

# Tackling Antimicrobial Resistance: Meeting the Global Challenge of AMR

CONFERENCE PROGRAMME

9 to 10 November 2017

Large Moot Court, 2/F, Cheng Yu Tung Tower,  
The University of Hong Kong

Organized By:



In Collaboration With:



## CONFERENCE OVERVIEW

ON 21 SEPTEMBER 2016, the UN General Assembly (UNGA) convened a high-level meeting of Heads of States and national delegations to discuss an issue of increasing concern to national public health authorities around the world: the rise of antimicrobial resistance (AMR). As an indication of the urgency and magnitude of the problem, this was only the fourth time that a health topic had been raised for discussion by the General Assembly. A draft political declaration was issued in the wake of the meeting endorsing the Global Action Plan on Antimicrobial Resistance formulated by the World Health Organization in collaboration with the UN Food and Agriculture Organization and the World Organization for Animal Health.

The scale of the threat posed by AMR, and its current and potential toll in terms of deaths, human suffering and economic loss is immense. Current conservative estimates are that 700,000 people die from resistant infections each year. Of these, 200,000 people die from tuberculosis alone, as commonly-used antibiotics begin to lose to their efficacy because of AMR. Beyond the direct cost in human lives, it is estimated that more than 2 million infections a year are caused by resistant bacteria, which imposes an additional burden of US\$20 billion on the US health care system alone. The human cost in countries that cannot afford such extra spending on healthcare is incalculable. Inappropriate use of antibiotics in livestock farming have accelerated the pace of the development of AMR, at once reducing the efficacy of critical antibiotics and leaking residual drugs into the environment and the food chain. It is estimated that over 70% by weight of the most important antibiotics are used on animals – and mostly for purposes other than for treating sick animals. The grim projection is that by 2050, the direct toll of human lives lost to AMR could rise to 10 million with a corresponding cumulative cost to global economic output of US\$100 trillion (all data from O'Neill *et al*, *Tackling Drug-Resistant Infections Globally: Final Report and Recommendations*, 2016: The Wellcome Trust / HM Government).

**Themes:** This conference sets out in the **first session ('The Challenge')** to present a survey of the present global scale and impact of AMR, and the implications for the future in human, clinical and economic costs if current trends in AMR is not reversed or contained. Current international efforts in building a concerted global response towards the containment of AMR will be examined, with especially reference to efforts by international agencies such as the World Health Organization.

The conference will then address next in its **second session ('Emergent Threats – The Experience')** specific shortcomings and problem areas such as public and professional awareness; in public and environmental health (public sanitation and access to safe water); and in clinical practice in both developed and developing countries (short or inappropriate courses of antibiotics, resistant nosocomial infections in hospital settings, the problem of counterfeit antibiotics). We also look into recent developments in relevant technologies, such as in pathogen genomics.

In the **third session ('The Community Context')** the conference will address specific situations in which AMR is already a grave and urgent threat (tuberculosis, malaria, MRSA and other resistant nosocomial infections), and examine accounts of current public health responses to the challenges of AMR for these specific situations, and consider recommendations for the future management of these conditions (including the incentivization of research, the development of new antibiotics and the prioritizing of resources to public health efforts at the control of these infections). The legal and ethical implications of some public health challenges are examined. The inappropriate use of antibiotics in animal agriculture is considered, as well as on its impact on the environment and the food chain, as well as recommended responses.

In the final and **fourth session ('Making It Work')**, the conference will focus on public health and national responses recommended by expert bodies such as the WHO in its global action plan on AMR, and the O'Neill Report. How much will it take to stem the tide of AMR? What will be the corresponding financial cost of failure? What should the relative distribution of burdens and responsibilities between better-off and poorer nations, and how can communities in the latter be helped?

## ABOUT CMEL

Established in 2012, The Centre for Medical Ethics and Law (CMEL) is a joint effort of two leading faculties, the Li Ka Shing Faculty of Medicine and the Faculty of Law at the University of Hong Kong. Our visions are: to become a focal point for international research excellence in the area of medical ethics and law; to co-ordinate and provide teaching and training to university students and professionals; and to promote and disseminate our expertise to the benefit of the public.

The Centre's objectives are respectively in research, teaching, knowledge exchange and training. **Research:** To produce and disseminate high-quality and cutting edge research in medical ethics and law. **Teaching:** To contribute to the interdisciplinary teaching and learning at the University by providing a forum for the discourse of medical ethics and law. **Knowledge Exchange:** To provide expert training and continuing education to the professionals of both disciplines and to help setting the ethical standard on related issues. **Training:** To promote and disseminate knowledge of medical ethics and law to the public at large and enhance the community's awareness in this regard. Aligning with the University's vision of 'Internationalisation, Innovation and Interdisciplinarity', the Centre collaborates with institutions, professional bodies and scholars in Hong Kong and internationally in order to pursue these objectives.

## SPEAKERS AND PANELISTS

### Guest of Honour:

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<b>Professor Sophia CHAN Siu-Chee, JP</b>	Secretary for Food and Health, The Government of HKSAR
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### Speakers and Panelists:

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<b>Ms Sabrina So-Kuen CHAN</b>	Member of the Hong Kong High-Level Steering Committee on Antimicrobial Resistance, and Senior Executive Director of The Hong Kong Association of the Pharmaceutical Industry
<b>Professor Dame Sally DAVIES</b>	Chief Medical Officer, England
<b>Ms Christy FEIG</b>	Senior Vice President, Global Health Strategies
<b>Professor Keiji FUKUDA</b>	Director, School of Public Health, The University of Hong Kong
<b>Professor Lawrence GOSTIN</b>	University Professor, Georgetown University; Faculty Director of the O'Neill Institute for National and Global Health Law and the Founding O'Neill Chair in Global Health Law
<b>Dr Christopher Kim Ming HUI</b>	The University of Hong Kong; HKU Shenzhen
<b>Associate Professor Li-Yang HSU</b>	Programme Leader, AMR Programme, Saw Swee Hock School of Public Health, the National University of Singapore
<b>Professor Ryuichi IDA</b>	President, Shiga University, Japan; former Chairperson, International Bioethics Committee of UNESCO
<b>Dr Timothy JINKS</b>	Senior Business Analyst, Wellcome Trust
<b>Mr Jeremy KNOX</b>	Policy Lead, Drug-Resistant Infections, Wellcome Trust
<b>Dr Leila LUHESHI</b>	Associate Director, Clinical and Translational Research at Oxford Nanopore Technologies Ltd; formerly Head of Science, The PHG Foundation, Cambridge
<b>Professor Ben MARAIS</b>	Professor, The Children's Hospital at Westmead Clinical School, Sydney

<b>Dr Colm McGRATH</b>	Faculty of Law, University of Cambridge
<b>Professor SETO Wing-Hong</b>	WHO Collaborating Centre for Infectious Disease Epidemiology and Control, School of Public Health, The University of Hong Kong
<b>Professor Hongzhe SUN</b>	Department of Chemistry, The University of Hong Kong
<b>Professor Paul TURNER</b>	Director, Cambodia-Oxford Medical Research Unit (COMRU)
<b>Dr Howard WONG</b>	College of Veterinary Medicine and Life Sciences, City University of Hong Kong
<b>Professor YUEN Kwok-Yung</b>	The University of Hong Kong; Member of the Hong Kong Steering Committee on Antimicrobial Resistance
<b>Professor ZHANG Tong</b>	Department of Civil Engineering, The University of Hong Kong

## Thursday 9 November 2017

8:30 - 9:00am **Registration**

9:00 - 9:15am

**Welcome Address**

**Professor Sophia Chan Siu-Chee, JP**

Secretary for Food and Health, The Government of HKSAR

9:15 – 9:25am

**Break**

### SESSION 1:

The Challenge

**Chair: Dr Phillip BEH,**

Co-Director, CMEL, The University of Hong Kong

9:25 - 9:55am

**Keynote Presentation: “The Global Challenge of Antimicrobial Resistance”**

**Professor Dame Sally DAVIES**

Chief Medical Officer, England

9:55 – 10:15am

**Presentation 2: “The Challenge of AMR – Hong Kong Perspectives”**

**Professor YUEN Kwok-Yung**

The University of Hong Kong; Member of the Hong Kong Steering Committee on Antimicrobial Resistance

10:15 – 10:45am

**Morning Tea**

10:45 – 11:05 am

**Presentation 3: “AMR in Animal Agriculture”**

**Dr Howard WONG**

College of Veterinary Medicine and Life Sciences, City University of Hong Kong

11:05 – 11:25 am

**Presentation 4: “Defining antimicrobial resistance as an economic and developmental issue”**

**Mr Jeremy KNOX**

Policy Lead, Drug-Resistant Infections, Wellcome Trust

11:25 am – 12:25 pm

**Roundtable Panel Discussion AND Q&A**

12:25 – 2pm

**Lunch**

**SESSION 2:**

Emergent Threats – The Experience

**Chair: Ms Daisy CHEUNG,**

Deputy Director, CMEL, The University of Hong Kong

2:00 - 2:20pm

***Presentation 1: “Ethical Considerations for Use of Unregistered Interventions for Ebola”***

**Professor Ryuichi IDA**

President, Shiga University, Japan; former Chairperson, International Bioethics Committee of UNESCO

2:20 - 2:40pm

***Presentation 2: “Antimicrobial and Antibiotic Use: A Tale of Two Cities”***

**Dr Christopher Kim Ming HUI**

The University of Hong Kong; HKU Shenzhen

2:40 – 3:00 pm

***Presentation 3: “Antibiotics Resistance in Environment”***

**Professor ZHANG Tong**

Department of Civil Engineering, The University of Hong Kong

3:00 - 3:30pm

***Tea/Coffee***

3:30 – 3:50pm

***Presentation 4: “Adjuvant Approach to Fight against Antimicrobial Resistance (AMR)”***

**Prof Hongzhe SUN**

Department of Chemistry, The University of Hong Kong

3:50 – 4:10pm

***Presentation 5: “AMR in the Context of Re-emergent TB in High-Income Countries/Singapore”***

**Associate Professor Li-Yang HSU**

Programme Leader, AMR Programme, Saw Swee Hock School of Public Health, the National University of Singapore

4:10 – 5:10pm

***Roundtable Panel Discussion AND Q&A***

6:30pm

***Conference Dinner***

*Speakers and Invited Guests*



## Friday 10 November 2017

9:00 - 9:15am **Registration (Day 2 Only)**

### SESSION 3:

The Community Context

**Chair: Professor Keiji FUKUDA,**

Director, School of Public Health, The University of Hong Kong

9:15 – 9:45am ***Keynote Presentation: “Global Health Security in an Era of Explosive Pandemic Potential”***

**Professor Lawrence GOSTIN**

University Professor, Georgetown University; Faculty Director of the O'Neill Institute for National and Global Health Law and the Founding O'Neill Chair in Global Health Law

9:45 – 10:05am ***Presentation 2: “The Global AMR Surveillance System (GLASS) of WHO and the Special Role of Diagnostic Stewardship”***

**Professor SETO Wing-Hong**

WHO Collaborating Centre for Infectious Disease Epidemiology and Control, School of Public Health, The University of Hong Kong

10:05 - 10:30am ***Morning Tea***

10:30 – 10:50am ***Presentation 3: “Transmitted MDR-TB: Evidence from the Asia-Pacific Region”***

**Professor Ben MARAIS**

Professor, The Children's Hospital at Westmead Clinical School, Sydney

10:50 – 11:10am ***Presentation 4: “Defining the burden of AMR in Cambodia – challenges and progress to date”***

**Professor Paul TURNER**

Director, Cambodia-Oxford Medical Research Unit (COMRU)

11:10 – 11:30am ***Presentation 5: “Private Law and the Challenge of Antimicrobial Resistance”***

**Dr Colm McGRATH**

Faculty of Law, University of Cambridge

11:30am – 12:30pm **Q&A Session**

12:30 - 2:00pm **Lunch**

**SESSION 4:**  
Making it Work

**Chair: Mr Terry KAAN,**

Co-Director, CMEL, The University of Hong Kong

2:00 - 2:30pm ***Presentation 1: “WHO/UN GA Initiatives and Efforts Towards a Coordinated and Cohesive International Response”***

**Professor Keiji FUKUDA**

Director, School of Public Health, The University of Hong Kong

2:30 - 3:00pm ***Presentation 2: “Pathogen Genomics into Practice”***

**Dr Leila LUHESHI**

Associate Director, Clinical and Translational Research at Oxford Nanopore Technologies Ltd; formerly Head of Science, The PHG Foundation, Cambridge

3:00 - 3:20pm ***Presentation 3: “Recent Efforts by the Pharmaceutical Sector in Containing the Spread of AMR”***

**Ms Sabrina So-Kuen CHAN**

Member of the Hong Kong High-Level Steering Committee on Antimicrobial Resistance, and Senior Executive Director of The Hong Kong Association of the Pharmaceutical Industry

3:20 - 3:50pm ***Tea/Coffee***

3:50 - 4:10pm ***Presentation 4A: “Effective Strategies for Public Education and Communication”***

**Ms Christy FEIG**

Senior Vice President, Global Health Strategies

4:10 – 4:30pm ***Presentation 4B: “Strategic Priority for AMR”***

**Dr Timothy JINKS**

Senior Business Analyst, Wellcome Trust

4:30 – 5:30 pm

***Roundtable Panel Discussion AND Q&A***

***End of Conference***

Thursday 9 November 2017

### SESSION 1: The Challenge

## KEYNOTE PRESENTATION

### THE GLOBAL CHALLENGE OF ANTIMICROBIAL RESISTANCE

**Dame Sally DAVIES**, Chief Medical Officer, England

Dame Sally's talk will focus on her journey from her first publication in 2011 on antimicrobial resistance, to where we are now, and what we need to do next to tackle this pressing public health threat.

## PRESENTATION 2

### THE CHALLENGE OF AMR – HONG KONG PERSPECTIVES

**Professor YUEN Kwok-Yung**, The University of Hong Kong; Member of the Hong Kong Steering Committee on Antimicrobial Resistance

The antimicrobial resistance of Hong Kong (HK) far exceeds those of other developed countries. Our proportions of methicillin resistant *Staphylococcus aureus* (MRSA), carbapenem resistant *Acinetobacter baumannii*, macrolide resistant *Streptococcus pneumoniae* and third generation cephalosporin resistant *Escherichia coli* (*E. coli*) in blood cultures are 3 to over 20 times higher than those of United Kingdom or Sweden. There is presently no data available on antimicrobial consumption in HK farm animals as farmers tend to buy antibiotics across the border. AMR surveillance in animals showed that 40 to 80% of our pigs, cattles or chickens carry extended spectrum beta-lactamase (ESBL) producing *E. coli*. AMR surveillance in ready-to-eat food showed that 7% are positive for ESBL producing Enterobacteriaceae. As 98% of our non-ready-to-eat or raw food items are imported, there are doubts whether control of antibiotic consumption in our farm animals is a cost effective measure. Furthermore the relative importance of the different sites or ways of acquisition of AMR from the wet markets, kitchen, food items or colonized human are still uncertain to allow making any firm recommendations. We do not have any objective non-self-reporting data on the antimicrobial prescription at private outpatient clinics but telephone survey by the Department of Health showed that half of our population has taken antibiotics in the past one year with 2% getting antibiotics not from doctors. The lack of reliable point-of-care-test to exclude bacterial infection is the most important reason for empirical antibiotic treatment in the outpatient setting. The defined daily dose (DDD) of inpatient antibiotic consumption in public hospitals has increased by 20% between 2005 to 2015. The compliance to antibiotic guideline is

perceived to be unsatisfactory and the manpower for antibiotic optimization program is insufficient. A high proportion of about 30-60% of hospitalized patients are taking antibiotics or/and proton pump inhibitors (potent suppression of gastric acid) which may also prolong the carriage of multiresistant bacteria such as carbapenem resistant Enterobacteriaceae. Compliance to infection control measures is unsatisfactory due to the overcrowded public hospital environment & the high workload on healthcare workers especially during seasonal surges of admission. A comprehensive surveillance and educational program supported by research on the AMR, antibiotic prescription, market force, infection control and hygienic measures are urgently needed to tackle this important global health threat.

## PRESENTATION 3

### AMR IN ANIMAL AGRICULTURE

**Dr Howard WONG**, School of Veterinary Medicine, City University of Hong Kong

Antibiotics have been used in animal production for around 80 years and constitute the largest demand for antibiotics of any sector. With the human population estimated to reach 9 billion by 2050 the demand for animal protein from livestock or aquaculture will only increase. Concerns with antibiotic resistance have led to the ban of certain antibiotics for animal production followed by bans on their use for growth promotion, mainly in Europe.

Consumer demands have also led to large food producers sourcing livestock products only from farms that don't use antibiotics.

However, antibiotic free (ABF) production is impossible without changes in animal husbandry, veterinary care and a complete re-design of how we raise animals for food. Simply stopping the use of antibiotics without regard for how the industry operates is a recipe doomed to fail.

## PRESENTATION 4

### DEFINING ANTIMICROBIAL RESISTANCE AS AN ECONOMIC AND DEVELOPMENTAL ISSUE

**Mr Jeremy KNOX**, Policy Lead, Drug-Resistant Infections, Wellcome Trust

Defining antimicrobial resistance as an economic and developmental issue

Antimicrobial resistance has been understood as a scientific phenomenon and recognised as a medical challenge since the earliest days of the antibiotic era. The medical community have therefore understood for some time the significance of the emerging threat, and its profound implications for medical practice.

However, it is not until more recently that the wider economic impact of rising rates of AMR has been recognised, and quantified either in terms of the impact upon health service resources or the macroeconomic impact of increasing mortality and morbidity. These estimates suggest that an uncontrolled rise of drug resistance will have a tangible impact upon economic growth - particularly

in low- and middle-income countries - and accordingly have been used as a powerful lever to establish an ever-stronger case for action against drug resistance, and to engage a broader range of politicians and policymakers behind this.

This presentation will explore how effective this economic case has been as a driver of change, and how the framing of AMR as an issue that threatens economic growth and the attainment of the Sustainable Development Goals (SDGs) is shaping the emerging global response to drug-resistant infections.

## **SESSION 2:** Emergent Threats – The Experience

### **PRESENTATION 1**

#### **ETHICAL CONSIDERATIONS FOR USE OF UNREGISTERED INTERVENTIONS FOR EBOLA**

**Professor Ryuichi IDA**, President, Shiga University, Japan; former Chairperson, International Bioethics Committee of UNESCO

This paper deals with ethical issues arising out of pandemics, taking in particular the Ebola virus disease (EVD) as example. The outbreak of the EVD showed us various ethical issues concerning prevention, diagnosis and treatment, as well as national, international and transborder responses and cooperation. We examine, first, ethical principles and issues that are relevant throughout various stages, and, second, focus on specific ethical considerations relating to eventual use of unregistered interventions.

In the EVD outbreak, two basic principles, Autonomy and Justice, are subject to limited application through restrictive measures such as quarantine or prioritization and triage for treatment. Practical consideration is also needed in the treatment level. Existing treatment often lacks its effectiveness, so that unregistered and experimental intervention should be envisaged. A new concept “Monitored emergency use of unregistered and experimental interventions (MEURI) “was introduced in Ebola outbreak. Although MEURI worked considerably well, yet, various issues are not completely solved, namely, assurance of safety and efficiency, clinical trial protocol, data collection, management and analysis, as well as care of recovered patients.

## PRESENTATION 2

### ANTIMICROBIAL AND ANTIBIOTIC USE: A TALE OF TWO CITIES

**Dr Christopher Kim Ming HUI**, The University of Hong Kong; HKU Shenzhen

Antibiotics for human and animal use are widely available in China without prescription, leading to overuse and antimicrobial resistance. China is the world's largest consumer of antibiotics, and account

According to a recent report from the Wellcome Trust in London, antimicrobial resistance in China could cause 1 million premature deaths annually by 2050 and cost the country \$20 trillion.

The Government has pledged to step up research and development into new antimicrobials and to rein in overuse of existing medicines to counter growing global antimicrobial resistance. As part of a centrally coordinated National Action Plan unveiled on 26 August 2016, 14 ministries and departments including health, food and drugs, and agriculture will be mobilized to address this complex issue.

The targets are clear: by 2020, the government aims to develop new antimicrobials, make sales of the drugs by prescription only, ramp up surveillance of human and veterinary usage, and increase training and education for both medical professionals and consumers on their proper use.

The World Health Organization has previously said: "There are several critical issues that have fostered antibiotic resistance in China. Physicians and veterinarians lack access to rapid diagnostics, and as a result fall back on antibiotics when they are not necessary or useful. Availability of the drugs without prescription vastly increases overuse, as does hospitals' previous reliance on sales of the drugs for profit. Consumers and farmers also demand quick and easy access to antimicrobials and use them too frequently, rendering the drugs less useful."

In this presentation, we examine our own 5-year experience "at the coal face" of The University of Hong Kong-Shenzhen Hospital and reflect on the specific challenges that we face, as well as how we might contribute to enhancing our own coordinated plan for furthering knowledge exchange, training, patient education and policy reviews in the future and vis-à-vis Hong Kong – A Tale of Two Cities.

## PRESENTATION 3

### ANTIBIOTICS RESISTANCE IN ENVIRONMENT

**Professor ZHANG Tong**, Department of Civil Engineering, The University of Hong Kong

The spread of antibiotic resistance genes (ARGs) is a growing global problem now. ARGs could be developed in multiple sources and discharged into natural environment, included the marine water and sediment. Untreated municipal wastewater and even the effluent after treatment are known to contain antibiotics of substantial concentrations as well as ARGs at high levels, eventually ending up in the marine environments. This study was conducted to develop the methodology based on metagenomics to investigate the occurrence and fate of antibiotic resistance genes in different environments. The results revealed the abundance and diversity of ARGs in marine sediments, and

compared the levels in the marine environment to those in activated sludge, biofilm, anaerobic digestion sludge, and river water. A pipeline was established for online ARGs annotation and advanced analysis. Additionally, a novel microbial sources tracking method was developed to assess the pollution contribution from different sources based on ARGs profiles.

## PRESENTATION 4

### ADJUVANT APPROACH TO FIGHT AGAINST ANTIMIOBIAL RESISTANCE (AMR)

**Prof Hongzhe SUN**, Department of Chemistry, The University of Hong Kong

Antimicrobial resistance (AMR) poses a huge threat to human health all over the world. However, no reliable solution is available to tackle this issue, largely owing to the complexity of AMR, and global underinvestment in the necessary financial and human capital.

Several alternatives have been proposed to tackle AMR, include discovering new antibiotics that confer no resistance; boosting the efficacy of currently used antibiotics by cocktail strategies using adjuvants; reusing metallo-antimicrobial agents. We will present our recent work using an adjuvant approach to fight against AMR.

## PRESENTATION 5

### AMR IN THE CONTEXT OF RE-EMERGENT TB IN HIGH-INCOME COUNTRIES/SINGAPORE

**Associate Professor Li-Yang HSU**, Programme Leader, AMR Programme, Saw Swee Hock School of Public Health, the National University of Singapore

Tuberculosis (TB) re-emerged in many industrialized countries as a consequence of the HIV epidemic and immigration from lower income but higher TB burden countries. Drug resistance in Mycobacterium tuberculosis is a major problem, negatively affecting the interplay of duration of therapy, risk of treatment adverse effects, and failure of therapy. The example of Singapore is used to discuss the issues posed by the re-emergence of TB and the rise of resistance to anti-tuberculosis drugs.

TB can be viewed as crude microcosm of a country's development, and in Singapore, it reflects in equal parts the benefits and risks of her openness to the world. The Singapore TB Elimination Programme (STEP) was launched in 1997 to eliminate the disease, resulting in incremental progress until 2008, when local TB rates first stalled, and then crept up to just under 40 cases per 100,000 population per year.

Virtually all patients with TB and MDR-TB have access to good quality care and social support in Singapore, but an ageing population and an increasing non-resident population resulted in the current failure to bring TB rates down further. A more metropolitan population also chafes at the restrictive measures of TB control such as the DOT programme, and are alarmed by media reports of TB cases in communal buildings, while the successes of yester-years had resulted in less support for STEP in the past decade. Fortunately, the rise of TB rates and greater awareness of multidrug-



resistant TB has resulted in more resources being made available for TB control in Singapore, and the adoption of newer technologies against this age-old problem. The effects, however, will only be apparent years from now.

## ROUNDTABLE SESSION

**Friday 10 November 2017**

### **SESSION 3:** The Community Context

## KEYNOTE PRESENTATION

### GLOBAL HEALTH SECURITY IN AN ERA OF EXPLOSIVE PANDEMIC POTENTIAL

**Professor Lawrence GOSTIN**, University Professor, Georgetown University; Faculty Director of the O'Neill Institute for National and Global Health Law and the Founding O'Neill Chair in Global Health Law

Pandemics pose a significant risk to security, economic stability, and development. Annualized expected losses from pandemics are estimated at \$60 billion per year. Despite the certainty and magnitude of the threat, the global community has significantly underestimated and underinvested in preparing for pandemic threats.

We cannot wait or continue with the status quo, in which we pay attention to infectious disease threats only when they are at their peak and then are complacent and remain vulnerable until the next major outbreak. To reinforce and sustain international focus, funding, and action, it is crucial that pandemics rise to the level of “high politics,” becoming standing agenda items for political actors.

In this lecture, I make the case for fundamental reform of the international system to safeguard global health security. I build on the action agenda offered by four international commissions formed in the wake of the Ebola epidemic, calling for the recommended “peace dividend” (an annual incremental investment of \$4.5 billion – 65 cents per person) to strengthen global preparedness, for the United Nations to play a greater role in responding to major global health and humanitarian emergencies, and for an effective and efficient R&D strategy with multiple stakeholders—governments, academics, industry, and civil society—identifying R&D priorities and leading a coordinated response. If my action plan were adopted, it would safeguard the global population far better against infectious disease threats. It would reap dividends in security, development, and productivity.

## PRESENTATION 2

### THE GLOBAL AMR SURVEILLANCE SYSTEM (GLASS) OF WHO AND THE SPECIAL ROLE OF DIAGNOSTIC STEWARDSHIP

**Professor SETO Wing-Hong**, WHO Collaborating Centre for Infectious Disease Epidemiology and Control, School of Public Health, The University of Hong Kong

The Sixty-eight World Health Assembly in May 2015 endorsed a global action plan to tackle antimicrobial resistance, which is an urgent threat to the entire world. As a result, the Global AMR Surveillance System (GLASS) is set up. A summary of this will be presented. One of the working groups that are designated is on Diagnostic Stewardship (DSP) which is defined as the coordinated guidance and interventions to improve appropriate use of microbiological diagnostics to guide therapeutic decisions and to promote appropriate, timely diagnostic testing, including specimen collection, and pathogen identification and accurate, timely reporting of results to guide patient treatment. The special role of DSP for proper surveillance and how to set it up in the hospital will be presented. A guide to its implementation is already on the WHO website and the HKU WHO Collaborating Center is given the task to develop tools for this endeavor. Thus an expert group is formed and an update on its progress will be presented. The tools that will be provided will also be briefly summarized.

## PRESENTATION 3

### TRANSMITTED MDR-TB: EVIDENCE FROM THE ASIA-PACIFIC REGION

**Professor Ben MARAIS**, Associate Professor, The Children's Hospital at Westmead Clinical School, Sydney

Tuberculosis remains the number-1 infectious disease killer on the planet. The World Health Organization (WHO) estimates that 10.4 million people developed tuberculosis (TB) in 2015; causing 1.8 million deaths (more than the deaths from HIV and malaria combined). Nearly half a million cases (480,000) had multidrug resistant (MDR) TB. The highest MDR-TB case-loads exist in the Asia-Pacific region (primarily the Indian subcontinent, China and the Russian Federation), but alarming case rates are reported in smaller countries like Papua New Guinea as well. The description of multiple well-defined clonal MDR-TB outbreaks provides proof that these drug resistant strains are actively transmitted within communities, with potential for future epidemic replacement. Since TB does not respect national borders, high and rising rates of drug-resistant TB have relevance beyond the worst affected areas. The presentation provides a brief overview of the global MDR-TB situation, drawing on data from South Africa, Mongolia, Vietnam and Papua New Guinea. The presentation will also consider how children are affected by the global TB epidemic, including uncontrolled MDR-TB transmission in TB endemic settings.

## PRESENTATION 4

### DEFINING THE BURDEN OF AMR IN CAMBODIA – CHALLENGES AND PROGRESS TO DATE

**Professor Paul TURNER**, Director, Cambodia-Oxford Medical Research Unit (COMRU)

Cambodia is a lower middle = income Southeast Asian nation of ~ 15 million people. Healthcare provision is fragmented and health seeking behaviours are complex. Infectious diseases remain a major cause of morbidity and mortality. The presentation will summarise available AMR data and will highlight the challenges faced by clinicians, public health officials, and policy makers. Emerging national AMR surveillance and containment plans will be discussed.

## PRESENTATION 5

### PRIVATE LAW AND THE CHALLENGE OF ANTIMICROBIAL RESISTANCE

**Dr Colm McGRATH**, Faculty of Law, University of Cambridge

A rise in antimicrobial resistance poses challenges on a number of levels. To the extent that the law is a factor in meeting that challenge, it is often a matter of constructing regimes oriented towards broad public health goals and, as a result reliant on public law or international legal structures to provide the foundation. By contrast, there is much less consideration of the role of private law in preventing or protecting against the harm that antimicrobial resistance threatens. This presentation addresses two way in which private law may be relevant here. Firstly, the extent to which private law may support a broadly defined right to health, for instance by imposing a duty to be adequately vaccinated. Secondly, whether information as to possible treatments may be withheld from a patient on the basis that to administer it would undermine the broader public health goal of combatting antimicrobial resistance.

## ROUNDTABLE SESSION

### SESSION 4: Making It Work

## PRESENTATION 1

### WHO / UN GA INITIATIVES AND EFFORTS TOWARDS A COORDINATED AND COHESIVE INTERNATIONAL RESPONSE

**Professor Keiji FUKUDA**, Director, School of Public Health, The University of Hong Kong

Antimicrobial resistance (AMR) is a complex issue combining significant scientific, medical, agricultural, social and political challenges. For such an issue, ensuring a coherent global dialog and approach requires understanding and balancing a variety of concerns and perspectives, especially among countries, sectors and civil society. The speaker will discuss such issues and efforts by WHO, FAO, OIE and the UN as well as countries, other organizations and champions to successfully manage them and deliver the Global Action Plan in 2015 and the UN High Level Meeting on AMR in 2016.

## PRESENTATION 2

### PATHOGEN GENOMICS INTO PRACTICE

**Dr Leila LUHESHI**, Associate Director, Clinical and Translational Research at Oxford Nanopore Technologies Ltd; formerly Head of Science, The PHG Foundation, Cambridge

The recent Review on Anti-Microbial Resistance (AMR) commissioned by the UK government and published in 2016 highlighted that dramatic improvements in the surveillance and rapid diagnosis of infectious disease would be critical components of any successful, integrated strategy to tackle this global threat. It is clear that traditional microbiological methods do not provide the speed, ease, or resolution, to enable the precise and rapid management of infectious disease at the individual and population level that is so urgently required.

It has long been recognised that sequencing the genome of a pathogenic organism provides the highest possible resolution characterisation of its identity, its relatedness to other organisms and its potential to cause disease and resist our attempts to treat it. Numerous academic studies have demonstrated the potential of pathogen genome sequencing to deliver precisely the high resolution surveillance and diagnostic information required to tackle AMR. But how to deliver this in practice? In 2013 the PHG Foundation set out to collaborate with academics, policy makers and health professionals to understand how to bring 'Pathogen genomics into practice'. Through our work (published in 2015) we made a series of recommendations that highlighted the steps that policy makers would have to take to realise the enormous potential of this technology. In particular we highlighted the urgent need for system leadership and co-ordination and for development of data infrastructure and policies for data sharing. We also highlighted gaps in technological performance and our ability to interpret genomic information that were limiting the utility of genomics in 'real world' clinical and public health scenarios.

In the two years since our report was launched, much has changed. The use of pathogen genomics for surveillance and outbreak control in public health microbiology is slowly becoming routine. Sequencing technology has developed to the point where real time, field-based diagnosis and surveillance of infectious disease is now within our grasp. Initiatives are underway to close the knowledge gaps to enable the use of genomic analysis across an ever wider range of pathogens. What remains, therefore, is for policy makers to seize the opportunities presented by these advances by building local, national and global systems capable of harnessing the genomic, clinical and epidemiological data that is now being generated to deliver a truly integrated approach to the surveillance and rapid diagnosis of potentially drug resistant infections.

## PRESENTATION 3

### RECENT EFFORTS BY THE PHARMACEUTICAL INDUSTRY IN CONTAINING THE SPREAD OF AMR

**Ms Sabrina So-Kuen CHAN**, Member of the Hong Kong High-Level Steering Committee on Antimicrobial Resistance, and Senior Executive Director of The Hong Kong Association of the Pharmaceutical Industry

The spread of antimicrobial resistance (AMR) has prompted researchers worldwide to look for ways to improve antibiotic production. Ms Sabrina Chan, senior executive director of the Hong Kong Association of the Pharmaceutical Industry, will bring to the session new cases of technological collaboration between the pharmaceutical industry and stakeholders on the containment of AMR. The pharmaceutical industry road map for progress on combating AMR, together with the strategic milestones and major innovations along the way, will be highlighted. Refined insights into how the industry interacts with national and international regulatory authorities to expedite drug approval process, strengthen clinical trial research and implement drug education will also be presented.

## PRESENTATION 4A

### EFFECTIVE STRATEGIES FOR PUBLIC EDUCATION AND COMMUNICATION

**Ms Christy Feig**, Global Health Strategy

When microbes develop resistance to the medicines needed to eliminate them, the options for treating the diseases they cause are reduced. It can make care more expensive and complicated, lengthening illness and increasing death rates. Because it poses such a significant threat to human health, AMR is recognized as one of the greatest public health crises of our time.

AMR is already increasing in every region of the world and will continue in dangerous directions unless nearly everyone in society takes action. Raising awareness of an issue is important, but by itself will not change behavior. In this presentation we examine how to use skilled communications to move beyond increased knowledge to convincing people to actually make the necessary behavior changes.

- We begin with an overview of AMR communications campaigns and identify their successes and common challenges including lack of sustainable behavior change.
- We will review the science of the steps required to use communications to change behavior,
- Refresh our memories on communication theories that help create action and could contribute effectively to sustainability.

Once we have a thorough understanding of how communications can be used to create behavior change and how to make it more sustainable, we will examine a case study from another major health crisis about a decade ago that required increases in awareness, prevention methods and political will. That crisis: HIV/AIDS. The campaign we will study ran shortly after the turn of this century in Russia – the place in the world the epidemic was increasing the fastest. It was successful against all three measurements but especially for its contribution in creating political will.

Taking the previous information into account we will recognize some of the lessons learned from the Russian HIV and previous AMR campaigns to identify some principles that should be applied in AMR communications efforts in the future. By including some of the key elements to move people through the behavior change steps and incorporating the theories that will convince them to take action, communications can make significant contributions to ensure existing medicines can continue to be effective as long as possible.

## PRESENTATION 4B

### STRATEGIC PRIORITY FOR AMR

**Dr Timothy Jinks**, Head of Drug Resistant Infections Programme at Wellcome

We are aiming for a world that successfully addresses the threat of drug-resistant infection through the application of science, policy, public engagement and behavior change.

Antimicrobial Resistance is a global health threat that undermines the progress made in the fight against infectious disease in the last century. There have been longstanding calls to address AMR with little real progress until recently. We face a pivotal opportunity to convert those appeals into action which requires bold, ambitious action to safeguard global health. This presentation will reflect on the global efforts underway, the challenges to make it work and focus specifically on Wellcome's focused strategy to reduce the threat of drug-resistant infections. The presentation will describe the core set of activities to be implemented to tackle AMR:

- **Epidemiology of Drug-Resistant Infection** Robust epidemiology generated and used in global and national strategies to combat DRI
- **New treatments** Accelerate the discovery of new therapeutics, diagnostics and preventatives to increase the pipeline of options for treating resistant infections
- **Accelerating clinical assessment** Accelerate the clinical development of new drugs and improved use of existing drugs through expanded clinical trials networks
- **Global governance** Effective global governance for AMR

## ROUNDTABLE SESSION

## SPEAKERS AND PANELISTS BIOGRAPHY

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### **Ms Sabrina So-Kuen CHAN**

Member of the Hong Kong High-Level Steering Committee on Antimicrobial Resistance, and Senior Executive Director of The Hong Kong Association of the

Ms. Sabrina Chan is the Senior Executive Director of Hong Kong Association of the Pharmaceutical Industry, Member of the HKSAR High Level Steering Committee on Antimicrobial Resistance; Member of Business Facilitation Advisory Committee under the Financial Secretary's Office; Chair of the Advisory Board of the Bachelor of Pharmacy Program, University of Hong Kong; Adjunct Assistant Professor in the School of Pharmacy, Chinese University of Hong Kong and a Member of APEC Biopharmaceutical Working Group on Business Ethics.

As the Sr. ED of HKAPI, Sabrina manages member association of international R&D Pharmaceutical companies providing over 70% of the treatment drugs for Hong Kong population. She defines strategic direction with HKAPI Board and advances mission of ensuring expedient access to innovative and effective drugs for patients.



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### **Professor Dame Sally DAVIES**

Chief Medical Officer, England

Dame Sally was appointed Chief Medical Officer (CMO) for England and Chief Medical Advisor to the UK Government in March 2011, having held the post on an interim basis since June 2010. Dame Sally is an independent advisor to the UK Government on medical matters, with particular responsibilities regarding Public Health.

From 2004-2016, Dame Sally was the Chief Scientific Adviser (CSA) for the Department of Health (DH), where she was actively involved in NHS R&D from its establishment and founded the National Institute for Health Research (NIHR). In 2013, Dame Sally became a Non-Executive Director of Genomics England Ltd, wholly owned and funded by DH, to sequence 100,000 whole genomes from NHS patients by 2017.

Dame Sally was a member of the World Health Organization (WHO) Executive Board 2014-2016 and has led delegations to WHO summits and forums since 2004. She advises many governments and organisations on health and policy, holding positions on a number of Boards.

Dame Sally advocates globally on AMR. She has spoken on AMR at numerous events including, the World Health Assembly side events, the G8 Science Ministers' meeting in 2015, the Global Health Security Initiative in 2015, and the UN General Assembly side event in 2016. She was chair of the 2013 AMR forum at the World Innovation Summit for Health (WISH) and is chair of the WHO Strategic and Technical Advisory Group on AMR. Most recently, Dame Sally has been appointed a co-convenor of the UN Inter-Agency Co-ordination Group on AMR, set up in response to the AMR declaration made at UNGA 2016.

Dame Sally received her DBE in 2009. She was elected Fellow of the Royal Society in 2014 and a member of the National Academy of Medicine, USA in 2015.





## SPEAKERS AND PANELISTS BIOGRAPHY

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### **Ms Christy FEIG** Senior Vice President, Global Health Strategies

Christy Feig brings more than 20 years of experience using her communications skills to help people around the world live longer, healthier lives. She is currently a senior adviser to Global Health Strategies and a freelance communications consultant specializing in strategy development for global health and development organizations.

Until September, Christy served as Senior Vice President at Global Health Strategies in New York where she oversaw and mentored ten teams providing communications and advocacy support to some of the top leaders in global public health, including the Bill & Melinda Gates Foundation, the World Health Organization's Africa Regional Office, UNFPA, Johnson & Johnson and the Global Polio Eradication Initiative. She led work to build political will for the Africa Declaration for Immunization, the production of the plenaries for the London Family Planning Summit in 2017 and oversaw the company's work in their China office.

Prior to joining GHS as Senior Vice President, Christy served as Director of Communications for the World Health Organization (WHO) in Geneva, where she managed the department of communications in the Director-General's office and worked closely with offices in headquarters, the six WHO regions and more than 150 countries. In this role, Christy was responsible for the communications strategies, products and messaging for all of the WHO's areas of work including HIV, TB, malaria, maternal and child health, non-communicable diseases, health systems and public health emergencies, including disease outbreaks. She also led the consultations during the development of WHO's first-ever global communications strategy.

Before moving to Geneva, Christy served as Director of International Communications for the American Red Cross developing and implementing communications strategies for the organization's work in 35 countries.



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### **Professor Keiji FUKUDA** Director, School of Public Health, The University of Hong Kong

Keiji Fukuda is the Director and a Clinical Professor at The University of Hong Kong School of Public Health. He previously worked at the World Health Organization (WHO) in several capacities including Assistant Director-General (ADG) and Special Representative of the Director-General for antimicrobial resistance; ADG for the Health Security and Environment Cluster; and Director of the Global Influenza Programme. Before that, he worked at the U.S. Centers for Disease Control and Prevention (CDC) as the Epidemiology Section Chief, Influenza Branch and as a Medical Epidemiologist in the Viral Exanthems and Herpesvirus Branch, National Center for Infectious Diseases. Professor Fukuda has been a global public health leader in many areas including health security; emerging infectious diseases including seasonal, avian and pandemic influenza, SARS, MERS and Ebola; antimicrobial resistance; development of the Pandemic Influenza Preparedness Framework; implementation of the International Health Regulations; food safety; and chronic fatigue syndrome. He has considerable experience in epidemiological research and field investigations, media communications and international diplomatic negotiations including those held to establish a historic Heads of State level meeting on antimicrobial resistance at the United Nations in 2016. He has a BA in Biology, an MD; an MPH; was trained in the Epidemic Intelligence Service at CDC and is certified in internal medicine by the American Board of Internal Medicine.





## SPEAKERS AND PANELISTS BIOGRAPHY

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### **Professor Lawrence GOSTIN**

University Professor, Georgetown University; Faculty Director of the O'Neill Institute for National and Global Health Law and the Founding O'Neill Chair in Global Health Law

Lawrence O. Gostin is University Professor, Georgetown University's highest academic rank conferred by the University President. He is the Faculty Director of the O'Neill Institute for National and Global Health Law and is the Founding O'Neill Chair in Global Health Law. He served as Associate Dean for Research at Georgetown Law from 2004 to 2008. He is Professor of Medicine at Georgetown University and Professor of Public Health at the Johns Hopkins University. Prof. Gostin is the Director of the World Health Organization Collaborating Center on Public Health Law & Human Rights. The WHO Director-General has appointed Prof. Gostin to high-level positions, including the International Health Regulations (IHR) Framework, smallpox, and genomic sequencing data. He is a member of the WHO Roster of Experts and the Expert Advisory Panel on Mental Health, and WHO/Global Fund Blue Ribbon Expert Panel entitled, The Equitable Access Initiative to develop a global health equity framework. He served on the Director-General's Advisory Committee on Reforming the World Health Organization, as well as numerous WHO expert advisory committees on Pandemic Influenza Preparedness. Prof Gostin is a lifetime elected member of the National Academy of Sciences. In 2016, President Obama appointed him to the National Cancer Advisory Board.



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### **Dr Christopher Kim Ming HUI** The University of Hong Kong; HKU Shenzhen

Dr Christopher Hui is Consultant and Clinical Lead Physician in Respiratory & Critical Care Medicine, and Deputy Chief of Service at the University of Hong Kong-Shenzhen Hospital. Following graduation with Distinction Honours and the Esther-Frances-White Memorial Prize from the University of London, he completed over 15 years of postgraduate certified-specialist training in Respiratory Medicine on the prestigious North-West Thames Rotation, Royal Brompton Hospital and JRCPTB Board in London with the late PRCP, Professor Dame Margaret Turner-Warwick and her team.

He is an experienced interventional bronchoscopist and conducts endobronchial ultrasound (EBUS-TBNA) and other advanced techniques such as NBI, rigid bronchoscopy and endobronchial valves.

He has published papers and texts on the subject of Airways Disease within the Experimental Studies Section of the National Heart & Lung Institute (Imperial College London) where he worked between 2006 and 2010 under Professors Kian Fan Chung and Peter J Barnes.

Dr Hui maintains a keen interest in postgraduate education and contributes regularly to the Royal College of Physicians specialist training examinations. As well as being an Examiner for the Hong Kong Medical Licentiate Exams, he is Clinical Director and has been a Licensed Instructor for the European and UK Resuscitation Council Advanced Life Support Training Courses since 2007.

His interest in Antimicrobial Resistance (AMR) stems from previous research contributions in the microbiome of asthma and airways disease, but also because as a practicing clinician, it is one of the most pressing problems facing us in our locale today.



## SPEAKERS AND PANELISTS BIOGRAPHY

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### **Associate Professor Li-Yang HSU**

Programme Leader, AMR Programme, Saw Swee Hock School of Public Health, the National University of Singapore

Dr Li Yang Hsu, MBBS (Singapore), MPH (Harvard), is an infectious diseases physician with private sector experience who is Head of the Department of Infectious Diseases at Tan Tock Seng Hospital and Programme Leader of the Antimicrobial Resistance Programme at the Saw Swee Hock School of Public Health. He is also the Director of the Singapore Infectious Diseases Initiative, which was established to spur collaborative biomedical and clinical research in infectious diseases. His areas of research include the epidemiology of methicillin-resistant *Staphylococcus aureus* as well as the clinical and socioeconomic impact of antimicrobial resistance, and he has published more than a hundred peer-reviewed articles in these areas.



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### **Professor Ryuichi IDA**

President, Shiga University, Japan; former Chairperson, International Bioethics Committee of UNESCO

President of Shiga University (National University Corporation); Vice-Director, International Institute for Advanced Studies; Professor emeritus of Kyoto University; Born in 1948; Graduated Faculty of Law, Kyoto University (1972); Professor of International Law and Law of International Institution (1986-2012), Kyoto University; Member, Science Council of Japan; Distinguished Invited Professor, Doshisha University (2012-2016).

Member then Chairperson, UNESCO International Bioethics Committee(1998-2002); Expert Consultant, WHO, Ethical Issues on Ebola virus disease(2014); Science Advisor, Ministry of Education, Japan (2000-2006); Member of various national committees relevant to bioethics, including “Expert Panel on Bioethics” (National Bioethics Committee); Contribution to drafting laws, guidelines, declarations and reports on different bioethical issues in Japan and in UNESCO and in WHO; President, Japanese Association for World Law(2005-2008); Member emeritus, Japanese Society of International Law; Professor, Hague Academy of International Law (2000); Author and editor of numerous books and articles on international law as well as on bioethics in Japanese, French and English. Decorated Chevalier dans l’Ordre des Palmes Académiques (France) (2001).



## SPEAKERS AND PANELISTS BIOGRAPHY

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### **Dr Timothy JINKS**

Senior Business Analyst, Wellcome Trust Innovations

Timothy Jinks PhD is the Head of Wellcome Trust's Drug Resistant Infections Priority Program leading Wellcome's efforts directed at reducing the threat of antimicrobial resistance. In his preceding role he led development of Wellcome's strategic plan to address drug resistant infections. Previously in Wellcome's Innovations Division, he was responsible for a portfolio of over a dozen early stage product development projects covering therapeutics, diagnostic and devices spanning across therapeutic areas such as infectious diseases and oncology. He is a member of the CARB-X Joint Oversight Committee, the Longitude Prize Committee and is Non-Executive Director of Reviral Ltd. Prior to joining the Trust in 2012 he has over a decade of industry experience, most recently as a consultant providing business development, licensing and commercial research services. His scientist background is as a chemist turned molecular biologist having studied at University of Georgia and Princeton University, with academic research experience at Harvard Medical School, Dana Farber Cancer Institute and the MRC National Institute for Medical Research.



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### **Mr Jeremy KNOX**

Policy Lead, Wellcome Trust Innovations

Jeremy Knox leads the Wellcome Trust's expanding policy and advocacy activities on antimicrobial resistance, as a key part of the organisation's five-year, £175m commitment to support the global response to drug-resistant infections through research and policy activities.

He joined Wellcome in July 2017 after eight years working in government at the UK Department for Health. During this time, Jeremy worked in public and global health roles, including a two year secondment from 2014 to 2016 to be deputy head of the small team working on Lord Jim O'Neill's Review on Antimicrobial Resistance.

Having originally studied economics at the University of Nottingham, Jeremy recently completed a master's degree in Health Policy at Imperial College, London.



## SPEAKERS AND PANELISTS BIOGRAPHY

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### **Dr Leila LUHESHI**

Associate Director, Clinical and Translational Research at Oxford Nanopore Technologies Ltd; formerly Head of Science, The PHG Foundation, Cambridge

Dr. Luheshi gained a BA in Natural Sciences, and a PhD in neurodegenerative disease research from the University of Cambridge. Following six years undertaking research into the fundamental molecular origins of disorders such as motor neuron disease and Alzheimer's disease she moved to work in the field of science and health policy as Head of Science at the PHG Foundation. While at the PHG Foundation she led the flagship 'Pathogen genomics into practice' project. Through intensive research and collaboration with policy makers, leaders in public health and some of the leading clinical academics working in the field of microbiology, her team produced a strategic report that set out a roadmap for the implementation of genomics in infectious disease. This report has been widely recognised for its role in bringing the importance of implementing pathogen genomics to the attention of policy makers and practitioners alike. Many of its recommendations are now being put into practice by public health and clinical microbiology services around the world.

Dr. Luheshi has recently moved to a new position as Associate Director, Clinical and Translational research at Oxford Nanopore Technologies Ltd. She is now working to deliver nanopore sequencing based solutions for infectious disease management that will help to realise the transformative potential of pathogen genomics set out in the PHG Foundation's report.

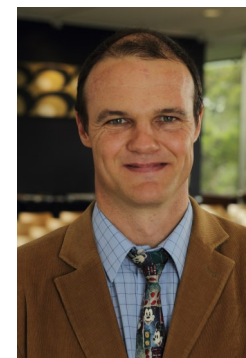


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### **Professor Ben MARAIS**

Associate Professor, The Children's Hospital at Westmead Clinical School, Sydney

Professor Ben Marais works in Paediatric Infectious Diseases at the Children's Hospital at Westmead, Sydney, Australia. He is Deputy-Director of the Marie Bashir Institute for Infectious Diseases and Biosecurity ([www.sydney.edu.au/mbi](http://www.sydney.edu.au/mbi)) and helps to lead the Centre for Research Excellence in Tuberculosis ([www.tbcre.org.au](http://www.tbcre.org.au)) at the University of Sydney. His research has focussed primarily on how children are affected by the global tuberculosis epidemic and the spread of drug resistant strains of *M. tuberculosis*.



## SPEAKERS AND PANELISTS BIOGRAPHY

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### **Dr Colm McGrath**

WYNG Research Fellow in Medical Law and Ethics, Trinity Hall,  
University of Cambridge

Colm McGrath is a member of the Cambridge Centre for Law, Medicine and Life Sciences based at the Faculty of Law, where he has taught Tort Law, Contract Law, Comparative Law, European Legal History and Roman law. Between 2009 and 2014 he was a scientific assistant at the Institute for European Tort Law in Vienna and a lecturer at the University of Graz where he taught private law and healthcare law. His research focuses on the comparative analysis of private law and the nature of professional liability, in particular the liability and regulation of the medical profession. He is the Co-General Editor of the long-running Journal of Professional Negligence and the Book Reviews Editor for the Journal of European Tort Law.



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### **Professor SETO Wing-Hong**

WHO Collaborating Centre for Infectious Disease Epidemiology and Control, School of Public Health, The University of Hong Kong

Professor WH Seto played a key role in initiating Infection Control in Hong Kong and started the local training course for Infection Control Practitioners in 1985. He is involved extensively in Infection Control education throughout China and the region and is the Founding President of the Asia Pacific Society of Infection Control. Besides being Honorary Professor for the University of Hong Kong and the Hong Kong Polytechnic University, he is also a visiting professor for the University of New South Wales. He was conferred honorary professorships by several universities in China including Honorary Professorship for Infection Control by the Military Postgraduate Medical College, PLA General Hospital (301) and the People's Liberation Army of China has in addition appointed him honorary consultant for Infection control in 1999. He is also the past Chairman of the Infection Control Scientific Committee of the "Centre for Health Protection" in Hong Kong. Presently and has authored over a hundred and fifty research papers including the book "Infection Control for the Asian Healthcare Worker". Many international societies had invited him to speak on Infection Control and they include the ICC, ICID, CDC (USA), ASM (USA), ICN (UK), Hospital Infection Society (UK), APIC (USA), SHEA (USA) and ICNA (Australia). The WHO has also regularly assigned him as advisor for various projects in Infection Control, Antibiotics Resistance and a core group member for the WHO Hand Hygiene guideline. He is also a member of the Emergency Committee of the IHR of the WHO, member of the Infection Control International Network and Director of WHO Collaborating Centre for Infectious Disease Epidemiology and Control, The University of Hong Kong. He is also awarded the "Bronze Bauhinia Star" in 2004 and "Silver Bauhinia Star" in 2011 from the Hong Kong Government for his work in Infection Control in Hong Kong. In view of his years of involvement in Infection Control, he is also active in the related field of Quality Healthcare Management and is presently the President of the Asia Pacific Society of Quality Healthcare.



For 2013 he is made a Meritorious Member of ISC (International Society of Chemotherapy) and also awarded The Yen Award for outstanding research in Infections Disease.

For 2015, he wins the IFIC (International Federation of Infection Control) Martin S. Favero Award 2015. This award is to honor him for his lifetime contribution to global infection prevention.



## SPEAKERS AND PANELISTS BIOGRAPHY

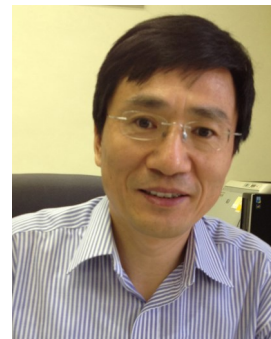
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### Professor Hongzhe SUN

Department of Chemistry, The University of Hong Kong

Hongzhe Sun obtained his Ph.D from the University of London (1996). After postdoctoral work at the University of Edinburgh, he joined the Department of Chemistry at the University of Hong Kong in 1998 where he is currently a professor of chemistry and biochemistry. Prof. Sun research interests are centered at the interface between chemistry and medicine, particularly on metallobiology and development of new antimicrobial agents. He has published over 160 papers in international journals edited a book entitled “Biological chemistry of arsenic, antimony and bismuth” (Wiley & Sons, 2011). He is a series editor of *Metallobiology* (RSC) and serves on the editorial board of several scientific journals, e.g. *Metallomics*, *BioMetals*. and advisory board of *J. Biol. Inorg. Chem.*.

He is the recipient of the NSFC Outstanding Young Scholar Award (2005), Croucher Senior Research Fellow (2010), Wuxi AppTec Life Science & Chemistry Research Award (2016), and UC Berkeley Muetterties Lectureship (2017-2018).



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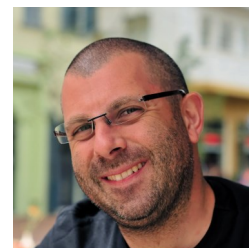
### Professor Paul TURNER

Director, Cambodia-Oxford Medical Research Unit (COMRU)

Paul Turner is the director of the Cambodia Oxford Medical Research Unit, based at Angkor Hospital for Children in Siem Reap, Cambodia. He leads research on pneumococcal colonisation / pneumonia and paediatric invasive bacterial infection / hospital acquired infection epidemiology. He has longstanding collaborative links with the pathogen genomics team at the Wellcome Trust Sanger Institute.

After graduation from medical school (St. George's, University of London; 1996), Paul trained in paediatrics (FRCPCH) and medical microbiology/virology (FRCPath) in London and the South of England. He moved to the Thailand-Myanmar border in late 2006, where he established a diagnostic and research microbiology laboratory at the Shoklo Malaria Research Unit (SMRU, University of Oxford). Research work at SMRU included a large longitudinal birth cohort study of pneumococcal colonisation (the Maela cohort, subject of his PhD thesis), respiratory virus surveillance (with US-CDC), and evaluations of novel diagnostic tests for various tropical infections.

In 2012, Paul commenced work at the Cambodia Oxford Medical Research Unit (COMRU; <http://www.tropmedres.ac/comru-cambodia>). COMRU is a major research unit of the Mahidol Oxford Tropical Medicine Research Unit (MORU) and part of the Wellcome Trust's Thailand-Laos Major Overseas Programme.



## SPEAKERS AND PANELISTS BIOGRAPHY

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### **Dr Howard WONG**

College of Veterinary Medicine and Life Sciences, City University of Hong Kong

Dr. Howard Wong graduated from the University of Cambridge with degrees in Biological Anthropology and Veterinary Medicine. He has a Master's degree in Preventive Veterinary Medicine from the University of California at Davis, School of Veterinary Medicine in the United States, a Master's degree in Sustainable Aquaculture from the University of St. Andrews and is a certified Aquatic Veterinarian with the World Aquatic Veterinary Medical Association.

Dr. Wong worked for the Hong Kong Government for 16 years with responsibility for the health and regulation of livestock farms in Hong Kong, the import and export of live animals, local slaughterhouses and the control of drug residues in livestock. Dr. Wong also oversaw the avian influenza prevention programme on local poultry farms including the introduction of vaccination for avian influenza on local farms and avian influenza depopulation exercises during the outbreaks of H5N1 avian influenza. Dr. Wong was head of the Veterinary Public Health Section in the Centre for Food Safety with responsibilities for the import of foods of animal origin, the inspection of Mainland livestock farms and overseas food production facilities, local slaughterhouses, export certification for foods of animal origin from Hong Kong and the regulation of aquatic products and seafood in Hong Kong including drafting the blueprint for a new Food Safety Law in Hong Kong.

In October 2012 Dr. Wong joined City University as the Executive Director of Hong Kong's first School of Veterinary Medicine. He is currently tasked with the job of planning, building and implementing various aspects of this recently established vet school.



## SPEAKERS AND PANELISTS BIOGRAPHY

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### **Professor YUEN Kwok-Yung**

The University of Hong Kong; Member of the Hong Kong Steering Committee on Antimicrobial Resistance



Professor Kwok-Yung YUEN, who graduated from the University of Hong Kong in 1981 and heads the Department of Microbiology from 2002 to 2011, has the rare distinction of being a microbiologist, surgeon and physician. His success in these three areas is exemplified by his numerous Fellowships at distinguished institutions, including the Hong Kong Colleges of Pathologists, Surgeons and Physicians, the Fellow of the Royal College of Physicians (London and Edinburgh), Surgeons (Glasgow) and Pathologists (UK), and also the Fellow of the American College of Physicians (USA). He was a Croucher Senior Medical Research Fellowship in 2006-2007 and was elected to the Chinese Academy of Engineering (Basic Medicine and Health) in 2007. He was awarded the Justice of Peace by the HKSAR in 2002 and the Silver Bauhinia Star Award of the Hong Kong Special Administrative Region of China in 2004.

In 2000, he was appointed the Scientific Co-director of the HKU-Pasteur Research Centre to set up a joint research venture between the Institute Pasteur and The University of Hong Kong because of his expertise in the area of emerging infectious diseases. His research strategy starts at the bedside by targeting patients with an obscure disease syndrome. He then moves to the laboratory to identify the novel microbe in clinical specimens. The animal source of the new microbe is then identified in the field. With these research data, he can help the government to contain outbreaks by controlling the epidemic centre. His leadership and experience have enabled him to rapidly mobilize and coordinate the joint effort of clinicians, microbiologists and epidemiologists in trying situations.

Widely known among specialists in infectious diseases, Professor Yuen made his mark in 2003 when the outbreak of Severe Acute Respiratory Syndrome, or SARS, gripped the globe. He played a key role in the discovery of the agent causing SARS, the SARS coronavirus, thus leading to measures that were crucial to containing the outbreak of this disease. He has also led his team in the discovery of over 50 novel disease agents, including the novel Human Coronavirus HKU1, the bat SARS coronavirus, bat coronavirus HKU2 to 24, and many other bacteria, fungi and parasites named after Hong Kong or China. He published the first clinical and laboratory diagnostic paper on Influenza A H5N1 in the *Lancet* which has been cited over 400 times since 1998 and in a review paper on this subject in the *New England Journal of Medicine* in 2005. The University of Hong Kong appointed to him the Henry Fok Professorship of Infectious Diseases in 2005. The Ministry of Science and Technology of China has given the honour of the State Key Laboratory of Emerging Infectious Diseases – the first State Key Laboratory outside the Mainland, to HKU in recognition of its exemplary contributions this area and Professor Yuen has been the first Co-Director of this laboratory. The HKSAR government has also honoured his contributions with the award of a Silver Bauhinia Star.

He is one of the top 1% researchers in the world, as ranked by the Essential Science Indicator (ISI web), and has published more than 700 papers in peer reviewed journals including the *Lancet*, *New England Journal of Medicine*, *Journal of Virology* and *PNAS*, with over 25,000 citations. His field of interest is novel microbes in emerging infectious diseases.



## SPEAKERS AND PANELISTS BIOGRAPHY

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### **Professor ZHANG Tong**

Department of Civil Engineering, The University of Hong Kong

Prof. Zhang is a Professor in Environmental Biotechnology Laboratory in Department of Civil Engineering, The University of Hong Kong. He got his Bachelor and Master degrees in Environmental Science and Engineering from Nanjing University (China), and his Ph.D. degree from The University of Hong Kong. Prof. Zhang's researches include antibiotic and antibiotic resistance genes, anaerobic digestion and bioenergy from wastes/wastewater (cellulosic biomass, sludge, kitchen waste, and wastewater), biological wastewater treatment (N removal and P recovery), biodegradation of emerging pollutants (antibiotics, PPCP and EDCs), etc. He has published over 180 peer-reviewed papers on the above topics, and got more than 10,000 citations (Google, Scholar). He has a H index of 58 and is Top 1% researcher (Essential Science Indicators) for 8 years from 2009 to 2016. He is the editorial board members of a few international peer-reviewed journals, and had served as an advisor for BGI (Beijing Genomics Institute) on Environmental Microbiology and Biotechnology from 2011 to 2014, and ASM (American Society of Microbiology) Country Liaison to China (Hong Kong) from 2012 to 2014. He was Yi Xing Chair Professor of Nanjing University from 2013 to 2016. He won First-Class Award in Natural Science of China Ministry of Education in 2015 and Second-Class Award State Natural Science Award of China State Council in 2016.

