



Public Health
England

Combatting Antimicrobial Resistance in the Caribbean

**A report on the workshop delivered as part of the
Commonwealth laboratory twinning initiative to combat
antimicrobial resistance**

9 to 10 December, 2014

Port of Spain, Trinidad and Tobago

Glossary

AMR	Antimicrobial Resistance
AMS	Antimicrobial Susceptibility
CACM	Caribbean Association of Clinical Microbiologists
CARICOM	Caribbean Community
CARPHA	Caribbean Public Health Agency
CIPARS	Canadian Integrated Programme for Antimicrobial Resistance Surveillance
CMOs	Chief Medical Officers
CMS	CARPHA Member States
CNISP	Canadian Nosocomial Infection Surveillance Program
ESBL	Extended- Spectrum Beta- Lactamase
HAI	Healthcare Associated Infections
IPC	Infection Prevention and Control
MRSA	Methicillin-resistant <i>Staphylococcus aureus</i>
PAHO	Pan American Health Organization
PHAC	Public Health Agency of Canada
PHE	Public Health England
REBACCC	" RE -Resistencia BAC -Bacteriana CC -Centroamérica y el Caribe" (Resistant Bacteria Central America and the Caribbean)
SOP	Standard Operating Procedures
WHO	World Health Organization

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Executive Summary

Overview

Antimicrobial resistance (AMR) has been highlighted by the World Health Organization (WHO) as a public health threat of global concern [1]. Within the Caribbean region, limited data are available to estimate patterns of drug resistance or antibiotic prescribing in our populations. However, anecdotal information from institutions within CARPHA Member States (CMS) indicates a state of affairs that closely mirrors the global situation. In light of the gravity of this threat, the Caribbean Public Health Agency (CARPHA) and Public Health England (PHE) have partnered to support the region to address AMR and jointly hosted a workshop on Combatting Antimicrobial Resistance in the Caribbean on 9th and 10th December 2014 in Port of Spain, Trinidad and Tobago.

The workshop provided a forum for CARPHA, its Member States and international partner organizations to work together to identify issues around AMR and explore the key steps that the region needs to take to tackle AMR. Additionally, the workshop provided an opportunity to determine how the Commonwealth laboratory twinning initiative and other international collaborations may support this.

Topics discussed included: AMR and Healthcare Associated Infections (HAI) surveillance; laboratory network-building; antimicrobial stewardship; the One Health approach to AMR; and strengthening infection prevention and control (IPC). CMS presented on the technical and policy landscapes in their respective countries and outlined major challenges.

Summary of key findings and opportunities for strengthening

Participants were divided into working groups to examine these areas in more detail and their findings were discussed in plenary sessions. The workgroups found significant heterogeneity in the capacities and structures related to combatting AMR in CMS, yet there were common resource challenges including data management, data sharing, and data use.

The following list summarizes the actions identified as critical to strengthening capacity under key themes:

Microbiology and Laboratory

- develop new / collaborate with existing networks of regional laboratories; build upon focal points of already existing professional networks e.g. Caribbean Association of Clinical Microbiologists (CACM)
- define a list of prioritized, critical pathogens for antimicrobial sensitivity testing (AST) locally, nationally and regionally

- standardize testing methods and standard operating procedures (SOPs)
- explore engagement in proficiency testing and/or external quality assurance
- explore the regulation and/or coordination of public and private laboratories

Surveillance and Epidemiology

- develop formal epidemiology and surveillance networks with nominated national focal points
- explore use of a standardized electronic data capture system, across the CMS, to enhance their surveillance capacity, with allocation of resources for regional training on the chosen electronic data capture system
- initiation of data submission and sharing by all CMS on AMR, even prior to resolution of data quality issues, which would provide a baseline and provide opportunities for future improvement.

Infection Prevention and Control & Antibiotic Stewardship

- develop a network of nominated national focal points for a formal IPC/antimicrobial stewardship network
- collect national procurement data and develop a procurement database for antimicrobials, enlist the support of TECHPHARM
- develop regional and national antibiotic guidelines for common community and hospital associated infections
- develop organisational culture, and strengthen leadership on patient safety and IPC
- investigate the use of quality indicators to help improve IPC and appropriate antibiotic use
- use webinars or e-learning opportunities for healthcare professional education and training
- review IPC/antimicrobial stewardship curricula for physicians, pharmacists, nurses and veterinarians.

It was noted that there was a need for regional leadership in confronting AMR and there was consensus that CARPHA would have a key role in this regard. It was also noted that the following were integral to the success of the battle against AMR in the region coordinated efforts among CMS; regional and national priority setting; formal laboratory, surveillance and IPC networks; standardisation of guidelines; quality monitoring; streamlined data-capture and greater data-sharing.

Summary of the road map of initial key actions

Following the workshop, and building on its key findings and the opportunities identified for strengthening, a road map of initial key actions has been developed. It was agreed that a more detailed situation analysis on AMR laboratory capacity and existing AMR

data at national level was needed. Data from this analysis would inform the development of a regional AMR strategy.

The following areas were identified for priority action, to be taken within the next 12 months, in plotting the course to confront AMR in the region.

1 - Assist CMS to develop and coordinate national action on AMR

- Increase awareness, leadership and engagement at national levels
- Develop a regional strategy and actions to improve regional and national coordination and action

2 - Develop and improve active surveillance of AMR and antibiotic use

- Develop and strengthen national and regional surveillance systems for AMR and antibiotic use
- Develop and strengthen national and regional laboratory capacity to support monitoring of AMR
- Develop and strengthen mechanisms to record antibiotic consumption in CMS

3 - To develop and strengthen infection prevention and control practices in health care facilities

- Develop and strengthen leadership on infection prevention and control
- Develop and strengthen national surveillance mechanisms for healthcare associated infections

Delivery of this road map will require resources, strengthened capacity and political will.

Foreword

Antimicrobial resistance (AMR) poses a major threat to everyone's health and the health care systems that we rely on. As microbes have evolved, current antimicrobials have become progressively less effective at preventing and treating infections and disease. Without action to combat AMR, everyday infections will become more dangerous, and already dangerous infectious diseases will become more common, impacting on the health and wellbeing of individuals and populations, and posing major risks for the world economy.

In an increasingly interconnected world, AMR is recognized as a threat to global health security, and one for which international cooperation and determined local action are essential. This workshop brought together technical and policy representatives from Caribbean Public Health Agency (CARPHA) Member States, along with key international partners. Over two days, the participants explored the challenges faced by the Caribbean as a result of AMR, and identified opportunities for strengthening laboratory and surveillance capability and capacity, and improving infection prevention and control and antibiotic stewardship.

CARPHA will lead and coordinate action to combat AMR across CMS. To do this, CARPHA will draw on the support of its Member States and international partners. Public Health England has twinned with CARPHA as part of the Commonwealth laboratory twinning initiative to combat AMR, and will support CARPHA as part of an international network of organisations committed to helping the Caribbean to combat the threat of AMR, and to strengthening global health security.

Our thanks go to all the workshop participants and contributors. This report sets out the key outcomes and recommendations, together with an initial road map of next steps. We look forward to working together with our partners in the Caribbean and internationally to strengthen the Caribbean's capability and capacity to combat AMR.



Dr. C James Hospedales
Executive Director, CARPHA



Professor Anthony Kessel
Director of International Public Health, PHE

Introduction

Antimicrobial resistance (AMR) has been recently highlighted by the World Health Organization (WHO) [1,2], and the Chief Medical Officer for England [3] as an issue of global concern. The growing challenge of AMR threatens health gains globally, and there is a growing consensus that closer collaboration and a more coordinated response across countries is necessary to combat the problem.

The Caribbean Public Health Agency (CARPHA) and Public Health England (PHE) partnered to deliver a two-day workshop titled 'Combatting Antimicrobial Resistance in the Caribbean' for CARPHA Member States (CMS) on the 9th and 10th December, 2014 in Port of Spain, Trinidad & Tobago. This workshop was delivered as part of the PHE-led Commonwealth laboratory twinning initiative to combat AMR, and was joined and supported by a range of international partners. The agenda and list of workshop participants are provided in Appendix A and Appendix B respectively.

The purpose of this report is to summarize the proceedings of the workshop and the opportunities identified by the participants for addressing the growing issue of AMR in the Caribbean. A key output of the workshop was a road map which would guide CARPHA and the CMS in their response to the issues and opportunities identified at the workshop.

Box 1: Antimicrobial resistance and why it is important

Microbes such as bacteria, viruses and fungi are highly resilient microorganisms that have the natural ability to adapt and evolve to help ensure their survival. When exposed to antimicrobials, especially at low doses, microbes can evolve resistance, making those antimicrobials less effective. Resistant microbes can both continue to cause illness in the individual, and can be passed on to other people. They threaten health gains, and result in excess socioeconomic and health care costs. Antibiotic resistance represents the largest contributor and driving factor to both local and global antimicrobial resistance; this is further complicated by the lack of development of new antibiotics.

The usage of antimicrobials in food animals creates an important source of antimicrobial-resistant bacteria that can spread to humans via the food chain. The safety of our food is being increasingly scrutinized and questioned by the public. Improved management on the use of antimicrobials in food animals especially those that are important for human medicine is a critical step towards preserving the benefits of antimicrobials for people. The *One Health* approach to food safety recognizes the relationship between human, animal and environmental/agricultural health policy and practice when tackling antimicrobial resistance. [4]

Combating Antimicrobial Resistance in the Caribbean

Background

The emergence and spread of antimicrobial drug resistance in the CMS is not surprising as it mirrors a global trend toward the development of drug-resistant organisms. Globalization, with its growth in travel, commercial exchange, and tourism, constitutes a fluid and ideal framework for the transmission of resistant strains from one region to another. Other factors such as the inappropriate use of available antibiotics, environmental changes, rapid population growth, self-medication and over-the-counter sale of antibiotics have also played a critical role [5].

In the Caribbean, infections due to resistant pathogens have been reported by hospitals and in community settings. There have been reports of penicillin-resistant pneumococci [6], chloramphenicol-resistant *Haemophilus influenzae* [7] and multi-drug resistant *Mycobacterium tuberculosis* [8]. Extended-spectrum beta-lactamase producing Enterobacteriaceae have been observed in tertiary care facilities in Jamaica [9] and Trinidad and Tobago [10], and carbapenemase-producing bacteria, which can pose serious challenges for national health services, have already been identified in Barbados [11].

The CARPHA laboratory has the capacity to perform antimicrobial testing for CMS for a range of pathogens including bacteria which cause pneumonia, Enterococcus and Staphylococcus species, members of the Enterobacteriaceae family and others.

An unpublished survey on capacities and practices with respect to AMR monitoring in human health was carried out by CARPHA to CMS from June 24 to 26, 2014; 9/24 CMS responded (38% response rate). Of these, eight CMS indicated that they conducted routine drug antimicrobial susceptibility testing in country, with Methicillin-resistant *Staphylococcus aureus* (MRSA), and ESBL-producing enterobacteria being the most common types of resistant organisms observed. Five CMS reported having committees for rational drug use at hospital level and one at national level. Five CMS reported utilizing CARPHA's TB testing services. One CMS reported having in-country HIV drug resistance testing capacity whilst none of the responding CMS reported influenza drug resistance testing activity.

While the generalisability of this survey is limited due to the low response rate, CARPHA believes that the results are likely reflective of the overall situation across the region, suggesting significant gaps in the areas of laboratory testing capacity, surveillance, and data availability and sharing across the Caribbean.

The PHE-led Commonwealth laboratory twinning initiative provides CARPHA with an opportunity to improve laboratory capacity, build epidemiological partnerships and strengthen disease surveillance among its CMS.

Purpose of the workshop

The workshop provided a forum for CARPHA, its Member States and international partner organizations (Box 2) to work together to identify issues around AMR and explore the key steps that the region needs to take to tackle AMR. Additionally the workshop provided an opportunity to determine how the PHE-led Commonwealth laboratory twinning initiative and other international collaborations may support this. The full workshop programme can be found in Appendix A.

The objectives of the workshop were:

- To raise awareness of AMR and strengthen liaisons and coordination with key stakeholders in the Caribbean;
- To determine opportunities to build and strengthen networks;
- To build a shared understanding of the AMR situation in the Caribbean and the opportunities for mitigating and overcoming the broad based threats and challenges of AMR;
- To identify the initial steps required to strengthen key areas:
 - public health microbiology laboratories,
 - laboratory based data quality,
 - surveillance capacity and epidemiological expertise,
 - prevention and control of health care associated infections, and
 - antimicrobial stewardship;
- To develop a practical road map for implementation and coordination of activities to combat AMR in the Caribbean.

Box 2: Participating organizations

CARPHA is the single regional public health agency for the Caribbean. It was legally established in July 2011 by an Inter-Governmental Agreement signed by Caribbean Community Member States and began operation in January 2013 [12]. The Agency rationalizes public health arrangements in the Region by combining the functions of five Caribbean Regional Health Institutes into a single agency. CARPHA provides strategic direction, in analysing, defining and responding to public health priorities of the Caribbean Community [12]. This aspect of CARPHA's work has been identified as a priority function for the achievement of the Caribbean Cooperation in Health III (CCH III) goals [13]. This includes, but is not limited to, the surveillance and management of non-communicable diseases that have reached epidemic proportions and the surveillance and management of communicable diseases, re-emerging diseases and new communicable diseases that are now endemic in the region. CARPHA is committed to engaging in ongoing skills-building, collaboration and professional supervision that enhance national capacities to deliver public health goods and services.

PHE's mission is to protect and improve the health and wellbeing of its population, and

reduce health inequalities. It does this through world-class science, knowledge and intelligence, advocacy, partnerships and the delivery of specialist public health services. PHE provides a local-to-national service in close collaboration with directors of public health in England's local authorities. At the international level, PHE's [Global Health Strategy: 2014 to 2019](#) [14] sets out PHE's global health priorities in the areas of improving global health security and meeting International Health Regulations requirements; responding to outbreaks and incidents of international concern and supporting the public health response to humanitarian disasters; building public health capacity, particularly in low and middle income countries; developing its engagement on international aspects of health and wellbeing, and non-communicable diseases; strengthening its UK partnerships for global health activity. PHE is an operationally autonomous executive agency of the Department of Health, England.

The Commonwealth laboratory twinning initiative to combat AMR, is led by PHE, linking in with the Commonwealth Secretariat [15]. Through the initiative, high income Commonwealth countries can twin with low and middle income Commonwealth countries. Twinning may be extended from laboratory capacity building to epidemiological partnering, strengthening disease surveillance and sharing wider expertise. This will support Commonwealth countries' responses to AMR for their own populations and contribute to wider regional and international efforts. Whilst CMS includes 12 Commonwealth Member States and 6 UK Overseas Territories, this workshop and the resulting road map aim to support capability and capacity strengthening for all 24 of CMS.

The role of the Public Health Agency of Canada (PHAC) is to: promote health and to prevent and control chronic diseases, injuries and infectious diseases; to prepare for and respond to public health emergencies; strengthen intergovernmental collaboration on public health and facilitate national approaches to health policy and planning; and, to serve as a central point for sharing Canada's expertise with the rest of the world. [16] PHAC has partnered with CARPHA and PHE to provide technical expertise and assistance in support of the twinning initiative.

Workshop Participation

Two representatives were invited from each of the 24 CMS. There was representation from 19 of the 24 CMS (see Appendix B for a list of those who attended). CMS were invited to send a senior technical advisor and a senior health policy official. Representatives of CARPHA, CMS, PHE, PHAC and Pan American Health Organization/World Health Organization (PAHO/WHO) and others gave presentations or led on specific sessions.

The workshop provided a forum within which country experiences were shared and best practices identified. CMS representatives worked together to begin to determine the steps required to combat AMR in the Caribbean, and the regional and wider

international support that may be required to do this, through the development of a draft road map. The workshop was designed to be as interactive and participative as possible with delegates providing significant personal contributions in round-table and plenary discussions towards the achievement of the workshop's objectives and the outcomes outlined below.

Workshop Presentations

Each of the two days began with a series of presentations from both the local and international partners. The overall theme of day one was microbiology and surveillance. The overall theme of day two was the *One Health* approach, infection prevention and control, and antimicrobial stewardship.

Day one

This began with a welcome from Dr. C. James Hospedales, the Executive Director of CARPHA, who summarised the importance of the AMR agenda to the Caribbean region and the importance of international collaborations. Surveillance was highlighted as a key aspect of addressing AMR in the CARPHA region.

This was followed by a recorded video address by Professor Anthony Kessel, Director of International Health at PHE, who welcomed the opportunity for collaboration between PHE and CARPHA in the context of the Commonwealth laboratory twinning initiative to combat AMR.

Dr. Bernadette Theodore-Gandi, from PAHO/WHO highlighted the conclusion from the WHO Surveillance Report that AMR is no longer a prediction for the future; rather it is happening right now. AMR as a global health security concern, affecting health, trade and economy was further reinforced with the need for a *One Health* approach in addressing AMR, spanning the human, animal, food, water and environment sectors.

The Honourable Dr. Fuad Khan, Minister of Health for Trinidad and Tobago, noted cultural influences on antibiotic use and the role of physicians as gatekeepers of antibiotics. The Minister laid out some of the planned actions for Trinidad and Tobago such as stricter regulations for the purchase of antibiotics, policy and legislation for microbiology laboratories, and a national hygiene and hand-washing campaign.

Dr. Babatunde Olowokure, Director of the Surveillance, Disease Prevention and Control Division at CARPHA, presented the workshop objectives, desired outcomes and participatory nature of the workshop. The various avenues for sharing ideas and experiences were explained and participants were encouraged to interact freely to maximize the opportunity presented by the workshop.

Dr. Cristina Gutierrez, Head of Laboratory Services and Networks, and Laboratory Director at CARPHA, noted the influence of the 25 million tourists to the region's population of 18 million. Data from the National Public Health Laboratories Situation

Analysis conducted earlier in 2014 showed that fewer than 12 laboratories in the region have the capacity to perform cultures and less than half of these have the capacity for antimicrobial susceptibility testing. These capacity issues, in part, account for the regional gaps in data provided for the WHO Global Report on Antimicrobial Resistance [2].

Professor Neil Woodford, Head of PHE's AMR and HCAI reference unit, discussed the role of an AMR reference laboratory, highlighting five of its key functions:

- Susceptibility testing for confirmation of exceptional resistances
- Inferring resistance mechanisms from antibiograms
- Investigation of priority resistance mechanisms
- Strain typing to aid outbreak investigation
- Providing treatment advice; infection prevention & control advice

Emphasis was on the importance of deciding on the critical drug/microbe combinations that should to be monitored in a given region.

Dr. Susan Hopkins, Consultant Infectious Diseases & Epidemiology, shared England's experience in addressing AMR focused surveillance, and emphasized the importance of building microbiology testing capacity while simultaneously thinking about surveillance.

Dr. Michael Mulvey, Chief of AMR and Nosocomial Infections at PHAC, described Canada's two federal flagship programmes: (1) the Canadian Nosocomial Infection Surveillance Program (CNISP); and (2) the Canadian Integrated Programme for Antimicrobial Resistance Surveillance (CIPARS), which takes a *One Health* approach from “farm-to-fork”.

These international presentations were followed by snapshots of the local situation in dealing with AMR in Turks and Caicos, Suriname and Jamaica. Dr. Alison Nicholson, from the University of the West Indies highlighted the progress made and ongoing work in identifying and prioritizing AMR issues by two important networks of regional Microbiologists: the Caribbean Association of Clinical Microbiologists (CACM) and Resistant Bacteria Central America and the Caribbean (REBACCC).

Day two

Started with Dr. Anna Cichowska, Consultant Public Health Strategy at PHE, giving a re-cap of day one.

This was followed by Dr. Lisa Indar, Programme Coordinator of the Tourism and Health Programme at CARPHA, who presented AMR monitoring in integrated foodborne disease surveillance in the Caribbean and stressed the importance of a regional strategy for foodborne disease surveillance and food safety in a farm-to-fork approach.

Dr. Sandra Vokaty, PAHO/WHO Sub-Regional Advisor for Veterinary Public Health highlighted the *One Health* approach to AMR and the importance of human, agricultural and environmental health through prevention and promotion.

Dr. Francis Dziva, Senior Lecturer Faculty of Medical Sciences, the University of the West Indies St. Augustine Campus, presented some of the key findings from his research and emphasized that there should be controlled and responsible use of antibiotics in animals and that decisions on its use should be made with consideration of their potential impact on human health.

Dr. Susan Hopkins, PHE, gave an overview of roles, competencies and quality indicators and highlighted that an organizational and system-wide approach is essential for IPC and that there should be clinical champions and a system wide approach for sustainability.

Ms. Jacqueline Arthur, Manager Strategic Issues, Centre of Communicable Diseases and Infection Control, presented an overview of Canada's Federal Actions to address AMR and Antimicrobial Susceptibility (AMS). She explained that their strategy included a public awareness component and active engagement with the executive management.

Dr. Alejandro Corso from Argentina shared Argentina's response to combatting AMR and highlighted that the main objectives of their programme included early detection of new resistance mechanisms of AMR and control of its spread, collaboration in the implementation of strategies for the proper use of antimicrobials and the strengthening of capacity and quality in laboratories.

These presentations were followed by country presentations dealing with AMR in Antigua and Barbuda, Anguilla, Aruba, Belize and St. Kitts and Nevis.

The Workgroups

Over the course of the two-day workshop, the participants broke into three working groups: (i) microbiology and laboratory; (ii) surveillance and epidemiology; (iii) infection prevention and control and antimicrobial stewardship. Discussions were facilitated by CARPHA staff and an international partner member. An account of the questions and further details of the discussion can be found in Appendices C-F. Each working group discussed focus questions nested within four broad categories of:

1. Where are we now?
2. Where do we want to get to?
3. What are the major local threats to success?
4. How do we get there?

Key Findings

There was considerable variation in AMR-related activity across the region commensurate with the differences in availability of technological, financial and human resources between CMS. Limitations of both financial and human resources were cited several times as the root cause of many current issues and as obstacles or threats to success. Another recurring theme which arose was that leadership at a senior level would be required for implementation of any meaningful change. The question and answer session raised the need for AMR champions in CMS.

The main points generated are summarised below under the broad headings of laboratory capacity, IPC, antibiotic stewardship and information-sharing.

Laboratory capacity and networking

- Microbiology laboratory capability and capacity differ greatly between CMS.
- MRSA screening is frequently the only AMR-related surveillance in many CMS and is primarily for litigation purposes rather than public health surveillance.
- Capacity building is limited by the lack of regional standards or quality controls for microbiology laboratories, and the absence of a set of defined priority pathogens for susceptibility testing.
- There is a need for compilation of a regional list of priority pathogens to focus surveillance priorities; the list of priority pathogens for reporting should align with those selected for antibiotic susceptibility testing.
- Development of regional standard operating procedures (SOPs); increased availability of training; emphasis on quality assurance and accreditation services should help to bolster capacity. Future work will discuss priorities on how to best achieve this.
- There is need for formal networks of laboratory and microbiology professionals:
 - These networks could build upon existing ones, such as the CACM.
 - If a current network does not exist, one could be created by having nominated members from each of the CMS assigned to a centrally coordinated AMR group or committee.
 - Regional networks could have functional working groups that could provide leadership or action such as the development of regional guidelines.
 - Coordinated networks would foster collaboration, and help to prevent the duplication of work across the region.

Infection Prevention and Control

- Guidelines for infection prevention and control exist across the region. However, there is a lack of standardisation.
- The guidelines are more commonly at a hospital level rather than country level.
- Recent Ebola response planning, has elevated the profile and, to some extent, bolstered the capacity of infection prevention and control departments across the region.
 - This increased profile could inspire leadership and advocacy from senior levels for infection prevention and control and promote the uptake and local adaptation of a regional infection prevention and control guideline or framework.

Antibiotic Stewardship

- Antibiotic stewardship has not seen the same success as IPC.
- Problems arise with antibiotic prescribing practices between and within the public, private sectors in hospital, clinics and pharmacies.
- Across the region, antibiotic stewardship is further complicated by the availability of antibiotics of varying quality and the cultural practice of the over-the-counter purchase of antibiotics in pharmacies without prescriptions.
- Training and education are the primary solutions to improving antibiotic stewardship across the region.
- However, this may be difficult as it is resource intensive and entails both improving prescribing practice and launching a public education campaign to work towards changing some cultural practices, including encouraging the public to visit their physicians instead of purchasing, or using, antibiotics without a prescription.
- Legislation was considered as another solution, but this would require enforcement to make it effective, and this may prove difficult.

Information sharing

- Several CMS are still using manual, paper-based data entry and record systems which creates challenges for analysis, interpretation and reporting of data.
- There is need for clear identification of the actions and resources required to transition from manual data collection to electronic data capture.

- The transition will facilitate reporting at all levels, and can help to provide a platform on which further changes can be based.
- Data sharing is integral to the success of the region in tackling AMR.
- Whether data is stored manually or digitally, the sharing of information is limited at present.
- Most CMS are collecting data, however the data often sits with the laboratory or hospital and is not used or disseminated.
- Fundamental communication and data sharing links between microbiology laboratories and surveillance bodies was limited in most CMS, often restricted to HIV and TB surveillance.
- Issues with data sharing are further compounded by the challenges of mixed public and private healthcare systems or, as with some CMS, solely private healthcare systems.
- A standardized reporting framework would be welcomed and could encourage further participation via policy and regulation.
- Currently there are limitations in the amount of feedback, communication and reporting among stakeholders.
- The culture of “information hoarding” needs to be shifted to a culture of data sharing or open data.
- Reliable data needs to be made available to inform public health decisions within the region, particularly where changes to policy, guidelines and regulations are concerned.
- Initial data can provide baseline indications of what individual CMS can do to improve data quality and validity.

Identified Opportunities for Strengthening

The workshop discussions generated a list of potential opportunities for CARPHA and CMS to strengthen arrangements to combat AMR in the Caribbean.

From the discussion it was clear that whilst CARPHA can provide overall leadership and may be able to deliver some improvement directly, CARPHA cannot and should not be expected to deliver all that is needed without sustained support and contribution from CMS and international partners.

A balance should therefore be struck between CARPHA's coordination and leadership role in AMR at a regional level, the identification, by CMS, of specific areas or items on which they can take leadership and the recognition of those domains in which international partners can best provide support.

The activities identified as key areas for strengthening AMR detection and response capacity are listed below under their respective workshop thematic areas.

Microbiology and Laboratory

- develop a network of regional laboratories, or collaborating and coordinating with other laboratory networks which have resources available;
- build upon focal points of an already existing laboratory network e.g. CACM
- define a list of prioritized, critical pathogens for antimicrobial sensitivity testing (AST) locally, nationally and regionally
 - Potential first tier: *M. tuberculosis*, *N. gonorrhoeae*, methicillin-resistant *S. aureus* (MRSA), *S. pneumoniae*, *K. pneumoniae*, *H. influenzae*
- potential second tier: *E. coli*, *Salmonella* spp.
- standardize testing methods and standard operating procedures (SOPs)
- explore engagement in proficiency testing and/or external quality assurance
- explore the regulation and/or coordination of public and private laboratories

Surveillance and Epidemiology

- develop a network of nominated national contacts for a formal epidemiology and surveillance network. Outputs of this network can be presented to decision makers including the Caribbean Community (CARICOM), Ministers of Health and Chief Medical Officers (CMOs);
- explore the standardised use of an electronic data capture system across the CMS to enhance their surveillance capacity (e.g. WHONET which can be downloaded for free at <http://www.who.int/drugresistance/whonetsoftware/en/>);
- move towards electronic data capture at both a national level and, where possible, at a local laboratory level, with regional training resources for the chosen electronic data capture system

- all CMS could submit and share data on the pathogens list regardless of data quality, this would provide a baseline and provide opportunities for future improvement.

Infection Prevention and Control & Antibiotic Stewardship

- develop a network of nominated national contacts for a formal IPC/antimicrobial stewardship network
- collect national procurement data and develop a procurement database for antimicrobials, enlist the support of TECHPHARM
- develop regional and national antibiotic guidelines for common community and hospital associated infections
- develop organisational culture, and strengthen leadership on patient safety and IPC
- investigate the use of quality indicators to help improve IPC and appropriate antibiotic use
- use webinars or e-learning opportunities for healthcare professional education and training
- review IPC/antimicrobial stewardship curricula for physicians, pharmacists, nurses and veterinarians.

Conclusions

AMR is a global public health security issue and requires individual, community, national, regional and global action.

The two-day workshop, 'Combatting Antimicrobial Resistance in the Caribbean' led by CARPHA in partnership with Public Health England, brought together CARPHA Member CMS and regional partners to raise awareness of AMR, and share national, regional and international experiences in addressing AMR. This interactive two-day event provided for lively discussion and learning with regard to key aspects of antimicrobial resistance which were the focus of the workshop: microbiology practices, surveillance, infection prevention and antibiotic stewardship.

There were several themes which consistently emerged in all the discussion topics, and it was clear that the CMS were looking towards CARPHA for regional leadership and coordination. However, the theme of limited resources, both financial and human was noted to affect everyone institutionally, nationally and regionally.

The workshop highlighted the lack of national and regional surveillance for AMR, and called for CARPHA to lead and coordinate efforts to address AMR in the region, drawing on existing networks, and international partnerships.

In leading a response across CMS, CARPHA would need, first, to assess and prioritize the areas for action identified by the workshop – setting out those that they can deliver directly, and those which will benefit from contributions and support from within its CMS and from international partners.

The initial steps of a regional road map on AMR were explored. A key proposal included a more in-depth situation analysis of the AMR laboratory capacity combined with an epidemiological analysis of the available resistance data at laboratory level in the CMS. Such an analysis would provide valuable information towards the development of a regional laboratory-based AMR surveillance system and other actions for the regional AMR response. As part of the solution to the challenges identified, CARPHA will seek to strengthen the engagement of an international network of organisations. PHE and CARPHA will seek to develop and strengthen their partnership under the Commonwealth laboratory twinning initiative to combat AMR in a way that actively complements the contributions of other international partners.

The workshop was an important step towards creating a common understanding of the AMR situation in the Caribbean region, examining the role of CARPHA and individual CMS, and highlighting areas that require improvement to address AMR in the Caribbean region. The presentations shared at this workshop were disseminated to participants. Delegates were encouraged to engage with their local stakeholders;

explore pathogen lists in order to optimize microbiology services; review existing data management practices to improve data quality, collection and reporting; and, investigate pharmacy sales data as one of the inputs for formulation of guidelines for antibiotic use.

It is hoped that the combination of approaches including advocacy from within CMS by delegates and relevant authorities, leadership and coordination from CARPHA,, and technical and financial support by collaborating regional and international public health and development partners, will bring success in the fight against the propagation of AMR in this region.

Road Map: Assessment to inform planning for action

Following the workshop, and building on its key findings and the opportunities identified for strengthening, a Caribbean regional road map has been crafted to outline the critical next steps that are needed to develop a sustainable, coherent, comprehensive and integrated regional response and action plan for combatting AMR.

The areas identified for strengthening clearly indicate that there is much to be accomplished. CARPHA cannot combat AMR in isolation. The support, contribution and commitment of CMS and regional and international organisations will be vital for a successful planned approach to mitigate the impact of AMR.

Action is required at all levels. This action will need to be planned, staged and monitored for effectiveness. Knowledge and understanding of the situation within the region will be required to inform and prioritise where most urgent actions are needed.

The focus therefore of the initial next steps is for information gathering and assessment. It is proposed that the road map will guide a 12- month period of initial activities. These activities will enable CARPHA to set out its long- term vision and action plan for regional AMR containment.

Three key action areas have been identified:

- 1) assist CMS to develop and coordinate national action on AMR;
- 2) develop and improve active surveillance of AMR and antibiotic use, and
- 3) develop and strengthen infection prevention and control practices in health care facilities.

Key action one - To assist CMS to develop and coordinate national action on AMR

a) Increased awareness, leadership and engagement at national levels

b) Develop a regional strategy and actions to improve regional and national coordination and action

Steps

- Plan and conduct a situational analysis to ascertain baseline information and identification of gaps and needs
- Provide relevant regional information to support policy decision makers to lead and advocate for AMR action
- Launch a regional advisory committee to develop a regional AMR strategy
- Work toward the establishment of regional working groups in priority areas to undertake exploratory research to inform actions

- Develop and build collaboration with regional and international organisations to develop partnerships for coordinated action
- Explore and develop information repository and information sharing mechanisms to facilitate easy access to regional and international information on AMR
- Develop and establish a communication strategy for sensitisation of key stakeholders and dissemination of information to both technical and strategic partners on matters pertaining to AMR
- Work to establish sustainable mechanisms for international multisectoral collaboration to combat AMR

Key action two - To develop and improve active surveillance of AMR and antibiotic use

- a) Develop and strengthen national and regional surveillance systems for AMR and antibiotic use
- b) Develop and strengthen national and regional laboratory capacity to support monitoring of AMR
- c) Develop and strengthen mechanisms to record antibiotic consumption in CMS

Steps

- Assessment of standards and methods for microbiological diagnostic and antibiotic susceptibility testing
- Assessment of national AMR patterns and trends to develop and define a list of regional priority pathogens
- Establish a clear framework for laboratory twinning and reach consensus on roles for laboratories and partners involved
- Expand regional laboratory capacity through twinning initiatives
- Assessment of national surveillance systems for AMR and antibiotic use
- Assessment of best practice for data sharing

Key action three - To develop and strengthen infection prevention and control practices in health care facilities

- a) Develop and strengthen leadership on infection prevention and control
- b) Develop and strengthen national surveillance mechanisms for healthcare associated infections

Steps

- Assessment of national infection prevention and control coordination and implementation

- Assessment of availability of national treatment guidelines and compliance
- Assessment of the monitoring of health care associated infections
- Assessment of antimicrobial stewardship programmes and guidelines

Beyond the activities of the initial 12- month period longer term goals should be developed. Actions such as the development of, and transition to, electronic systems; establishment of regional AMR surveillance systems; establishment of twinning activities; incorporation of regionally-relevant AMR training into pre-qualification curricula for health professionals and integration of the human and animal health components of AMR surveillance and response, must be preceded by the foundational steps outlined above. The format taken by the associated activities, will be informed to a greater or lesser extent by the outcomes of the steps listed above.

It should be noted that AMR activities cannot take place in isolation, or without resources and political will. There will need to be consultations and discussion with regard to how Caribbean AMR strategies will link with other CARPHA and global strategies, as well as national planning processes and priorities.

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Appendices

Appendix A: Programme

  <p>CARIBBEAN PUBLIC HEALTH AGENCY (CARPHA) in partnership with Public Health England</p> <p>AGENDA</p> <p>Commonwealth Laboratory Twinning Workshop: Combatting Antimicrobial Resistance in the Caribbean</p> <p>December 9-10, 2014</p> <p>Trinidad Hilton & Conference Centre La Boucan Room Port of Spain, Trinidad & Tobago</p>    <p>UK Science & Innovation Network</p> <p>Public Health Institutes of the World IANPHI</p> <p>Department of Health</p>	<p>Day 1: Tuesday December 9, 2014</p> <p>07:45 – 8:15am Registration</p> <p>WORKSHOP LAUNCH EVENT</p> <p>8:15 – 8:50am SESSION 1:</p> <p>Welcome from the Executive Director of the Caribbean Public Health Agency Dr. C. James Hospedales, CARPHA</p> <p>Welcome and Introduction to the Commonwealth Laboratory Twinning Initiative to combat AMR from Public Health England's Director of International Public Health Professor Anthony Kessel, PHE</p> <p>Welcome from the Pan American Health Organization Dr. Bernadette Theodore-Gandi, PAHO/WHO Representative, Trinidad and Tobago</p> <p>Welcome from the Minister of Health, Trinidad and Tobago The Honourable Dr. Fuad Khan</p> <p>Workshop programme overview Dr. Babatunde Olowokure, Director, Surveillance, Disease Prevention and Control, CARPHA</p> <p>08:50 – 09:00am COFFEE BREAK</p>
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<p>MICROBIOLOGY AND SURVEILLANCE SECTION</p> <p>9:00 – 10:45am SESSION 2:</p> <p>Introduction of participants</p> <p>Regional and International Experience</p> <p><u>Regional experience</u></p> <ul style="list-style-type: none"> - CARPHA: Dr Cristina Gutierrez - Director, Laboratory Services <i>Surveillance of AMR and laboratory networking in the Caribbean</i> <p>Questions and Answers</p> <p><u>International experience</u></p> <ul style="list-style-type: none"> - PHE: Professor Neil Woodford - Head, Antimicrobial Resistance and Healthcare Associated Infections Reference Unit (AMRHAU) <i>The role of an AMR Reference Laboratory</i> - PHE: Dr Susan Hopkins Consultant, Infectious Diseases & Epidemiology <i>Surveillance and its effective use to monitor and prevent infectious diseases</i> - PHAC: Dr Michael Mulvey - Chief, Antimicrobial Resistance and Nosocomial Infections <i>Surveillance of Antimicrobial Use and Resistance in Canada: Current Activities and Future Directions</i> <p>Questions and Answers</p>	<p>10:45 – 11:00 am COFFEE BREAK</p> <p>11:00 – 12:00noon SESSION 3:</p> <p>Technical and policy perspectives within the Caribbean</p> <p>Presentations by Member States</p> <p>Plenary Discussion</p> <p>GROUP PHOTOGRAPH</p> <p>12:30 – 1:30pm LUNCH</p> <p>1:30 – 2:35pm SESSION 4:</p> <p>GROUP WORK: Microbiology / Laboratories</p> <p>2:35 – 3:45pm SESSION 5:</p> <p>GROUP WORK: Surveillance / Epidemiology</p> <p>3:45 – 4:00pm COFFEE BREAK</p> <p>4:00 – 5:00pm SESSION 6:</p> <p>Plenary feedback session</p> <p>06:30 – 08:30pm Cocktail Reception - British Residence</p>
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<p>Day 2: Wednesday December 10, 2014</p> <p>8:15 – 8:30 SESSION 7:</p> <p>Summary and recap of Day 1 (microbiology and surveillance section)</p> <p>INFECTION PREVENTION AND CONTROL (IPC) & ANTIBIOTIC STEWARDSHIP SECTION</p> <p>8:30 – 10:00am SESSION 8:</p> <p>Presentations: Regional and international experiences</p> <p><u>Regional experience</u> CARPHA: Dr Lisa Indar - Programme Coordinator, Tourism and Health <i>Antimicrobial Resistance Monitoring in Integrated Food Borne Disease Surveillance in the Caribbean</i></p> <p>PAHO: Dr. Alexandra Vokaty - Regional Advisor, Veterinary Public Health <i>One Health Approach to Antimicrobial Resistance</i></p> <p>University of the West Indies: Dr. Francis Dziva - Senior Lecturer, Faculty of Medical Sciences <i>Antibiotic Resistance - Linking Human & Animal Health</i></p> <p><u>International experience</u> PHE: Dr Susan Hopkins - Consultant, Infectious Diseases & Epidemiology <i>IPC: Role, Competencies & Quality Indicators</i></p> <p>PHAC: Jacqueline Arthur - Manager, Strategic Issues, Centre for Communicable Diseases and Infection Control <i>Overview of Canada's Federal Actions to Address Antimicrobial Resistance and Antibiotic Stewardship</i></p> <p>Questions and Answers</p>	<p>Day 2: Wednesday December 10, 2014 Cont'd.</p> <p>10:15 – 10:45am COFFEE BREAK</p> <p>10:45 – 12:00noon SESSION 9:</p> <p>Technical and policy perspectives within the Caribbean</p> <p>Presentations by Member States</p> <p>Plenary Discussion</p> <p>12:00 – 12:50pm LUNCH</p> <p>12:50 – 2:15pm SESSION 10:</p> <p>GROUP WORK:</p> <p>Infection prevention and control in the context of AMR and Antibiotic stewardship</p> <p>2:15 – 3:15pm SESSION 11:</p> <p>Plenary feedback session</p> <p>3:15 – 3:45pm COFFEE BREAK</p> <p>WORKSHOP CONCLUSIONS & NEXT STEPS</p> <p>3:45 – 5:00pm SESSION 12:</p> <p>Summary of learning from the workshop</p> <p>Plenary discussion on road map, next steps and report</p> <p>Closing remarks</p>
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Appendix B: Delegate List

COUNTRY	NAMES	DESIGNATION
MEMBER STATES		
Anguilla	Ms. Everette Salome Duncan	Coordinator Laboratory Services
	Ms. Maeza Demis-Adams	Health Planner
Antigua and Barbuda	Mr. Dave Bridgewater	Manager/Chief Pharmacist
	Mr. Alfred Athill	Director, Pharmaceutical Services
Aruba	Ms. Jualine Andrew	Infection Control Nurse
	Jaclyn de Kort	Internist/Infectologist
Barbados	Dr. Karen Springer	Senior Medical Officer of Health
	Dr. Edmund Blades	Laboratory Manager
Belize	Mr. Aldo Sosa	Medical Technologist
Bermuda	Ms. Susan Jatto	Laboratory Supervisor
	Ms. Ashley Smith	Acute Care Hospital Clinical Pharmacist
British Virgin Islands	Dr. Irad Potter	Chief Medical Officer
	Dr. Michelle Vitug	Clinical Pathologist
Dominica	Dr. Ruby Josephine Blanc	Hospital Medical Director (Ag.)
	Ms. Catherina Jemmott	Laboratory Superintendent
Grenada	Ms. Quintilla Lloris Bleasdille	Infection Control Nurse
	Ms. Pearl Williams	Senior Medical Technologist
Jamaica	Dr. Karen Shaw	Microbiologist
	Dr. Alison Nicholson	University of the West Indies, Mona
Montserrat	Dr. Sharra Greenaway-Duberry	Medical Officer
	Ms. Monique Spencer	Medical Technologist
St. Eustatius	Mr. Siegfried Malone	Senior Laboratory Technician
St. Christopher/Nevis	Ms. Sonia Daly-Finley	Director of Institutional Nursing Services
	Mr. Ian Branford	Laboratory Technician
Saint Lucia	Ms. Lydia Atkins	Research Officer
Saint Maarten	Ms. Claudine Beaubrun	Microbiology Analyst
St. Vincent and the Grenadines	Mr. Steve Randolph Millington	Manager, Central Medical Stores
	Mr. Levi Walker	Chief Pharmacist
Suriname	Ms. Kathleen Jharie	Infection Control Nurse
Trinidad and Tobago	Dr. Rajeev Nagassar	Microbiologist, ERHA
Turks and Caicos Islands	Dr. Shandey Malcolm	Deputy Chief Epidemiologist
	Ms. Lessonjulle Dobney	Medical Laboratory Technologist

OBSERVERS/PRESENTERS		
ENTITY	NAME	DESIGNATION
European Union, Trinidad and Tobago Office	Mr. Solomon Ioannou	Development Cooperation Officer
PAHO/WHO, Country Office Trinidad and Tobago	Alexandra Vokaty	Sub-regional Advisor on Veterinary Public Health
	Dr. Eldonna Boisson	Advisor, Disease Surveillance & Epidemiology
	Dr. Bernadette Theodore- Gandi	PAHO/WHO Representative, Trinidad and Tobago
Institut Pasteur de Guadeloupe	Dr. Stephanie Guyomard- Rabenirina	Medical Biologist/Researcher
Argentina	Dr. Alejandra Corso	Head, Antimicrobial Resistance Service, National Reference Laboratory in AMR/Reginald Reference Laboratory in AMR, PAHO/WHO
University of the West Indies (UWI), Trinidad and Tobago	Dr. Francis Dziva	Senior Lecturer, UWI, Trinidad and Tobago
Ministry of Health, Trinidad and Tobago	The Honourable Dr. Fuad Khan, Minister of Health	Minister of Health
UWI School of Vet Medicine	Professor Christopher Oura	Professor of Veterinary Virology
British High Commission - representative	Ms. Fiona Grant	Head, Political/Economic Section
Public Health England (PHE)	Professor Neil Woodford	Head, Antimicrobial Resistance and Healthcare Associated Infections Reference Unit
	Dr. Susan Hopkins	Consultant in Infectious Diseases/Healthcare Epidemiology
	Dr. Anna Cichowska	Consultant in Public Health Strategy
	Mr. Mark Keilthy	Global Health Strategist
	Ms. Jane Fletcher	Health Protection Practitioner
Public Health Canada (PHAC)	Mr. Alex Bhattacharya	Higher Executive Officer
	Ms. Jacqueline Arthur	Manager, Strategic Issues
	Dr. Michael Mulvey	Chief, Antimicrobial Resistance and Nosocomial Infections

CARPHA STAFF		
Caribbean Public Health Agency (CARPHA)	Dr. Babatunde Olowokure	Director, Surveillance, Disease Prevention and Control
	Dr. Avery Hinds	Senior Technical Officer, Communicable Disease and Emergency Response
	Dr. Cristina Gutierrez	Head, Laboratory Services and Networks
	Dr. Lucette Cargill	Head, Drug Testing Laboratory
	Ms. Ermine Herman	Laboratory Technologist
	Dr. Pablo Salazar	Chief, Virology
	Dr. Lisa Indar	Programme Coordinator, Tourism & Health Programme
	Ms. Lorraine Francis	Technical Officer, Communicable Disease and Emergency Response
	Ms. Nicole Bovell-Arthur	IT Assistant
	Ms. Judy Dyer-Braveboy	Administrative Assistant
	Ms. Catrina Squires	Administrative Assistant
	Ms. Farida Sirjoo	Administrative Assistant
	Ms. Christine Alexander-Cornwall	Data Entry Clerk
	Ms. Victoria Cruickshank-Taylor	Communication Officer

Appendix C: Where are we now

Members were asked to consider the current strengths and weaknesses of their programmes in line with the following questions.

Microbiology and Laboratory

What are the basic laboratory capacities to achieve the implementation, maintenance and retention of adequate AMR laboratory surveillance?

What have been the achievements, gaps, challenges for national laboratories towards the development of twinning and establishment of a regional laboratory network for integrated response for AMR?

- There is significant variation across CMS for microbiology laboratory capacity and quality; AMR-related testing is highly variable, and few laboratories have capacity for antimicrobial sensitivity testing, most are limited to pathogen identification
- Standard Operating Procedures (SOPs) were heavily requested to help bolster laboratories and encourage standardised reporting
- Training for personnel and laboratory accreditation/competency testing were both considered necessary to increase capacity and capability

Surveillance and Epidemiology

What are the similarities and differences between systems for AMR surveillance in the Member States represented within your group?

- Large variation across CMS for data collection and usage, many CMS are using manual paper-based records
- There are significant gaps in communication between microbiology laboratories and epidemiology and surveillance; further complicated by the public, private divide
- Laboratories generate data, however they are not disseminating ,sharing or reporting data

Infection Prevention and Control and Antimicrobial Stewardship

Who has IPC or antimicrobial stewardship guidelines or policies currently in place?

For the Caribbean, who would be potential partners or stakeholders to consider in moving forward on IPC or antimicrobial stewardship activities?

- Many CMS reported having infection prevention and control and/or antimicrobial stewardship guidelines at a local hospital level, but few have national guidelines
- Noted difficulties with implementation of guidance, as only enforced in public sector, but not private hospitals or clinics

- It was noted across the CMS that there is a need for standardised infection prevention and control guidelines and a regional antimicrobial stewardship formulary/guidelines for local or national adaptation; these should be backed by data as available
- Potential partners for moving forward on IPC or antimicrobial activities include CARPHA, PAHO, PHE, PHAC and others.

Appendix D: Where do we want to get to?

Members were asked to consider the objectives and goals of their programmes in line with the following questions.

Microbiology and Laboratory

Please make a list and justify the key actors and institutions with which the laboratory should have constant communication in order to adequately generate an integrated response to AMR.

- Private sector
- Surveillance/Epidemiologists
- Infection control staff / health promotion units
- Clinicians
- Pharmacists and Pharmacies
- Community health professionals
- Veterinary sector
- Hospital management / health authorities
- Reference laboratory

Surveillance and Epidemiology

Which drug resistant pathogens do you think should be considered to be of the greatest public health relevance?

- Routine and standardised exchange of info with formal guidelines
- Focus first on the important infections or where there is the most attainable info; once achieved move on to the next goal
- MRSA
- ESBLs: *K. pneumoniae* and *E. coli*
- Carbapenems
- VRE
- Multi-drug resistant (MDR) Gram-negative bacteria
- *N. gonorrhoea*
- *Salmonella* spp.
- *M. tuberculosis*

Infection Prevention and Control and Antimicrobial Stewardship

What would be needed to encourage effective IPC and antimicrobial stewardship at a Regional, National or Hospital level?

- Regional standard infection prevention and control guidelines
- Regional standard antibiotic stewardship guidelines
- Advocacy from institutions, public and private sector and senior leadership on standardised guidelines
- To do a cost analysis and impact of the lack of policies and parallel situation analysis at a national and regional level

Appendix E: What are the major local threats to success?

Members were asked to consider current obstacles that may arise, or external factors which may threaten the success of any programmes in line with the following questions.

Microbiology and Laboratory

What challenges does the region face in building laboratory capacity for AMR surveillance (e.g. Programmatic, operational, technical)?

- “brain drain”, single individuals with no contingency and a lack of resources to train replacements or new personnel; complicated by a limited availability of personnel with increasing workloads
- lack of accreditation or external quality control programmes for laboratories
- lack of standardisation (SOPs)

Surveillance and Epidemiology

Are there pathogens on the drug resistant pathogen list that are NOT under surveillance in our health systems?

What are the greatest gaps or challenges in AMR surveillance in your health systems?

- Lack of information systems and standardised approaches or policy
- Insufficient senior level / policy level participation and support
- Lack of information sharing between laboratories, hospital and Ministry of Health / epidemiologists
- Inadequate staffing to collect, analyze and report data

Infection Prevention and Control and Antimicrobial Stewardship

What would be some of the potential enablers and barriers to IPC and antimicrobial stewardship?

- Challenges due to the lack of trained personnel, maintaining staff and lack of management buy in
- There is a significant regional reliance on tourism, which impacts both IPC and stewardship
- Lack of clear shared vision
- Consider coordinating with the International Health Regulators (IHR)
- Consider a resource optimization exercises conducted by national Ministries of Health

Appendix F: How do we get there?

Members were asked to consider potential solutions to identified threats and obstacles, how to build upon identified strengths and how to keep weaknesses from becoming obstacles. These were to form a group of identified opportunities to reach the objective or goals in line with the following questions.

Microbiology and Laboratory

How can we guarantee a suitable feedback between involved institutions and laboratories for the purpose of AMR control?

- development of standardised reporting guidelines, with emphasis on timely reporting
- defined roles and responsibilities for personnel with further emphasis on continued education
- moving away from manual data records and “data hoarding” and transitioning to electronic information systems which can additionally facilitate reporting and data sharing

Surveillance and Epidemiology

How would you design an optimal system for AMR surveillance in your Member States setting? How can monitoring and evaluation of data quality be integrated into the design of this system?

What can be done in order to raise and maintain awareness of the AMR threat among national and regional health authorities?

- Building closer formal working relationships for sharing surveillance data in country with laboratory, hospitals, Ministry of Health, epidemiologists and pharmacists
- Create formal reporting structures through regional groups such as CARPHA or PAHO
- Establish multi-disciplinary group on national level, including animal, agricultural and human health
- Parallel existing HIV surveillance systems to model AMR surveillance and reporting
- Transition to electronic based data entry, record keeping, analysis and reporting

Infection Prevention and Control and Antimicrobial Stewardship

To enhance AMR IPC and antimicrobial stewardship in hospitals and communities, what are top priority tools, actions and strategies for different audiences such as health care providers and professionals, patients and the public?

- What actions would be top priority and critical for positive public health impact?
- What actions would provide a supportive environment for meaningful impact on AMR and AMU?

- What actions that might appear appealing should be avoided because they risk negative consequences?
- formal written standardised guidelines are the primary requirement to bolster IPC and stewardship
- Senior level leadership and advocacy at Ministerial level required; authority positions do not always understand threat of AMR, [continuing] education is necessary, this can lead to development of legislation and regulation.
- Public education campaigns are required to change the way the public obtains antibiotics; continuing education and training is required to change the way healthcare professionals prescribe.