigm for NCDs prevention	Faculty of Medicine Ramathibodi Hospital, International Health Policy Program (IHPP),Department of Health, Ministry of Public Health of Thailand,Faculty of Medicine Siriraj Hospital
“How Can Health Data and Technological Innovations Contribute to the Next-generation UHC to Ensure Global Human Security?”	National Health Security Office (NHSO), Thailand, The Partnership Project for Global Health and Universal Health Coverage (GLO+UHC),Institute for Global Health Policy Research (iGHP), the Bureau of International Health Cooperation, National Center for Global Health and Medicine (NCGM), Japan
Patient Empowerment & Patient Engagement	National Health Security Office (NHSO), Thailand, Heart to Heart Foundation
Out-of-pocket expenditure and the Quest for Universal Health Coverage: Lessons learned from implementing innovative health financing schemes in the South-East Asia Region	Health Intervention and Technology Assessment Program (HITAP), Thailand
PMAC 2018 World Art Contest Award Ceremony	Prince Mahidol Award Conference
Emergency Risk Management in Urban Settings: What should the Primary Health Care providers do?	World Health Organization, Asia Pacific Observatory on Health Systems and Policies,Asian Development Bank

TITLE	ORGANIZATION
Achieving UHC goals and an inclusive society – by putting vulnerable and neglected populations at the centre of focus	The Global Fund to Fight AIDS, Tuberculosis and Malaria,
Challenges to Operationalising One Health	Chatham House
IACG civil society engagement panel: Access Without Excess	World Health Organization
The Global Virome Project: the Beginning of the End of the Pandemic Era	United States Agency for International Development, University of California, Davis
The Global Virome Project: the Beginning of the End of the Pandemic Era: Closed session	United States Agency for International Development, University of California, Davis,EcoHealth Alliance, Metabiota
Planetary Health Asia Pacific Planning Meeting	United Nations Development Programme
Research in emergencies: global, regional and national perspectives	World Health Organization, GOARN
Enhancing Health Emergencies and Health Systems Capacities	World Health Organization, Regional Office for Sourth-East Asia, New Delhi, India
Stakeholder Roundtable on Global Virome Project	United States Agency for International Development, Global Virome Project (GVP)
PMAC IOC Retreat	Prince Mahidol Award Conference

List of Special Event

TITLE	ORGANIZATION
Book Launch : The 5th Global Health Watch	People's Health Movement
Book Launch : Lancet Green Section: Health systems development in Thailand: a solid platform for successful implementation of Universal Health Coverage	International Health Policy Program (IHPP)
Book Launch : Japan Health Systems in Transition	Asia Pacific Observatory on Health Systems and Policies (APO)
Book Launch : The Bulletin of the WHO, Special Collection	Prince Mahidol Award Conference, International Health Policy Program (IHPP)
Book Launch : BMJ AMR Special Theme	World Health Organization, South-East Asia Regional Office (SEARO)

FIELD TRIP
PROGRAM

The Prince Mahidol Award Conference 2018 (PMAC 2018) will be organized under the theme "Making the World Safe from the Threats of Emerging Infectious Diseases". The PMAC 2018 field trip will be arranged to share experience in implementing related health care initiatives to promote knowledge and to provide understanding on approach for control toward a One Health Approach to Antimicrobial Resistance (AMR) in different settings.

SITE 1
Simplicity and Complexity of Controlling Multidrug-Resistant Organisms in a University Hospital

Location: Ramathibodi Hospital, Mahidol University

Antimicrobial resistance among bacterial pathogens is a major health threat to people worldwide. In the past few decades, the prevalence of such organisms has alarmingly increased continuously. The proportion of Acinetobacter baumannii with carbapenem resistance increased is now around 70-90% in the majority of hospitals countrywide. They are also resistant to multiple classes of antibiotics, which led to high mortality among infected patients. This situation led to a proactive continuous implementation of multifaceted intervention in Ramathibodi Hospital, a university hospital in Central Bangkok, Thailand. We started out, 10 years ago, with a program to limit the use of carbapenem using manual antibiotic order form and proceeded to computer-assisted prescription which allowed physicians to prescribe this group of antibiotics for culture-proven and exclusively carbapenem-susceptible infection. It could slow down the increasing rate of use for years. Then, in 2010, we established the alert system from microbiology laboratory to nurses and physicians who are taking care of that particular patient as well as infection control team so that contact precautions and other necessary measures can be started instantly. The target organisms include carbapenem-resistant Acinetobacter baumannii (CRAB), carbapenem-resistant Pseudomonas aeruginosa, carbapenem-resistant Enterobacteriaceae (CRE), and vancomycin-resistant enterococci (VRE). In 2012, we started the hand hygiene campaign using the framework of the World Health Organization. We arranged various activities to promote hand hygiene and made alcohol hand rub solution available at the point-of-care, as well as renovated sinks for hand hygiene. Training courses and on-site auditing for hand hygiene practice and adherence to contact precautions have been performed all year round by the infection control team in all patient care areas. Furthermore, we distributed information pamphlets to our patients and relatives so they are aware of the importance of practicing hand hygiene themselves. The hand hygiene campaign could raise and maintain compliance up to 70% for many years. Consequently, we were awarded “The Asia-Pacific Hand Hygiene Excellency Program” for the Asia-Pacific Society of Infection Control in 2017.

In 2013, a large epidemic of VRE was detected by our MDRO alert system, which superimposed on the high prevalence of XDR A. baumannii, emergence of carbapenem-resistant Enterobacteriaceae. However, with multifaceted intervention described above, we now can bring these organisms under control. For example, VRE was completely eradicated and prevalence of infection caused by XDR A. baumannii and MRSA decreased from 10/1000 and 6.8/1000 admission in 2012 to 4.2/1000 and 1.6/1000 admission in 2017, respectively. Although our resource is limited, but the combination of simple techniques like hand hygiene and collaboration among all involved personnel has brought about a successful control of problematic MDRO.

SITE 2

Antibiotic Smart Use (ASU) Program to Promote Rational Use of Antibiotics in Hospitals and Communities

Location: Phraphuthabat Hospital and
Ban Lang Khao Health Promoting Hospital, Saraburi Province

Thailand initiated the Antibiotic Smart Use (ASU) Program in 2007 to promote rational use of antibiotics. The ASU Program is a three-phase program running by a team of local multidisciplinary members (healthcare personnel, local leaders, etc.) and be organized by central partners which be comprised of the national agencies, academics and researchers. The local partners are responsible for designing the strategies, to be implemented in their units, while the central partners play catalytic and supportive roles and facilitate collaboration between local partners.

Thailand piloted the program in Saraburi province, 200 km from Bangkok with a population of 0.6 million. The project was introduced in 10 district hospitals and 87 primary health centres (subdistrict health promoting hospitals). A neighbouring province with similar demographics was selected as the control group. The first phase focused on designing an intervention to reduce unnecessary uses of antibiotics. During the second phase, important factors influencing antibiotics prescribing were identified, and they were prescribers' poor understanding and pressure from patient's antibiotic expectation. A half-day course was then conducted in the 10 district hospitals. Each hospital received a package of materials for patients and prescribers, and financial support to help implementation and evaluation. Evaluation showed 97% recovery of patients without receiving antibiotics, and 18-46% ofantibiotic use could be reduced safely. The second phase also focused on feasibility of ASU scaling up. During this phase decentralization was achieved by training new trainers and encouraging local partners to conduct research and promote good practices. After good results from the pilot project, efforts were made to implement ASU practice at the national level.

The adoption of ASU practice as a pay-for-performance criterion by the National Health Security Office, a major purchaser of health care for Thailand, was an important achievement that prompted nationwide expansion of ASU. Apart from hospitals, ASU has also been implemented in pharmacies and communities. The project has now moved into the third phase, focusing on sustainability. The implementation of the 2011 National Drug Policy (strategies on combating AMR and promoting rational use of medicines) together with civil society movements, such as adoption of Antibiotic Awareness Day as a public campaign in Thailand, has strengthened the AMR movement, a supportive climate for sustaining ASU practice.

This site visit is a hospital and a community in the pilot area of the ASU project. The participants can learn and experience how the ASU practice and implement and how they move forward change behavior in antibiotic use in communities, schools, health centers, hospitals and advocacy to other communities.

SITE 3

Multi-Sectoral Coordination : Preparedness Approaches for Addressing Emerging Infectious Diseases and Antimicrobial Resistance in a University Hospital

Location: Siriraj Hospital, Mahidol University

Nowadays, many infectious diseases and antimicrobial resistance have become the emerging threats for people around the world. The global spread of emerging infectious diseases has further highlighted the importance of hospital planning for hazardous infectious diseases. Hospitals are faced with the potential situation of providing care to patients with emerging and re-emerging diseases as well as antimicrobial resistance while assuring optimal safety for staff.

Siriraj Hospital, the biggest hospital in the ASEAN region under Mahidol University with 1,800 medical instructors and residents, and 5,200 nurses and nurse assistants, provides services to 3,000,000 out-patients and 85,000 in-patients per year. The Faculty of Medicine Siriraj Hospital, Mahidol University has been actively engaged in resolving this particular challenge. A number of implemented policies for preparedness and response within the healthcare settings, national and international collaborative projects to prevent and reduce antimicrobial resistance were demonstrated in the isolation unit. The isolation unit was provided to isolate patients who pose a risk of passing a potentially harmful infection on to others. The Clinical Epidemiology Unit, Department of Research and Development, Faculty of Medicine Siriraj Hospital was designated as a WHO Collaborating Center for Antimicrobial Resistance Prevention and Containment.

Thai Traditional Medicine is one of the complementary and alternative medicines which emphasizes on individualized holistic approach and focuses on promoting the individual's health by assisting the person's innate self-healing and health-maintaining capacity. In addition, herbal medicines may fill this therapeutic gap, providing effective treatment that reduces antibiotic prescription and does not contribute to microbial resistance.

SITE 4

Emerging Infectious Disease Preparedness: Linking Community-Based Approach and Research to the National System

Location: Phanat Nikhom District, Chonburi Province
Focal Point: Department of Disease Control, Ministry of Public Health

The threat from outbreaks of Emerging Infectious Diseases (EIDs) continues to increase. Every year, several EID outbreaks are reported throughout the world. Over the last 2 decades, Thailand had sporadically been affected by major outbreaks of emerging infectious diseases. This includes the SARS outbreak in 2003, the resurgence of avian influenza between 2004-2008, influenza pandemic (H1N1) back in 2009, and other infectious diseases which have been posting a constant health threat, such as Ebola Virus Disease Outbreak in 2014, and the Middle East Respiratory Syndrome Coronavirus (MERSCoV) outbreak in the Republic of Korea in May 2015. Thailand is susceptible to the threats from newly developed infectious diseases, infectious diseases found in the new geographical areas, and the re-emergence of existing infectious diseases. There is a high likelihood that these diseases will enter into the kingdom over time, given the fact that Thailand is a regional hub for international travel and transportation.

EID events are dominated by zoonosis (60.3% of EIDs): the majority of these (71.8%) originate in wildlife (for example, severe acute respiratory virus, Ebola virus), and are increasing significantly over time. Often the initial outbreaks occur in the area where there is high human-animal interaction. Several attempts are made to detect at the source novel pathogens which have zoonotic potential and are likely to be pandemic. Wildlife, particularly bats, are known to harbor several EIDs including MERS and Ebola etc. International research projects including “PREDICT” were launched with the collaboration of partners throughout the world. Thailand is also part of these projects, with the focal point from the university and the collaboration from government organizations and communities.

To promote the country’s preparedness, prevention and response, the National Strategic Plan for Emerging Infectious Disease was established. It aims to serve as a framework for all concerned units in formulating their respective operational plans in order to ensure multi-sector cooperation and materialization of objectives from the national plan. It also stresses the participation of all sectors including the government, community and private sectors to coordinate and foster closer cooperation among members of the network to achieve the stated goals under the “One Health” concept. The strategic plan has been driven by the committee chaired by the Deputy Prime Minister. The Director General of the Department of Disease Control serves as secretariat. EID prevention and control activities have been aligned with routine healthcare and public health system work, through the disease control section or community health in each Provincial Health Office. Since the Department of Disease Control does not have the local bodies itself, Disease Prevention and Control Regional Offices have helped to clarify and follow-up on activities such as capacity building of Surveillance and Rapid Response Team (SRRT), risk communication, and preparedness exercise. Their roles are to monitor and evaluate activities conducted within their responsible areas.

Official systems for disease prevention and control often suffer from inadequate resources and face challenges in engaging local communities. Therefore, collaboration from academic and research institutes is necessary in order to help fill these gaps. 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.

SITE 5

An Evap* Pig Farm: Commitments to Responsible Antimicrobial Use in Animals

Location: Rayong Province

The appropriate use of antimicrobials in both human and veterinary medicine is one of the most important interventions to tackling AMR—a global threat. The excessive use of antibiotics in animal husbandry could result in selective pressure for the emergence of AMR pathogens while the unsafe handling may contaminate the food supply chain of animal products with resistant bacteria, causing difficult-to-treat infections in consumers.

Consequently, all relevant stakeholders try to limit the usage of antimicrobials in the animal food chain. Nowadays, there are increasing demands by consumers, not only for quality and taste but food safety from antibiotic residues and resistant pathogens.

Regulators such as the Department of Livestock Development (DLD) have introduced policies to contain irrational use of antibiotics in animals. For example, the use of antibiotics as growth promoters in Thailand was banned in poultry since 2006 and was completely banned in all animal species in 2015. DLD implements the certified standard farms which are supervised by veterinarians and establishes drafted regulation to control medicated feed in particular restrictions on the use of certain reserved antibiotic classes in animal feed such as Colistin. As a member of OIE, Thailand DLD has developed and implemented guidelines for the prudent use of antimicrobials in veterinary medicine, as well as standards for controlling drug uses in food-producing animals. The Guideline No. 9032 entitled “Code of Practice for Control of the Use of Veterinary Drugs” was endorsed by the Ministry of Agriculture and Cooperatives in 2009. This guideline also complies with the Codex CAC/REP 38-1993.

This site visit is a private pig farm in Rayong province, one of the standard farms certified by DLD that must comply with the code of practice for control of the use of veterinary drugs. In this connection, the company will show a pilot project presentation to restrict, reduce and terminate the use of antibiotics for pig farms in the northern part of Thailand.

*Evaporative cooling system

SITE 6

Commitments to Responsible Antimicrobial Use in Farms through Demands of Consumers of Farm Products

Location: A conventional pig farm in Ratchaburi province

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On the role of the private sector, several interventions are applied; for example the promotion of the biosecurity standards with prudent antimicrobial use. These are the example of farms which the PMAC participants may visit in January 2018.

This site visit is a conventional pig farm in Ratchaburi province which has applied Thai herbs such as Kariyat and Tumeric which are incorporated into feed in the ratio at 0.5 kg of herbs per 1000 kg of feed to support animal health to reduce the use of antibiotics. In addition, autogenous vaccine trail in this farm is a joint research project between the Faculty of Veterinary Medicine, Chulalongkorn University and DLD. The study has proved that autogenous vaccine can reduce the amount of antimicrobial usage and duration of treatment in pigs raised in this farm.

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Carlos Zambrana-Torrelio		
LEAD RAPPORTEUR TEAM		
Sylvie Briand		
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E06	Containing Antibiotic Resistance: A One Health Chinese-Swedish Research Collaboration	Qiang Sun
E07	Can Behavioural Interventions Improve the Rational Use of Antibiotics in Low-and Middle-Income Countries?	Mishal Khan
E08	Social, Economic and Behavioural Drivers of Antibiotic Use By Informal Providers in Rural West Bengal in India	Meenakshi Gautham
E09	Regulating Antibiotic Distribution in Thailand	Angkana Sommanustweechai
E11	Tackling “Non-Natural Disasters” through the One Health Approach in Indonesia	Asfri Rangkuti
F01	Enhancing Prevention, Detection and Response to Zoonoses and AMR Through Transformations of One Health Workforce in Tanzania	Robinson Mdegela

ID	POSTER TITLE	AUTHOR
F03	Flu Near You: Crowdsourcing Influenza-Like Illness Reporting in the United States	Emily Cohn
F04	Strengthening One Health in Uganda: An After-Action Review of Crimean Congo Hemorrhagic Fever Outbreak Response	Winyi Kaboyo
F05	Temporal and Geographical Comparison Between Two Highly Pathogenic Avian Influenza Global Epidemics	Paula Caceres
F06	The Survey of Poultry Value Chain and the H7N9 Entry Risk Assessment of the Live Bird Wholesale Market in Guangxi, Yunnan, Hunan Three Provinces of China	Chaojian Shen
F07	Risk Mitigation for Influenza A (H7N9) Spread Outside of China through Informal Poultry Trade	Qi Yu
F08	Taking One Health Solutions to the Community: A Case of Rabies Eradication Efforts Through Future One Health Workforce in Kenya	Peter Kimeli
F09	Global Health Security: Tracking the Money	Rebecca Katz
F10	Mers-Cov Surveillance in Camels: Harmonization and Flexibility in a Multi-Country Project	Elias Walelign
F11	Evidence for the Normative Appeal of Collaboration: Assessing Collaborative Performance in Two Regional One Health University Networks	Kaylee Myhre Errecaborde

PMAC 2018
World Art Contest

Since 2013 a unique activity called the “Art Contest” was introduced to the Prince Mahidol Award Conference (PMAC) which not only crossed over two different sides of knowledge, art and science, but also brought the public audience, the community, closer to the PMAC concept.

The Art Contest project was initiated as an instrument to communicate the idea of the conference theme to the public audience. The contest was open to everyone, with the aim of raising the awareness of the young generation in how their health is connected to their little families and through the entire World. Vice versa, the various new perspectives of a successful world where all people live better, happy, healthy and equitably from the young generation have been presented to our prestigious participants.

This year, the Prince Mahidol Award Conference invited students and all people to take part in the PMAC 2018 World Art Contest under the topic “Making our World Safe from Infectious Diseases” through Drawings & Paintings and Photos.

The project has received positive response nationally and internationally from young people, parents and schools. Out of 14 countries that participated, 468 entries were sent in, 125 young artists won the prizes (73 prizes worth over 444,000 THB). The winners were invited to receive the award during PMAC 2018 on 31 January 2018, at the Centara Grand at CentralWorld. The award ceremony event was a fulfilling and enjoyable experience for the winners and participants, as most of the winners came from very difficult and remote areas of Thailand for example, schools located in the mountainous Northern provinces, schools from the Southern border provinces, schools from disadvantaged North-Eastern provinces.

All the winning artworks were displayed during the conference. The display art pieces amazed most PMAC participants by their high quality artistic skill and creativity. We recognized the difficulties of many schools which support our program as well. Consequently, we introduced the “art contribution”. The purpose was to provide financial contribution from our prestigious PMAC participants to schools which supported the art program for their students. The “art contribution” of winning art pieces from PMAC 2017 had raised 120,940 THB and 24 schools were invited to receive 5,000 THB each from the PMAC 2017 Art Contribution. The PMAC 2018 art contribution raised 107,453.09 THB.

Drawings & Paintings Category

Group: Under 9 years old

World First Prize

Rachawin Promchampa, Monthathip Pidtathasa, Nunthida Somnuek

World Second Prize

Suphavit Pasanpot, Suphasuta Pasanpot

World Third Prize

Chonpansa Ngeumnanjai, Chonpatcharapan Ngeumnanjai Suriya Patoomwan, Nannalin Nandun, Ketsuda Kiengsri, Thampaphon Madee, Banluekeat Hongsa, Patiphan Chaiya, Masahiro Matsumoto

World Honorable Mention Prize

Phutthiphong Phondon, Suchada Srithon, Narumon Phokphan, Thiti Krairach, Jetsada Wichachai, Theerasak Nantasuk, Chonthicha Pidtathasa, Wacharakon Kawinram, Rungthiwa Duangchampa

World Young Artist Recognition

Pawinsak Rattanadilokkoon, Panthawat Promsapha, Thanyarat Kangsamaksin, Pinyapat Sakultanapaisal, Pitchaya Namauttawong, Hathaichanok Jantarotai, Janyamon Meesamran, Phannalin Tamrogkiatsiri, Issareeya Thangkerd

Group: 9-13 years old

World First Prize

Gunyawee Jitprawat, Manascha Klinhom, Poommipat Jitprawat

World Second Prize

Thanakit Karasorn, Nanicha Udkawe

World Third Prize

Juntira Juntachote, Sirinya Chongcharoun, Nutcha Petrasathaen, Worramakha Nillawanapha

World Honorable Mention Prize

Watchareewan Sanguansin, Photthakorn Benjarat, Arreeya Pangtham, Anutthaya Buame, Sunisa Dokmai Kantaplit Somnueknaitham, Pandaree Somnueknaitham

World Young Artist Recognition

Dusita Bunsang, Anupap NamPanya, Sudarat Noratat, Nuttasith Sirisupavich, Dechochit Atichayo, Thanawat Joemwatthana, Nichapa Songphasuk, Tiphatta Suwannarattapoom, Aimpraporn Chuajedong, Melanie Rosalia Van Der Ham, Kannika Rattanavipaschai, Tawan Nithiwirun, Chayanont Saksiriwutto, Prompiriya Thongthanyarat, Maria Angelica Tejada, Sirirach Rattamanee, Thanakorn Santhaweesuk, Pichayut Suttana, Athiphon Pitithano, Zainab Hussain, Malak Mahmodd, Abegail Rahm,

Group: 14-17 years old

World First Prize

Wigavee Rattamanee

World Second Prize

Krichakarn Pirakong, Nattiporn Kongsing,
Chonnicha Khunsri

World Third Prize

Thanabadee Lamunpand, Patipan Kingnok,
Thanaboon Pobumrung,Tawanrat Pakseelert,
Wachiratech Ngrmsing

World Honorable Mention Prize

Jakkree Pommek, Naphat Kretzhcmar,
Nattapat Watcharaporn, Kittipat Kanthong,
Jutamas Rattanaphibunkun, Anant Wongsin,
Prangthip Singhnuoo,

World Young Artist Recognition

Leenrada Chookaew, Rakfha Chartnarin, Pakwan Liengsri,
Supranee Kanaraksapong, Nathanich Chantharojwong,
Oannop Sathasri, Noppawan Chamnansilp,
Phisit Wannakham,Nannanin Rueangyoungmee,
Poonyot Rueangyoungmee,Mathis Ngamchawee,
Samatchanan Rodkred, Jidaporn Sornarj

Group: 18-25 years old

World First Prize

Nattawat Pansaing

World Second Prize

Unchalika Keawjan, Surasak Jongsomjit, Jongruk Somboon

World Third Prize

Paveena Sratongrad, Paveenuch Sratongrad, Tiwtus Kanama

World Honorable Mention Prize

Thanadon Wanshuserm, Nattayaporn Yodkong,
Issara Thongbai, Chatuphon Siretar

World Young Artist Recognition

Chanokphan Kitinartintranee, Khachen Playbun,
Krittakorn Prathatsing, Sirinthra Saenthijak, Anuwat Inphu

Photos Category

World First Prize

Thanyaphong Channoi

World Second Prize

Jeerasak Soonrai

World Third Prize

Teeraphong Pinnarak, Pairin Kaewsuriwong

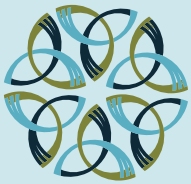
Nicharat Kasemhirunphong

World Honorable Mention Prize

Thitaree Patumaukkarin, Sarayuth Sukthep, Wiwat Sungkhabut

World Young Artist Recognition

Nattapong Chareanpong, Natthanun Sukkleewanat



MAKING THE WORLD SAFE FROM

THE THREATS OF EMERGING INFECTIOUS DISEASES

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