INNOVATION, UNIVERSITIES & SKILLS
Select Committee Inquiry

Biosecurity in UK research laboratories

EVIDENCE SUBMITTED BY THE SOCIETY FOR GENERAL MICROBIOLOGY (SGM)

Introduction

The Society for General Microbiology, founded in 1945, is an independent professional scientific body dedicated to promoting the 'art and science' of microbiology. It has now established itself as one of the two major societies in the world in its field, with some 5,500 members in the UK and abroad.

General Comments

The Society for General Microbiology (SGM) welcomes the Select Committee's inquiry into Biosecurity in UK research laboratories.

Specific Comments

- the current capacity for research on dangerous pathogenic material in the UK and the capability to conduct research on the causative agents of disease that may emerge at a future time;

Research involving these hazardous agents is absolutely essential in order to combat the threat of existing and emerging infectious diseases. Any regulatory framework must achieve a suitable balance - providing appropriate safeguards whilst not unduly restricting crucial research. It is compulsory that research involving hazardous pathogens or toxins is conducted in appropriately equipped and resourced facilities. Associated requirements are robust safety and security procedures that ensure minimal risks of harm to laboratory workers, the wider public and the environment.

With the exception of some MoD establishments, the UK capacity is lacking in training and facilities. The area of infectious diseases, which underpins much of this work, has been identified as needing strategic boosts for example by studentship programmes funded by MRC. The SGM is concerned that the UK should maintain and indeed strengthen the capacity for research into dangerous pathogens that may emerge or re-emerge through natural processes and through malicious release.

- the state of biological containment facilities in the UK;

Modern, well maintained facilities are required for research on dangerous pathogens and biosecurity should be considered when allocating budgets. Several Universities are building level 3 containment suites in order to increase the capacity to work with higher level pathogens and respond to emerging disease threats meaningfully. However, the state of central large animal facilities is deplorable. These need to be provided centrally as few or no

Universities would have a sufficient volume of work to sustain these on a full economic costs basis.

The UK needs to continue to invest in this area so as to set up facilities at the Institute for Animal Health or elsewhere. The state of the highest category containment laboratories (BSL 4) in the civil sector, such as at the Health Protection Agency and at the National Institute of Medical Research, has been deteriorating over time and will probably require significant capital investment in order to maintain state-of-the-art capacity.

- laboratory inspection regimes and the rationale and practicalities of the licensing system;

Old facilities can be difficult to inspect, so regimes would benefit from an overall updating of facilities. In general, there are few inspectors and inspections of licensed facilities are rare. Laboratory inspection regimes conducted by the Health & Safety Executive are good, but there appears to be over-emphasis on a spurious rationale for respiratory safety containment even for pathogens that do not spread by this route; therefore some rethinking about practicalities concerning true dangers and possibly false security would be advisable.

Any licensing system needs to be confined to category 3 pathogens and above and should not be bureaucratic. A very considerable amount of time is spent on dealing with the bureaucratic implications of some work, including research on animals using genetically modified micro-organisms. It is difficult to say what should be jettisoned but the cumulative effect of the bureaucracy is stifling. Having said this, licences for new facilities should be considered carefully.

- biosafety training provision for staff working in containment facilities;

It is the responsibility of research institutions working with hazardous biological agents to ensure that this research is safely conducted. All clinical and academic researchers, students and technicians working with hazardous agents should receive correct and specific training before they begin this work. Training programmes must include refreshers at regular intervals thereafter, including updates on regulatory developments.

Dedicated Biological Safety Officers (BSOs) in institutions must take the leading roles in responsibility for organizing and delivering effective staff training, tracking developments, and advising institutions' senior management. Government must ensure sufficient long-term funding is provided to key national institutions for provision of research facilities equipped to undertake work on these agents, and for retention of technical expertise in research institutions. This also includes maintenance of culture collections. Institutions themselves should develop appropriate succession planning arrangements to ensure continuity of skills within their staff.

While biosafety training provision for staff at universities and research institutions appears to be rigorous, there is a danger that the UK is gradually losing expertise to investigate and handle certain dangerous pathogens through previous lack of interest and lack of adequate funding, both in the medical and in the veterinary fields. Greater emphasis on training is needed; as the UK is a signatory to the Biological and Toxic Weapons Convention, it needs to take its responsibility in this area more seriously. Reviews of training (which is controlled by individual facilities) should be more proactive.

- the maintenance and recording practices surrounding the storage and transportation of dangerous pathogens;

The maintenance and strict recording practices of the storage and transportation of dangerous pathogens is an area that needs to be continually monitored in order to improve security and to introduce better recording practices afforded by computerised methods. If any changes are envisaged they should be applicable only to the highest categories of pathogens.

The term dangerous pathogens as defined in UK legislation covers too wide a range of organisms.

The primary responsibility for ensuring safety and security must rest with institutions. However, relevant regulatory agencies also have an obligation to coordinate effectively in developing and implementing regulatory processes. There seems to be lack of consistent guidelines and regulations on the transport of potentially hazardous biological materials between different countries.

- measures implemented when pathogenic material cannot be accounted for;

It is of crucial importance to ensure appropriate measures to follow up investigations into the provenance and destiny of dangerous pathogens, without triggering unnecessary panic if an audit of the pathogens appears faulty. It should be made applicable only to category 3 organisms or above. Better contingency plans are needed for loss and damage during transportation.

- the role of universities in overseeing security clearance for research students working with dangerous pathogens.

The role of the universities is to educate and train students and research fellows in the proper practice of safe microbiology. Students and fellows should be selected on merit without prejudice as to the country of origin. However, security clearance should be sought for access to those pathogens that represent a threat to public health if released.

A role for the Universities in overseeing security clearance is opposed. Universities already need to identify projects and get these approved for the issuing of visas to foreign students. A role for Universities in overseeing clearance of UK or EU individuals could be considered a breach of trust between the organization and its students. Universities are not particularly well equipped to make the proper security investigations and more clarity of guidance would be welcome in this regard. The Security Service is well equipped to carry out such clearances and improved communication between the Services and Universities working with dangerous pathogens would be advantageous.

It should be borne in mind that there are several dangerous pathogens which are dangerous only to those who handle them and not to the community at large. Care should be taken that security clearance is not so risk averse as to become over-zealous because the UK could lose its microbiological experts. For example, the President of this Society understands that he would not pass positive vetting at the Department of Defence yet his advice in civilian biosecurity is frequently sought to the benefit of the UK.

Additional Comments

The SGM is also concerned about which microbes are classified as "dangerous". Like its sister organisation, the American Society for Microbiology, it notes that certain US microbiologists have been arraigned for handling or distributing microbes which for the past 50 years have been safely handled in undergraduate microbiology practical classes. While it is always wise to reappraise the classification of microbes (which themselves can change in virulence from strain to strain), conventional use of microbes should not lead authorities to regard professional microbiologists as traitors or terrorists.

There is complex existing regulation relating to biosecurity with at least several Government departments and agencies involved at different levels within the biosecurity framework. The regulatory framework could be improved through simplification, clarification and co-ordination of procedures to protect biosecurity of research conducted in UK laboratories. However, development of new sets of regulations would unnecessarily raise the existing administrative burden on the research community.

The Royal Dutch Academy has developed a document inspired by the fact that many countries have ratified the biological and toxin weapons convention (BTWC) in which they commit themselves to stopping the development, production or storage of biological weapons. A number of high level rules for behaviour have been identified in the document:

Awareness

- Ensure that in the education and postgraduate education of life sciences researchers there is a specific and explicit part of the programme that indicates awareness and the risks of misuse of biological, biomedical and biotechnological research and ensure that people understand the limitations of the BTWC.
- Disseminate concerns in professional journals on a regular basis.

Research and publication policy

- The application and evaluation procedure for research proposals includes consideration of potential dual use.
- If there is a dual use, make a potential risk benefit analysis of the to-be-expected result of the research.
- Limit, as far as possible, the risk that scientific publication of results of potential dual use research could make an unintentional contribution to the misuse of the knowledge.

Whistle-blowing

- Ensure that every potential view of misuse of dual use technology is reported to the appropriate authorities.
- Take whistleblowers seriously. Ensure there is no detrimental effect to their career from their activities.

Internal and External Communication

- Ensure there is extra security in relation to internal and external email, mail and telephone and data security in relation to information on potential dual use research and material.

Accessibility

- Ensure there is extra security for personnel and visitors in places and companies where potential dual use research is being carried out and where material is stored.

Transport and Transfer

- Ensure that extra security screening and interest in biosecurity is developed in those people who are transporting, as well as in the recipients of potential dual use biological material.

Sources

This evidence has been prepared on behalf of SGM by Professor Robin Weiss (University College, London), Professor Bert Rima (Queen's University, Belfast), Professor Howard Jenkinson (University of Bristol) and Dr Michael Tully (Leicester School of Pharmacy)

About the SGM

Society membership is largely from universities, research institutions, health and veterinary services, government bodies and industry. The Society has a strong international following, with 25% of membership coming from outside the UK from some 60 countries.

The Society is a 'broad church'; its members are active in a wide range of aspects of microbiology, including medical and veterinary fields, environmental, agricultural and plant microbiology, food, water and industrial microbiology. Many members have specialized expertise in fields allied to microbiology, including biochemistry, molecular biology and genetics. The Society's membership includes distinguished, internationally-recognised experts in almost all fields of microbiology.

Among its activities the Society publishes four high quality, widely-read research journals (*Microbiology*, *Journal of Medical Microbiology*, *Journal of General Virology* and *International Journal of Systematic and Evolutionary Microbiology*). It also publishes a highly respected quarterly magazine, *Microbiology Today*, of considerable general educational value. Each year the Society holds two major scientific meetings attended by up to 1500 microbiologists and covering a wide range of aspects of microbiology and virology research.

The governing Council of the SGM has a strong commitment to improving awareness of the critically important role of microbiology in many aspects of human health, wealth and welfare. It has in this connection recently initiated a 'Microbiology Awareness Campaign' aimed at providing information to the government, decision makers, education authorities, media and the public of the major contribution of microbiology to society.

An issue of major concern to the Society is the national shortage of experienced microbiologists, particularly in the field of clinical microbiology and in industry. To attempt to improve this situation long-term, the Society runs an active educational programme focused on encouraging the teaching of microbiology in university and college courses and in the school curriculum, including primary schools. Some 400 schools are corporate members of SGM.

Society for General Microbiology
Marlborough House
Basingstoke Road
Spencers Wood
Reading RG7 1AG, UK

Telephone: 0118 988 1812
Fax: 0118 988 5656
Web: http://www.sgm.ac.uk

Contact: Dr R S S Fraser, Executive Secretary (e-mail: r.fraser@sgm.ac.uk)

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