1. Purpose of the APW
Production of a draft technical note on the application of molecular methods to support implementation of Antimicrobial Resistance (AMR) surveillance.

2. Background
a. Antimicrobial resistance (AMR) in a wide range of infectious agents is a growing public health threat of huge concern to countries and many sectors. Especially alarming is the rapid global spread of multi-resistant bacteria that cause common infections and that resist treatment with existing antimicrobial medicines.

b. In May 2015 the World Health Assembly approved a global action plan to combat AMR. This action plan reflects a global consensus of countries, organizations, multiple sectors including key partners such as the Food and Agriculture Organization of the United Nations (FAO) and the World Organization for Animal Health (OIE) and civil society and was adopted at the sixty-eighth World Health Assembly in May 2015. It sets out five strategic objectives: (1) to improve awareness and understanding of AMR; (2) to strengthen knowledge through surveillance and research; (3) to reduce the incidence of infection; (4) to optimize the use of antimicrobial agents; and (5) to ensure sustainable investment in countering AMR.

c. WHO developed the Global Antimicrobial Resistance Surveillance System (GLASS), it aims to support the implementation of the Global Action Plan on AMR (GAP-AMR), and specifically the GAP-AMR strategic objective to strengthen the knowledge and evidence base through surveillance. Having all countries able to capture and share information with a global AMR surveillance system is key to inform local and global strategies to contain AMR.

d. The goal of GLASS is to enable integrated analysis of standardized, comparable and validated data on AMR to be shared with countries and inform strategies to tackle AMR locally, regionally and globally. GLASS aims to foster national surveillance systems and will gather AMR surveillance information provided by the national governmental bodies. Currently more than 40 countries are participating in GLASS. More information on GLASS is available at [http://www.who.int/antimicrobial-resistance/global-action-plan/surveillance/glass/en/](http://www.who.int/antimicrobial-resistance/global-action-plan/surveillance/glass/en/).

e. The detection and reporting of microbiological markers currently used in GLASS are based on the phenotypic expression of AMR. Molecular methods for detection of AMR markers can be used to enhance AMR surveillance. The potential application of various molecular methods to support AMR surveillance and GLASS need to be evaluated for costs, benefits and drawbacks. A SWOT analysis of the current landscape of molecular methods application to AMR surveillance with clear outcomes could be very useful to inform how the information obtained through these methods could be incorporated in GLASS.
1. **Planned timelines** (subject to confirmation)
   
   Start date: 22/09/2017.
   
   End date: 15/12/2017.

2. **Work to be performed**

   **Output 1:** WHO technical note to inform GLASS and countries on the application of molecular methods for antimicrobial surveillance. Evaluation of various molecular methods for AMR surveillance, describing benefits, costs and drawbacks of existing methods and their application to support AMR surveillance.

   **Deliverable 1.1:** A technical note on the application of existing molecular methods, including SWOT analyses of individual methods and comparative assessment, to support AMR surveillance.

3. **Timeline:**
   - **Start of project:** 22/09/2017
   - **Developing drafts**
   - **Submitting to WHO Collaborating Centres technical leads (Neil Woodford, Monica Lahra, Roman Kozlov) for feedback:** every 2 weeks
   - **Finalisation of draft document following feedback:** 30/11/2017
   - **Submission of final draft to WHO CC technical leads:** 01/12/2017
   - **Final amendments as requested by WHO CC technical leads and WHO GLASS Secretariat:** 15/12/2017

4. **Methodology for desk review:**
   - The technical guidance should be produced as a Word document
   - WHO will have ownership of the product.
   - All references should be cited using Endnote
   - All references cited should be provided as PDF files together with a hyperlinked Index in either Word or Excel format.
   - Supervision will be provided on a regular basis by technical leads, with whom it will be required to work closely for development of the technical guidance.
   - Size of document: Approximately 20-30 pages, including references, annexes, etc.

5. **Technical note to include the following content:**
   - Brief introduction and background to GLASS, with a description of the need for molecular methods to enhance GLASS.
   - Landscape analyses of various molecular methods for consideration, including any relevant ones from the current innovation pipeline, as molecular methods are evolving rapidly.
   - A detailed SWOT analysis of various molecular methods for potential application in AMR surveillance. For each selected method a description and analysis of costs, benefits, drawbacks and considerations for sustainability. Summary table of the SWOT outcomes.
   - The practical aspects of potential implementation of these methods in limited resource countries, the challenges and benefits.
   - Use of Whole Genome Sequencing (WGS) and Next Generation Sequencing (NGS) for global AMR surveillance purposes
   - Considerations for selection of potential molecular methods for pilot testing for GLASS purposes
The technical note must be applicable to GLASS and to low and middle income countries and applicable to the bacteria in WHO Priority Pathogens List (PPL), the current list of 8 select organisms for GLASS and emerging types of bacterial resistance (list to be provided by GLASS Secretariat).

6. Technical Supervision
The incumbent will work under the technical supervision of three WHO CC technical leads:

- Prof Monica Lahra: WHO Collaborating Centre for Sexually Transmitted Diseases, Australia
- Prof Neil Woodford: WHO Collaborating Centre for Reference and Research on Antimicrobial Resistance and Healthcare Associated Infections, UK
- Prof Roman Kozlov: WHO Collaborating Centre for Capacity Building on Antimicrobial Resistance Surveillance and Research, Russia

WHO staff responsible for this agreement of performance of work (APW) are:

<table>
<thead>
<tr>
<th>Responsible Officer:</th>
<th>Dr Sergey Eremin, Medical Officer, HQ/DGO/AMR Secretariat</th>
<th>Email:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manager:</td>
<td>Dr Carmem Pessoa, AMR Coordinator a.i., HQ/DGO/AMR Secretariat</td>
<td>Email:</td>
</tr>
</tbody>
</table>

7. Specific requirements

Qualifications required:

- Advanced degree in microbiology/molecular biology.

Experience required:

- Experience in microbiology/molecular biology
- Experience in molecular detection of antimicrobial resistance
- International experience in the public health domain.
- Experience in low and/or middle income countries (as per World Bank classification)

Skills / Technical skills and knowledge:

- Experience in developing technical reports and documents including in the field of AMR and molecular biology.
- Excellent written skills.

Language requirements:

- Excellent knowledge of English.

Interested candidates should send an expression of interest (cover letter) and availability, a CV and indication of a daily rate in USD to:

glass@who.int

The deadline for receiving applications is 8 September 2017.