

# Collaborations and data sharing, reflections from the GRAM project

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The Gamechangers RADAAR AMR Policy Webinar









### Background: What is AMR?



- Background:
  - AMR is one of the most complex and multifaceted health challenges facing the global community today it involves many types of pathogens and diseases<sup>1</sup>
  - Antibiotic resistance is complex
    - involves the development, transfer and transmission of resistance through many different vectors (the environment, animals, plants and humans) in many ways (eg chromosomal or on plasmids) this can affect how resistance spreads
  - The use of antibiotics, lack of policy and enforcement of policy surrounding antibiotic use differs in HICs and LMICs, this is thought to be associated with increased antibiotic resistance:
    - use in animal food (for growth promotion)
    - by humans (in excess for some, insufficient use for others)
    - problems with substandard medicines

<sup>1</sup>Wellcome Global response AMR report, 2020









### Background: AMR is a global concern – Political will

- 2014 UK government commissioned the O'Neill Review, with the aims to define the economic impact of AMR, raise the profile of AMR and establish global support
- 2015 Adopted by World Health Assembly Global Action Plan (GAP) for AMR (FAO NEWS OIE, WHO endorsed
- 2015 the WHO launched the Global Antimicrobial Resistance and Use Surveillance
  System (GLASS) at the World Health Assembly
- 2016 AMR resolution at the UN General Assembly Interagency Coordination Group (IACG) on AMR) reaffirmed GAP as blueprint for tackling AMR at global, regional and national level = a call for countries to develop and implement collaborative, multi-sectoral national action plans (NAPs) in line with GAP to address AMR in country
- 2016 Review on AMR chaired by Jim O'Neill with recommendations
- 2016 the review led to the establishment of the Fleming Fund
- 2017 the IACG was convened, published "No time to wait" in 2019
- 2020 One Health Global Leaders Group is launched
- G7/G20 Meetings with AMR on the agenda (2021 our work was discussed)





# Sustainable Development Goal – AMR indicator

Goal 3: Ensure healthy lives and promote well-being for all at all ages



- Target 3.d: Strengthen the capacity of all countries, in particular developing countries, for an early warning, risk reduction and management of national and global health risks
- 3.d.2 = new indicator:

Percentage of bloodstream infections due to selected AMR organisms:

- MRSA
- E. coli resistant to 3GC









### The GRAM project

- A partnership between the University of Oxford Big Data Institute and Global Health and Tropical Medicine and the Institute of Health Metrics and Evaluation to:
  - Prepare a comprehensive and up to date global data synthesis of AMR of selected bacterial pathogens
  - Perform geospatial mapping of the distribution of resistance of selected bacteria and antibacterial drug combinations
  - Incorporate the mortality and morbidity caused by these drug resistant bacterial pathogens into the GBD study estimates (https://vizhub.healthdata.org/gbd-compare/)



#### 1. Lower respiratory infections, both sexes, all ages deaths per 100,000 in 2019



#### 2. Nepal, both sexes, all ages, all causes of deaths 2019

## Data hungry analytical approach: Estimating the burden of AMR



# The Challenge



al alla



## The solution - collaborations



# Data availability for modelling the prevalence of resistance



*E coli* – 3<sup>rd</sup> generation cephalosporins



### Methicillin resistant S. aureus (MRSA)



MRSA



### 3<sup>rd</sup> generation cephalosporin resistant *E. coli*



### 3<sup>rd</sup> generation cephalosporin resistant *E. coli*





# What are the priority action areas?

- We need to translate data/evidence into action
- there needs to be a continuous quality improvement through ...
  - advocacy and awareness for the delivery of health services
  - Improved diagnostic capacity
  - Improved capacity for data management, analysis and interpretation
  - collaboration















## Thank you ...

#### Collaborators

We would like to thank the following collaborators for sharing data and expertise. Their support and dedication is essential to our work to estimate the global burden of antimicrobial resistance.

#### Global

- Global Tuberculosis Programme (GTB) of the World Health Organization (WHO), Geneva, Switzerland.
- Prof Mike Sharland, and Dr Yingten Hsia, GARPEC (Global Antimicrobial Resistance, Prescribing, and Efficacy Among Neonates and Children) project, St George's Hospital, University of London (SGUL), and the Penta Foundation, Padua, Italy.
- The Childhood Acute Illness & Nutrition (CHAIN) Network investigators (primary contacts: Prof Jay Berkley and Prof Judd Walson).

#### Africa

- Prof Nick Feasey, Malawi-Liverpool-Wellcome Trust Clinical Research Programme (MLW), Blantyre, Malawi, and the Liverpool School of Tropical Medicine (LSTM), Liverpool, United Kingdom.
- Dr Daniel Elbach, and Dr Raif Krumkamp, Bernhard Nocht Institute for Tropical Medicine (BNITM), Hamburg, Germany, and Dr John Amuasi, Kumasi Collaborative Centre for Research in Tropical Medicine (KCCR), Kumasi, Ghana.
- Dr Seymour Waner, Lancet Laboratories, Johannesburg, South Africa.
- Dr François-Xavier Babin, Dr Mathieu Raad, Dr Laurent Raskine, Dr Nicolas Steenkeste, Mérieux Foundation, Lyon, France, and Antananarivo, Madagascar.
- Dr Florian Marks, Typhoid Fever Surveillance in Africa Program, International Vaccine Institute (IVI), Seoul, Republic of Korea, and University of Cambridge, UK.
- Dr Lillian Musila, Department of Emerging Infectious Diseases, Kenya Medical Research Institute (KEMRI), United States Army Medical Research Directorate-Africa, Kenya (USAMRD-A, K), Nairobi, Kenya.
- Dr Godfrey Bigogo, Centre for Global Health Research (CGHR), Kenya Medical Research Institute (KEMRI), Kisumu, Kenya, and Dr Jennifer Verani, US Centers for Disease Control and Prevention (CDC), Nairobi, Kenya.
- Dr Karen Forrest, Dr Davis Nwakanma, Prof Anna Roca, and Saffiatou Darboe, MRC Unit The Gambia at London School of Hygiene and Tropical Medicine (LSHTM)

#### Asia

- Prof Paul Turner and Dr Ngoun Chanpheaktra, Cambodia Oxford Medical Research Unit (COMRU) and the Angkor Hospital for Children, respectively, Siem Reap, Cambodia
- The Lao-Oxford-Mahosot Hospital Wellcome Trust Research Unit (LOMWRU), Vientiane, Laos.
- Prof Guy Thwaites and Dr Thuy Duong Bich, Oxford University Clinical Research Unit (OUCRU), Ho Chi Minh City, Vietnam.
- Dr Rachel Greer and Prof Yoel Lubell, Mahidol-Oxford Tropical Medicine Research Unit (MORU), Chiang Rai, Thailand.
- Dr Anand Manoharan, The CHILDS Trust Medical Research Foundation (CTMRF), Chennai, India.
- Prof Heiman Wertheim, the ABACUS study, Oxford University Clinical Research Unit (OUCRU), Hanoi, Vietnam
- Dr Fazle Rabbi Chowdhury, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka, Bangladesh.
- Dr Tri Wangrangsimakul, Dr Rachel Greer, Dr Carlo Perrone, Areerat Thaiprakhong, Nidanuch Tasak, Prapass Wannapinij, Chiang Rai Clinical Research Unit part of the MORU Tropical Health Network, Chiang Rai, Thailand.

#### Europe

- Data from the European Surveillance System (TESS)) provided by Austria, Beigluim, Bulgaria, Crostia, Republic of Oynus, Csceh Republic, Demmark, Estonia, Friand, France, Germany, Gresce, Hungary, Ireland, Italy, Lativa, Lithuania, Luxenbourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, and United Kingdom, and released by the European Centre for Disease Prevention and Control (ECDC), Including the European Antimicrobial Resistance Surveillance Network (RARS-Net), the European Food-and Water-borne Diseases and Zoonces Network (FWD-Net), the European Surveillance Orasimption Network (ESAC-Net), and European California Surveillance Network (ESAC-Net), and European Food-and Water-borne Diseases and Zoonces Network (FWD-Net), the European Surveillance Consumption Network (ESAC-Net), and Participating Diseotrations, Solna, Sweden, and Strein Surveillance Network (FWD-Net), the European Surveillance Markedin, Strein Surveillance Network (FWD-Net), the European Surveillance Network (FWD-Net), the Surveillance Network
- Prof Sarah Walker, Prof Tim Peto, Infections in Oxfordshire Research Database (IORD), NIHR Oxford Biomedical Research Centre, Oxford, United Kingdom.

https://www.bdi.ox.ac.uk/oxfordgbdgroup/Collaborators

#### Blog

#### By month v Search by keywords All categories v Se

GRAM voices ...our collaborators share their experiences with us



#### The KICK-AMR Pacific Partnership

🗂 1 June 2021

Dr Ravi Naidu, Head of Infection Prevention and Control, Colonial War Memorial Hospital, Suva, Fiji, and Dr Michael Loftus, Monash University, Melibourne, Australia, discuss the KICK-AMR Pacific Partnership, which aims to improve the understanding of AMR prevalence and drivers in Fiji and the Pacific region.



#### Mahidol Oxford Tropical Medicine Research Unit (MORU) and Chiang Rai Clinical Research Unit in Chiangrai, Northern Thailand

10 May 2021

Carlo Perrone is a research physician based at the Mahidol Oxford Tropical Medicine Research Unit and is the head of the Chiang Rai Clinical Research Unit in Chiangrai, Thailand



#### Medical University Varna, Bulgaria

1 April 2021

The Medical University at Varna was founded as a Higher Medical Institute in 1960. The school was founded in response to public demand for highly qualified medical personnel and specialised medical care for the population in this region of the country. Higher Medical Institute, Varna, was renamed Medical University, Varna, in 1995. Professor Temenuga Stoeva is Head of the Microbiology Department here and at University Hospital, 'Saint Marina' and discussed her work with the GRAM team.



#### KEMRI Nairobi, Kenya, with the Walter Reed Project (USAMRD-A)

The Kenya Medical Research Institute (KEMRI) is a state corporation responsible for carrying out health research in Kenya, KEMRI has grown from its humble beginning over 40 years ago to become a regional leader in human health research. The Institute currently ranks as one of the leading Centres of excellence in health research both in Africa as well as globally. Dr Lillian Musila is a Kenyan Scientist working at KEMRI in Nairobi. She is a principle Research Scientist and the Principle Investigator for an Antimicrobial Resistance Surveillance Project under the Department of Emerging

https://www.bdi.ox.ac.uk/oxfordgbdgroup/blog

### ... and the GRAM team

### GRAM project team





Annie Browne

Geospatial Research Assistant and Doctoral

Researcher



Dr Michael Chipeta Geospatial Epidemiology Researcher

Prof Nick Day Professor of Tropical Medicine and Global Health

Prof Christiane Dolecek

Scientific Lead



Data Analyst









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Freddie Fell Clinical Microbiologist & Infectious Diseases Physician Data Analyst

Dr Sean Hackett Data Analyst



Georgina Haines-Woodhouse Data Analyst





Senior Communications and Public Engagement Officer



Dr Gisela Robles Aguilar



Prof Benn Sartorius Senior Geospatial Infectious Disease Modeler and Global Health Epidemiologist ...









Bahar Kashef Hamadani

Prof Mohsen Naghavi Director, Subnational Burden of Disease



Estimation



Prof Andy Stergachis Professor of Pharmacy and Global Health and Senior Investigator

