

risky research proposals proactively. In short, the moratorium — the lifting of which is announced this week (see page 460) — has seen serious thought on the complex issues involved.

In the past year, the debate's focus has somewhat shifted from bio-terrorism concerns — which, being classified, are difficult for outsiders to evaluate — towards biosafety issues. And it has concentrated attention more broadly on how best to regulate 'gain-of-function' research: work intended to increase the transmissibility, host range or virulence of pathogens. The United States is the main funder of such research, and what it decides is key to international thought. The proposed framework for assessing H5N1 gain-of-function research, outlined by the US National Institutes of Health at an international meeting in Bethesda, Maryland, in December, spells out several criteria that such research would need to meet before being funded.

One can quibble with some ambiguities in the wording of those proposals, but overall the framework should serve as an important checklist. The criteria include sensible questions, such as whether safer, alternative approaches exist that could address the same scientific points. Researchers already accept the need for regulations in areas such as animal welfare, and an extra layer of review for gain-of-function H5N1 research — which will affect only a few projects — is a small price to pay for improved public confidence in safety and oversight.

Flu researchers have been generous with their time over the past year. They have engaged in public debates and expressed their often-conflicting views in commentaries in scientific journals. The polarization of views between proponents and opponents of such research has, however, too often resulted in reiterations of entrenched viewpoints, rather than substantive discussions. Whether justified or not, there remains a perception among many critics that the debate has taken place largely behind closed doors, and has been dominated by flu scientists and research funders who have vested interests in the outcome.

As several critics point out, the assessments of the relative risks and benefits of such research remain restricted to largely qualitative arguments. The formal, quantitative risk assessment common in the nuclear power and other industries could have helped to nail down and quantify risks, and would have informed the debate better. One year on, an irreproachable, independent risk-benefit analysis of such research, perhaps convened by a body such as the World Health Organization (WHO), is still lacking.

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When it comes to mitigating risks, it is gratifying that the WHO guidelines on mammalian-transmissible H5N1 research, released last July, go beyond simply discussing the required level of biocontainment facility. They also recommend that labs doing such work should conform to international risk-management standards, thus encouraging a culture of safety in all procedures and practices.

The guidelines go on to state [original emphasis]: “Given the potential of these newly developed laboratory-modified H5N1 strains to start a pandemic, it is important that facilities that are NOT able to identify and appropriately control the risks associated with these agents REFRAIN from working with them.” Those are sensible words, but unfortunately lack any means of enforcement.

The lifting of the moratorium by researchers must not be seen as closure of the debate. The potential risks of the work demand exceptional precautions in any future research. It is clear that the immediate practical applications of gain-of-function flu research remain largely hypothetical, and that its true value lies in long-term fundamental research to improve understanding of the transmissibility and pathogenicity of the virus. That makes it even more incumbent on researchers and authorities to exercise the greatest responsibility and prudence. ■

Science stakes

With the Royal Institution in trouble, Britain's crowded public-science scene must evolve.

Since 1799, the Royal Institution of Great Britain has occupied a grand building in London's Mayfair, surrounded today by luxury shops and private art galleries. For many years, the building was a central part of British science. Michael Faraday dazzled crowds there in the nineteenth century with pyrotechnic displays of chemistry.

In many respects, its address, 21 Albemarle Street, is the Royal Institution (RI) — hence the consternation in the United Kingdom and abroad when *The Times* newspaper last week reported that the RI building was up for sale. The news was no surprise. The RI has been on the financial ropes for years, lumbered with the costs of a misguided £22-million (US\$35-million) refurbishment.

Richard Sykes, the RI's current chairman, said last week that the charity was likely to be restructured. But the RI, whose property includes a remarkable collection of historic scientific equipment and documents, insists that it will continue its mission to educate and inform the public about science and will not fold.

In many ways, the RI is a victim of the trend it pioneered. When the charity started out in 1799, science itself was a novelty. What would now be deemed 'science outreach' was even more so. Albemarle Street became London's first one-way street, to deal with the crowds that headed there. Now, nearly every university encourages its academics to push their research to the public, and science communication itself has become a career.

Perhaps more importantly, people who wish to be informed about a topic no longer need to sit in an uncomfortable seat and listen to a

lecture by an *éminence grise*. While the RI resolutely championed this formal mode of engagement, the rest of the world has moved on. The vectors of knowledge are the Internet and mass media, not refined public meeting rooms. In its defence, the RI has made some attempt to modernize, but it is still known to most people as the place with the famous old (and very steep) lecture theatre.

Happily, there remains a market for science events. People flock to informal venues and to the type of flamboyant entertainment pioneered by Faraday. Cafés Scientifiques have taken off in many countries, and thousands of people attend science festivals in the United Kingdom, elsewhere in Europe and in the United States.

With the future of the RI in severe doubt, those who care about science communication in Britain should take this opportunity to discuss publicly how the landscape should change. And if such efforts fail to be self-sustaining, the RI's trustees should consider whom to favour with the charity's collection of historic equipment and other resources.

Here is *Nature's* brief guide to the runners and riders, should the RI withdraw from the race. The Royal Society does not have the corporate stomach or skills to take on a substantial increase in science communication and engagement activities. The British Science Association has appointed an ambitious new chief executive, and faces a tough challenge just to develop its annual public meeting into an event with national impact. The Wellcome Trust is strong in the crowded science-outreach field, at least in London, but is focused on biomedicine.

Alongside these, and with a lively pack of mass media, bloggers and tweeters snapping at its heels, the RI seems likely to emerge redundant, whatever happens to its lovely buildings. The institution best positioned to inherit its legacy is the Science Museum, which has invested well in showmanship and online facilities. It has yet to make its mark as a forum of national discussion, but has ambitions to do so. And its headquarters are always crowded with children and adults, and fun to visit, too. ■

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