

# Strategies for regional surveillance and action

Fleming Fund CAPTURA Project

John Stelling  
27/06/2022



**CAPTURA**

Capturing data on Antimicrobial resistance  
Patterns and Trends in Use in Regions of Asia



Hospital and community microbiology laboratories and clinical pharmacies generate a richly-detailed window into evolving microbial populations and antimicrobial use practices in real-time. Yet these resources remain largely untapped and underutilized.

Surveillance platforms could and should support local, national, regional, and global collaboration and analyses:

- recognition, tracking, and containment of emerging threats in real-time
- cost-effective patient care through antimicrobial stewardship and locally-relevant treatment guidelines
- public health awareness, policy, interventions, and assessment of interventions
- Basic science and operational research
- Local and national capacity for data management and continuous quality improvement

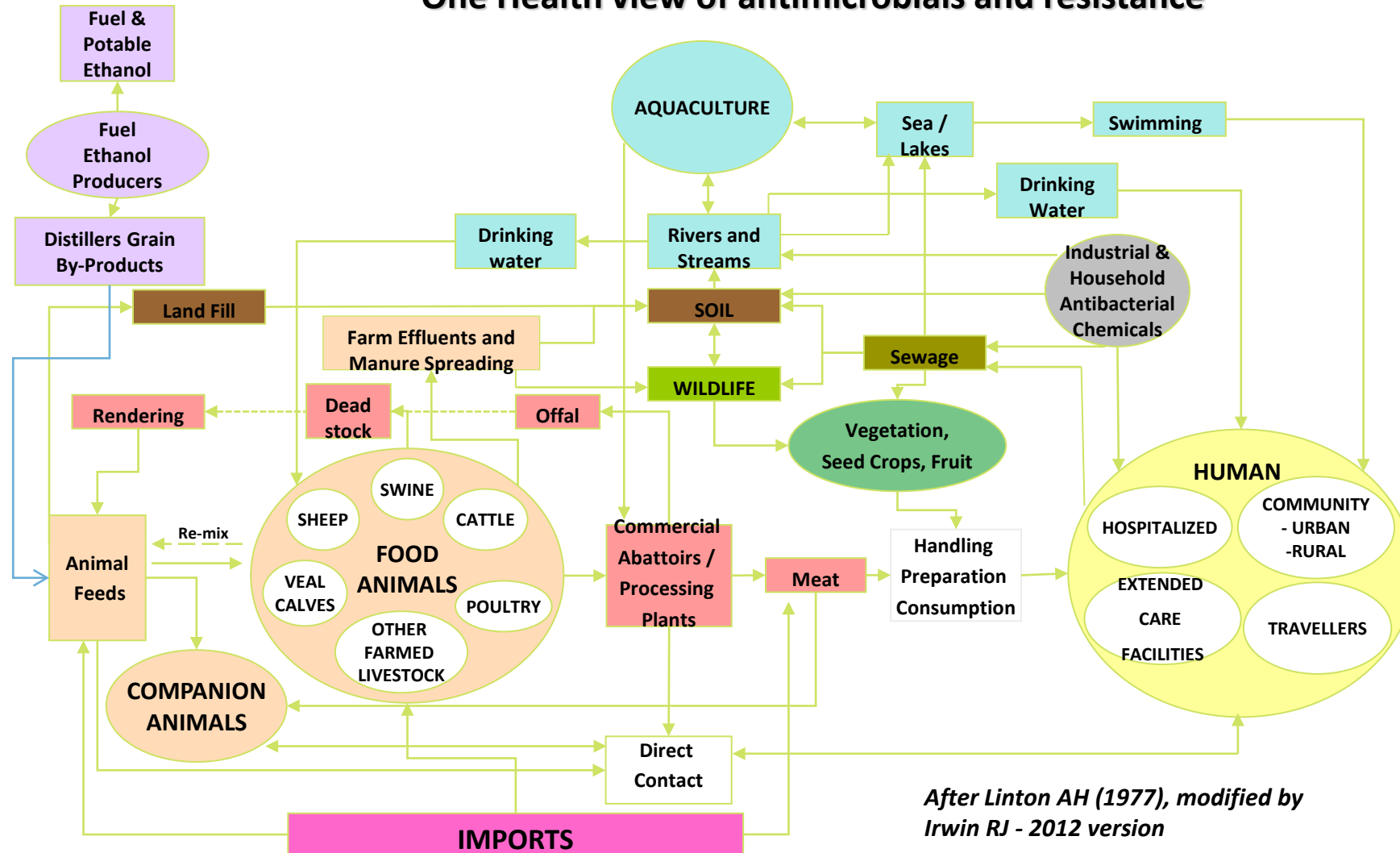
# AMR Surveillance objectives

Objectives	Local	National	Regional	Global
<b>Policy and advocacy</b>				
Priority setting and funding	X	X	X	X
Awareness and education	X	X	X	X
Legislation and regulation			X	X
<b>Epidemiology of resistant microbes</b>				
Pathogen and resistance trends	X	X	X	X
Recognition of emerging threats	X	X	X	X
Disease burden	X	X	X	X
Benchmarking		X	X	X
<b>Resistance containment</b>				
Treatment guidelines	X	X		
Response to emerging threats	X	X	X	X
Assessment of interventions	X	X	X	X
New diagnostics and therapeutics			X	X
<b>Capacity-building</b>				
Laboratory capacity	X	X	X	X
Epidemiological capacity	X	X	X	X

# Moving from CAPTURA into the future

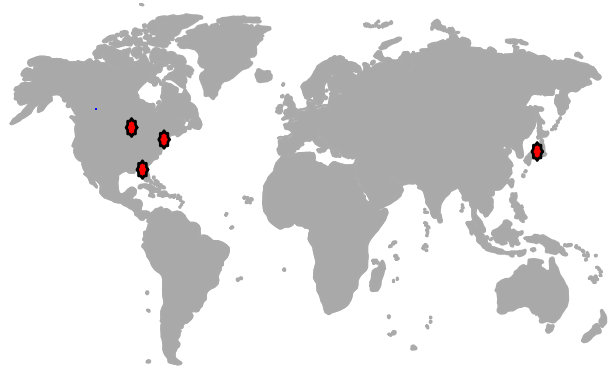
- Major findings:
  - There are many stakeholders, activities, data, and accomplishments
  - There are also significant barriers: limited financial and human resources, data quality, standardization, barriers to data exchange
  - There is great heterogeneity in antimicrobial resistance and use issues between pathogens, antimicrobials, and geographic and clinical setting
- Moving ahead
  - Movement from one-time collection of historical data (with manual data cleaning) to prospective and sustainable data collection and analysis
  - Expand the number of facilities for more meaningful geographic and demographic coverage, including the addition of animal health, food, and environmental laboratories and drug providers
  - Translating data into action

# One Health view of antimicrobials and resistance



# Emergence of antimicrobial resistance

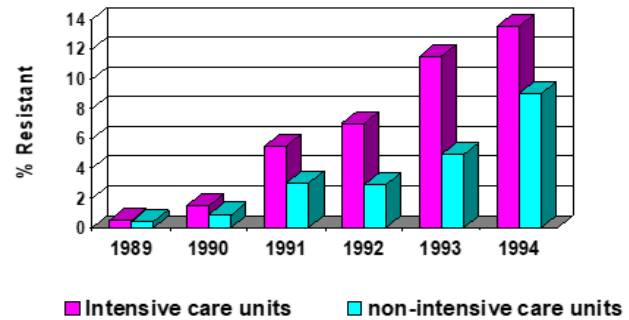
*Appearance*



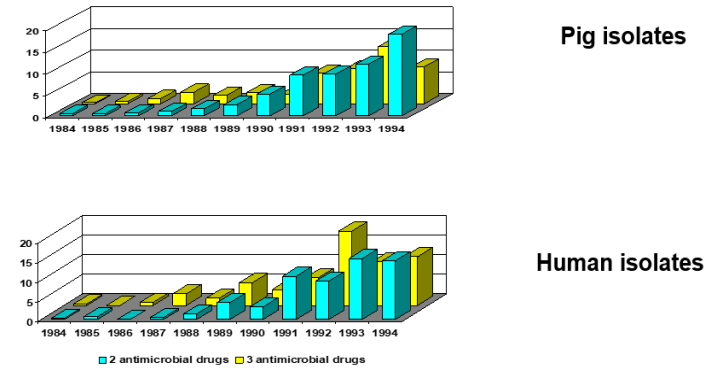
*Dissemination*



*Establishment*



*Transfer between sectors*



# Regional approach to AMR containment

- Value of the regional approach
  - Advocacy: Ownership, relevance, and sustainability
  - Epidemiology: Regional view and benchmarking of antimicrobial use and resistance trends
  - Resistance containment: Regional coordination of response strategies and initiatives and cooperation with national authorities
  - Capacity-building: National strengthening and standardization of approaches, best practices, lessons learned, mentoring, technical support, feedback
- Need for two regional frameworks
  - Framework for data collection, sharing, and analysis
  - Framework for translating data into action



# Framework for regional data collection, sharing, and analysis



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# Framework 1 – Data...and other information needs

- Tracking evolving AMU practices and AMR threats
- Systems approach to characterize organizational structures, capacities, relationships, responsibilities
- Registries and inventories of legislation, regulations, policies, campaigns, activities
- Respect for privacy issues in human health and in food production
- Data type considerations
  - Ongoing versus periodic versus snapshot information needs
  - Aggregate statistics versus patient- or isolate-level reporting
  - Local, national, regional, and global data and literature sources
  - Public, private, academic, industry, *etc.*

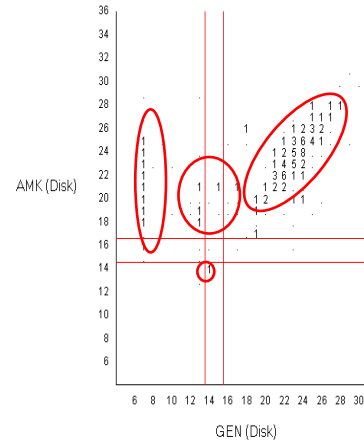
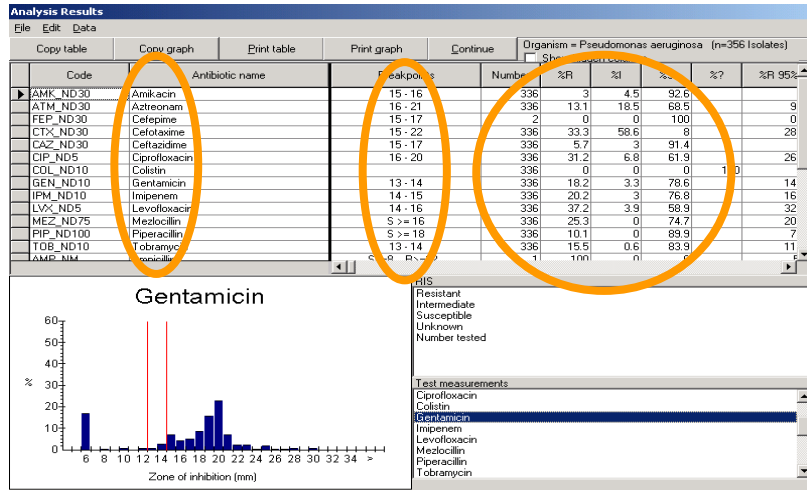
# Data ownership, privacy, and data use agreements... and trust

- In most instances, data platform coordinators are NOT considered to be the data owners, but rather data stewards supporting the needs of data contributors under defined data sharing and use agreement
  - Regional requirements (GDPR, HIPAA, etc.) and agreements on data ownership, use, and access
- Differences in confidentiality concerns between human and animal data

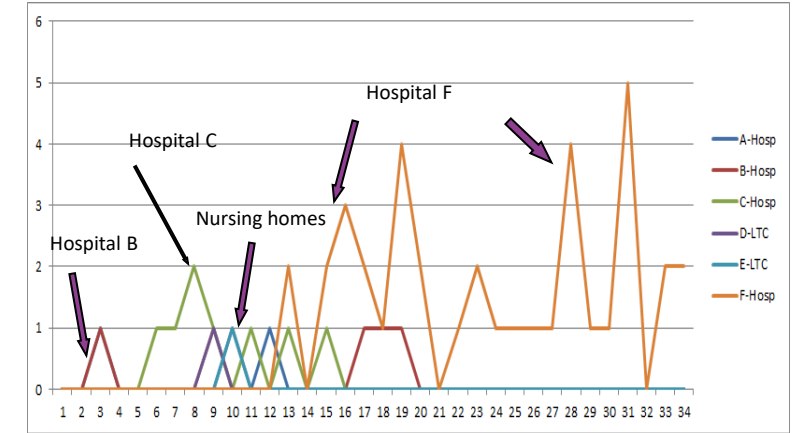
# Antimicrobial resistance surveillance models

- Alert organism surveillance
- Enhanced routine surveillance
- Targeted surveillance protocols and surveys

# WHONET analysis, alert, and report features

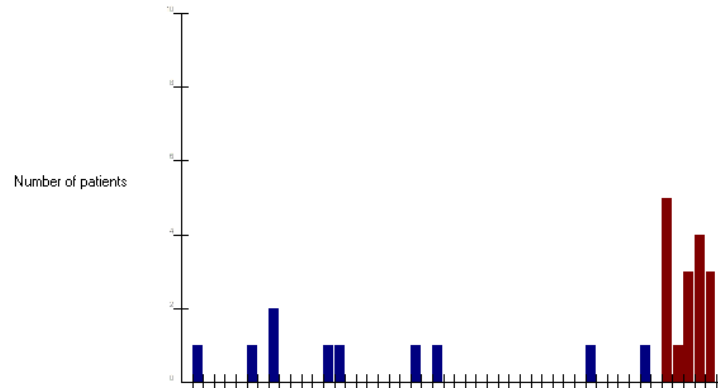


	R	I	S
S	10%	1.1%	85.9%
I	1.4%	0.3%	0.5%
R	0.3%	0.5%	



	CHL	CIP	CLI	COL	ERY	GEN	IPM	LVX	M
?	S	R		?		I	R*	R	
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	I*		R		R	S		R	

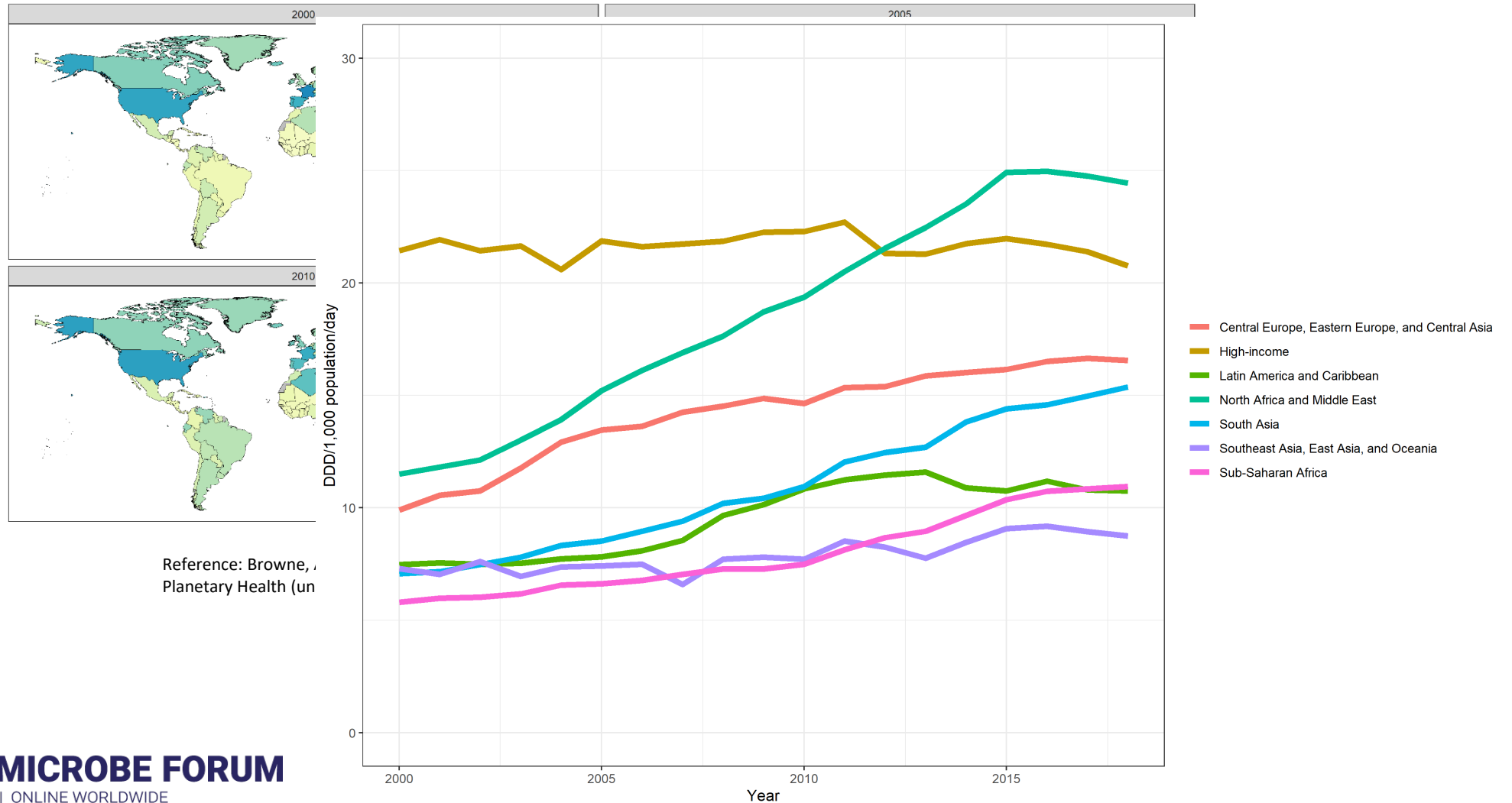
S. sonnei non-susceptible to SXT



# Antimicrobial use surveillance models

- Aggregate facility or national statistics – “Antimicrobial Consumption”
- Patient-level “Antimicrobial Use”
- Metrics:
  - Quantitative
  - Qualitative

# Global antibiotic consumption rates: time series 2000-2015



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An ASM & FEMS Collaboration

# Establishing a regional data sharing framework

- Regionalization of national initiatives – from bottom up
  - AMR: EARS-Net, CAESAR, EFSA, ReLAVRA
  - AMC: ESAC-Net, EFSA, WPRACSS
- Regionalization of global initiatives – from top down
  - WHO GLASS
  - FAO (with initial development in Asia)
  - OIE

**Direct links between global and national authorities are valuable to get started - but for the long term, the regional approach is generally more sustainable, relevant, and impactful**



# IT approaches to support regional surveillance

- Region-specific software development
  - Europe: ECDC TESSy for EARS-Net, ESAC-Net, and HAI-Net
  - Europe: WHO CAESAR and WHO EURO AMC Network
  - Latin America and Caribbean: PAHO PLISA for ReLAVRA
  - Western Pacific: WPRO WPRACSS
- Regionalization of global platforms
  - WHO GLASS, FAO, OIE WAHIS, OIE Global Database on Antimicrobials Intended for Use in Animals
  - FAO/OIE/WHO Tripartite: TrACSS, TISSA
  - There should be minimal core protocols followed by all countries to support global reporting: Data sources, reporting frequency, specimen types, pathogens, antimicrobials, animal species, dashboards, reports
  - However, there should be wide scope for customization reflect regional priorities and consensus agreements

# Some current IT initiatives

- **Global initiatives**
  - WHO GLASS, OIE WAHIS, FAO, TISSA, TrACSS
- **Microbiology laboratory information systems**
  - Free systems: LabBook (Fondation Merieux), BLIS, Bika
  - Free systems in development: Mini-LIMS (Doctors Without Borders), SEDRI-LIMS (SEDRIC, Wellcome Trust), SENAITE, OpenELIS
  - Veterinary LIMS: SILAB (IZSAM with support from FAO)
  - Commercial systems
- **Data analysis and public health reporting**
  - WHONET and SaTScan
  - DHIS2 and AMR: WAHIT, Norway, India, Senegal, WHONET, (Viet Nam)
  - SORMAS
  - OpenLDR
  - AMASS
- **WHO AMR Collaborating Center Network**
  - Coding and antibiotic interpretation standards

# Framework for translating data into action



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## Framework 2 - Priorities

- What actions are needed?
  - What data are needed to support those actions?
- What data exist?
  - What can be done with these data? Strengths, deficiencies?
- What are the information gaps?
  - What are possible strategies to address these gaps?
- What partners and skillsets are needed?

# Strategic versus technical policymaking

Strategic policymakers	Technical policymakers
<ul style="list-style-type: none"><li>• Advocacy - resistance is major public health threat, heterogeneous issues, and worsening</li><li>• Strengthen organizational structures and build capacity</li><li>• Establish coordination mechanisms and communication pathways</li><li>• Define public health priorities and resource needs according to disease burden</li><li>• Allocate sufficient financial and human resources</li><li>• Advance regulatory and legislative agenda for antimicrobial resistance containment</li><li>• Establish high-level objectives, strategies, and monitoring and evaluation metrics for program success</li></ul>	<ul style="list-style-type: none"><li>• Translate high-level objectives and strategies into implementation plans</li><li>• Detect and contain emerging resistant pathogens, including outbreaks, in real time</li><li>• Assess and update standard treatment guidelines in human and animal settings</li><li>• Benchmark antimicrobial use, infection control, and laboratory test practices across healthcare facilities and communities with investigation and guidance on improvements</li><li>• Benchmark resistance findings and investigate outlying and unexpected findings</li><li>• Develop educational and advocacy materials targeted to healthcare workers, policy makers, food producers, and the general public</li></ul>

# Partners in resistance containment

- Governmental authorities: Ministries of health, agriculture, animal welfare, finance
- Human and animal healthcare delivery
- Food production professionals
- Pharmaceutical and diagnostic industry
- Civil society: media representatives, patient advocacy groups
- Nongovernmental, academic, and research organizations

# Priority action areas

- Translating data into action for capacity and continuous quality improvement
  - Advocacy and awareness for health services delivery
  - Improved capacity for clinical and laboratory diagnostic services
  - Improved capacity for data management, analysis, and interpretation
- Translating data into action for resistance containment
  - Advocacy and awareness for antimicrobial resistance containment
  - Disease prevention
  - Improved use of existing antimicrobials and treatment options
  - Decreased transmission of resistant pathogens



# Data visualization, communication, and dissemination

- Results, conclusions, and recommendations must be presented in a variety of ways with content and formatting customized according to the needs of priority audiences
  - General public
  - Strategic stakeholders
  - Technical stakeholders
  - Public health researchers

# Current global initiatives



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# U.N. Organizations.... and OIE

- United Nations (UN)
- World Health Organization (WHO)
- Food and Agricultural Organization of the United Nations (FAO)
- United Nations Environment Programme (UNEP)
- United Nations Development Programme (UNDP)
- World Organisation for Animal Health (OIE)
- FAO-OIE-WHO Tripartite

# AMR Containment in the Asian context



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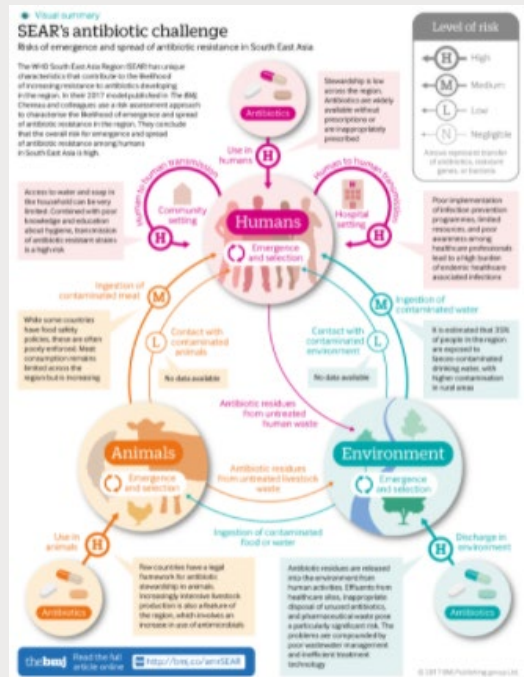
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# The Fleming Fund Regional Grants



J Antimicrob Chemother 2018; 73: 844–851  
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## Journal of Antimicrobial Chemotherapy

### Impact of antibiotic stewardship programmes in Asia: a systematic review and meta-analysis

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**Background:** The use of antibiotic stewardship programmes (ASPs) is increasing in Asia, but their effectiveness in reducing antibiotic consumption and their impact on clinical outcomes is not known.

**Objectives:** To determine the impact of ASPs conducted in Asia on the consumption of antibiotics and on patients' clinical outcomes.

**Methods:** We systematically searched the Embase and Medline (PubMed) databases for studies that compared antibiotic consumption or clinical outcomes of patients in an Asian hospital or clinic with an ASP (intervention) with those in a similar setting without an ASP (control). Meta-analysis of all-cause mortality and hospital-acquired infection (HAI) were performed using random-effects models.

**Results:** The search identified 77 studies of which 22 and 19 reported antibiotic usage and cost, respectively. Among these, 20 (91%) studies reported reduced antibiotic usage and 19 (100%) reported cost savings in the intervention group. Duration of antibiotic therapy was reduced in all seven studies in association with an ASP. Rates of all-cause mortality and HAI were not significantly different between the intervention and control groups. However, mortality rates were significantly improved by ASPs using drug monitoring, while HAI rates were also improved by ASPs that included infection control or hand hygiene programmes.

**Conclusions:** In Asia, ASPs reduce antibiotic consumption in hospital and clinic settings and do not worsen clinical outcomes. The findings strongly support the broad implementation of antimicrobial stewardship interventions in hospital and clinic settings in Asia.

### Introduction

Antimicrobial resistance (AMR) is a growing global threat of huge concern to countries around the world.<sup>1,2</sup> An especially alarming aspect is the rapid global spread of multidrug-resistant bacteria causing common infections.<sup>3</sup> Antibiotic stewardship programmes (ASPs) are considered an important approach to optimizing the use of antimicrobial drugs, especially in clinical settings. They have been defined by the IDSA as 'coordinated interventions designed to improve and measure the appropriate use of antimicrobials by promoting the selection of the optimal antimicrobial drug regimen, dose, duration of therapy and route of administration'.<sup>4</sup> Other organizations and professional societies have adopted similar definitions.<sup>5,6</sup> When mounting an ASP, the WHO has highlighted the need to engage professional and civil societies and patient organizations, and to take into consideration the local factors that drive sub-optimal use in different settings.<sup>7</sup> Guidelines and recommendations for the proper development and implementation of ASPs have also been published.<sup>8</sup>

The effectiveness and economic impact of ASPs have been evaluated in previous systematic reviews<sup>9–12</sup> and in specific settings including inpatient wards,<sup>13</sup> or critical care facilities.<sup>14</sup> Some have focused on particular infections, e.g. *Clostridium difficile*.<sup>15</sup> However, there is a lack of such studies from countries in Asia, which differ from western countries in many aspects. A recent international survey of ASPs in hospitals revealed that authorization to use restricted antibiotics was needed in 88% of ASPs implemented in Europe and 87% in North America, but only 38% in Asia.<sup>16</sup> Another survey on non-compliance with antibiotic therapy for acute community infections reported that the proportion of respondents admitting non-compliance was highest in China (44%) and Japan (34.4%) and lowest in the Netherlands (9.9%) and Italy (11.2%).<sup>17</sup> Other differences between Asian and western countries include public hygiene,<sup>18</sup> communication between doctors and patients,<sup>19</sup> people's knowledge and attitudes about antibiotics,<sup>20</sup> and so on. These differences are important determinants of the effectiveness of antimicrobial stewardship. This study aimed to evaluate the effectiveness and economic impact of ASPs conducted in Asia.

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## MEETING REPORT

## Open Access

# Antimicrobial Resistance in the Asia Pacific region: a meeting report

Esabelle Lo Yan Yam<sup>1\*</sup>, Li Yang Hsu<sup>2</sup>, Eric Peng-Huat Yap<sup>1</sup>, Tsin Wen Yeo<sup>1</sup>, Vernon Lee<sup>2,3</sup>, Joerges Schlundt<sup>4</sup>, May O. Lwin<sup>5</sup>, Direk Limmathuroksakul<sup>6,7</sup>, Mark Jit<sup>8,9,10</sup>, Peter Dedon<sup>11,12</sup>, Paul Turner<sup>13,14</sup> and Annelies Wilder-Smith<sup>1,15,16</sup>

### Abstract

The Asia Pacific region, home to two-thirds of the world's population and ten of the least developed countries, is considered a regional hot-spot for the emergence and spread of antimicrobial resistance (AMR). Despite this, there is a dearth of high-quality regional data on the extent of AMR. Recognising the urgency to close this gap, Singapore organised a meeting to discuss the problems in the region and frame a call for action. Representatives from across the region and beyond attended the meeting on the "Antimicrobial Resistance in the Asia Pacific & its impact on



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## Disease dynamics

Hub researchers are assessing how pathogens and genes can transmit between chickens and from chickens to people and back again - focusing in particular on how this is influenced by how chickens are kept and traded. This is vital information to inform potential interventions.

## Developing a situation analysis tool to assess containment of antimicrobial resistance in South East Asia

Manish Kakkar and colleagues discuss the development of a tool to assess how programmes tackling antimicrobial resistance in South East Asia are faring

Antimicrobial resistance (AMR) is no longer defined by national or political boundaries. Instead, it is a global public health threat that has been identified in China, but also in other parts of the world. Evidence shows that the main drivers of AMR are antibiotic selection pressure and transmission of resistant microbes. But drivers at the level of policies and systems also contribute.<sup>1</sup> This complexity calls for a comprehensive, holistic, collaborative approach. The 68th World Health Assembly in 2015 adopted the global action plan on AMR (GAP-AMR, box 1), which was expected to translate into national action plans by May 2017.<sup>2</sup> National action plans should include a strategic action plan, based on a "One Health" approach, bringing together multiple actions to combat resistance in the local context. The One Health approach provides opportunities to integrate multiple disciplines, working locally, nationally, regionally, and globally to tackle the drivers of AMR emergence.<sup>3</sup> To assist member states, WHO, the Food and Agriculture Organization of the United Nations, and the World Organisation for Animal Health have developed a manual and sample templates, as well as a library of existing national action plans.<sup>4</sup> The manual recommends performing a situation analysis before developing a national action plan. Countries differ widely in their capacity to develop a comprehensive, holistic national action plan. Of 133 countries surveyed in the worldwide situation analysis conducted by WHO, very few reported to have a comprehensive, multi-sectoral national action plan for containment of AMR supported by sustainable financing.<sup>5</sup> Conducting a comprehensive situation analysis is essential for tailoring a national action plan to the setting of a particular member state, which would inform the subsequent steps of the process.

**SEAR tool for situation analysis**  
The WHO South East Asia Regional Office (SEARO) developed a tool to conduct a system-wide analysis of AMR containment programmes. We developed indicators based on existing evidence to evaluate the progress made in each member state of the region over five years (2016–20). The tool was developed to identify vulnerabilities in the system, to identify the stage of implementation of GAP-AMR related activities, and to assess the progress made over time. The situation analysis tool is being piloted in several countries. Here we present the tool and discuss its potential in identifying gaps in implementing the GAP-AMR, its shortcomings, and its relevance in comparison to other available tools. This will be instrumental for WHO

### KEY MESSAGES

- The situation analysis tool can assess and monitor the progress made towards implementing the national action plan for antimicrobial resistance in the member states of the South East Asia region.
- A multi-stakeholder review, conducted through guided discussions, table top exercises, and site visits as needed identifies strengths, challenges, and implementation gaps.
- The tool has been developed in the context of developing countries with rudimentary or non-existent programmes for the containment of antimicrobial resistance.

- Box 1. Strategic objectives of the global action plan against AMR**
1. Improve awareness and understanding of antimicrobial resistance through effective communication, education, and training
  2. Strengthen the knowledge and evidence base through surveillance and research
  3. Reduce the incidence of infection through effective sanitation, hygiene, and infection prevention measures
  4. Optimize the use of antimicrobials in human and animal health
  5. Develop the economic case for sustainable investment that takes account of the needs of all countries and increase investment in new drugs, diagnostic tools, vaccines, and other interventions

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BMJ 2018;377:14

Contents lists available at ScienceDirect

## Journal of Global Antimicrobial Resistance

journal homepage: [www.elsevier.com/locate/jgar](http://www.elsevier.com/locate/jgar)



# APCCM SINGAPORE 2021

## 18<sup>TH</sup> ASIA PACIFIC CONGRESS OF CLINICAL MICROBIOLOGY AND INFECTION

THE HYBRID EDITION • 11-13 November 2021

Suntec Singapore Convention and Exhibition Centre

## Antimicrobial stewardship capacity and manpower needs in the Asia Pacific

Tau Hong Lee<sup>a,b,c,d,\*</sup>, David C. Lye<sup>a,b,c,d,\*</sup>, Doo Ryeon Chung<sup>e,f</sup>, Visanu Thamlikitkul<sup>g</sup>, Min Lu<sup>h</sup>, Andrew TY Wong<sup>i</sup>, Po-Ren Hsueh<sup>j</sup>, Hui Wang<sup>k</sup>, Celia Cooper<sup>l</sup>, Joshua CX Wong<sup>m</sup>, Nobuyuki Shimono<sup>n</sup>, Van Hung Pham<sup>o</sup>, Jennifer Perera<sup>p</sup>, Yong-Hong Yang<sup>q</sup>, Atef M Shibi<sup>r</sup>, So Hyun Kim<sup>e,f</sup>, Li Yang Hsu<sup>a,b,d,r</sup>, Jae-Hoon Song<sup>s</sup>

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## Antimicrobial Resistance

## Antimicrobial Resistance

Home > Regional Activities > Antimicrobial Resistance > Antimicrobials: Handle with Care – World Antimicrobial Awareness Week

LAST UPDATED: 4/1/2021

# Antimicrobials: Handle with Care - World Antimicrobial Awareness Week



# Governance framework

- ASEAN
  - Regional Strategy on AMR Communication and Advocacy
  - ASEAN Leaders' Declaration on AMR
- SAARC
  - AMR Technical Advisory Group of the South Asian Association for Regional Cooperation
- Nongovernmental organizations
  - Asia Pacific Society of Clinical Microbiology and Infection
  - ReACT Asia Pacific
  - Australasian Society for Infectious Diseases
- Other agencies with interest in the region
  - UK Fleming Fund
  - Japan Agency for Medical Research and Development
  - Global Antibiotic Research and Development Partnership
  - Global Health Security Program (FAO/USAID)



## ASEAN Leaders' Declaration on Antimicrobial Resistance (AMR): Combating AMR through One Health Approach

1. WE, the Heads of State and Government of the Member States of the Association of Southeast Asian Nations (ASEAN), namely Brunei Darussalam, the Kingdom of Cambodia, the Republic of Indonesia, the Lao People's Democratic Republic, Malaysia, the Republic of the Union of Myanmar, the Republic of the Philippines, the Republic of Singapore, the Kingdom of Thailand, and the Socialist Republic of Viet Nam, on the occasion of the 31<sup>st</sup> ASEAN Summit in Manila, Philippines on 13 November 2017, have come together to jointly cooperate in combating antimicrobial resistance (AMR) through a multisectoral and multidisciplinary approach within the framework of "One Health";

Adopted 39<sup>th</sup> AMAF Meeting (28/9/2017)



ASEAN REGIONAL STRATEGY ON ANTI MICROBIAL  
RESISTANCE COMMUNICATION AND ADVOCACY

# Conclusions - 1

- The threats and challenges of AMR are complex, diverse, and evolving
  - Much has already been accomplished!
  - But much remains to be done – promotion, coordination, standardization, interventions – and regional approaches are fundamental for relevance, ownerships, sustainability, and impact
- Framework for regional data collection, analysis, and interpretation
  - Based in governmental and intergovernmental structures, but in partnership with nongovernmental agencies
  - Should include traditional surveillance data, but also information on resources, activities, structures, accomplishments
- Framework for translating data to action
  - Improved knowledge, capacity, prioritization
  - Improved disease prevention, antimicrobial use, and decreased transmission
  - Diverse partners are needed! A broad coalition of governmental, nongovernmental, industry, and civil society partners



## Conclusions - 2

- How can we translate the accomplishments of CAPTURA with stakeholder engagement and data mobilization into a sustainable ongoing system for data analysis and interpretation locally, nationally and regionally?
- How can we tie surveillance program conclusions and recommendations into meaningful interventions for capacity-building and for resistance containment? What organizational structures and strategies are needed to tie data into action?