

Biochemical Society response to the Health and Social Care Committee's inquiry into how the Government is responding to the challenge of Antimicrobial Resistance

Summary:

Antimicrobial Resistance remains a formidable global health threat which cannot be tackled without global collaboration, focussed investment into research and development and effective antimicrobial stewardship across all areas of health, aqua- and agriculture and the environment. AMR is multifaceted and will require collaboration across multiple disciplines and sectors if it is to be effectively mitigated. Any research and investment initiatives employed to combat AMR should be mindful of the broad spectrum of issues and operate a One Health Approach.

What should be the key actions and priorities for the Government's next AMR strategy, due to be published at the end of this year?

1. Investment into AMR Research and Development

- 1.1. **Establish a sustainable model to incentivise industry to invest in antimicrobial research and development (R&D).** This has been the subject of a wide ranging discussions and publications, including the O'Neill Report¹ and 2016 AMR Industry Declaration², 2016 AMR Industry Roadmap³ and a 2017 Policy Position Statement from the International Federation of Pharmaceutical Manufacturers and Associations⁴. The threat of AMR will not subside without long-term, sustainable investment by Industry, yet investment into R&D for new antimicrobials remains low due to the limited financial return gained in comparison to developing pharmaceuticals for chronic non-communicable disease. Figures released in 2017 by the World Health Organization (WHO) showed that the current pipeline for AMR is insufficient to treat a number of high priority pathogens, including Tuberculosis and *Clostridium difficile*⁵. It is essential that the Government develops a sustainable model to incentivise Industry to invest in the R & D of new antimicrobials and that it provides support to small and medium enterprises who are researching and developing new antimicrobials. Ultimately, it is vital that any models adopted work globally and not just within the UK. The Society calls upon the Government to increase global collaboration in this area. The UK is in

¹ https://amr-review.org/sites/default/files/160525_Final%20paper_with%20cover.pdf

² <https://www.ifpma.org/resource-centre/declaration-by-the-pharmaceutical-biotechnology-and-diagnostics-industries-on-combating-antimicrobial-resistance/>

³ <https://www.ifpma.org/resource-centre/industry-roadmap-for-progress-on-combating-antimicrobial-resistance/>

⁴ http://partnerships.ifpma.org/uploads/documents/218_1485276320.pdf

⁵ <http://apps.who.int/iris/bitstream/handle/10665/258965/WHO-EMP-IAU-2017.11-eng.pdf;jsessionid=33A3F3C385F5B8C526C2A1A4F701285E?sequence=1>

a strong position to take a global lead on this as it did with the commissioning of the O'Neill Review, encouraging other nations to follow suit.

- 1.2. **Continue to invest in global approaches to antimicrobial R&D** and continue to inject funding into schemes such as CARB-X (Combatting Antibiotic Resistant Bacteria and Biopharmaceutical Accelerator) and GARDP (Global Antibiotic Research and Development Partnership). There are a number of schemes the UK could provide additional funding to, such as The AMR Centre and follow-up schemes to the innovative medicines initiative (IMI). It is vital the UK continues to invest in European R&D following our exit from the European Union, the threat of AMR is a global issue and as such, any Government investment into R&D must reflect this.
- 1.3. **Investment into the development of Vaccines and alternatives to antimicrobials.** Vaccines and alternatives to antimicrobials remain a promising therapeutic route in combatting AMR and these areas should continue to receive high levels of investment.
- 1.4. **Incentivise the investment in and development of point of care / rapid diagnostics.** Point of Care and Rapid Diagnostics have the potential to provide targeted and accurate use of antibiotics and reduce their unnecessary use. By concluding an infection is bacterial or viral in the clinic or field at the point of care would dramatically reduce the administration of antibiotics for viral infections. Additionally, diagnostics have the potential to identify resistant strains of bacteria, allowing for a targeted therapeutic approach, thus reducing the administration of antibiotics for infections where the pathogen may already be resistant to particular classes of antibiotics.
- 1.5. **Incentivise academia to become more involved in translating basic research into new antimicrobial treatments.** Academics at universities and research institutions are a critical resource in the hunt for new antibiotic treatments, development of diagnostic tools and our understanding of the mechanisms and drivers of AMR. There is a wealth of untapped AMR research hidden within UK universities. However, researchers often encounter difficulties when attempting to translate their research into commercial treatments. Often this is due to uncertainties by principal investigators on how to engage with enterprise activities, insufficient enterprise funding within institutions or past IP disclosure rendering new patents and industrial development considerably less likely. Government must offer incentives to ensure a timely release and commercial development of research associated with AMR. For government-funded research into AMR, the conditions of the award could include clauses to ensure protection of IP and commercial development. For example, grant recipients could have their data and potential IP scrutinised and signed off by a commercial organisation specializing in the area of AMR research and development before any potential disclosure. Penalties could potentially be applied for any disclosure that could jeopardise potential patent positions and the ability develop the research commercially.



2. Continue to employ a One Health Approach⁶. The threat of AMR is multi-faceted and requires interdisciplinary and intersectional collaboration globally. It is important that any strategies to combat AMR consider their implications for health, agriculture and the environment. Strategies also need to be mindful that AMR is not limited to just antibiotic resistance in healthcare and agriculture but that there are also significant problems with resistance found in other microbes, such as anti-fungal resistance within agriculture, which have often been overlooked⁷. Improvements to address AMR in one sector could be masked completely if AMR is not addressed in others.

3. Implement behavioural strategies to improve AMR awareness and Antimicrobial Stewardship. The overuse of antibiotics and other antimicrobials has been linked to the increase in antimicrobial resistance. Going forward, it is vital that antimicrobials are used sparingly and only where necessary. To achieve this, it is essential that antimicrobial stewardship is improved across healthcare and agriculture and that any implications to the environment are identified and addressed appropriately. Key steps will include:

3.1. Placing a key focus on improved antimicrobial stewardship via the NHS and the establishment of the NHS training networks within the UK. There is the potential for these training networks to provide global consultancy services to international healthcare providers.

3.2. Increased educational strategies to improve public awareness and understanding of AMR. It is imperative that the public are engaged with the threat of AMR and the strategies that can be utilised in everyday life to prevent AMR, such as regular hand-washing and good hygiene practices. Specifically, it is important for common misconceptions to be addressed, including for example the difference between bacterial, fungal and viral infections and what types of medicines are effective against each, as well as the fact that it is microbes that are becoming resistant to antimicrobials rather than humans⁸. This understanding would highly improve the patient experience and reduce unnecessary demands for antibiotics.

3.3. Focus on education to improve understanding of and uptake of vaccines. The recent outbreaks of measles across Europe has been linked to decreased uptake of vaccines, the Measles, Mumps and Rubella, MMR, in particular.⁹ There remain small, but significant pockets of distrust regarding vaccinations across the British public and it is imperative that communication strategies are put in place to restore this trust in vaccinations to avoid the spread of preventable infections in the future.

⁶ <http://www.who.int/features/qa/one-health/en/>

⁷ <https://www.frontiersin.org/articles/10.3389/fmicb.2017.01024/full>

⁸ See for example <https://inews.co.uk/news/science/antifungal-resistance-fungal-infection-treatment-research/>

⁹ <https://www.gov.uk/government/publications/measles-confirmed-cases/confirmed-cases-of-measles-in-england-and-wales-by-region-and-age-2012-to-2014>

- 4. Increased regulation of responsible manufacturing of antimicrobials.** The manufacturing of antimicrobials needs to be regulated more stringently, especially the manufacture of generic antimicrobials. It is essential that the impact of pharmaceutical pollution is properly understood, strictly regulated and minimised wherever possible. The leakage of antimicrobials into the environment results in increased exposure of antimicrobials and a higher incidence of resistance. The UK Government can contribute to this by ensuring that all antibiotics and drugs purchased by the NHS are produced under GMP conditions and under non-polluting conditions that have been regularly inspected by the relevant authorities.

The Biochemical Society welcomes The Health and Social Care Committee's Inquiry into Antimicrobial Resistance and we are pleased to have the opportunity to share a number of comments and concerns of our members.

For any queries, please contact the Science Policy Team at the Biochemical Society, Charles Darwin House, 12 Roger Street, London, WC1N 2JU. Email: policy@biochemistry.org

About the Biochemical Society:

The Biochemical Society promotes the future of molecular biosciences; facilitating the sharing of expertise, supporting the advancement of biochemistry and molecular biology, and raising awareness of their importance in addressing societal grand challenges.

We achieve our mission by:

- Supporting the next generation of biochemists; promoting the opportunities offered by biochemistry and molecular biology through education and training from age 15 upwards
- Bringing together molecular bioscientists; fostering connections and providing a platform for collaboration and networking across our membership and the wider community to ensure a strong future for molecular biosciences in both academia and industry
- Promoting and sharing knowledge; enabling the circulation of scientific information through meetings, publications and public engagement to support innovation, inform decision-making and advance biochemistry and molecular biology
- Promoting the importance of our discipline; highlighting the role of molecular biosciences in interdisciplinary and translational research, while supporting the fundamental research that underpins applied studies.