

House of Commons Science and Technology Select Committee: Science Communication Inquiry

Microbiology Society Written Evidence

Microbiology Society

1. The Microbiology Society is a membership organisation for scientists who work in all areas of microbiology. It is the largest learned microbiological society in Europe, with a worldwide membership based in universities, industry, hospitals, research institutes and schools. The Society publishes key academic journals, organises international scientific conferences, and provides an international forum for communication among microbiologists and supports their professional development. The Society promotes the understanding of microbiology to a diverse range of stakeholders, including policy-makers, students, teachers, journalists and the wider public, through a comprehensive framework of communication activities and resources.

Introduction

1. One of the Microbiology Society's strategic priorities is to raise awareness of microbiology through public engagement: to inspire and educate people about microbiology, and allow them to make informed decisions which recognise the importance of microbiology and its advances.
2. Through the Society's public engagement work we address global issues, identified by government and others, where there is a need to raise awareness such as antimicrobial resistance¹ (AMR) and sexually transmitted infections² (STIs). As a scientific learned society we specialise in addressing the science within these public health issues in an engaging manner.
3. In addition to our own activities, as a learned society of practicing microbiologists the Microbiology Society provides support and recognition to individual members to engage the public and communicate their research. The Society awards an annual Microbiology Outreach Prize and gives out grants for members to undertake outreach activities. Some examples of activities undertaken by members can be found at Appendix A.
4. In this response we will address one of the areas highlighted in the Inquiry: *The communications strategies being taken to encourage young people to study STEM subjects in higher and further education, and to encourage those people towards STEM careers.* We will focus on two of the projects that the Society is currently undertaking which are using novel strategies to deliver these aims.

¹ [UK 5 Year Antimicrobial Resistance \(AMR\) Strategy 2013–2018](#), HM Government, September 2013

² [A Framework for Sexual Health Improvement in England](#), Department of Health, March 2013

Crowd-sourcing antibiotics

5. AMR is a serious problem. In 2014, the Prime Minister described it as having the potential to cast us back “into the dark ages of medicine”³. Microbiology and microbiologists are of fundamental importance in tackling this issue and as such this is an important issue for the Microbiology Society to address.
6. Government and others have called for increased public awareness and education about antimicrobial resistance^{4,5,6}. In response, the Microbiology Society is running a project looking at crowd-sourcing new antibiotics⁷. The project gives the general public, students and educators in the UK and Ireland the opportunity to work with researchers to discover new antibiotics from soil bacteria.
7. The project has three aims: to raise awareness of the issue of AMR, antibiotic stewardship and drug discovery with the public, students and educators; to enable students and the public to experience and understand real research which in turn will inspire them to (continue to) study science; and to understand how best to use a well-known global challenge such as AMR to engage the public in the scientific process.
8. To address some of the findings from the BIS Public Attitude to Science survey in 2014⁸, the project aims to foster a positive understanding among public audiences concerning the openness of science and scientists, by making both more accessible. Moreover, the project increases public understanding of the important role research plays in everyday life. For the particular topic of antibiotic resistance, the project aims to increase understanding of the topic and dispel myths and misunderstandings about increasing resistance and antibiotic use.
9. In addition, by harnessing students and the public’s interest in AMR^{9,10} we hope to engage both with scientists and the scientific process of drug discovery. Students and the public will get to experience ‘real’ scientific research, which we hope will increase their scientific literacy and inspire them to follow a career in a STEM subject.
10. Alongside these overarching aims, each strand of the project has its own foci:

³ [Prime Minister warns of global threat of antibiotic resistance](#) [Press Release], Department of Health, Prime Minister’s Office, 10 Downing Street

⁴ [Rapid Diagnostics: Stopping Unnecessary use of antibiotics](#), Review on Antimicrobial Resistance, chaired by Jim O’Neill, October 2015

⁵ [Ensuring Access to Working Antimicrobials](#), House of Commons Science and Technology Select Committee Report, July 2014

⁶ [Global action plan on antimicrobial resistance](#), World Health Organization, May 2015

⁷ The pilot phase of this project was run as part of the Small World Initiative

<http://www.smallworldinitiative.org/>

⁸ [Public Attitudes to Science 2014](#), Ipsos Mori/ Department for Business, Innovation and Skills, March 2014

⁹ [Longitude Prize](#), Nesta

¹⁰ [Wellcome Trust Monitor Report Wave 3](#), Tracking public views on science and biomedical research, Wellcome Trust, April 2016

Public Engagement Programme:

11. We are using a novel communication strategy of a combination of pop-up science events and digital activities to engage members of the public along the journey of the drug discovery process. This approach is different to traditional citizen science strategies as participants are exposed to direct face-to-face contact with scientists, followed by long-term digital engagement. By combining in-person engagement with longer-term digital engagement, participants can gain a good understanding of how scientific research works, while feeling invested in working towards a solution to the global issue of antimicrobial resistance.
12. Alongside the pop-up science events and digital engagement activities, the Microbiology Society has joint-funded a PhD student with the University of East Anglia to carry out a combination of biological and social science research. The PhD student is developing methods to investigate potential antibacterial compound-producing soil bacteria and looking at ways to measure the impact of the public engagement programme on the participants, including identifying the best way to communicate with the public to achieve long-term engagement with science. All publications from the PhD will be published in open access journals to facilitate the sharing of knowledge.
13. In addition to our pop-up events, we have taken samples from high profile locations such as 10 Downing Street, the Blue Peter Garden and Polaris House (where the Research Councils are based) to help demonstrate the significance of this issue to the public.

Pop-up Science Events

14. We are running pop-up events at Forestry Commission sites across the UK and Ireland. Members of the public from a wide variety of demographics collect a soil sample, then prepare and submit it for scientific analysis. At the time of submitting a sample, members of the Microbiology Society who are active researchers talk with them about antibiotic resistance and public policy developments, drug discovery and the scientific process.
15. In 2015, the events garnered significant local media coverage, highlighting the issue of AMR and drawing the public's attention to the science. The coverage resulted in members of the public visiting the Forestry Commission sites specifically to take part in our activities.
16. A key aim of holding these events at locations other than public science festivals and fairs, where science public engagement usually occurs, is to target families and adults that may be new audiences to science and the issue of antimicrobial resistance. The Forestry Commission locations are also places where people visit for extended periods of time. This has given us a unique opportunity to engage with people in person for around 15 minutes each – a much greater time than at a science festival or similar events.

Digital Engagement

17. Participants from the pop-up science events are encouraged to follow the analysis of their sample online, actively looking for bacteria that are producing antibacterial compounds, and discussing the microbial diversity of their samples. Researchers are available online to answer questions about the process. We have produced a series of videos about the analysis process, explaining in detail what each stage of the analytical process is trying to discover.

Undergraduate Programme:

18. In this part of the project we are facilitating university departments to run the project as a practical course for its undergraduate students. Within the course the students design their

own investigations, collecting a soil sample and carrying out a series of experiments to look for new antibiotics. This provides real research experience, emphasises self-guided research and encourages interest in both the topic and the scientific method.

19. We aim for this experience to encourage students to progress with a STEM career. For those that transition out of science, the project will help ensure they have an enhanced understanding of the scientific process and scientific literacy, enabling them to make informed decisions about science in the future.

School Partnership Programme:

20. The Society is facilitating schools to partner with research organisations¹¹ to run the project with Key Stage 5 students. The students will follow the same experiments as in the Undergraduate Programme, but adapted for school use. Again, the students have the opportunity to design their own investigations and are able to visit the partner organisation to experience research in a professional laboratory. Such authentic research activities can be pivotal events, inspiring students to continue to study STEM subjects. Additionally, student representatives from each school and their teacher are invited to the Microbiology Society Annual Conference, which has over 1,300 delegates, to present their research through a poster.
21. The aim with both the Undergraduate and School Partnership Programmes is for them to embed it within their curriculum, allowing the Society to support a greater number of schools as the project progresses.

Sexually Transmitted Infections (STIs)

22. Another global issue the Microbiology Society has been addressing is sexually transmitted infections. STIs significantly impact on the health of the nation. They have been on the rise in Britain for the last decade; in the particular case of gonorrhoea, there has been an associated increase in antibiotic resistance, which has the potential to make this dangerous infection untreatable¹².
23. In 2013, the Society produced a position statement titled *Microbiology and the challenges of sexually transmitted infections – are we up to it?*¹³, convening an expert panel mapping the key issues facing the current system of research and healthcare in sexual health, and how we might respond to these issues in terms of UK policy.
24. Launching the document in the House of Commons, Sir Peter Bottomly MP, a long-term advocate for sexual health, called for a greater emphasis to be placed on sexual health education. An Ofsted report, *Not yet good enough: personal, social, health and economic (PSHE) education in schools (2012)*¹⁴, found that PSHE education (in which Sex and Relationships Education (SRE) is usually contained) in English schools was 'not yet good enough' and SRE 'required improvement' in over a third of schools. In addition, the

¹¹ Any professional laboratory including: research institutions, universities, hospitals, industry

¹² [Gonococcal resistance to antimicrobials surveillance programme \(GRASP\) report](#), Public Health England, October 2014

¹³ [Microbiology and the challenge of sexually transmitted infections: are we up to it?](#), Microbiology Society, December 2013

¹⁴ [Not yet good enough: personal, social, health and economic education in schools: Personal, social and health education in English schools in 2012](#), Ofsted, May 2013

government's *Framework for Sexual Health Improvement in England*² identified an ambition to "build knowledge and resilience among young people".

25. To address these issues, the Microbiology Society decided to develop an innovative education package that helps to address the lack of adequate sexual knowledge in young people.
26. Cross-curricular drama has been used for many years to engage the public with scientific issues and to support meaningful science learning in schools, allowing participants to reflect on the Nature of Science. In 1997, an evaluation¹⁵ of Theatre Debate, a Wellcome Trust-commissioned project which addressed controversial science topics using dramatic performance and debate, concluded that:
"Arts projects such as these were seen to be very successful in delivering science education. The drama is a way into a lot of areas and enhances the subject especially for those who are alienated or threatened by science. The Gift (one of the science topics) successfully contributes to science teaching – its strength is in personalizing science rather than delivering biological information."
27. In September 2014, the Society agreed to develop a theatre in education play on sexually transmitted infections for 14–16 year olds that could be performed in schools. Developed by experts from both the arts and science communities, the play works as a piece of theatre whilst highlighting some of the key scientific and ethical sexual health issues faced by young people.
28. The play focuses on a 17-year-old boy who has unprotected sex and discovers information about STIs before being diagnosed with gonorrhoea. There is an emphasis on the threat of STIs that are resistant to known antibiotics and the resulting long-term complications that can occur.
29. For the often controversial topic of STIs, the use of a play as a communication strategy has been very effective. Since March 2015, the play has performed 94 times in schools across 11 areas of the UK, seeing 20,000 students. Feedback has been excellent from all schools, particularly those with students with behavioural or special educational needs. The play provides invaluable engagement with an at-risk age group in a way that not only educates on the subject of STIs but also engages them with the science behind a public health topic. In addition, we hope that some students are inspired by the public threat of antibiotic resistance, and will consider further study and a career in a STEM subject.

Contact

30. Please contact Isabel Spence, Head of Public Affairs (i.spence@microbiologysociety.org; tel: 020 7685 2697) with any questions regarding this response or the activities of the Microbiology Society.

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¹⁵ www.ytouring.org.uk and Evaluation Associates 1997 Cracked: A study of impact

Annex A: Examples of member activities supported by the Microbiology Society

- Professor Matthew Hutchings from the University of East Anglia presented an interactive stand on antibiotic producing leaf-cutting ants at the Royal Society Summer Exhibition and the BBSRC Great British Bioscience Festival.
- PhD student Carla Brown has developed the Bacterial Combat game, a Top Trumps style game about AMR.
- Dr Phillip Aldridge from Newcastle University developed an app called epiFECTION that simulated an infection outbreak. People's survival and how the infection spread was based on how they answered questions on their behaviour in the outbreak.
- Professor Joanna Verran from Manchester Metropolitan University is running a series of dinners hosted by a professional microbiologist, engaging with the public about the importance of microbiology in food.
- Rebecca Philp from The Pirbright Institute ran a panel discussion at Big Biology Day about emerging zoonotic diseases.