Microbial technology: a further preview of this year's BSMT conference

This year's British Society for Microbial Technology Annual Microbiology Conference will be held on 11 May at the RAF Museum in Hendon, North London. Here, BSMT Chair Dr Mark Wilks continues his preview of the programme and introduces two more themes of the meeting.

The following is the second of two articles previewing the Annual Scientific Conference of the British Society for Microbial Technology (BSMT), which this month covers further aspects of antimicrobial resistance (AMR) and also childhood respiratory infections.

Global problem of AMR

In the previous article[1] we highlighted problems in predicting the number of deaths that might be caused by unsuccessful treatment of AMR infections by 2050; however, what is not in dispute is that up to 90% of all deaths related to AMR are predicted to come from Africa and Asia. What are the particular problems with low- and middle-income countries (LMIC) that might account for this?

It's often said that the reasons behind a particular problem are multifactorial to disguise the fact that we actually don't know what the reasons are, but this is certainly not the case with AMR and LMICs. Here, a number of factors have been identified and supported by clear data, even if the relative importance of each one is not clear.

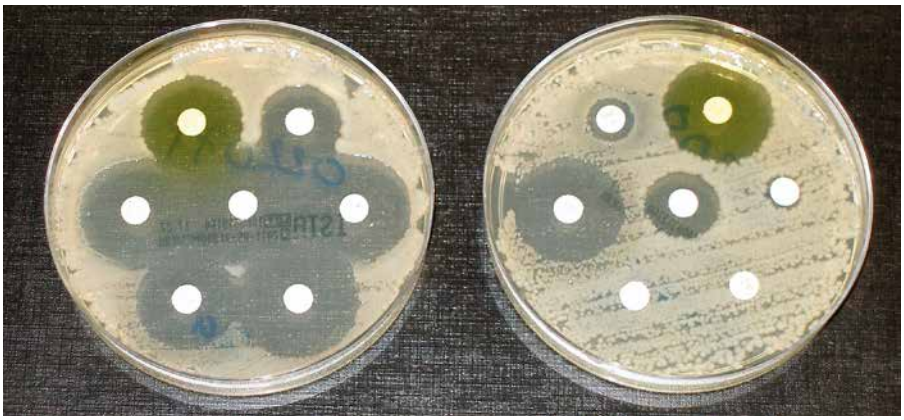
First, it is certainly true that there is a lack of investment in new antimicrobial agents while pharmaceutical companies prioritise the development and marketing of medications targeted at the long-term treatment of chronic diseases such as hypertension. It obviously makes more sense to spend $1 billion on bringing to market a medicine for long-term use rather than an antimicrobial agent that might only be prescribed for a week. Furthermore, there is nothing specific about LMICs in this context, rather our interest is on finding out why newer drugs such as quinolones and cephalosporins with improved pharmacokinetics that are widely available seem to be misused.

It is certainly true that in many LMICs antimicrobial agents are readily available over the counter, but arguably this is overemphasised and it's worth remembering that this was pointed out by Alexander Fleming in his Nobel acceptance speech in 1945: "The time may come when penicillin can be bought by anyone in the shops. Then there is the danger that the ignorant man may easily underdose himself and by exposing his microbes to non-lethal quantities of the drug make them resistant".

It's not just the 'ignorant man' at the shop, and the over-the-counter purchase though. According to World Health Organization (WHO) data, nearly 80% of drugs that have been prescribed in developing countries were prescribed by someone with no educational background in dispensing medications.

In addition, many of these drugs are adulterated and may contain only a minimal amount of the named therapeutic agent. This can mean that conditions are treated with a low concentration of an antimicrobial agent providing the ideal conditions for the development of resistance.

The incorrect use of antimicrobial agents for example in the treatment of coughs, colds and viral upper respiratory tract infections remains much more



Dr Graham Beards / en.wikipedia CC BY-SA 4.0 Wikimedia Commons

Antimicrobial resistance is an evolving issue, as demonstrated by the results shown here. Bacteria in the culture on the left are sensitive to the antibiotic impregnated in the discs, while the bacteria on the right are resistant to most of the antibiotics.

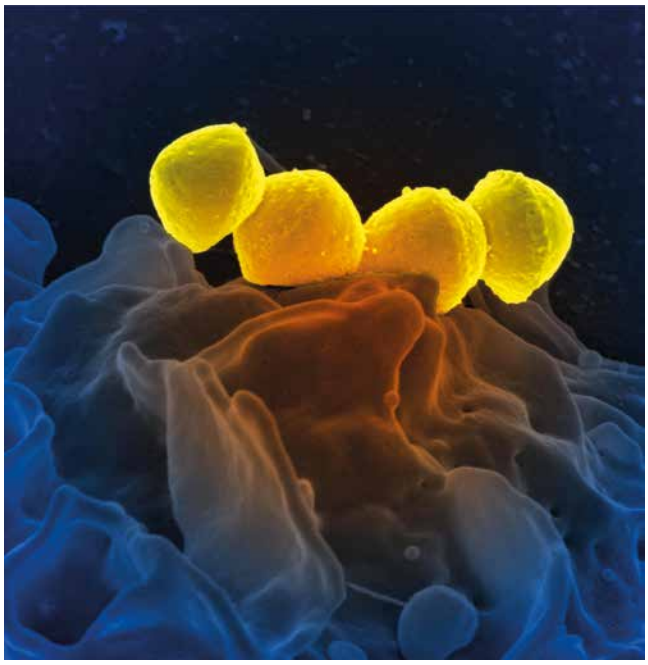
common than in more developed countries. Even when the correct agent is correctly prescribed, cost can be a major factor in its use especially in the long-term treatment of chronic diseases like TB.

Another major important factor and one that is most relevant to this audience is that in LMICs there is a lack of up-to-date and reliable AMR data as a consequence of the lack of diagnostic laboratories able to culture and identify the causative organisms and determine their antimicrobial susceptibility testing (AST) profile.

Several programmes to rectify this are in progress. The WHO has identified an initial seven countries to benefit from a comprehensive technical package to support the implementation of national action plans on AMR based on the specific country needs. These countries include Egypt, Ethiopia, Jordan, Indonesia, Nigeria, Pakistan and Sudan. The WHO will focus on assisting the countries in building their capacity across the relevant technical areas including multisectoral governance, awareness, surveillance, laboratory strengthening, infection prevention and control (IPC), stewardship, and monitoring and evaluation. It will also assist countries in incorporating their AMR national action plan into their respective United Nations Sustainable Development Cooperation Frameworks and in prioritising multilateral collaboration at country level. It will also enable WHO to appoint a dedicated AMR senior technical advisor in each WHO Country Office of the seven countries to support the coordination of implementation of national action plans.

The idea is that lessons learned from the initial seven countries will be used to update and scale up the approach globally, to tackle this urgent global crisis that threatens a century of progress in health and achievement of the UN sustainable development goals (SDGs). It's worth pointing out that this programme is funded by a donation of $21 million from Saudi Arabia, without which this programme would not be happening.

Another programme is run by the Fleming Fund. We are fortunate to have Dr Claire Gordon, Consultant in Infection, Rare & Imported Pathogens Laboratory (RIPL), UK Health Security Agency, London, to talk about laboratory development for AMR surveillance in LMICs. She has previously worked with the Fleming Fund and has been trying to improve laboratory diagnostic facilities in LMICs. The work of the Fleming Fund in improving hospital laboratories in developing countries is relatively little known in the UK where laboratories are understandably more focused on protecting and improving their own services. A vital part of this work is ensuring that any new and improved laboratories are used properly by doctors. Doctors are responsible for requesting laboratory tests on patient samples, collecting clinical data (eg by completing request forms and making good clinical notes) and are the end-users for individual laboratory results to inform patient care and antimicrobial treatment.



Group A *Streptococcus* bacteria (colourised scanning electron micrograph [SEM]).

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At next year's conference, which will probably be in May 2024, we will be having a talk on the challenges of setting up a laboratory from scratch in an area where there is no existing laboratory and only intermittent electricity, and how even a relatively simple set up can make a huge difference.

Childhood respiratory infections

Last, and even more topically, we will be looking at the area of group A streptococcal infections and other infections in children in the post-COVID pandemic period. Dr Charlene Rodrigues, Consultant in Paediatric Infectious Diseases, St Mary's Hospital, London, and the London School of Hygiene & Tropical Medicine will be guiding us through this complicated area. This is quite confusing to most people who work in the field but not to the keyboard warriors whose confident pronouncements were such a feature during the COVID pandemic and who have now switched their attention to other respiratory tract infections.

The increases in influenza, COVID and respiratory syncytial virus (RSV), which began last autumn, appear to have peaked and were certainly more severe than in recent years, but it is not clear why. Most attention has been paid to the increase in group A streptococcal (GAS) infections, especially the increases in invasive group A streptococcal infections (iGAS) and scarlet fever cases. The UKHSA reported that 2085 iGAS cases were reported through laboratory surveillance in England between September 2022 and the end of February 2023, resulting in 262 deaths overall, including 31 deaths in children. This exceeds the number of deaths in the last peak season (2017–2018), although it appears to have a similar case-fatality rate.

Incidentally, Adela Alcolea-Medina – some of you may remember she spoke at last year's conference on the use of direct sequencing from clinical specimens – has been sequencing some GAS isolates from St Thomas' Hospital and has shown that the majority of invasive isolates had the superantigens *spea* (7/10, 70%) and *spej* (8/10, 80%), whereas in non-invasive isolates these superantigens were found less frequently (*spea*: 5/46, 11% and *spej*: 7/46, 15%). This raises the possibility that rapid sequencing might predict which cases of GAS infection lead to invasive disease rather than remain as a sore throat.

Commercial support and…

As in previous years, the BSMT conference will have a full trade show supported by 20 of the most innovative companies attending to present the latest developments and newest equipment to talk to delegates about what their companies can offer laboratories. The conference provides scientists with the opportunity to discuss and debate their experiences: and a great chance to question the experts! Registration is now open, and early booking is advised as the conference last year sold out. Please check the BSMT website (http://www.bsmt.org.uk) to register and for updates to the programme.

Reference

1 Wilks M. Microbial technology: a preview of the BSMT microbiology conference. *Pathology in Practice*. 2023 Feb: **24** (1): 14–6.