

Microbiology Society written evidence to the House of Lords EU Energy and Environment Sub-Committee Brexit: Plant and Animal Biosecurity Inquiry

Summary

1. The UK and EU face common biosecurity threats from animal, plant and foodborne pathogens. Scientific collaboration is and will continue to be vital for research, surveillance, risk assessment and response to infectious disease outbreaks.
2. Brexit could impact fundamental and applied infectious disease microbiology in several ways, including mobility of scientific expertise, and involvement in EU research and surveillance funding programmes, networks, infrastructures and regulatory bodies.
3. The UK must retain and promote EU and international infectious disease scientific partnerships because pathogens easily cross borders, and effective research and surveillance depends on information and resource sharing, collaboration, and mobility of skills and expertise. Future scientific partnerships and arising national capacity needs should be swiftly clarified and addressed to avoid compromises to UK and EU biosecurity.

Introduction

4. The Microbiology Society is a membership charity for scientists interested in microbes, their effects and their practical uses. It is one of the largest microbiology societies in Europe with a worldwide membership of 4,700 people based in universities, industry, hospitals, research institutes and schools. Our members have a unique depth and breadth of knowledge about the discipline. The Society's role is to help unlock and harness the potential of that knowledge.
5. We welcome the opportunity to inform the Sub-Committee's timely inquiry. Microbiologists in the UK, Republic of Ireland, and other European countries play key roles in the research, surveillance and control of infectious diseases of animals and plants, which pose biosecurity threats to agriculture, horticulture, the environment and public health in the case of foodborne pathogens and zoonotic diseases transmissible to humans.¹
6. The Society raised the issue of Brexit and infectious disease biosecurity in writing and in person to the House of Commons Science and Technology Committee Brexit Science and Innovation Summit Inquiry.^{2,3,4} Drawing on this response and further information provided by expert members, our response focuses on issues relating to science for biosecurity against animal, plant and foodborne infectious diseases.

¹ Microbiology Society (2015). Emerging Zoonotic Diseases Briefing. <https://microbiologysociety.org/uploads/assets/uploaded/98de741a-4230-4213-a6a9d53bc7a9d06b.pdf>.

² Science and Technology Committee Brexit Science and Innovation Summit transcript. <http://data.parliament.uk/writtenevidence/committeeevidence.svc/evidencedocument/science-and-technology-committee/brexit-science-and-innovation/written/79377.html>.

³ Microbiology Society written evidence to the Science and Technology Committee, Brexit Science and Innovation Summit Inquiry. <http://data.parliament.uk/writtenevidence/committeeevidence.svc/evidencedocument/science-and-technology-committee/brexit-science-and-innovation/written/77875.html>.

⁴ Microbiology Society letter regarding science and security to the Chair of the Science and Technology Committee - Brexit Science and Innovation Summit Inquiry. <http://data.parliament.uk/writtenevidence/committeeevidence.svc/evidencedocument/science-and-technology-committee/brexit-science-and-innovation/written/79996.html>.

Continued need for UK-EU collaboration

Importance of a shared approach to infectious disease biosecurity

7. **The UK must continue to work in partnership with the EU and international partners on infectious disease biosecurity because pathogens do not respect national borders.** The Government identifies risks to UK biosecurity from a wide range of animal, plant and foodborne pathogens, both from mainland Europe and other regions, and recognises the international and collaborative nature of these challenges.^{5,6,7,8} Trade, travel, geography, climate change and the natural movement of pathogens (e.g. by wind, insect vectors, migrating birds and shifting ranges due to climate change) mean that the UK and EU will continue to face common biosecurity threats requiring collaboration and coordination on research, surveillance and information sharing, risk assessment, regulation and control.^{9,10,11}
8. **UK-EU collaboration on microbiological research is important for preparing for and responding to threats for animal, plant and foodborne pathogens.** Scientific research informs the risk assessment, surveillance and interception of diseases, tracking and control of disease outbreaks, and the development of vaccines and interventions to treat and prevent disease. Microbiologists in the UK benefit from *and* contribute expertise to: EU research funding programmes and networks, such as Horizon 2020-funded projects; research and surveillance infrastructures, including pathogen reference laboratories; and EU advisory and regulatory bodies including the European Centre for Disease Prevention and Control (ECDC), European Food Safety Authority (EFSA) and European Medicines Agency (EMA). The Government's EU future partnership paper on science and innovation also highlights animal and plant infectious diseases as important common challenges for consideration.¹²

Case studies – One Health collaboration

9. **Zoonotic and foodborne diseases require an international, coordinated 'One Health' approach spanning human health, veterinary, agricultural and environmental sectors. It is important that animal, plant and human biosecurity threats are not just considered in isolation with respect to future UK-EU collaboration.**
10. Antimicrobial resistance (AMR) is recognised as a global One Health threat to public health, animal health, agriculture and sustainable development.¹³ Members of the Society participate closely in EU AMR research and surveillance projects such as the EU Horizon 2020 *Compare* project, an enabling, analytical framework encompassing globally linked data and an information-sharing platform for the rapid identification, containment and mitigation of emerging infectious diseases and foodborne disease outbreaks.¹⁴ Such fundamental partnerships result from decades of close EU collaboration.

⁵ Animal diseases: international and UK monitoring. UK Government. <https://www.gov.uk/government/collections/animal-diseases-international-monitoring#outbreak-assessments-2018>.

⁶ Cabinet Office (2017) National Risk Register of Civil Emergencies – 2017 Edition.

⁷ UK Plant Health Risk Register. DEFRA. <https://secure.fera.defra.gov.uk/phiw/riskRegister/>.

⁸ Department for Exiting the EU (2017). Collaboration on science and innovation - a future partnership paper.

⁹ Emerging Zoonotic Diseases Briefing. (See footnote 1.)

¹⁰ Microbiology Society Letter to the Chair of the Science and Technology Committee. (See footnote 4.)

¹¹ Microbiology Society (2015). Microbiology and Climate Change Briefing. <https://microbiologysociety.org/publication/policy-documents/microbiology-and-climate-change.html>.

¹² Future Partnership Paper. (See footnote 8.)

¹³ Microbiology Society (2016). Antimicrobial Resistance Briefing. <https://microbiologysociety.org/publication/briefing/antimicrobial-resistance.html>.

¹⁴ COMPARE. <http://www.compare-europe.eu/>.

11. The WHO Collaborating Centre for Reference and Research on Influenza at the Francis Crick Institute works closely with the EU/OIE/FOA reference lab at the APHA Weybridge laboratory. Emerging zoonotic influenza threats to animal health and human health are considered together and the sharing of information, viruses, methods and reagents is paramount. An example would be that the zoonotic H7N9 avian influenza virus that emerged in humans in 2013 was rapidly shared with the APHA laboratory in Weybridge to allow them to validate their detection protocols used in the EU.

Case studies: Plant infectious disease surveillance and research

12. *Xylella fastidiosa* is an emerging bacterial plant health threat, which is spread by insects that feed on plant sap, causing disease in a wide range of woody commercial plants such as grapevines and several species of broadleaf trees widely grown in the UK. Although not yet present in the UK, *X. fastidiosa* has been confirmed in several European countries since 2013, including France. DEFRA reports that *X. fastidiosa* introduction into the UK would have huge implications for horticultural trade and the wider environment, with measures and controls initiated at the EU level.¹⁵ Several tree pathogens, most notably *Hymenoscyphus fraxineus* causing ash dieback, have already spread to the UK from Europe in recent decades.
13. To coordinate disease surveillance for all wheat rusts in the UK, microbiologists at the John Innes Centre and NIAB work closely with the Global Rust Reference Centre (GRRG) in Denmark. The GRRG acts as a hub, reporting new disease outbreaks and evaluating samples from outbreaks where people have limited expertise. The GRRG is leading a new Horizon 2020-funded project, RUSTWATCH, which involves UK scientists and brings together all the major surveillance programs across Europe with industry partners to share information, experience and expertise. Other rust diseases are also becoming more of a concern to the UK due to increasing outbreaks across Europe since 2013, as identified by an assessment involving scientists from the UK and other European countries.¹⁶ The Society was told “*it will be essential to maintain these links and most importantly funding opportunities with our European partners following Brexit. This will ensure the UK maintains its prominent position in these networks and is party to emerging information regarding disease outbreaks in mainland Europe that of course can be an early sign of imminent shifts in UK populations for these wind-dispersed pathogens*”.

Case studies: Collaboration on livestock infectious disease surveillance and research

14. A range of livestock and zoonotic pathogens are present in or near Europe and could spread to other EU countries and the UK. Threats noted in the UK National Risk Register include Bluetongue, African Swine Fever, Foot and Mouth, and Avian influenza.¹⁷ Livestock diseases pose considerable economic and welfare impacts resulting from disease control costs, loss of trade and animal movement restrictions.
15. The network of EU Reference Laboratories for OIE notifiable livestock diseases ensures capabilities in national laboratories are effective and benchmarked against each other, and exchange of information about the performance of different diagnostic methods and analysis of gaps. Other important information about virus strains such as DNA sequence, transmission and disease data are also exchanged via these networks and other EU-funded networks and projects involving the UK including the EPIZONE European Research Group for epizootic diseases and the European Virus Archive; both projects do also involve non-EU partners.^{18,19}

¹⁵ DEFRA (2018). UK plant health guidance: *Xylella fastidiosa*

¹⁶ Lewis, C. M. *et al.* (2018). Potential for re-emergence of wheat stem rust in the United Kingdom. *Communications Biology*, 1, 18.

¹⁷ UK National Risk Register 2017. (See footnote 6.)

¹⁸ EPIZONE. <https://www.epizone-eu.net/en/Home.htm>.

16. Capacity and collaboration is also important for surveillance and action against previously uncharacterised viral diseases. For example, the Schmallenberg virus emerged dramatically across northern Europe in 2012.²⁰ This was identified first by the Friedrich Loeffler Institute in Germany and rapid transfer of information between the relevant research Institutes, collaborative EU Reference Laboratories and veterinary authorities facilitated the characterisation of the virus including pathogenesis in different hosts, vectors transmission, diagnostic tests and vaccine development.

Brexit implications and needs for animal and plant biosecurity

17. **The Government should quickly clarify and agree to future scientific partnerships relevant to animal and plant biosecurity to ensure the effectiveness of UK and EU preparedness and response to infectious disease threats.** The Society is concerned that any loss of access and collaboration with EU research and surveillance programmes and infrastructures could detrimentally affect UK and EU biosecurity. Members have told us that current uncertainty about future partnerships could also affect UK participation in developing EU scientific programmes of relevant infectious disease research. Members have also suggested that a reduction of UK infectious disease expertise and capacity at the EU level could affect the proficiency of European research and surveillance in some areas, which could potentially compromise biosecurity for both the UK and EU.²¹

People and skills

18. **The Government needs to clarify plans and strengthen positive messaging to ensure and promote mobility of scientific skills, talent and knowledge, across all career stages and sectors, between the UK, EU and other countries.** This includes microbiologists working in research and applied roles in academia, pharma and industry, agriculture, food safety and regulatory roles. Our members have highlighted concerns and examples where Brexit has affected, or could affect, the mobility, attraction and retention of microbiological expertise.²²

Science funding

19. **Our members require greater clarity about future participation and coordination with EU scientific programmes that fund and support animal, plant and food safety research, and any replacement national funding and support.**²³ There is concern about the potential loss of funding and the benefits these programmes provide for facilitating international and cross-sector scientific collaboration, as illustrated by the case studies provided above.

EU advisory and regulatory bodies

20. **Our members are concerned about loss of participation and reduced partnership with EU bodies including the ECDC, EFSA and EMA. The Government should aim to retain as many cooperative links to these bodies as possible, as well as developing stronger links to other non-EU European bodies (e.g. EMBO and the European and Mediterranean Plant Protection Organization).**²⁴ These bodies provide important services and capacity for scientific advice and risk assessment, and information sharing and regulation in relation to animal, plant and foodborne infectious diseases. The UK has also invested substantial financial and scientific

¹⁹ European Virus Archive. <https://www.european-virus-archive.com/>.

²⁰ Microbiology Society (2012). Schmallenberg Briefing. <https://microbiologysociety.org/uploads/assets/uploaded/4b806025-da49-43d4-8ee7f68694271304.pdf>.

²¹ Microbiology Society written evidence to the Science and Technology Committee. (see footnotes 3 and 4.)

²² Microbiology Society written evidence to the Science and Technology Committee. (See footnote 3.)

²³ Microbiology Society written evidence to the Science and Technology Committee. (See footnote 3.)

²⁴ Microbiology Society written evidence to the Science and Technology Committee. (See footnote 3.)

input into these bodies, thereby helping to strengthen EU biosecurity. Members are concerned that it would be difficult to replicate their scale and effectiveness, and that the UK's influence on science priorities, regulation and policies that may still affect the UK, risks being diminished.

21. **The Government needs to ensure any regulatory and scientific advisory capacity lost is strengthened domestically before Brexit.** Microbiologists also depend on being able to easily enquire about regulations, guidelines and standards for research. Members have expressed concern that losing access to EU agencies such as the EMA could also impede research if UK agencies and departments are not better resourced to deal with a likely increase in enquiries and workload post-Brexit.²⁵

Surveillance and information sharing

22. **It is important that arrangements are in place before the UK leaves the EU for continued collaboration on surveillance, and information sharing mechanisms and programmes for infectious diseases, to ensure effective preparedness and responses to shared biosecurity threats.** Members of the Society contribute to and utilise numerous EU surveillance and information sharing mechanisms and programmes that are important for animal, plant and foodborne infectious diseases biosecurity.
23. One of our members highlighted that antibiotic consumption, antibiotic resistance data and the pathogen testing of animals is reported on an EU-wide basis. The methods used to monitor usage and detect pathogens are the same across the EU. If the UK subsequently deviated from these methods then the data from the UK would no longer be comparable to the data obtained from the EU. This could affect surveillance and maintenance of common standards of food consumption and animal sales.

Research and surveillance infrastructures

24. Our members are concerned about potential loss of access to and reduced collaboration with European microbiological research and surveillance infrastructures, including pathogen reference laboratories and microbial culture collections. The Government should swiftly clarify and ensure future collaboration with these infrastructures and, where necessary, strengthen national capacity.²⁶ It is of national biosecurity importance to act to maintain and promote access and reciprocity of internationally available microbial strains, DNA collections and other data, so the UK research community can continue to effectively study these global threats. Loss of EU infrastructures currently based in the UK and potentially reduced partnership with wider infrastructure and networks could have biosecurity and resourcing implications as the UK may need to invest in national capabilities and/or arrange continued participation in EU infrastructures.
25. The Government's Future Partnership Paper highlights the value of, and need to consider, future collaboration with EU Reference Laboratories for food and animal health, for sharing information on disease risks between countries, regulation and standards, and access to the best scientific expertise.²⁷ The UK hosts several EU Reference Laboratories and benefits from and contributes to the wider network in terms of research and surveillance (see case studies above). The Pirbright Institute, for example, has informed the Society that they provide the EU Reference Laboratories for Bluetongue and Foot and Mouth Disease, which will move to other EU countries in 2019; although Pirbright will continue to provide national and international

²⁵ Microbiology Society written evidence to the Science and Technology Committee. (See footnote 3.)

²⁶ Microbiology Society written evidence to the Science and Technology Committee. (See footnote 3.)

²⁷ Future Partnership Paper. (See footnote 8.)

capabilities and work with EU Reference Labs. Nonetheless, some of our members have expressed uncertainty about what broader UK involvement with these EU infrastructures and networks will look like. It has also been brought to our attention that in some cases such as Foot and Mouth Disease, there is no facility in Europe that matches the capacity and capability to provide diagnostic services and research capacity of the UK facility.

26. European culture collections providing other microbial resources for research and industry, are of key importance for fundamental and applied microbiological research in the UK and vice versa. The huge diversity within the microbiological world means that culture collections are specialised and no one centre can provide comprehensive coverage of the key microbial groups necessary to advance research, including on AMR, animals and plants.²⁸

Import–export requirements

27. **It is essential that appropriate agreements are put in place to prevent the import–export of scientific research materials being hindered on exiting the EU, which could disadvantage the UK research base, including infectious disease research.**
28. EU membership simplifies the import–export of scientific research materials (e.g. live animals, seeds, micro-organisms, CITES-listed samples and other biological resources) and use of DNA sequencing services. The extent to which the Government has considered post-Brexit import–export requirements on the movement of scientific materials important for research remains unclear.
29. Changes to controls at the UK-EU border could also have financial impacts on research. For example, a member highlighted that research institutes working on plant health exchange crop seeds within and outside of the EU, and the cost of exports (e.g. inspections, laboratory analysis, phytosanitary certificate) could substantially increase if the UK exits the EU without a like for like export agreement in place.

Additional comments on post-EU arrangements

Precautionary principle

30. It is important that future biosecurity policies and controls are considered, proportionate, and informed by the best available national and international scientific evidence.

Common UK biosecurity framework

31. As outlined in paragraphs 7 and 8, pathogens do not respect borders, therefore a common UK biosecurity framework and/or specific collaboration in relation to defined animal and plant disease threats is important.

Biosecurity on the island of Ireland

32. Members in both the UK and Republic of Ireland stress links between the countries must remain strong to ensure that bilateral scientific collaboration, including in animal and plant health, continues to thrive²⁹. Coordinated information sharing and collaborative research programmes will remain vital for biosecurity on the island of Ireland. An example is the control of the 2001 Foot and Mouth Outbreak.³⁰

²⁸ Microbiology Society written evidence to the Science and Technology Committee. (See footnote 3.)

²⁹ Microbiology Society written evidence to the Science and Technology Committee. (See footnote 3.)

³⁰ Costelloe, J. A. *et al.* (2002). Control of foot and mouth disease: lessons from the experience of Ireland. *Rev. sci. tech. Off. int. Epiz.*, 2002, 21 (3), 739-750.

Strengthening UK biosecurity

33. The EU Plant Passport scheme is currently visual inspection only, and screening using molecular technologies is not currently mandatory. A member suggested the UK could more rapidly innovate the Plant Passport scheme (or an equivalent post-EU mechanism) using advances in high throughput screening technologies to mandate higher levels of molecular certification for access to our markets; this is implemented in the US and of interest in the EU. It is therefore important that the UK is involved in these innovations and the development of standards, which requires international collaboration.
34. The Society has called for the Government to be more ambitious in investing in UK research and promoting international partnerships, including building on the UK's expertise in microbiology and infectious disease research.³¹ This would be beneficial to strengthen UK and international animal and plant biosecurity.

³¹ Microbiology Society written evidence to the Science and Technology Committee. (See footnote 3.)