

The global approach

Many microbial threats endangering society have the potential to wreak global devastation. Effective, coordinated cooperation on a worldwide scale will be essential if effective responses are to be realized.

Microbiologists, more than most, are acutely aware that the world is a small place and is getting smaller all the time. Microbial forms of life are the ultimate 'frequent flyers', with their progression around the globe unhindered by mountain ranges, oceans or political borders. The microbial threats facing society today are equally cosmopolitan, and neither the geographical nor economic insulation enjoyed by the more developed regions of the world, and the assumed protection that this once afforded these areas, provides any respite from their consequences.

The dangers to global society posed by microorganisms are well documented. As of late 2003, an avian influenza epidemic has resulted in human deaths in Vietnam, Cambodia, Thailand, Indonesia, China and, most recently, Turkey and Iraq. If the virus acquires the ability to become easily transmissible from person to person, a devastating global pandemic is a very real possibility. The H5N1 virus, however, represents only one pathogen that has the potential to cause a pandemic. New infectious diseases are emerging at the rate of one per year, over half of which jump from animals to humans. Many of these emerging infectious diseases, which can arise in any part of the world, have the potential to be highly virulent, easily transmissible and the source of the next global pandemic.

Although not the focus of current media attention, the deliberate exposure of a susceptible population to an infectious agent represents another microbiological threat with potentially global ramifications. We live in an era in which scientists have the ability to design and build organisms for their own purposes, beneficial or otherwise. In the internet era, the containment of potentially dangerous biological knowledge is a formidable, worldwide challenge that microbiologists in particular have a duty to address.

Such global threats require global solutions, and it is only through coordinated, multilateral action across national borders, regions and continents that effective solutions will be achieved. Take any emerging infectious disease as an example. Currently, we cannot be optimistic that a deadly and easily transmissible disease emerging in a resource-poor region such as sub-Saharan Africa would be detected, characterized and contained before spreading. There is no global body charged with taking a leadership role in managing the surveillance of emerging diseases, particularly those that can cross the species

barrier from animals to humans. In addition to this glaring deficiency, there is a lack of local human disease surveillance and back-up laboratory resources in regions of the world where these diseases are most likely to emerge. With such critical gaps in our global epidemic preparedness, the recent call for the establishment of a network of laboratories to monitor cases of infectious diseases in developing world nations, based on an existing model of US military facilities, is particularly welcome¹. The mission of these laboratories, multilateral in nature and closely aligned with the WHO, would be to develop regional surveillance and response capacity in resource-poor regions, and they would act in concert with the WHO through its **Global Outbreak Alert and Response Network** and other global surveillance efforts.

The threat of bioterrorism is another challenge requiring a global solution. At present, this threat is policed primarily by a handful of people in the military and intelligence agencies operating with unknown levels of scientific expertise and resources. However, because of the potentially global scale of this danger, it is only vigilance by a much larger network of working biologists that can hope to provide adequate protection. This is the central message of a **recent report** published by the US Institute of Medicine. The document, entitled *Globalization, Biosecurity and the Future of the Life Sciences*, makes a convincing argument that much greater cooperation between scientists around the world will be required to counter bioterrorism. The document calls on all scientists to create global grassroots networks to discuss and monitor biological research that has the potential to be used for nefarious purposes. Only biologists can effectively police the misuse of biological agents; however, for this policing to be effective, global scientific cooperation is a minimum requirement.

Microbiologists, like all scientists, tend instinctively to favour independence and creativity and to oppose monitoring, regulation and the restrictions that inevitably arise from large-scale cooperative efforts. However, there are circumstances in which it falls on the community to support such efforts, even if freedom of action is restricted — circumstances such as precautionary vigilance against microbial threats of global significance.

1. Chretien, J. P. *et al.* Global network could avert pandemics. *Nature* **440**, 25–26 (2006).

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