Report of the meeting of the WHO Global Collaborating Centres to support AMR activities globally

13-14 December 2016

WHO Headquarters

Geneva, Switzerland

Meeting Report
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Abbreviations

AGISAR Advisory Group on Integrated Surveillance of Antimicrobial Resistance
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<th>Acronym</th>
<th>Definition</th>
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<tbody>
<tr>
<td>AMR</td>
<td>antimicrobial resistance</td>
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<td>AST</td>
<td>antibacterial susceptibility testing</td>
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<td>CAESAR</td>
<td>Central Asian and Eastern European Surveillance of Antimicrobial Resistance</td>
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<td>CC</td>
<td>Collaborating Centre</td>
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<td>CDC</td>
<td>US Centers for Disease Control and Prevention</td>
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<td>EARS-Net</td>
<td>European Antimicrobial Resistance Surveillance Network</td>
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<td>ESBL</td>
<td>extended spectrum beta-lactamase</td>
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<td>EQA</td>
<td>external quality assessment</td>
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<td>FAO</td>
<td>Food and Agriculture Organization of the United Nations</td>
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<td>GLASS</td>
<td>Global AMR Surveillance System</td>
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<tr>
<td>MRSA</td>
<td>methicillin-resistant <em>Staphylococcus aureus</em></td>
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<td>NRL</td>
<td>national reference laboratory</td>
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<td>OIE</td>
<td>World Organisation for Animal Health</td>
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<tr>
<td>ReLAVRA</td>
<td>Latin American Antimicrobial Resistance Surveillance Network</td>
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<td>RO</td>
<td>regional office</td>
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<td>TB</td>
<td>tuberculosis</td>
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<td>TOR</td>
<td>terms of reference</td>
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<td>TP</td>
<td>target product</td>
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<td>WHA</td>
<td>World Health Assembly</td>
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<td>WHO</td>
<td>World Health Organization</td>
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**Executive Summary**

The World Health Organization (WHO) has developed the Global Antimicrobial Resistance Surveillance System (GLASS) in accordance with the World Health Assembly (WHA) resolution (WHA68.20) and in collaboration with the World Health Assembly (WHA) resolution (WHA68.20). The system is designed to provide global surveillance of antimicrobial resistance (AMR) and to support the development of evidence-based policies and interventions to combat AMR. The GLASS aims to collect and analyze data on AMR from various countries and regions, and to disseminate this information to stakeholders and policymakers worldwide. The system will facilitate the exchange of best practices and promote international cooperation in the fight against AMR. The implementation of GLASS will be critical in addressing the global threat of AMR and in ensuring the sustainability of effective and affordable treatments for infectious diseases.
Assembly (WHA) Resolution WHA68.7 to support the implementation of the global action plan on antimicrobial resistance (AMR). WHA68.7 also specifically requested the WHO Secretariat to establish a network of WHO Collaborating Centres (CCs) to support surveillance of antimicrobial resistance and quality assessment in each WHO region.

Consequently, on 13-14 December 2016 WHO hosted a meeting with WHO Collaborating Centres, for the purpose of supporting global AMR surveillance capacity building.

1. **Update on Global Action Plan to combat AMR and GLASS activities**

Participants were provided with an overview of progress in implementation of the Global Action Plan to combat AMR (GAP), including the United Nations General Assembly high-level meeting on AMR in September 2016 that saw all Member States committing to tackling AMR. Participants provided feedback on increased awareness and government activities to tackle AMR in their countries.

GLASS has received expressions of interest in enrolment from 38 countries (exceeding expectations), of which 29 are now fully enrolled as of December 13, 2016. While WHO cannot oblige countries to enrol, the 2nd Member States’ consultation to be held in April 2017 in Sweden will be an opportunity to understand the difficulties countries are encountering and to reinforce political buy-in.

Activities completed in 2016 include: development of the IT platform for aggregated and individual data; adapting WHONET for GLASS; development of an implementation package, with a focus on low-income countries; and, development of guidelines on integrated surveillance (led by WHO/FOS). Ongoing activities include an antimicrobial consumption survey and antimicrobial use methods; enhanced surveillance for *N. gonorrhoea*; and surveillance of ESBL-*E.coli* in the environment, humans, food and animals. An overview of next steps was also provided.

Discussions centred on the need to focus on the target indicators for this early implementation phase of the global system (eight pathogens in four anatomical sites). This list will be reviewed at the end of the 5-year period in 2019. However, it was noted that countries may conduct a much broader surveillance, according to their needs and priorities. There will be a data call in the first quarter of 2017 with the 1st GLASS report due in the fourth quarter of 2017.

2. **WHO collaborating centres: policies, procedures and practices**

The meeting was apprised of the criteria for designation as a CC, responsibilities, (re)designation, funding, intellectual property rights and reporting requirements of CCs. The reference document: *Guide for WHO collaborating centres* was provided for all participants. Discussion points related to reasons for non-approval of applications, regional CC meetings, and funding.
3. Master plan for 2017-2019 GLASS implementation and further development: priority areas of work and target products (TPs)

On day one, the draft master plan, covering a 3-year period and providing an overview of four priority areas of work, was distributed and comments were invited from participants. The draft master plan includes target products and respective activities in each area of work. Following a good discussion, the Chair closed the day’s meeting and requested all to view the master plan on the SharePoint that evening to identify and define the type of activities that CCs can contribute towards. Roles and responsibilities would be for discussion on day two. The plan was updated overnight.

Discussion points:

i. External quality assurance (EQA): There was acknowledgement that EQA was an absolute requirement and could be a costly one. It was pointed out that focusing solely on proficiency testing is limiting; quality management systems as a whole were necessary, not solely EQA.

ii. There was discussion on how GLASS would coordinate with AGISAR with respect to foodborne AMR. The GLASS secretariat is already working in collaboration with the Food Safety Department to ensure alignment of efforts. It was proposed that if a CC exists for food safety, it could liaise with the AMR group for foodborne pathogens. There was acknowledgement that some overlapping will occur. The aim of this meeting is to make transparent who is doing what in each group of activities.

iii. Defining the focus of the master plan: The focus is to build capacity for early implementation, concentrating on eight bacterial pathogens. In 2019, the focus will have to expand.

iv. It was noted that more complex issues than colistin should be considered e.g. carbapenamase. However, detection of colistin resistance is included in GLASS and countries are asking for assistance with this as their measures are currently inadequate.

v. Global surveillance of antifungal resistance in selected invasive fungal disease does not exist despite it being an emerging threat. Currently, not many CCs address this issue but those that do have very specific strengths. Following discussion, it was agreed that countries could not be asked to include antifungal resistance in GLASS minimal indicators at this point of GLASS implementation. However, there is a need to start exploratory work on this issue and to reassess the situation in 1-2 years. It was agreed that antifungals should be a GLASS Development TP and future module.

vi. The development of protocols for assessment of the economic and health impact of AMR to be applied in sentinel sites in all regions was
considered. There was acknowledgement that this is an important TP but there is still a long way to go. Some CCs have signed up to contribute to this area as they want to assess impact in the human, animal and environment sectors. For the purposes of this meeting, it was clarified that this TP refers to its public health impact. WHO has started discussions with the Wellcome Trust to work on this. Many partners, both internal and external can collaborate with WHO on assessing the burden of disease.

vii. Following discussions, diagnostic stewardship was added to TP7, under activity 14. It was also noted that diagnostic stewardship guidance is provided in the GLASS implementation manual. Training on stewardship should be provided as part of capacity building. At the same time, there is a need to consider the most appropriate surveillance strategies e.g. through proof-of-principle (PoP) studies.

viii. Guidance on the use of molecular methods to foster surveillance implementation was raised. Despite limited options in many regions, the importance of discussing how to apply this at the country level was acknowledged, given the rapidly changing landscape.

ix. Data management, epidemiological analysis and development of reports. While acknowledging that some countries have been reluctant in the past to share data, it was noted that when a country commits to enrol in GLASS, it commits to sharing data and authorizes WHO to make it public. To motivate countries to accept GLASS, it was proposed to emphasize that assistance will be provided to countries to build their surveillance systems.

4. **Agreed inputs to be provided by each CC to master plan activities and products**

Participants were split into two groups to consider contributions to the four areas of work outlined in the revised master plan: (i) capacity building/technical support: microbiology laboratory; (ii) capacity building/technical support: surveillance system; (iii) GLASS development; and (iv) Increase understanding of the impact of AMR. The objectives of the working groups were:

i) To clarify what each CC could provide to each activity.

ii) To decide leads for 12 Target Products (18 CCs in total at the meeting)

Feedback from the groups is provided in the table below. In addition to the TPs in the draft master plan, Group 1 requested that the following topics be highlighted and addressed:

i) Support for laboratory testing and surveillance in the environment

ii) Diagnostic stewardship

With regards to TP6, “Technical assistance to low-income countries”, Group 2 emphasised that human resource capacity will be a bottleneck here. Ideally, a
pool of experts per Region should be identified. It will also be necessary to think about training the trainers to avoid overloading CCs.
## Master plan for 2017-2019 GLASS implementation: Lead CCs by Target Product

<table>
<thead>
<tr>
<th>Area of work</th>
<th>Target Product</th>
<th>Activities and inputs</th>
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| Capacity building/technical support: microbiology laboratory                  | 1. Technical assistance to low income countries                               | 1. Technical support to development and operation of NRL through tutoring and EQA, quality management  
2. Continuing training and refresher courses on how to perform AMR laboratory testing and reporting-interpretation of AMR results                                                                                                                                                                                      |
|                                                                              | 2. Network supranational laboratories to provide reference testing of unusual AMR | 3. Provide EQA support and be a lab reference for testing of unusual AMR  
4. Assist WHO in the development of framework for the support to be provided to countries (e.g., flow and logistics for supporting verification of unusual types of AMR, agreement mechanism, etc.)                                                                                                                                                                    |
|                                                                              | 3. Definition of minimal requirements for national reference laboratory (NRL) for limited resource settings | 5. Assist WHO in the development of an inventory of minimal equipment and supplies for bacteriological identification and AST at NRL  
6. Assist WHO in the development of guidance on best practices, including procurement of supplies and equipment maintenance (bacteriology)                                                                                                                                                                                                 |
8. Contribute to the development of a framework to guide the investigation of colistin resistance (e.g., which population, AST profile, sampling strategy, etc.)                                                                                                                                                     |
|                                                                              | 5. Guidance on use of molecular methods to foster surveillance implementation | 9. Review of benefits, costs and drawbacks of existing molecular methods application to support AMR surveillance  
10. Pilot testing of application of selected molecular methods in few study sites  

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<th>Area of work</th>
<th>Target Product</th>
<th>Activities and inputs</th>
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<tr>
<td>Capacity building/technical support:</td>
<td>6. Technical assistance to low income countries</td>
<td>11. Provide technical support to development of national surveillance system through training and tutoring on basic principles and methods of surveillance, data analysis and risk assessment</td>
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</table>
| Surveillance system                      | 7. Operational research protocols to inform sustainable implementation of AMR surveillance in limited resource settings | 12. Review of AMR surveillance programmes in limited resource settings  
13. Resource needed and resource use analysis for surveillance programmes in limited resource settings  
14. Development of generic protocols for proof of principle (PoP) studies in limited resource settings, including diagnostic stewardship, different surveillance approaches |
| GLASS Development                        | 8. Development of IT and data management tools                                 | 15. Support the development of new tools, and review and adaptation of existing tools to fit GLASS implementation  
16. Training on use of IT tools in LIC  
17. Assisting with quality control of AMR (epidemiological and laboratory) data before uploading them to GLASS  
18. Assist GLASS Secretariat in management and analysis of surveillance data |
<p>|                                         | 9. Data management, epidemiological analysis and development of reports        |                                                                                                                                                       |
|                                         | 10. Framework for early detection and information sharing of unusual types of AMR | 19. Contribute to the development of draft framework to be submitted to the Member States Consultation (Apr/17)                                       |</p>
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<td>Area of work</td>
<td>Target Product</td>
<td>Activities and inputs</td>
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<tr>
<td>22. Assist in mapping public/university based laboratories with capacity to assist and support antifungal susceptibility testing</td>
<td>23. Assist WHO with systematic reviews of impact of selected types of AMR</td>
<td>24. Assist WHO with Identification of research gaps</td>
</tr>
<tr>
<td>25. Assist WHO with development of models to assess impact</td>
<td>26. Assist WHO with development of generic surveillance protocols to assess impact</td>
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**Notes:**

i) TP 1 and 3 coordinators will need to liaise.

ii) TP 2 and 10 coordinators will need to liaise

**Requests for additional topics:**

i) Support for laboratory testing and surveillance in the environment: Dr Heike Schmitt (NET-42) as lead.

ii) Diagnostic stewardship TP: Prof Wing Hong Seto (CHN-120) would be the lead
5. **Network communications and modus operandi**

The following network structure was proposed: One CC to assist WHO with overall coordination and each CC TP Lead to assist with activities related to individual TPs. Participants were positive to the proposed structure but noted the need for a full-time person and the fact that active coordination and good communication would be essential for success. It was confirmed by the GLASS Secretariat that funding has been secured for communications. The Sweden CC (SWE-66) agreed to take on the job of assisting with coordination of the WHO GLASS CC Network for two years on a rotational basis.

For communication purposes, it was agreed that using the SharePoint and an alert system would be optimal (to avoid overloading email inboxes).

6. **Terms of Reference (TORs) of GLASS CC Network**

The TORs for the Network were presented. Discussion centred around credit for Network activities: The Network and its activities are on request and agreed as part of the work plan. Credit is not for WHO only - all participants will be acknowledged. It was agreed that if the wording of the TORs can be improved to better reflect this, it will be.

7. **Fund raising**

CCs were requested to indicate the following on the SharePoint excel file:

i) Estimate of resource needs and in-kind resources that can be contributed

ii) Exact activities and prioritization of same

iii) Ideas on fund-raising strategies.

For 2017, the GLASS team has secured funds to cover priority activities for the year. For the 2018-19 biennium, the Secretariat is confident about the availability of needed resources thanks to support from countries. However, it is necessary to continue to fund raise.

Among the discussion points, it was noted that an increasing number of donors will go bilaterally to countries via the Ministry of Health. It would therefore be useful to develop a mechanism to map out bilateral investments to LICs for regional and global use. WHO country offices and ROs have an important role here as donor coordination group members. While the basic surveillance work implied in GLASS does not often win grants from academic institutions, it was recommended that regional consortia comprised of CCs and LIC institutions be developed to improve funding application success from organizations such as the Pasteur Institute. Surveillance is one of activities that the World Bank is also raising resources for.
Background:

The World Health Organisation (WHO) developed the Global Antimicrobial Resistance Surveillance System (GLASS) in accordance with the World Health Assembly (WHA) Resolution WHA68.7 to support the implementation of the global action plan on antimicrobial resistance (AMR).

GLASS collects data on AMR and on the implementation status of national AMR surveillance systems in order to enhance understanding of the extent and impact of AMR on populations and provide evidence for interventions and advocacy.

A call for country enrolment in GLASS was released in March 2016. As at 1 December 2016, 27 countries had enrolled and a further 11 had expressed an interest in joining GLASS. There is a clear need to support low- and middle-income countries (LMICs), in particular low income countries (LICs), in the implementation of GLASS.

WHA68.7 also specifically requests the WHO Secretariat to establish a network of WHO Collaborating Centres (CCs) to support surveillance of AMR and quality assessment in each WHO region. A broader collaborative platform, including WHO CCs, other technical institutions and international AMR surveillance networks assists WHO in providing technical support for implementation of AMR surveillance to Member States; promoting exchange and peer support between countries; and informing further development of GLASS.

Organization and process of the meeting

On 13-14 December 2016 WHO hosted a meeting with WHO Collaborating Centres, the purpose of which was to establish a WHO AMR Surveillance and Quality Assessment Collaborating Centres Network to support global AMR surveillance capacity building.

The list of participants in the meeting is provided in Annex 1.

The agenda is provided in Annex 2.

The meeting was chaired by Dr Malin GRAPE.

At the Chairperson’s request, all those present introduced themselves.
Objectives of the meeting:

- To improve mutual understanding of the contribution of each CC to the GLASS
- To identify priority areas of work and support to specific products and activities to which the CC would contribute
- To define the mission of the CC Network and its terms of reference (TORs)
- To define the Network's methods of working and communications

Expected outputs from the meeting:

- CC Network established with defined mission, TORs and modus operandi
- 2017-2019 work plan with defined contributions of each participating CC to the implementation of GLASS

Day One. Session 1: Global action plan on AMR and global AMR surveillance system (GLASS)

Welcome
Dr Marcus Sprenger, Director, AMR Secretariat, opened the meeting by welcoming all participants. Dr Carmem Pessoa- Silva, Acting Coordinator, clarified that as all present were in working relations with WHO, there was no need to review Conflicts of Interest. Rules for the meeting would be based on WHO CC rules. A final meeting report will be made available on the GLASS website. Finally Dr Pessoa-Silva thanked Dr Malin Grape representing WHO CC Sweden for its loyal and strong support as a GLASS partner and Dr Grape herself for assuming the role of Chairperson for the meeting.

1.1 Overview of the Global Action Plan to combat AMR (GAP)

Dr Sprenger gave an overview of progress in implementation of the GAP. He recalled that 20 years ago this topic was being discussed but with little progress achieved until very recently. The United Nations General Assembly high-level meeting in September 2016\(^1\) and the commitment of all Member States to tackle AMR was a milestone. AMR has now become an issue for Heads of State who recognize its implications for trade, agriculture, education, health and the environment. The Resolution mandates a multiagency intersectoral coordination group and a decision on the establishment of this coordinating mechanism is imminent. Tripartite collaboration between WHO, FAO and OIE has achieved

progress but it is clear is that further progress can only be achieved in close collaboration with all sectors.

The five objectives of the GAP were reviewed. No.1 is to raise awareness at all levels of society and this is very challenging. No. 2 is concerned with understanding the magnitude of the problem and this is the principal focus of this 2-day meeting. While there are good studies from Thailand, UK and USA, in general, knowledge is limited. There is a great need for surveillance information to inform treatment guidelines. Also lacking are data on consumption and use of antimicrobials worldwide, as well as their use in the animal sector. Objective No.3 is to reduce the incidence of infection and WHO has developed new guidelines and core components\(^2\) in 2016 to contribute to this. Objective No. 4 is concerned with optimizing the use of antimicrobial medicines: some new medicines are in the pipeline. Success with this objective requires good health systems, which are lacking in many countries and many falsified and substandard medicines are circulating. Objective No.5. is concerned with the development of the economic case for sustainable investment: one suggestion here is to use existing agriculture subsidies to incentivise improved behaviour in the food sector.

Dr Sprenger reviewed national data on resistance for nine AMR indicators (2013 data) that highlighted the limited information available on the impact of antibiotic resistance on the human population. He reiterated that WHO needs the help of all CCs to improve surveillance and data.

**National action plans:** With regards to national action plans (NAPs) political buy-in is essential and must be multisectoral. Denmark is a good example of banning the use of antibiotics in animals without loss of profit. A NAP manual and tools have been developed to support countries\(^3\): these have been disseminated via regional workshops, with the support of FAO and OIE.

**Monitoring and evaluation (M&E):** For M&E, deciding on targets and indicators is difficult and Dr Sprenger invited CCs to consider the indicators and give their feedback. A self-assessment tool\(^4\) for countries has been developed jointly with FAO and OIE, the results of which will be available in January 2017 and will be posted online.

Dr Sprenger finished by stating that expectations were very high and he hoped CCs could provide support and be an ambassador for the GAP in their own countries.

**Discussion points**

1. **FAO & OIE.** A question was raised about inputs from FAO and OIE and how they harmonize with WHO. It was explained that OIE is monitoring antibiotic

\(^2\) [http://www.who.int/gpsc/ipc-components/en/](http://www.who.int/gpsc/ipc-components/en/)


use. There are also concrete products from joint working: e.g. the tools for developing NAPs were developed jointly with FAO and OIE. The joint approach has changed the landscape completely making it much easier to reach sectors in-country. The designation of AMR focal points and the conduct of workshops have facilitated the forging of connections between people who despite coming from the same geographical areas have never met before and this is delivering synergies in-country.

2. Noticeable changes in participants’ countries?
Participants were asked to feedback on changes with respect to AMR in their countries. In Hong Kong, SAR, China, there is a new department for AMR within the Ministry of Health and the Minister has signed a commitment to tackle AMR. It is still very general, not yet concrete and the problems are complex with many dimensions e.g. treatment, infection prevention and control (IPC), regulation, etc. WHO was urged to be prepared with multi-factorial answers otherwise it may not succeed.

In South Africa, there has been progress since the GAP: a NAP for 2014-2019 exists and includes the animal and environmental sectors. There is Government and Ministerial commitment, an engaged stewardship programme, and guidelines have been released.

In the USA, a NAP exists and includes all parts of Government although there is a need to include the environmental sector more. An Advisory Committee exists to monitor and track implementation i.e. it provides oversight. Congress has invested for human health, but there has not been a similar investment in the animal and environment sectors: however, work is in progress with agencies to identify programmes in these sectors.

1.2 GLASS overview and planned next steps.

To illustrate the need for good data, Dr Pessoa-Silva highlighted a study of nine AMR indicators\(^5\) conducted in 2013 (see below), in which only 22 of 129 countries (17%) could provide information on all indicators.

Important findings from this study also included that:
I. Where country data existed, it often never reached the national agencies
II. Most of the data concerned the proportion of tested isolates with little or no relation to the humans behind this data.

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In other words, there was no sense of the significance/meaning of the data for human health and infections. Hence, the need for GLASS. While GLASS covers more than just bacteria, the most glaring gaps were found in bacteria and it was decided that the focus should be on bacteria. However, everyone is mindful of the need to link with surveillance in the food chain, the environment and antimicrobial use. The vision for GLASS is to capture and integrate information needed to inform strategies to tackle AMR locally, regionally and globally.

**GLASS guiding principles**

1. Foster national AMR surveillance systems
2. Gather epidemiological, clinical and microbiological data
3. Conduct a stepwise approach to meet local and global priorities
4. GLASS early implementation focus will be on bacterial pathogens.
   - Priority specimens and bacterial pathogens in humans
   - Progressive inclusion of other types of AMR-related surveillance (e.g. food chain, antimicrobial use, environment)

**The GLASS development approach** is a collaborative one that includes CCs, international networks and other partners. There is consultation with Member States to ensure political buy-in. Sweden will host the 2nd Member States consultation in April 2017 to get their input into new GLASS modules.

**Core components of national surveillance systems**
• AMR surveillance sites
• A national reference laboratory (NRL)
• A national coordinating centre (NCC)

Data to be reported to GLASS will include
• the status of the national AMR surveillance system
• aggregated AMR data for priority indicators
• and new types of AMR (after confirmation and report to national authority)

AMR indicators: eight target indicators and four target sites (blood, urine, faeces, urethral and cervical swabs).

Countries enrolled in GLASS: to date, 38 have expressed interest, of which 29 are fully enrolled. These expressions of interest have come from the countries themselves without any push from WHO. The original target in March was to achieve 30 expressions of interest by the end of 2016.

Activities in 2016:

• Completed activities include development of the IT platform for aggregated and individual data; adapting WHONET for GLASS; development of an implementation package, with a focus on low-income countries; and, development of guidelines on integrated surveillance (led by WHO/FOS).

• On-going activities include an antimicrobial consumption survey and antimicrobial use methods (led by WHO/EMP); enhanced surveillance for N. gonorrhoea (led by WHO/STI); and surveillance of ESBL-E.coli in environment, humans, food and animals (led by WHO/FOS).
• **Links to other AMR data**: These have included working with the HIV/TB/Malaria cluster within WHO towards creating a common portal; and collaborating with regional surveillance networks e.g. CAESAR, ReLAVRA and EARS-Net.

Next steps:
• There will be a data call in the first quarter of 2017 with the 1st GLASS report is due in the fourth quarter of 2017.
• Development of a rapid detection and alert mechanism
• AMR surveillance in invasive fungal infections
• Explore application of molecular methods
• Translation of the early implementation road map into all official UN languages – this should encourage further interest in enrolment in GLASS
• Special protocols: proof of principle studies, burden of disease, syndrome-based surveillance
• Link different AMR surveillance activities in humans (e.g. malaria, TB, HIV)
• Create new GLASS modules: ESBL *E.coli* Tricycle surveillance, e-GASP, antimicrobial use and consumption.

Challenges:
• Lack of capacity, especially in low-resource settings
  ➢ Surveillance structure and capacity
  ➢ Diagnostic and laboratory quality assurance capacities
• Lack of resources within WHO
• Coordination with partners

Discussion points
1. **The inclusion of other pathogens** such as *Clostridium difficile* and *pseudomonas* was raised. It was acknowledged that *Clostridium difficile* is the priority pathogen in the U.S.A. Discussions have taken place on how and when to include these but two-thirds of countries are LMICs and these will need support if further pathogens are added to the priority list. The list will be reviewed in 2019. It was pointed out that *Clostridium difficile* is associated with antibiotic use and is not really within the terms of AMR surveillance. However, countries can report as much data as they would like to, as long as they are reporting on the priority data required.
2. **Data reporting**: So far, more than half of the countries enrolled have provided data on the status of their surveillance systems. The report summarizing 2016 data will be made available at the end of 2017. Some countries are still struggling, especially those not using WHONET - countries have been requested to use what data they currently have to report to GLASS.
3. **Encouraging enrolment**: While WHO cannot oblige/prescribe countries to enrol, the April meeting in Sweden will be an opportunity to understand the difficulties countries are encountering and to reinforce political buy-in. To date, the enrolment process has exceeded expectations.
Day One. Session 2: WHO Collaborating Centres and Network of WHO Collaborating Centres (CCs)

2.1   WHO collaborating centres: policies, procedures and practices

Matias Tuler (Manager, WHO Collaborating Centres Secretariat) provided an overview of the policies, procedures and practices pertaining to WHO collaborating centres. The reference document: Guide for WHO collaborating centres was provided for all participants and can also be accessed online.6

Background: There are now approximately 800 CCs in over 80 countries worldwide, with the exact number changing frequently. Some are long term while others exist for four years: a WHO CC is a time-limited contract with agreed deliverables. Every technical department in WHO works with a CC.

Strategic rationale: Designation as a WHO CC is always the formalization of an existing, successful collaboration between WHO and an external institution. In the case of AMR, the requirement has resulted from a need specified in a Resolution. Institutions are designated as WHO CCs to support WHO in implementing its mandated work and are invaluable in supporting WHO in the implementation of its programmes and activities. Activities should be jointly planned by the institution and WHO. WHO CC activities should be anchored in the WHO programme budget and directly contribute to WHO’s programmes (as opposed to benefitting public health in general). Standard activities of an institution are not included in the WHO CC work plan, and are not covered by the designation.

Common misconceptions:

- The designation as a WHO CC is not: a certification of excellence; an accreditation; a prize or award, nor a lifelong agreement.
- There are no "regional" or "global" WHO CCs.
- WHO CCs are not preferred providers of services.

Criteria for designation: Institutions are proposed for designation by a WHO department or programme and need to fulfil a set of criteria:

- High scientific and technical standing nationally and internationally
- Prominent place in the country's health, scientific or educational structures
- High quality of leadership with sufficient number of qualified staff

http://www.who.int/collaboratingcentres/Guide_for_WHO_collaborating_centres_2016.pdf?ua=1
• Stability in terms of personnel, activity and funding
• Strong working relationship with other institutions at national, regional and global level
• Clear ability, capacity and readiness to contribute to WHO programme activities
• Technical and geographical relevance of the institution and its activities to WHO’s programme priorities
• At least two (but in most cases many more) years of previous collaboration with WHO in carrying out jointly planned activities

In addition, WHO departments may have additional strategies or criteria that determine when an institution will be proposed as a WHO CC.

**An agreement of collaboration:** A WHO CC is not a legal entity. The designation is a time-limited agreement with agreed deliverables that automatically ends on the expiry date.

**Designation:**

• Always at WHO’s initiative and based on concrete WHO’s programme needs
• Only eligible institutions with which WHO has a long-standing history of collaboration can be considered
• Other mechanisms of collaboration are explored; there is no overlapping with other contractual types

**Developing the WHO CC work plan:** This requires active communication between the responsible officer at WHO and the proposed institution. The negotiation is based on concrete needs from the WHO programme budget, and what the proposed institution is ready and capable of doing to address those needs. The WHO responsible officer takes the lead.

**Responsibilities:** During the period of designation, each designated institution is expected to:

• Implement the agreed WHO CC work plan in time and to the highest possible standards of quality
• Regularly communicate with its’ WHO responsible officer
• Follow WHO CC regulations and policies, as expressed in the terms and conditions for WHO CCs
• Submit annual reports

**Redesignation:**

• Designation as a WHO CC can be renewed ("redesignation") for 1, 2, 3 or 4 years.
• WHO decides whether it will propose an institution for redesignation based on past performance, future needs and relevance of the institution to WHO’s
programmes (operational plan/programme budget).

- Requires that all requested annual reports have been submitted via the electronic processing system (eCC - see below).
- The procedure can be initiated as early as nine months prior to the expiry date, but never later than one month prior to the expiry date.
- The procedure is initiated by a WHO staff member.
- The procedure must be finalized (not just initiated) before the expiry date to avoid automatic expiry.

**Funding:**

- Normally, institutions themselves are expected to provide or raise the funds needed for the activities of the WHO CC.
- Funding for the activities of a WHO CC is subject to the policy on interaction of WHO CCs with industry and private sector (part 4 of the Terms and Conditions) - the goal of this policy is to avoid any real or perceived conflict of interest.
- In principle, WHO CCs and their activities should not be funded or otherwise supported by
  - companies
  - business or trade associations
  - foundations not at arms' length from their commercial sponsors
- Distinction between companies with incompatible business activities; companies with a direct commercial interest; and companies with an indirect commercial interest.

**Intellectual property rights:** For the expected deliverables of the WHO CC subject to intellectual property rights, there are two possible scenarios:

- Product of the WHO CC, and therefore WHO CC owns IP and gives license to WHO (see Terms and Conditions, 3.1.1 and 3.2.1)
- WHO product, and therefore WHO owns IP and gives WHO CC a license (see Terms and Conditions, 3.1.2 and 3.2.2)
- If no mention is made in the (re)designation form, 3.1.1 and 3.2.1 apply.

**Use of WHO name, emblem and flag**

- Requires WHO’s authorization in advance each time it is used. Authorization can only be given:
  - in relation to an activity included in the agreed work plan
  - if the use is in line with certain visual identity guidelines
  - during the period of designation
- Authorization will not be given for business or visiting cards, or certificates of attendance for training.
- Specific rules apply to letterheads, websites, and published materials.
- See details in part 2 of the Terms and Conditions

**Electronic processing system (eCC)**

Designated institutions use eCC for:

- Completion of the redesignation form
• Completion of annual reports, once a year

Annual reports
• are online forms, requested automatically via email every 12 months on the anniversary of the (re)designation;
• are progress reports, used to monitor the implementation of the agreed work plan during the past year;
• are not the place to report detailed technical or scientific results.

Resources
• The respective agreement (re/designation form)
• The responsible officer for the specific WHO CC
• Other WHO staff working with the WHO CC

In the WHO Internet site, http://www.who.int/collaboratingcentres/information/en/ can be found:
• WHO CC database and portal
• The regulations
• Terms and conditions for WHO CCs
• Guide for WHO CCs
• FAQs for eCC
• email eCC_techsupport@who.int

Discussion points

1. **Reasons for not approving applications:** These can include: conflict of interest e.g. funding from tobacco companies; activities proposed are not WHO activities and therefore unsuitable for a CC; interests have changed after the initial four years; and, WHO is already paying an institution/individual to carry out the activity.

2. **Regional CC meetings:** These take place in WPRO, SEARO and AMRO but not in AFRO or EURO. They can be done by geographic area or by thematic area. Thematic organization allows for more frequent meetings e.g. nursing CCs meet every two years. On the other hand, geographic area meetings can facilitate smaller technical side meetings.

3. **Funding:** there was a question re supporting CCs to raise funds. A condition of being a WHO CC is that activities will not be paid. For some, the GLASS work is new and will not be in existing, agreed work plans. WHO will not reopen the agreement but, as AMR is new, there can be flexibility: CCs should send an email detailing activities and if there are funds available within WHO, they may be made available to the Network.

4. When a CC is redesignated, the newly-added activity will be “regularised” and included in the work plan. In the meantime, CCs are advised to follow the format in the agreement and when submitting the annual report list additional activities.
related to GLASS support separately.

WHO can help CC to raise funds, for example, when a CC is applying for a grant, WHO can write a letter/make a phone call in support of the application.

2.2 Priority areas of work and planned activities and products overview

Dr Sergey Eremin (Medical Officer, WHO AMR Secretariat) distributed a draft “Master plan for 2017-2019 GLASS implementation and further development: priority areas of work and target products”. The plan covers a 3-year period and provides an overview of priority areas of work.

Discussion points:
1. External quality assurance (EQA): There was acknowledgement that EQA was an absolute requirement and could be a costly one. It was pointed out that focusing solely on proficiency testing is limiting: quality management systems as a whole were necessary, not solely EQA. It was noted that 5 out of WHO’s 6 regions have designated EQA programmes covering routine bacterial identification and antimicrobial susceptibility testing – the continental countries of the Western Pacific region is the only area lacking one. It was suggested that WHO should focus Fleming Fund discussions on these areas.

   It was acknowledged that while there are programmes in the regions to support laboratories, gaps still exist. The purpose of the present meeting is to gain a common understanding of what exists and what is lacking so that everyone can feed into what is needed and where it is needed. Day two’s discussions will allow for agreement on individual contributions to specific activities.

2. Suggestions for rephrasing: Participants gave suggestions and these were noted.

3. How will the AGISAR work fit in with this? The GLASS secretariat is already working in collaboration with the Food Safety Department to ensure alignment of efforts. If a CC exists for food safety, it can work with the AMR group for food borne pathogens. It was noted that some overlapping will occur. The aim of the meeting is to make transparent who is doing what in each group of activities.

4. Defining the focus of the master plan: The focus is to build capacity for early implementation, concentrating on eight bacterial pathogens. In 2019, the focus will be revised and may expand.

5. It was noted that there are more complex issues than colistin to consider e.g carbapenamase. However, detection of colistin resistance is included in GLASS. Colistin resistance is difficult to identify with most available methods and countries are asking for help as their measures are inadequate. Work has already started on addressing this issue and will continue later this week.

6. Guidance on detection and reporting of antifungal resistance in selected invasive fungal disease. Global surveillance for this doesn’t currently exist but
these are the initial steps. Pressure exists to discuss what will be the direction and the steps to take. Not many CCs exist to address this but those that do have very specific strengths.

7. **Protocols for assessment of economic and health impact of AMR to be applied in sentinel sites in all regions.**

There was acknowledgement that this is an important target product (TP) but there is a long way to go. Some CCs have signed up to contribute to this area as they want to assess impact in the human, animal and environment sectors. For the purposes of this meeting, it was clarified that it refers to public health impact. Dr Pessoa-Silva suggested that the focus be on human health, especially as countries are asking about morbidity and mortality due to AMR.

8. **Where is diagnostic stewardship?** The role of clinics, collection and transporting of samples, and feedback to clinicians, is not clear from the plan. It was suggested that this should be an area of activity. It was noted that diagnostic stewardship guidance is provided in the GLASS implementation manual and that training on stewardship should be provided as part of capacity building. At the same time, there is a need to consider the most appropriate surveillance strategies e.g. proof-of-principle (PoP) studies. It was agreed to reword Activity 14 (in the draft master plan) to include diagnostic stewardship.

9. **Guidance on use of molecular methods to foster surveillance implementation.** Despite limited options in many regions, it is important to discuss how to apply this at the country level. The landscape is changing rapidly and will be very different in two years’ time, therefore it needs to be included in the agenda now.

The Chair closed the day’s meeting by asking everyone to review the master plan on the SharePoint and identify and define the type of activities they could contribute towards. Roles and responsibilities would be discussed on day two. The plan would be updated overnight.

**Day Two. Session 3: WHO surveillance activities and inputs requested from CCs**

3.1 **Contribution of CCs to planned activities and products**

The Chair welcomed newcomers to the meeting and announced that the master plan had been reorganized. To facilitate progress, the agenda had also been rearranged.

**Discussion points on the updated masterplan**

1. **Antifungals.** The Secretariat is open to suggestions from the group but felt that antifungals should be a GLASS Development TP as a future module. Some CCs
have volunteered to work on this. The USA-417 CC stated that it is happy to work on this but a discussion needs to take place about an antifungal resistance surveillance system. There was support for this from some members of the group but it was also pointed out that this was overambitious: even in well-resourced settings, it is difficult to achieve comparison over years. There is a danger that some countries will think they have to do everything. Better to stick with some pathogens, but not fungals for now.

Dr Pessoa-Silva stated that it is impossible to ask countries to include antifungal resistance in GLASS minimal indicators, even though the problem exists today. However, there is a need to start exploratory work on this issue now and to reassess within 1-2 years. The USA-417 CC agreed that it is best to do it in stages.

2. **Need to acknowledge clinics’ function** – it was suggested that clinics should be an area of work and diagnostic stewardship should be split between laboratories and clinics. In an effort to avoid too many areas of work, it was proposed to put this under the Surveillance area of work, with an activity that includes clinical issues and diagnostic stewardship.

3. **TP9: Data management, epidemiological analysis and development of reports.** While acknowledging that some countries have been reluctant in the past to share data, it was noted that when a country commits to enrol in GLASS, it commits to sharing data and authorizes WHO to make it public. To motivate countries to accept GLASS, it was proposed to emphasize that help will be provided to countries to build their surveillance systems.

5. **TP12: Protocols for assessment of economic and health impact of AMR to be applied in sentinel sites in all regions.** Several partners are trying to assess the burden of AMR. WHO has started discussions with the Wellcome Trust to work on this. Many partners, both internal and external can collaborate with WHO on assessing the burden of disease. The idea is to take a few CCs with expertise in this and in AMR e.g. the Swiss CC can help WHO connect with all partners.

3.2 **Agreed inputs to be provided by each CC to master plan activities and products**

Participants were split into groups to consider contributions to four areas of work: (i) capacity building/technical support: microbiology laboratory; (ii) capacity building/technical support: surveillance system; (iii) GLASS development; and (iv) Increase understanding of the impact of AMR.

Group 1 was assigned to the following Areas of Work: “Capacity building/technical support: microbiology laboratory” and “GLASS development”. The Rapporteur for Group 1 was Dr Sirenda Vong.

Group 2 was assigned to the following Areas of Work: “Capacity building/technical support: Surveillance system” and “Increase understanding of the impact of AMR”. The Rapporteur for Group 2 was Dr Marianne van der Sande.
The objectives of the working groups were:

- To clarify what each CC could provide to each activity.
- To decide leads for 12 Target Products (18 CCs in total at the meeting)

Clarification: The Chair clarified that the AMR Secretariat is the responsible entity but individual CCs and the Network can be of great assistance. Assuming the position of Lead CC for a TP does not mean that the CC will do all the work but rather will provide technical leadership and facilitate communication between CCs working towards the same TP. With regards to the timeline – the first data report will be published in Q4 of 2017, following which there may have to be some revision to working methods. With regards to funding and resources, the Chair highlighted that it would be helpful, especially for the Secretariat, to get an estimation of additional resources required to achieve Network activities.

Please see the "Master plan for 2017-2019 GLASS implementation: Lead CCs by Target Product" table in the Executive Summary for the results of the group work. Dr Vong, reporting for Group 1, noted that the leads will get together and discuss how to move forward. In addition to the TPs in the draft master plan, Group 1 requested that the following topics be highlighted:

i) Support for laboratory testing and surveillance in the environment. Dr Heike Schmitt (NET-42) as lead.
ii) Diagnostic stewardship. Prof Wing Hong Seto (CHN-120) would be the Lead

Discussion points from Group 2 feedback.

TP6: Technical assistance to low-income countries. It was acknowledged by all that human resource capacity will be a bottleneck here. Ideally, a pool of experts per Region should be identified. For the Regional Offices (ROs), support may need to be discussed with donors and it will be important to educate donors to broaden their scope. ROs are a good entry point and should approach countries proactively. At the same time, it will be important to avoid overlap and create synergies.

The CC Network can be used to get input on existing protocols, and to curate these resources to avoid conflicts/redundancies. But how will this be managed? Two streams of needs will be managed by WHO:

i) Requests from ROs to CC Network for help in specific countries
ii) Development of/review of existing common tools and establishing an inventory.

CCs can coordinate a consortium of excellent institutions but it is necessary to think about training the trainers and not put everything on CCs. Equally, countries will need to understand what they are committing to: here, the situation is very much context dependent.
Day Two. Session 4: GLASS CC Network: ways of working

4.1. How do we work together? Network communications and modus operandi

It was reiterated that the GLASS Secretariat is responsible for overall management of the GLASS CC Network but it would be helpful if a CC could assist WHO in coordinating with other partners - this function would rotate between CCs.

Matias Tuler (Manager, WHO Collaborating Centres Secretariat) noted that a complex structure of networks such as that proposed by GLASS will need a lot of coordination: it will be impossible for WHO to do this alone. He gave examples of other complex networks e.g. nursing which has 38-40 CCs that, on a rotational basis, selects a large CC to be the Secretary of the network for two years. This requires a staff member from the institution dedicated to coordinating and reporting to WHO. Occupational health is an example of an even bigger network - this has been divided into six areas of work with one CC assigned to each area of work and each CC reporting directly to WHO.

Dr Pessoa-Silva proposed the following structure: One CC to assist with overall coordination and each CC TP Lead to assist with activities related to individual TPs. e.g. an annual face-to-face meeting supplemented with regular webex/videoconferences.

The Sweden CC (SWE-66) agreed to take on the job of assisting with coordination of the WHO GLASS CC Network for two years on a rotational basis.

For communication purposes, it was agreed that using the SharePoint and an alert system would be optimal (to avoid overloading email inboxes).

4.2 Presentation of Terms of Reference (TORs) of GLASS CC Network

The TORs for the Network were presented by Tejinder Chowdhary (Technical Officer, GLASS Secretariat) and supported by Matias Tuler (Manager, WHO Collaborating Centres Secretariat) and Françoise MOURAIN-SCHUT (Senior Legal Officer, WHO).

Status: The Network is not an independent legal entity and therefore cannot conduct actions in its own name.

Function: To assist WHO support countries to develop and implement AMR surveillance
Objectives:

Objectives

Without prejudice of the individual terms of reference and activities that WHO has agreed with each WHO CC, all WHO CCs participating in the AMR Surveillance CC Network are, upon WHO request, expected to:

1. cooperate on activities to strengthen countries’ capacity for developing and implementing AMR surveillance;
2. support development of tools for AMR surveillance globally, including IT tools;
3. support the establishment of supranational laboratories to provide EQA and reference for testing of unusual AMR;
4. assist with coordination of epidemiological analysis and development of reports; and
5. contribute to develop special surveillance protocols such as operational research in implementation of surveillance in low/middle resource settings income settings, protocols to evaluate burden of AMR in humans, and protocols to evaluate the application of molecular tests to AMR surveillance.

An agreed plan should be developed in agreement with the Network members to address the above objectives (see in “plan of action” under section 5. Management).

Details on areas of co-operation are contained in the Master Plan of priority activities

Structure: A Network based on CCs already working with WHO. Participation does not impact existing designation and terms and conditions.

Management: Main points:

- Plan of action is key
- AMR Secretariat will provide support
- The Network will normally meet on an annual or ad hoc basis
- Generally, decision making is by consensus
- Working groups formed on needs’ basis
- Members as a rule are not remunerated for participation. However, some activities may be funded.

Information and documentation: Main points

- As a general rule, WHO shall be responsible for issuing publications about Network activities. Decisions about preparation and dissemination of publications of network activities are in consultation with WHO
- Copyright is vested in WHO
- “Publications” include any form, whether paper or electronic, and in any manner, including articles in scientific journals. Parties are always allowed to cite or refer to Network publications, except for the purpose of promoting any commercial products, services or entities.
- Publications issued by Network members must contain disclaimers as decided by WHO
• Communication:
  ➢ WHO will make public the conclusions of Network activities
  ➢ WHO website or tool such as SharePoint
  ➢ Network members shall not make public statements on Network activities
  ➢ Contributions will be duly acknowledged

Confidentiality and liability: Standard WHO terms apply

Amendments: The TORs may be amended and Network members will be informed. Endorsement of amended terms is a condition for continued participation in the Network.

Discussion points:

Credit for activities: A meeting participant felt that the TORs appeared to indicate that the CCs were expected to do a lot of work but credit for the work would be for WHO only. It was noted that the Network and its activities exist to assist WHO. The activities are on request and agreed as part of the work plan and result from a two-way communication process. Credit is not for WHO only – the contributions of all participants will be duly acknowledged. It was agreed that if the wording of the TORs can be improved to better reflect this, it will be.

4.3 Fund raising

Dr Pessoa-Silva highlighted the need to raise resources for both the CCs and WHO. For those CCs who do not have a line in their current TORs, it would be useful for the GLASS Secretariat to have a sense of priorities, available resources and estimate of resource needs for GLASS CC Network activities. The CCs were requested to indicate the following on the SharePoint excel file:
  iv) Estimate of resource needs and in-kind resources that can be contributed
  v) Exact activities and prioritization of same
  vi) Ideas on fund-raising strategies.

For 2017, the GLASS team has secured funds to cover priority activities for the year. For the 2018-19 biennium, the Secretariat is confident about the availability of needed resources thanks to support from countries.

Discussion points

1. Funding from external sources: any fundraising for any Network activities must be in accordance with WHO policies and requires WHO’s prior agreement. If the funding is for activities outside CC Network TORs but within the collaborating centre’s activities, WHO’s requirements for funding of activities of collaborating centres apply. Even if the activities involve non-Network and non-collaborating
centres activities, participants are recalled that institutions designated as collaborating centres should not accept funding or other support from companies whose business activities are incompatible with WHO’s work (such as, for example, tobacco companies).

2. **Map donors and LICs**: An increasing number of donors will go bilaterally to countries. It will be necessary to find a mechanism to map out bilateral investments to development products for regional and global use. WHO country offices and ROs can have an important role here as donor coordination group members.

3. **Surveillance and academic grants**: The basic surveillance work implied in GLASS work is unlikely to win grants from academic institutions - calls are looking for novelty in applications. However, some technical institutions mix science with public health – it was encouraged that regional consortiums with CCs and LIC institutions be developed.

4. **Increase the visibility of the WHO CC Network**: WHO Regional Office for Europe has a newsletter with its partner surveillance CCs. The GLASS webpage can acknowledge CCs’ contributions and raise visibility. It was noted that there is a need to better coordinate external communications. CCs are requested to provide a short description of their activities and partners.

5. **The World Bank** met in October 2016 to discuss how to raise resources - surveillance is one of activities mentioned.

6. **UNICEF**: WHO was encouraged to explore a collaboration with UNICEF in Asia as both brands are prestigious and strong in the region

### 4.4 Conclusions and next steps

The Chair thanked all for their engagement and commitment, and congratulated all on achieving the aim of establishing a WHO CC Surveillance Network. The network will be presented at the 2nd Meeting of the GLASS Collaborative Platform, to take place immediately following this one on 15-16 December 2016.

**Next Steps:**

1. CCs will define their contributions to the Network
2. CCs will provide a short description of their activities and partners
3. In a few weeks, the GLASS Secretariat will come back to the Lead CCs to organize activities around TPs
4. The timelines of WHO HQ and ROs will be communicated to the Network
5. CCs will be invited to the 2nd Member States Consultation meeting in April 2017. This event can provide a good opportunity for a short side meeting of the Network
6. The master plan will be revised and communicated via SharePoint
7. The GLASS Secretariat will communicate with ROs with regards to planning for support to countries and will communicate with TP Leads to organize activities.
### Annex 1: List of Participants

<table>
<thead>
<tr>
<th>CC REF</th>
<th>WHO COLLABORATING CENTRES</th>
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Head, Antimicrobial Resistance and Healthcare Associated Infections (AMRHAI) Reference Unit  
WHO Collaborating Centre for Reference and Research on Antimicrobial Resistance and Healthcare Associated Infections  
Antimicrobial Resistance and Healthcare Associated Infections Reference Unit  
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Email: Neil.Woodford@phe.gov.uk |
| USA-181 | Dr John STELLING  
WHO Collaborating Centre for Surveillance of Antimicrobial Resistance  
Division of Infectious Diseases  
Department of Medicine  
Brigham and Women’s Hospital  
Boston | Telephone No.:  
Email: jstelling@whonet.org |
<table>
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<tr>
<th>Country</th>
<th>Name</th>
<th>Position/Role</th>
<th>Organization/Division/Branch</th>
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<tbody>
<tr>
<td>USA</td>
<td>Dr Jean PATEL</td>
<td>Acting Director</td>
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<td>Telephone No.: +1 404 639 0361 Email: <a href="mailto:vzp@cdc.gov">vzp@cdc.gov</a></td>
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<tr>
<td></td>
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<tr>
<td>USA</td>
<td>Dr Brion EDWARDS</td>
<td></td>
<td>WHO Collaborating Centre for Surveillance, Epidemiology and Control of Salmonella and other Foodborne Diseases</td>
<td>Telephone No.:  Email:</td>
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<tr>
<td></td>
<td>Dr Tom CHILLER</td>
<td></td>
<td>WHO Collaborating Centre for Surveillance, Epidemiology and Control of Salmonella and other Foodborne Diseases</td>
<td>Telephone No.: +1 404.639.4753 Email: <a href="mailto:tnc3@cdc.gov">tnc3@cdc.gov</a></td>
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<td>OBSEVER</td>
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<td>Dr Bersabel EPHREM</td>
<td>Telephone No. Tel: 613-948-6799 Email: <a href="mailto:bersabel.ephem@phac-aspc.gc.ca">bersabel.ephem@phac-aspc.gc.ca</a></td>
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<tr>
<td></td>
<td></td>
<td>Public Health Agency Of Canada</td>
<td>Centre for Communicable Diseases and Infection Control</td>
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<td></td>
<td></td>
<td>Infectious Disease Prevention and Control Branch</td>
<td>Canada</td>
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## WHO REGIONAL OFFICES

### AFRO
- **Dr Jean Bosco NDIHOKUBWAYO**  
  Regional Advisor  
  Health Systems and Services  
  Brazzaville  
  **Congo**

- **Dr Philippe DOO-KINGUE**  
  Advisor  
  Essential Drugs and Medicines (EDM)  
  Health Systems and Services Cluster  
  Ouagadougou  
  **Burkina Faso**

### AMRO/PAHO
- **Dr Pilar RAMON PARDO**  
  Advisor on Antimicrobial Resistance (AMR)  
  Washington DC  
  **USA**

- **Dr Marcelo GALAS**  
  Specialist  
  Antimicrobial Resistance surveillance  
  Washington DC  
  **USA**

### EMRO
- **Dr Ali R MAFI**  
  Medical Officer  
  Communicable Disease Surveillance Forecasting And Response (CSR)  
  Communicable Disease Control (DCD)  
  Cairo  
  **Egypt**

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<td>Telephone No. :</td>
<td>Email: <a href="mailto:ndihokubwayoj@who.int">ndihokubwayoj@who.int</a></td>
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<td>Telephone No. :</td>
<td>Email: <a href="mailto:dookinguep@who.int">dookinguep@who.int</a></td>
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<td>Telephone No. : +1 202 974 3901</td>
<td>Email: <a href="mailto:ramonpap@who.int">ramonpap@who.int</a></td>
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<tr>
<td>Telephone No. : +1 202 9743 901</td>
<td>Email: <a href="mailto:mafia@who.int">mafia@who.int</a></td>
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<td>EURO</td>
<td>Dr Danilo LO FO WONG</td>
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<td>Dr Jane ROBERTSEN</td>
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<td>Dr Nienke van de SANDE-BRUINSMA</td>
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<td>SEARO</td>
<td>Dr Sirenda VONG</td>
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<td>Dr Babatunde OLOWOKURE</td>
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<td>WHO HEADQUARTERS</td>
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<tr>
<td>DGO</td>
<td>Telephone No.: + +41 22 791 2897 Email: <a href="mailto:mourainschuf@who.int">mourainschuf@who.int</a></td>
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<tr>
<td>Ms Françoise MOURAIN-SCHUT</td>
<td>Senior Legal Officer International Administrative Law Office of the Legal Counsel</td>
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<tr>
<td>Mr Matias TULER</td>
<td>Manager Strategy, Policy and Information</td>
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<tr>
<th>Family, Women and Child Health</th>
<th>Telephone No.: +41 22 791 4575 Email: <a href="mailto:wit@who.int">wit@who.int</a></th>
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<tbody>
<tr>
<td>Dr Theodora Elvira WI</td>
<td>Medical Officer Sexual and Reproductive Health and HIV Reproductive Health and Research</td>
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<tr>
<th>Health Systems and Innovation</th>
<th>Telephone No.: +41 2279 13617 Email: <a href="mailto:amuller@who.int">amuller@who.int</a></th>
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<tr>
<td>Dr Arno MULLLER</td>
<td>Consultant Policy, access and Use</td>
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<tr>
<td>Prof Francis MOUSSY</td>
<td>Scientist Public Health, Innovation and Intellectual Property</td>
</tr>
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<tr>
<th>Non Communicable Diseases</th>
<th>Telephone No.: +41 22 791 1062 Email: <a href="mailto:matheualvarezj@who.int">matheualvarezj@who.int</a></th>
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<tr>
<td>Dr Jorge MATHEU-ALVAREZ</td>
<td>Project Officer Foodborne and Zoonotic Diseases Food Safety and Zoonotic Diseases Department</td>
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<tr>
<th>WHE</th>
<th>Telephone No.: +41 2279 79058 Email: <a href="mailto:oxenfordc@who.int">oxenfordc@who.int</a></th>
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<tbody>
<tr>
<td>Mr Christopher OXENFORD</td>
<td>Technical Officer IHR National Capacity Development Unit Global Capacities, Alert &amp; Response Department</td>
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| MEETING SECRETARIAT | |

<table>
<thead>
<tr>
<th>AMR/ DGO</th>
<th>Telephone No.: +41 22 791 4229 Email: <a href="mailto:sprenger@who.int">sprenger@who.int</a></th>
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<tr>
<td>Dr Marcus SPRENGER</td>
<td>Director Antimicrobial Resistance (AMR)</td>
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<tr>
<th>Name</th>
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<tr>
<td>Dr Carmem Lucia PESSOA-SILVA</td>
<td>Acting Coordinator</td>
<td>Telephone No.: +41 22 79 2844 Email: <a href="mailto:pessoasilvacl@who.int">pessoasilvacl@who.int</a></td>
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<td>Dr Sergey EREMIN</td>
<td>Medical Officer</td>
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<tr>
<td>Dr Jolanta GRISKEVICIENE</td>
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<tr>
<td>Mr Tejinder CHOWDHARY</td>
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<tr>
<td>Dr Elizabeth TAYLER</td>
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<td>Dr Jung Kyu LEE</td>
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<tr>
<td>Dr Muna ABU SIN</td>
<td>Consultant</td>
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<tr>
<td>Ms Breeda HYCKEY</td>
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<tr>
<td>Mrs Mawuto FIAWOO-MARKHAM</td>
<td>ADMINISTRATIVE SUPPORT</td>
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Annex 2: Meeting agenda.

Meeting of the WHO Collaborating Centres
to support AMR activities globally
13-14 December 2016
Geneva, Switzerland, WHO HQ
Salle B

Tentative Agenda

<table>
<thead>
<tr>
<th>Time</th>
<th>Session Description</th>
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<tbody>
<tr>
<td>13:00-13:30</td>
<td>Registration</td>
</tr>
<tr>
<td>13:30-13:40</td>
<td>Welcome and introductions</td>
</tr>
<tr>
<td>13:40-14:00</td>
<td>Meeting format, objectives and desired outcomes</td>
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<td>Meeting rules and procedures</td>
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<td>Selection of chair</td>
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<td>Format and desired outcomes</td>
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<tr>
<td>14:00-14:20</td>
<td>GAP overview</td>
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<td>Marc Sprenger</td>
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<tr>
<td>14:20-14:30</td>
<td>Discussion</td>
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<tr>
<td>14:30-14:50</td>
<td>GLASS overview and planned next steps</td>
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<td></td>
<td>Carmem L. Pessoa-Silva</td>
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<tr>
<td>14:50-15:00</td>
<td>Discussion</td>
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<tr>
<td>15:00-15:30</td>
<td>Coffee break</td>
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<tr>
<td>15:30-16:30</td>
<td>Ways of working with individual CCs and through networking</td>
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<tr>
<td></td>
<td>Matias Tuler (WHO Collaborating Centres Secretariat)</td>
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<tr>
<td>16:30-17:30</td>
<td>Priority areas of work and planned activities and products overview</td>
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<td>Sergey Eremin</td>
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<td>17:30</td>
<td>Meeting adjourns</td>
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<td>Time</td>
<td>Session Description</td>
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<tr>
<td>9:00-10:30</td>
<td>Contribution of CCs to planned activities and products</td>
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<td>Open discussion – Facilitator: Chair (TBD)</td>
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<td>10:30-11:00</td>
<td>Coffee break</td>
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<tr>
<td>11:00-12:30</td>
<td>Agreed inputs to be provided from each CC to activities and products</td>
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<td>Open discussion – Facilitator: Chair (TBD)</td>
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<td>12:30-13:30</td>
<td>Lunch break</td>
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**SESSION 4: GLASS WHO Collaborating Centres Network: ways of working**

<table>
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<th>Time</th>
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<tr>
<td>13:00-15:00</td>
<td><em>How do we work together? The network communications and modus operandi</em></td>
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<td>Open discussion – Facilitator: Chair (TBD)</td>
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<tr>
<td>15:00-16:30</td>
<td>Presentation of Terms of Reference (TORs) of GLASS CC Network</td>
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<td>16:30-16:45</td>
<td>Coffee break</td>
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<td>16:45-17:00</td>
<td>Conclusions and next steps</td>
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<td>Chair (TBD)</td>
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<tr>
<td>17:15</td>
<td>Meeting closes</td>
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<tr>
<td>18:30</td>
<td>Working Dinner</td>
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