# AMR in the Global Setting Workshop

# Workshop Report

## 1. Background

The research councils, along with other UK funders, have been working together to identify a number of research opportunities and challenges to tackling the rise in AMR. A cross-council initiative was launched in June 2014 (www.mrc.ac.uk/amr) that would foster collaboration and information-sharing between diverse stakeholders, and allow access to resources to help develop and deliver new ways to prevent and treat resistant bacteria.

Funders have therefore identified four key themes to target investments over the next five years. These themes would foster collaboration between diverse disciplines and share information across the public and private sectors. This would allow access to tools, compound libraries, datasets and screens to acquire new insights into the emergence and spread of antibiotic resistant bacteria, the evolution of resistance and to drive the discovery of new diagnostic, preventative and therapeutic strategies for bacterial infections particularly antibiotic resistant strains.

The four themes identified were:
**Theme 1:** Understanding the resistant bacteria
**Theme 2:** Accelerating therapeutic and diagnostics development
**Theme 3:** Understanding the real world interactions
**Theme 4:** Behaviour within and beyond the healthcare setting

The research councils have so far committed £40m under the four themes including £6.2m provided by EPSRC to support 11 networks to build links between the engineering and the physical sciences and the biomedical health communities in a call named 'Bridging the Gap'.

Beyond the research councils, discussions with other funders have been taking place with the Department of Health and DEFRA investing in theme 4 and the Medical Research Foundation investing in training across all themes.

The next call/s to be run as part of the Cross-Council AMR Initiative will be supported by the Global Challenges Research Fund. This workshop was organised to discuss the key challenges in ABR in the global and LMIC setting to scope the aims of the next call to be launched early 2017.

## 2. Format of the Workshops

The aims of the workshop were to:

- discuss the priority areas for research in LMICs,
- highlight topics where meaningful gains could be achieved with limited resources,
- discuss appropriate funding models to achieve these research aims.

Following an introductory presentation, the participants split into 3 groups to discuss 4 topics:
a. Areas of research opportunities and impact
b. Developing capacity and capability
c. Encouraging interdisciplinary research
d. Building collaboration
followed by plenary feedback sessions.

Further details can be found in the Annex 1: Agenda and Annex 2: Attendees.

## 3. Breakout sessions and group discussions

Three breakout sessions covering the four topics highlighted above provided opportunities for delegates to discuss and propose the different challenges and opportunities for ABR research in LMICs. A rapporteur from each group summarised the outcomes from these discussions.

Breakout session 1: Areas of research opportunities and impact
The participants discussed the areas of unmet need in LMIC settings likely to have the greatest impact on ABR.

Breakout session 2: Developing capacity and capability
The participants discussed what is needed to meet the challenge in terms of understanding the local landscape, infrastructure, people and cost.

Breakout session 3: Encouraging interdisciplinary research and building collaboration
The participants discussed the need for interdisciplinary research, how it should be framed and how to initiate or develop collaborations.

## 4. Research challenges

- **Overarching Themes**

The working group reaffirmed the Research Council's general approach in funding both small high risk high gain projects and large collaborative investments.

There was strong consensus that further encouraging interdisciplinarity is essential. Single discipline research remains of high importance also and clear guidance should be provided as to whether it fits within future funding calls as part of the initiative and what other funding routes are available.

- **Areas of research opportunities and impact**

Participants agreed that taking a holistic view of AMR is essential if we are to understand it's ecology from a global perspective. This will therefore require further exploration of interdisciplinary research areas to join up the relevant disciplines. Making funding available to encourage the development of new interdisciplinary collaborations would be highly beneficial to the research community to allow time to explore and prepare novel proposals in AMR.

In moving to the global setting, there was strong consensus that research must be undertaken to understand the scale of the problem. This will help direct future interventions to the pathogens of greatest importance to human and animal health. To do this research must move beyond the identification of resistance genes and link the prevalence of resistance to clinical or proxy data. To interrupt the transmission of AMR it will be important to understand the drivers. For example, there is great publicity around the issue of antimicrobial overuse and misuse but very little mechanistic understanding of how this affects the spread and burden of medically and economically important AMR. Antibiotic overuse is a term widely used, however with no formal definition. A global understanding of what this term means and at the same time working towards increasing access to antibiotics in areas that require it form an essential part of the solution.

Modelling will be required to pull together the complex array of data collected as part of this One Health approach. These models will be crucial for understanding the ecology and drivers of AMR. In addition there is opportunity here to take a retrospective look to understand the

successes and failures of historical behaviour and policy changes in different settings and importantly why any succeeded or failed.

It was felt that more can be done to address the economic issues around AMR. This goes beyond the issue of pharmaceuticals lack of profit margins affecting their drive to discover new drugs. Current pathogen/resistance testing kits that are commercially available are 10 times the cost of the antibiotics, meaning there is no economic incentive to test prior to treatment. Better diagnostics to quickly and cheaply differentiate between bacterial and viral infections and beyond that move towards the identification of species/strain and resistance profiles require fast-tracking to the commercial market with fully developed incentive plans in place. This could be via subsidies and education programs. Again with antibiotics available so cheaply, overuse in the food production industry is widespread with little or no incentives to change practice. Efforts to curb overuse must be coordinated on a global scale.

Throughout future research, more can be done to understand AMR challenges on the ground and maintain end user involvement to ensure real world feasibility. This could be via the inclusion of an end user throughout or engaging with end users at specific check points during research projects.

- **Developing capacity and capability**

The UK research base is highly diverse and strengths exist outside the biomedical fields that are essential to addressing AMR in a holistic manner. Identifying and reorienting these existing strengths (health economics, anthropology, medical statisticians, geographers, interdisciplinary, etc.) in particular towards AMR in the LMIC context should be encouraged to build on the existing efforts made by the UK AMR funders.

The participants highlighted that long term surveillance capacity (infrastructure, personnel and technology) in the global setting is essential to understand the current landscape and assess the impact of future interventions. To ensure that these surveillance systems are set up in a meaningful way to inform such future endeavours, it is critical that consideration is made and a consensus reached of what surveillance data is required and how best to collect it. Data capturing in the field could be greatly advanced by the development of better diagnostics and mobile technology. To complement the technology, background research is needed to inform the resolution/spatial scales to be used for data capturing with the added consideration of the resolution of pathogen scales and pathogen grouping.

To maximise outputs of existing and future efforts it will be important to share both expertise and data globally. Where experienced personnel exist in one area but are lacking in another, both training and collaborative working should be encouraged. Regional hubs would allow larger areas to feed into a centralised facility for sample storage and data analysis. Beyond that, Biobanking would be a valuable resource to provide arrays of samples for application in different research agendas.

Finally, modelling has been identified as playing an important role in analysing the vast array of data required to understand the ecology of AMR (lab data, syndromic data, hospital prescribing, clinical outcomes, linking to agricultural data, antifungals, vaccine uptake, etc.). Developing capacity and capability for these models can begin now to consider the interplay of the data collected.

- **Encouraging interdisciplinary research and building collaboration**

Building interdisciplinary and collaborative research projects would benefit from specific funding to allow the research community time to develop their ideas. This could be done via two tiered funding to firstly bring people together and develop the research question, followed by further

funding to conduct the research. Alongside this, any measures to encourage institutional capacity and career flexibility would help to ensure that universities are supportive of this style of working.

Further encouragement could be made by running networking events, sandpits and wider advertising of calls reaching beyond the biomedical research communities. To ensure the non-biomedical communities buy-in to AMR, they could be strongly directed to lead interdisciplinary research projects even if they do not represent the dominant research topic.

Where funding is being directed specifically towards interdisciplinary research, it would be beneficial to explain what degree of interdisciplinarity is expected and how this is defined. Further to this, clear briefs should be provided for assessment panels on how to evaluate interdisciplinary proposals; this could be via a multiple weighted scoring system.

## 5. Concluding Remarks

Following these discussions, the Research Councils concluded the meeting by summarising the major points and thanked the attendees for helping to shape the upcoming funding agenda. Points raised in this workshop will feed into the development of the next funding round to be launched early 2017.

## 6. Further Information

If you have any further questions please contact: AMR@headoffice.mrc.ac.uk

Or visit: http://www.mrc.ac.uk/research/initiatives/antimicrobial-resistance/

This Cross Council initiative is supported by:

- Arts & Humanities Research Council (AHRC)
- Biotechnology and Biological Sciences Research Council (BBSRC)
- Engineering and Physical Sciences Research Council (EPSRC)
- Economic and Social Research Council (ESRC)
- Medical Research Council (MRC)
- Natural Environment Research Council (NERC)
- Science and Technology Facilities Council (STFC)

# Annex 1: Agenda

**AMR Cross Council Initiative phase 2 – A challenge-led approach Working group**

13th October 2016, 12-4pm Ampthill Suite, Grand Connaught Rooms 61-65 Great Queen St, London WC2B 5DA

Agenda

| Subject | Paper / presentation |
|---|---|
| **Steering Group (closed meeting)** | 12:00-12:45pm |
| 1. Welcome and Introductions | Oral |
| 2. Roundtable update | Oral |
| 3. ToR – sign off | Paper |
| 4. Cross council initiative update and next steps | Paper |
| **Working Group meeting** | 1:00-4:00pm |
| 1. Welcome and Introductions | Oral |
| 2. Background and aims of the WG | Paper and Oral |
| 3. AMR research in context of Global Health<br>a. Areas of research opportunities and impact<br>b. Developing capacity and capability<br>c. Encouraging interdisciplinary research<br>d. Building collaboration | Discussions |
| 4. AMR cross council initiative – summary and next steps | Oral |

Lunch will be provided from 12pm

# Annex 2: Attendees

**Steering group**
Prof Herman Goossens (Chair)
Prof David Armstrong
Prof Alastair Macdonald
Prof Duncan Maskell (apologies received)
Prof Rachel McKendry - TC
Dr David Payne - TC
Prof Sharon Peacock
Dr Jared Silverman – TC
Prof Richard Smith - (apologies received)
Prof Elizabeth Wellington - (apologies received)

**Additional Experts**
Prof David Armstrong
Prof Chris Butler
Prof Joanna Coast
Prof Jon Cooper
Prof Neil Ferguson
Prof Eric Févre - TC
Prof Stephen Gordon - TC
Prof Alison Holmes
Dr Helen Lambert
Dr Hayley MacGregor
Prof Adrian Mulholland
Prof Bertie Squire
Prof Mark Woolhouse

**Funders**
Naomi Beaumont, ESRC
Annette Bramley, EPSRC
Sue Craver, AHRC
Sarah Harding, MRC
Caroline Harris, MRC
Ruth Kelly, DH
Sam Lambshead, AHRC
Helen Pearce, NERC
Jonathan Pearce, MRC
Sian Rowland, BBSRC
Marta Tufet, DH/Wellcome
Christina Turner, EPSRC
Penny Walker-Robertson, DH
Ghada Zoubiane, MRC