# Policy Matters

Tackling antimicrobial resistance through rapid diagnostics

Emma Sykes (Science Policy Officer, Biochemical Society)

Antimicrobial resistance (AMR) is a growing global concern; the ability of microorganisms to resist the action of one or more antimicrobial agents is posing a significant threat, not only to our individual health, but also to the integrity of many standard medical interventions. Without effective antimicrobials, the return to a 'pre-biotic era' is quite possible, rendering intensive medical therapies such as surgery, chemotherapy and organ transplantation almost unachievable.

The surge in antibiotic resistance has caused particular alarm as the number of drug resistant bacteria is increasing exponentially. The Review on Antimicrobial Resistance (O'Neill Review), which published its final report in 2016, estimated approximately 700,000 people a year die from AMR infections and warns this figure could reach 10 million by 2050 if the current trend is not halted. In order to control AMR, both the World Health Organisation (WHO)

and G20 health ministers have emphasized the need to decrease exposure of antimicrobials, and reduce their unnecessary use within both healthcare and agriculture. Accurate diagnosis is seen as paramount in reducing AMR. Currently, the timeframe for establishing the cause of an infection is 3-4 days, and the tests are both costly and time-consuming. A lack of reliable and timely diagnostics has resulted in countless inappropriate antibiotic prescriptions, leading to a general overuse and overexposure of antibiotics globally. This in turn has led to a greater level of AMR. The surge in multi-resistant strains of microbes led to the World Health Organisation calling for an expansion in the current Research and Development (R&D) pipeline of both new classes of antibiotics and rapid diagnostic techniques. As new classes of antibiotics are few and far between, the challenge of combatting AMR falls heavily on diagnostic methods and improving antimicrobial stewardship.
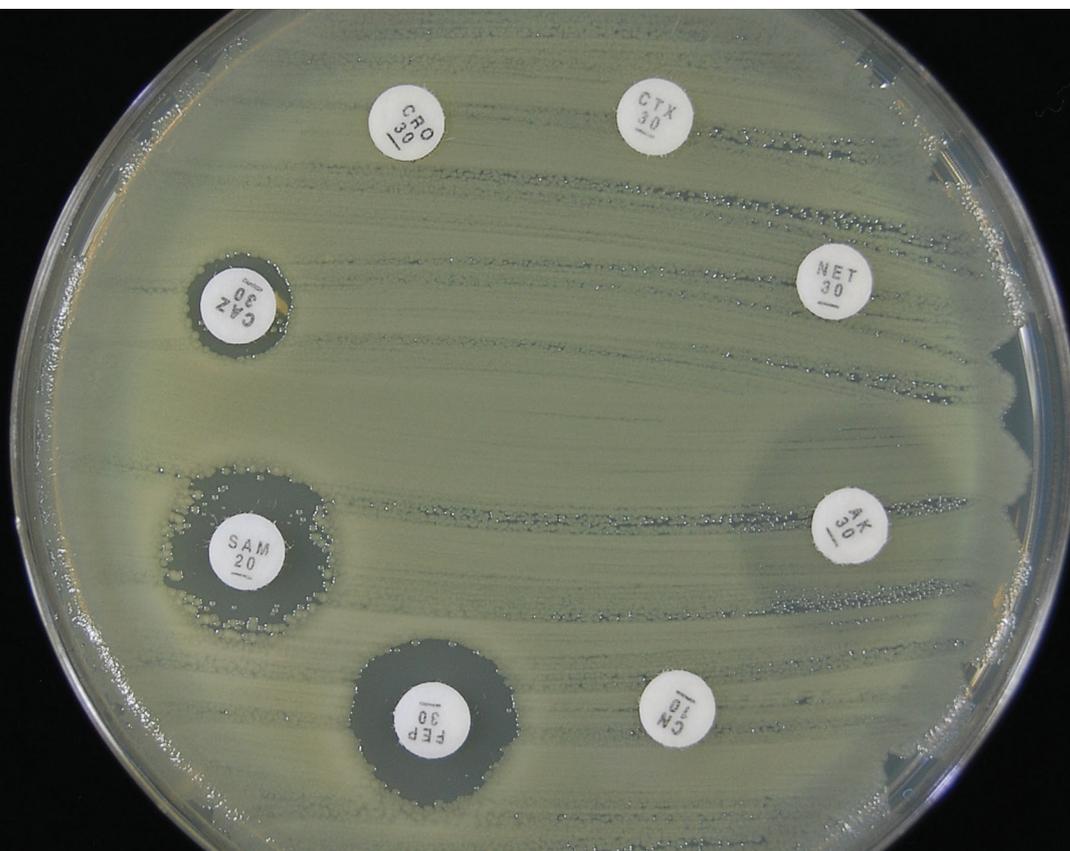
The potential for diagnostic techniques to help combat AMR is huge, but at the moment this potential is not being realised. As part of World Antibiotic Awareness week in November 2017, the Biochemical Society, in partnership with the Learned Societies Partnership on Antimicrobial Resistance (LeSPAR), convened a one-day workshop specifically focussed on the challenges facing the development of rapid diagnostics to tackle AMR.

LeSPAR was established following the Antimicrobial Resistance Strategy published by the Department of Health in 2013, and the then Prime Minister, David Cameron's statement that antimicrobial resistance threatens to cast medicine 'back into the dark ages'. The partnership is made up of seven learned Societies, including the Biochemical Society, with the aim of sharing information, promoting evidence-based knowledge, and providing a voice for the 75,000 scientists that make up their collective membership.

Our recent workshop was aimed at Early Career Researchers and brought together an interdisciplinary field of experts and delegates to discuss the challenges facing diagnostics for AMR, and ways in which we can combat and overcome these obstacles.

Professor Rosanna Peeling from the London School of Hygiene and Tropical Medicine kicked off the day with an overview of the importance of diagnostics in tackling and reducing the global burden of AMR. Delegates were then exposed to the far reaching implications of AMR, with speakers delving into the depth and breadth of the issue across a wide range of disciplines. Talks spanned from discussing the successes, failures and consequences of rapid diagnostics in the fight against malaria in developing countries with Dr Bhargavi Rao, from the Médecins Sans Frontières, to the complexities in the path from bench to bedside with Professor David Persing from Stanford University.

'Interdisciplinary Collaboration' was the theme of the day, and delegates were encouraged to think outside the box and consider the broader impact of diagnostic research, and how it can be utilised in society. Delegates were split into interdisciplinary groups and were encouraged to share expertise to design a hypothetical funding call for AMR, focussing on not just the scientific challenges, but the individual challenges faced by Early Career Researchers wanting to progress in this field.

A number of key themes emerged from the workshop, and the final wrap-up session saw a focus on developing basic research and knowledge, promoting wider stakeholder engagement and methods to supporting ECR career development. All with a focus on promoting the approach of One Health, through interdisciplinary collaboration and promoting behavioural change.

Dr Jessica Boname, from the Medical Research Council, closed the day by providing an overview of the upcoming opportunities available for ECRs. A summary of the discussions has been collated by the representatives of LeSPAR, and the partnership presented the outcomes of the workshop, along with their recommendations to the Medical Research Council in January 2018. ∎

LeSPAR is a partnership between the following Learned Societies:

Biochemical Society, British Society for Antimicrobial Chemotherapy, British Pharmacological Society, Royal Society of Chemistry, Royal Society of Biology, Microbiology Society, and the Society for Applied Microbiology

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Further reading

- News from DNAe www.dnae.com/news.html
- Tackling drug-resistant infections globally: final report and recommendations. The review on antimicrobial resistance. Chaired by Jim O'Neill https://amr-review.org/sites/default/files/160525_Final%20paper_with%20cover.pdf
- Health First Europe website - White Paper on rapid diagnostic technologies to tackle AMR http://healthfirsteurope.org/uploads/Modules/Newsroom/white-paper---final-version.pdf
- NIH - Antimicrobial Resistance Diagnostic Challenge website https://dpcpsi.nih.gov/AMRChallengeSemifinalists
- How many bacteria vs human cells are in the body? American Microbiome Institute website www.microbiomeinstitute.org/blog/2016/1/20/how-many-bacterial-vs-human-cells-are-in-the-body