PMAC PRINCE MAHIDOL AWARD CONFERENCE 2018

MAKING THE WORLD SAFE FROM
THE THREATS OF EMERGING INFECTIOUS DISEASES

29 JANUARY - 3 FEBRUARY 2018 I BANGKOK, THAILAND

Conference Synthesis:
Summary & Recommendations

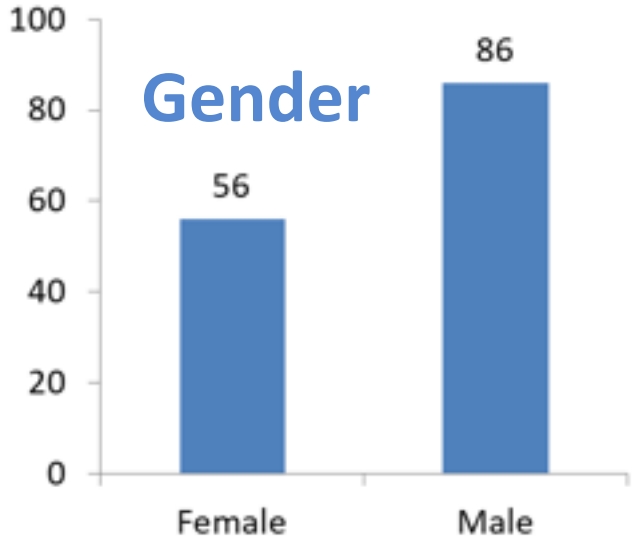
Saturday 3 February 2018

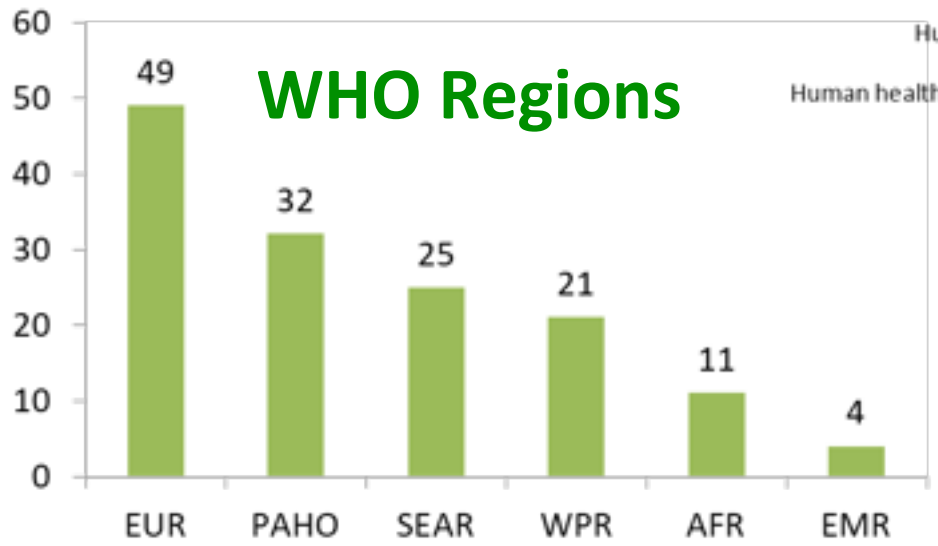
Conference programme structure

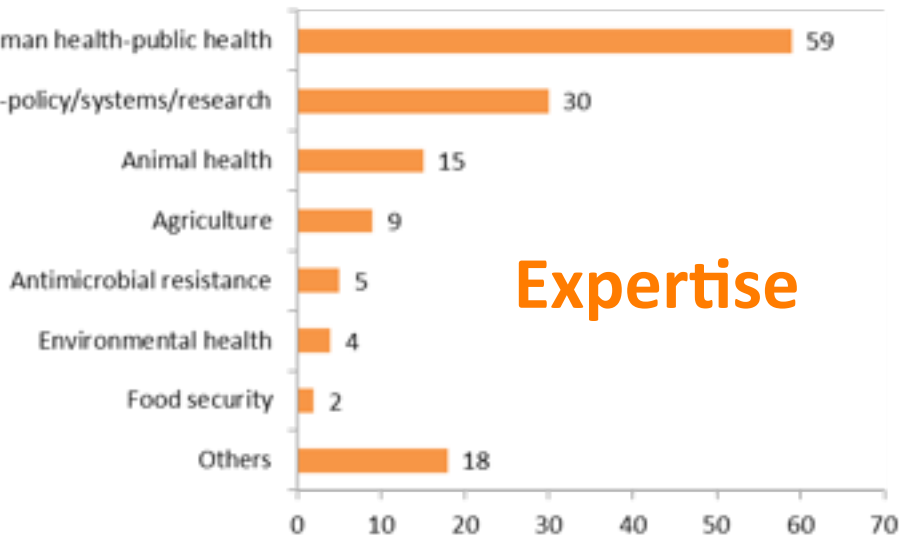
- Pre-conference: 29 – 31 January 2018
  - 40 side meetings
  - 6 field trips
- Main conference 1 – 3 February 2018
  - 4 Keynote addresses
  - 4 plenary sessions
  - 20 parallel sessions
  - 5 Book launches
  - 60 E-poster presentations
  - World Art Contest: 468 entries from 14 countries participated
- Total registered participants
  - 1,263 participants from 85 countries (F 48%, M 52%)

24 Plenary and parallel sessions

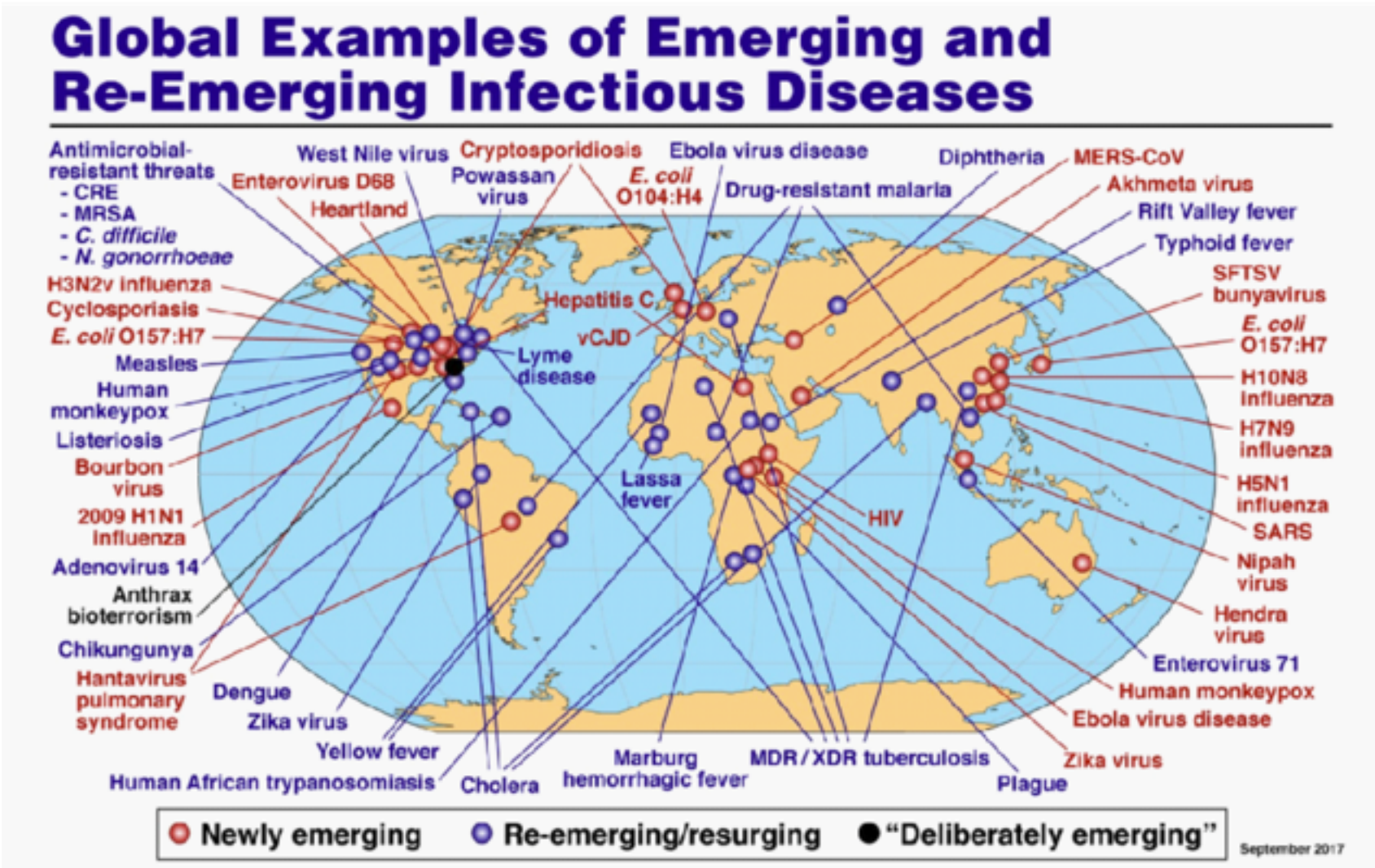
142 Moderators/speakers/panelists







Problem streams



Source: Slide from PS 2.4, Kohl K.

Examples

Yellow Fever, Angola 2016

- 2016 (January – July): 3,552 Yellow Fever cases from all provinces of Angola, 355 deaths
- International spread: from Angola to the DRC (59 confirmed cases), Kenya (2 confirmed cases) and China (11 confirmed cases)

MDR TB

- MDR-TB is a public health crisis and a 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.
- Cost of treatment (USD per patient)

	HIC	UMIC	LMIC	LIC
Drug Sensitive TB	14,659	840	273	258
MDR TB	83,365	5,284	6,313	1,218
Ratio MDR:DS	5.7	6.3	23.1	4.7

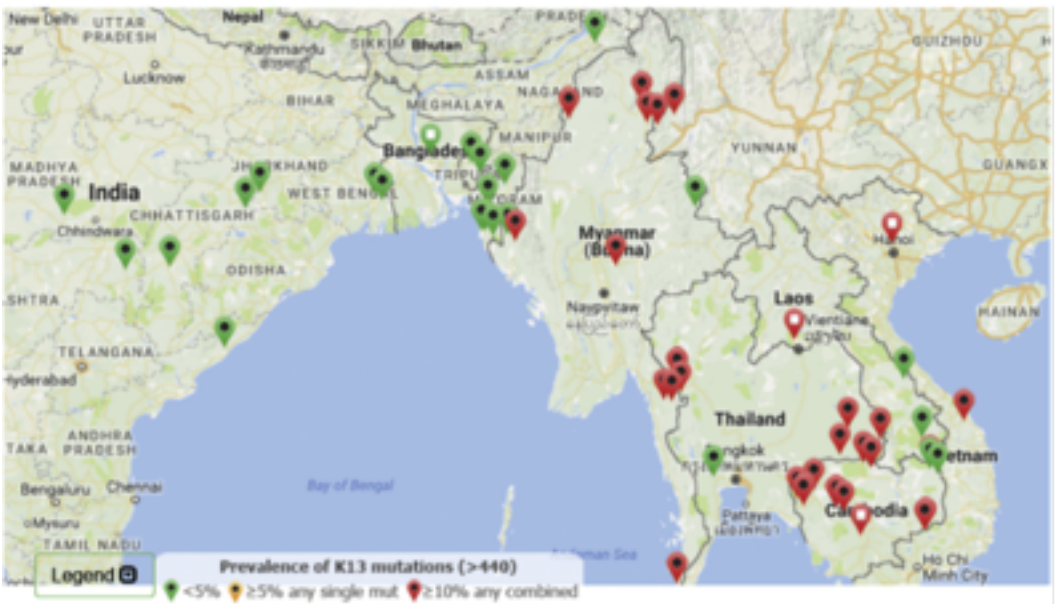
Source: PharmacoEconomics (2015) 33:939–955 https://goo.gl/H8QxxQ

Examples

Artemisinin resistant Malaria

- Southeast Asia is the epi-centre of anti-malarial drug resistance and one of the most popular travel destinations, with 104 million international travellers in 2015, facilitating international spread
- 38 and 90% of the artemisinin medicines on the market were substandard or falsified

Figure Map of prevalence of K13 mutations from K13 Molecular Survey, accessed 16 November 2016.



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

Examples

ART drug resistance

- Prevalence of virologic failure was 10.4% after one year of antiviral treatment in China [BioMed Research International, 2016]
- Overall prevalence of primary HIV drug resistance was 7.9% in Thailand [PLOS One].

AMR challenges

- In OECD in 2014, 15% of overall admissions had an AMR infection, and for the top three countries this was 25%, 11 times higher than the lowest three countries [OECD 2016];
- most common pathogens
  - 3rd generation cephalosporin-resistant E. Coli
  - Carbapenem-resistant K. pneumoniae

Objectives of PMAC2018

ACTION FOCUSED addressing EID and AMR

1. Problem stream
   - Understand the drivers of EID and AMR
2. Solution stream
   - Accelerate progress on multi-sectoral actions
   - Advocate evidence-based priority setting and policies
   - PMAC as learning and sharing platform
3. Evidence for policy decisions
   - Underscore the security, socio-economic and development benefits from One Health action

Structure of the synthesis

- Drivers, consequences, cost of inaction for EID and AMR
- Solutions
- Cross cutting recommendations

I. Emerging Infectious Diseases

Main drivers

Source: Slide from PL0, Fineberg H.

Source: Terrolio Z. et al. 2015. from PS4.5

Main drivers continued

- Increased contacts between humans and animals
- More outbreaks of emerging or re-emerging infectious diseases affect more people. Urbanization has led to more urban outbreaks (e.g. yellow fever in Angola) which pose significant challenges in terms of scale of response and potential international amplification
- Poor and marginalized populations particularly affected, e.g. people on the move—internal, international displaced persons, pastoralists
- UNICEF's response to potential Cholera outbreak https://youtu.be/FvCexK18hiU

Cost of inadequate surveillance and response

- The cost of preparedness is at least 10 times less
- “Preparedness costs millions, response costs hundreds of millions and recovery costs billions”.
- The impact is not only financial or economic it is also social and political

Examples

- MERS-CoV outbreak in the Republic of Korea, 2015
  - a total of 186 persons have been infected, 38 of whom have died
  - Foreign tourists decreased by 41% compared with May 2014. Total economic loss of US$10 billion; 0.1% reduction in GDP growth in 2015. [Euro Surveill. 2015; 20(25)]

Ebola affected countries: Guinea, Liberia and Sierra Leone (2014-16)

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 Yamamoto N. (PS1.4)

- 11 thousand deaths from Ebola epidemic, although Ebola was diagnosed in 1976
- Inadequate capacity to respond
  - Fragile health systems
  - Lack of investment in health and health systems
  - Poor health delivery infrastructure
  - No vaccine had been developed

Thailand's responses to MERS-CoV

- An Omani patient (2015)
  - Day 1: with heart condition was diagnosed with pneumonia on hospital admission
  - Day 2 and 3: two false negative tests on upper respiratory tract samples
  - Day 3: subsequent sputum exam confirmed MERS-CoV
  - Patient was moved back into the negative pressure unit and transferred to Infectious Disease Institute, MOPH
- Over 170 contacts were traced; 48 were quarantined and 122 self-monitored symptoms. High-risk close contacts exhibiting no symptoms, and those whose lab test on 12th day after exposure was negative, were released on the 14th day
- The Omani Ministry of Health (MOH) was notified using IHR 2005 mechanisms. Outbreak investigation was conducted in Oman and findings were published on WHO intranet and shared with Thailand's IHR focal point
- Key to successful infection control, with no secondary transmission, was collaborative efforts among hospitals, laboratories and MOHs of both countries

Solutions to EID

- Improve and sustain the **IHR core capacities**
- Strengthen interventions at the **human animal interface**
- **People centered** responses including community and civil society engagement, leaving no one behind, focus on the most vulnerable populations
- **Renewed governance**
  - Transparency and accountability of national government for preparedness and response
  - Trust and collective commitment
  - Coordination: multi-partner, multi-disciplinary and multi cultural response teams
- **Optimize partnerships**: incentivize collaboration; joint objectives based on local needs
- **Build capacities** dealing with existing threats and epidemics to ensure adequate systems
- **Approaches**
  - Invest in systems not projects
  - 2 faces of the same coin: health security and primary care
  - Engage politicians and financial stakeholders, increase their awareness before

Lessons of experience and good practices

- Engage the media proactively and at an early stage of the response, shape the narrative, remain flexible in message development (e.g. Brazil Yellow fever)
- Prepare the health system to respond , train health workers to cope with unexpected outbreaks, improve infection prevention and control
- Improve general public literacy about the risks and prevention measures
- Learn from other countries' experience
- Integrate surveillance data sources (human, animal, community surveillance)
- Use big data for surveillance but focus on quality analysis ("reduce noise")
- Produce economic metrics on health systems preparedness to raise and sustain awareness of politicians and decision makers
- Include private sector in preparedness and response
- Include pastoralists and nomadic populations in surveillance, biosecurity and policy dialogue to find innovative and cost efficient solutions

II. AMR

The key drivers of AMR

- Antimicrobial misuse and overuse
- Environmental contamination
- Health-care transmission
- Suboptimal rapid diagnostics
- Suboptimal vaccination
- Suboptimal dosing
- International travel facilitating spread of AMR pathogens
- Substandard and falsified antimicrobials

Global consumption of antimicrobials in food animal production

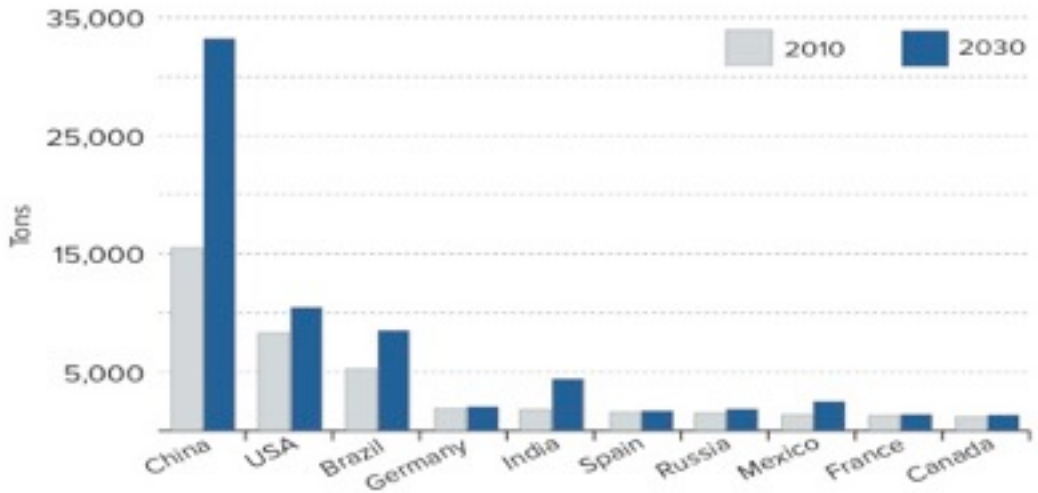
- 2010: Estimated at 63,151 (±1,560) tonnes
- 2030: Projected to rise by 67%, to 105,596 (±3,605) tonnes
- Increased consumption is driven by the growth in consumer demand for livestock products in middle-income countries, and shift to large-scale farms where antimicrobials are used routinely.

Consumption of antimicrobials in food animals

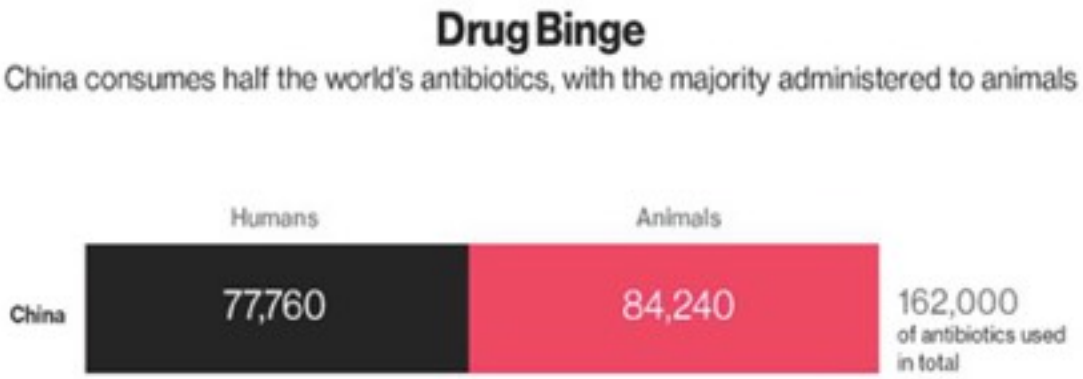
Source: Slide from PL0; Fineberg H.

- Hotspots such as India where areas of high consumption (30 kg per km^2) for industrial poultry production are expected to grow by 312% by 2030

Antibiotic consumption in livestock, top ten countries 2010–2030 (projected for 2030)



Source: Van Boeckel et al., 2015, PNAS (slide from PS4.5, Laxminarayan R.)

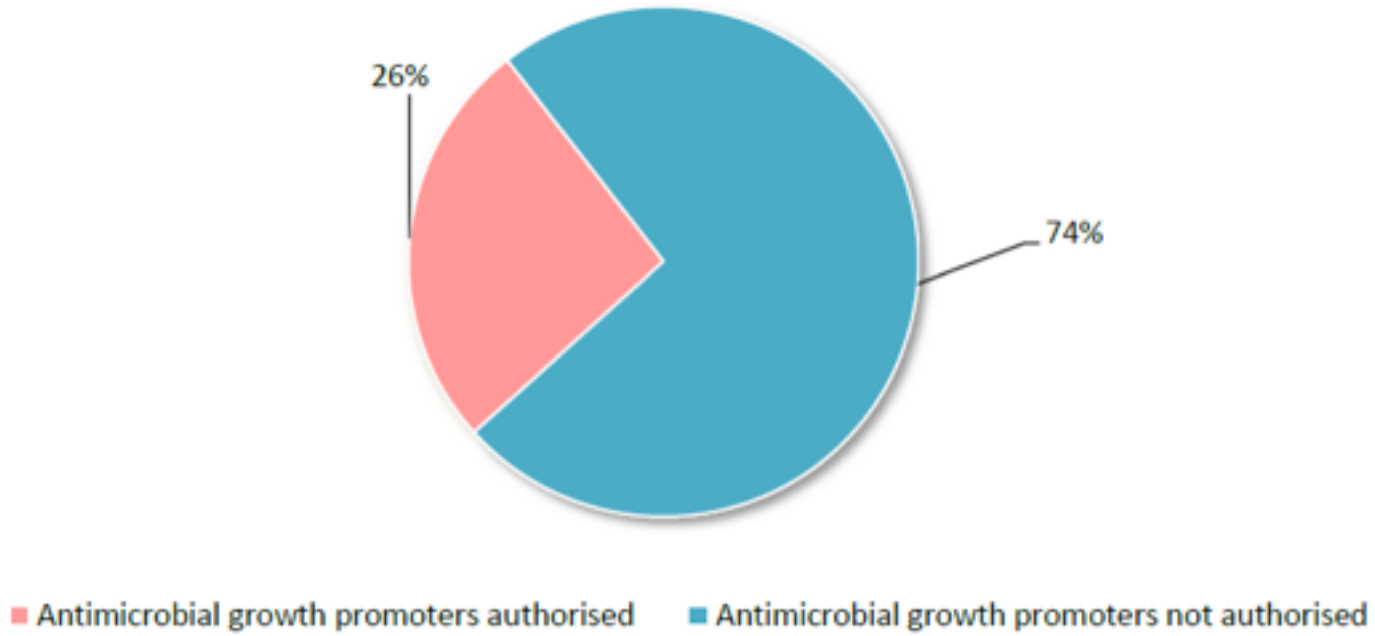


Source: Slide from PS4.5, Laxminarayan R.

Use of antimicrobial agents for Growth Promotion

In 2015, a total of 96 out of 130 (74%) OIE Member Countries did not authorize antimicrobial agents for growth promotion in animals; increased from 77 out of 151 (51%) in 2012

Authorisation of Antimicrobial Growth Promoters in 130 OIE Member Countries, 2015



Source: OIE Annual Report on the use of antimicrobial agents in animals. 2016

Substandard and falsified antibiotics: not adequately addressed by GAP-AMR

Cost of inaction

- Of the 48,000 samples of medicines tested for quality (66% Antimicrobials)
  - 10.6% failure rate, equivalent to annual spend of $30.5 billion on SF products

Impacts of substandard and falsified antibiotics and antimicrobials

- Estimated 72,430-169,271 deaths of childhood pneumonia due to SF antibiotics
- Additional 116,000 deaths from malaria in Sub Saharan Africa due to SF anti-malarial drugs, and $38.5 m. additional treatment cost due to failure of initial treatment.

Root causes

- Poor governance: corruption, unethical practices, poor procurement
- Weak National Regulatory Authority capacity

What do we know?

World Health Organization

- Availability
- Affordability
- Acceptability

- Poor oversight
- Limited awareness
- Lack of resources

- Poor procurement
- Unethical practice
- Corruption

Source: Slide from PS1.3, Bond K.

Solutions for AMR

1. Active implementation of national action plan on AMR, strengthen institutional capacities on two major fronts
2. Monitoring strand: surveillance for policy:
   - Antimicrobial consumption in human and animal sectors
   - AMR in human and animals
   - Integrated surveillance in food chain
   - AB residues and AMR in environment
   - Point prevalence surveys to capture prevalence of healthcare associated infections and AMR, AMU in health facilities, AMR attributed mortality and economic loss as %GDP
   - Post-marketing quality of medicines, recall of SF products and legal action
   - Disposal of expired antibiotics

Action Strand

1. Redesign livestock production systems e.g. breeds and vaccines; husbandry – stocking densities; quality of water and feed

2. Improve antibiotic stewardship
   - Develop and enforce clinical practice guidelines, dispensing and prescription audits, peer support, counselling and continued professional education
   - Improve antibiotic literacy and AMR awareness
   - Strengthen antibiotic literacy in professionals
   - Regulation: reclassification of antibiotics into three groups: access, watch and reserve; and limited use of reserve group
   - Regulate by capping antimicrobials per 'population correction unit'

3. Strengthen infection prevention and control in healthcare facilities

4. Research and Development
   - Health policy and systems research on AMR
   - Public investment in R&D in novel molecules and diagnostics
   - Research for alternatives, e.g. autogenous vaccines

Need to address huge implementation capacities gap

III. Cross Cutting Recommendations

1. Raise EID and AMR to the national human security agenda
2. Good governance, accountability and transparency to address corruption
   - Multisectoral action for health
   - Public-private-community-civil society engagement

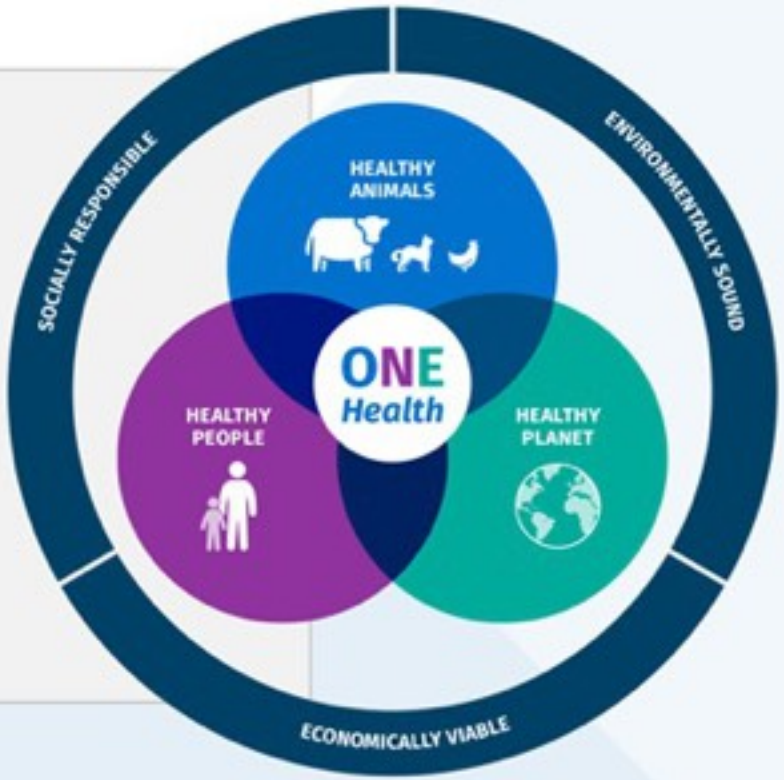
3. Role of Leadership

4. Trust among partners

- trust building before disease outbreak
- shared vision, shared understanding
- common values
- acting wisely

5. One Health System Strengthening: human, animal and environment

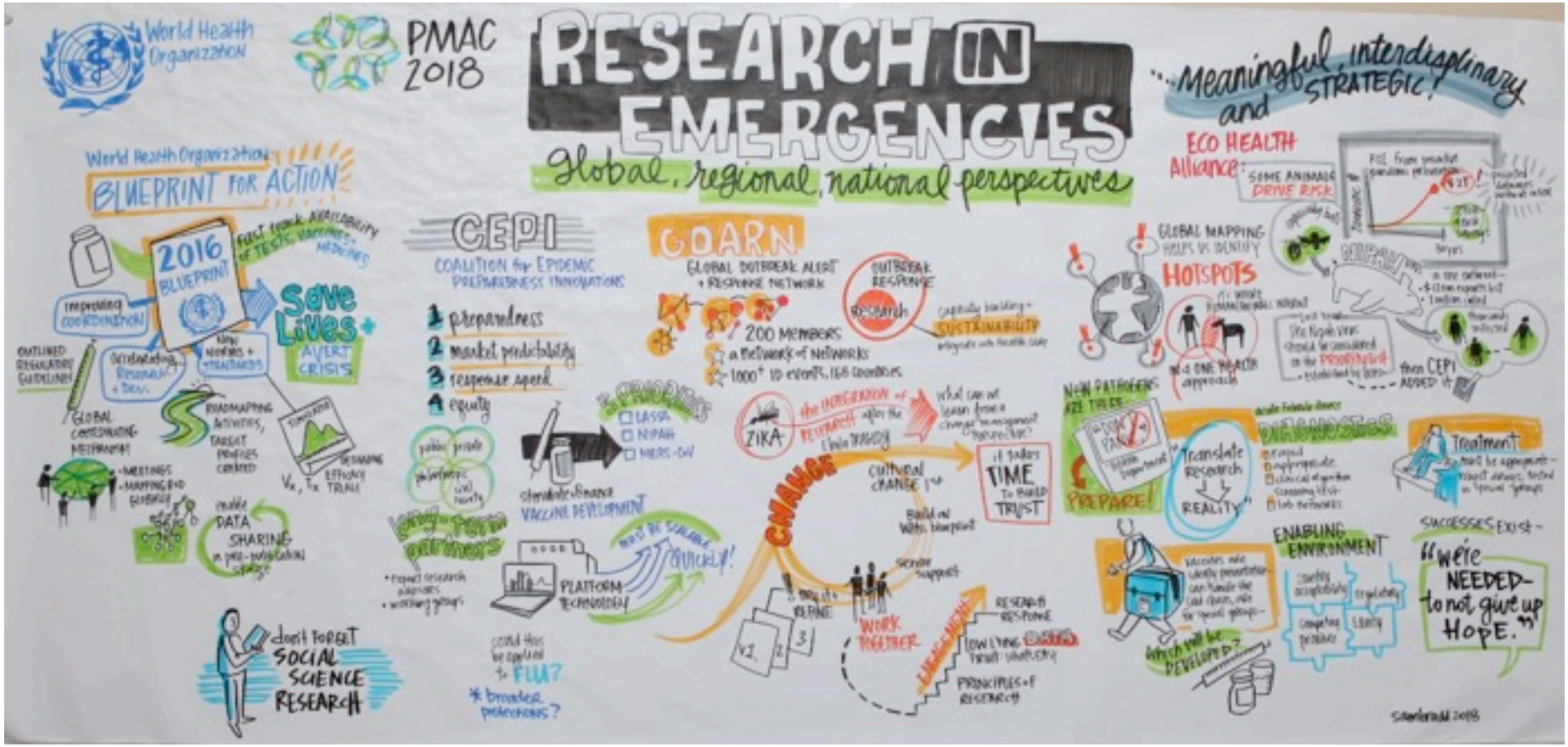
Efficiently raised, healthy animals are critical to healthy people and a healthy planet.



Source: Slide from PS4.4, Policarpio S.L.

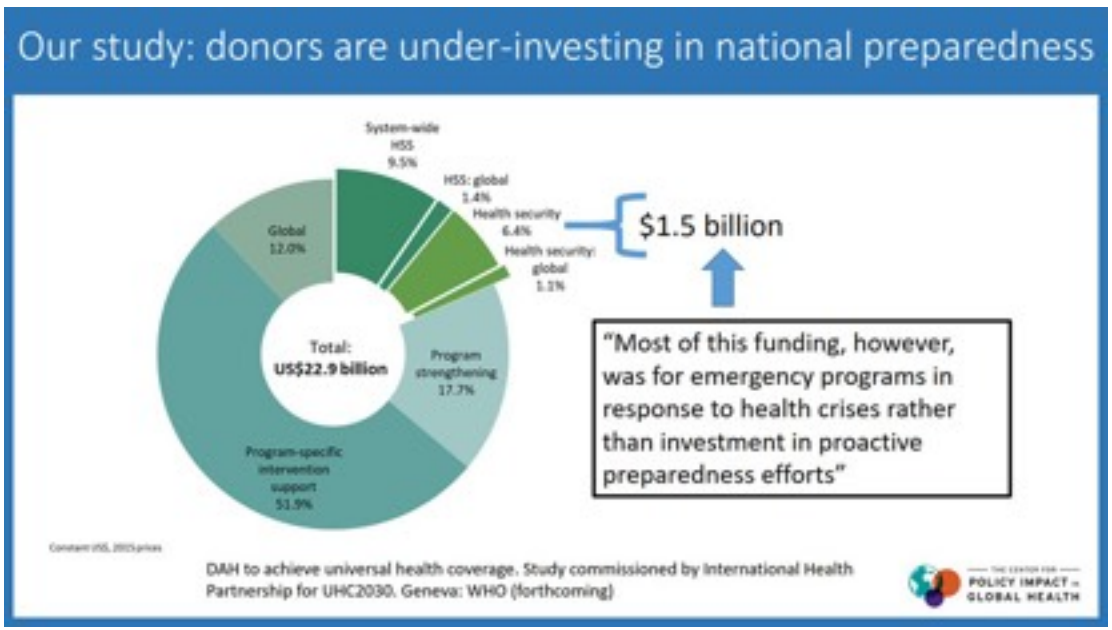
6. Risk communications during epidemics/ pandemics

7. R&D and evidence based policy



8. Health security financing: size, sources, flow of fund

- Donors need to invest more in national preparedness
- Innovative approaches to maximize efficiency of spending– digital, new technology, building on human genome project
- Political commitment to secure domestic resources
- Integration of health security financing process into country budgeting process



Source: Slide from PS4.5, Yamey G.

Summary

- **Economic investment for preventing EID and AMR**
- **Strengthen economic evidence base**, e.g. cost of inaction ("hidden losses"), calculate Return on Investment
- **Scale economically informed innovations**, e.g. land-use planning that accounts for economic impact of disease emergence from disrupted landscape
- **Incentivize risk mitigation**, e.g. incorporate epidemic risk profiles into macro-economic analyses and bond ratings
- **Mobilize funds:** domestic and ODA
- **Keep pandemics and AMR at top of the agenda**: G7, G20, Global Health Security Agenda

Special thanks

Mr. Sam Bradd, from Drawing Change for the wonderful graphic recording.

Lead Rapporteur **1. Prof. Dame Anne Mills** **2. Dr. Sylvie Briand** **3. Dr. Julie R Sinclair**
4. Dr. Juan Lubroth **5. Dr. Viroj Tangcharoensathien**

1	Aimee	Lee	23	Kanokwaroon	Watananirun	45	Noppawan	Piaseu	67	Suladda	Pongutta
2	Anond	Kulthanmanusorn	24	Kanthika	Imsaengjan	46	Orana	Chandrasiri	68	Sunicha	Chanvatik
3	Arisa	Hisamatsu 3rd	25	Karnsinee	Yotsakulsate	47	Orarat	Wangpradit	69	Supanan	Inphlang
4	Benjaporn	Niyomnaitham	26	Kasama	Thongbaeb	48	Palita	Rodanant	70	Suphanna	Krongthaeo
5	Bowwarn	Juengwattanasirikul	27	Keiko	Tsukamoto	49	Pantila	Taweewigyakarn	71	Surangrat	Jiranantanagorn
6	Cameron	Tabrizi	28	Konvika	Chantarat	50	Patinya	Srisai	72	Suriwan	Thaiprayoon
7	Carol	Dayo Obure	29	Kritchavat	Ploddi	51	Payao	Phonsuk	73	Taketo	Tanaka
8	Chainarong	Sukputanan	30	Li	Niu	52	Piyawan	Kanan	74	Tanapat	Laowahutanon
9	Charay	Vicahthai	31	Maho	URABE	53	Pranpriya	Chaypho	75	Thanachol	Wonghirundecha
10	Chayanis	Kositamongkol	32	Maki	Sakuma	54	Raththar	Benchapalanont	76	Theerut	Densathaporn
11	Chayut	Pinichka	33	Manushi	Sharma	55	Rei	Haruyama	77	Thuyen	Nguyen
12	Chutima	Akaleephan	34	Mariam	Parwaiz	56	Rick	Brown	78	Titiporn	Tuangratananon
13	Ei Ei	Aung	35	Myelone	Tharmasselan	57	Sakditat	Ittiphisit	79	Uravadee	Chanchamsang
14	Hathairat	Kosiyaporn	36	Nareerut	Pudpong	58	Saowaluk	Srikajornlarp	80	Vasinee	Singsa
15	Huijuan	Liang	37	Nicolas	Rosemberg	59	Sarayuth	Khuntha	81	Voleak	Van
16	Inthira	Yamabhai	38	Nisachol	Cetthakrikul	60	Saudamini	Dabak	82	Wei Pin	Hung
17	Jaruayporn	Srisasalux	39	Nissara	Spence	61	Shaheda	Viriyathorn	83	Wilailak	Saengsri
18	Jeannette	Wong	40	Nitchakorn	Tangsathapornpanich	62	Sirinard	Nipaphorn	84	Woranan	Witthayapipopsakul
19	Jing	WANG	41	Nongnapas	Assawamasbunlue	63	Smith	Kuprasertvong	85	Xian	Sun
20	Jintana	Jankhotkaew	42	Nongnuch	Jaichuen	64	Sophavanh	Thitsy	86	Yasmeen	Vaheng
21	Joseph	Harris	43	Nongyao	Kasatpibal	65	Suchunya	Aungkulanon	87	Yumiko	Miyashita
22	Jurairat	Phromjai	44	Noppakun	Thammatacharee	66	Sukanya	Numsawat			

Rapporteur coordinator: Walaiporn Patcharanarumol, Warisa Panichkriangkrai, Angkana Sommanustaweechai