

“Nature is the biggest bioterrorist”:
Scientists, the Risk of Bioterrorism, and the Freedom to Publish

William Leiss (22 December 2011)

The quoted sentence in the title is attributed to R. A. M. Fouchier, a scientist at Erasmus Medical Center in Rotterdam and the University of Wisconsin, in an interview with *The New York Times*.¹ He is the lead researcher for the team that, working in a highly secure laboratory in the Netherlands, genetically engineered the “highly pathogenic” avian influenza A(H5N1) virus so as to make it easily transmissible in mammals. H5N1 is an extraordinarily lethal group or clade of viruses which has killed about 60% of the 600 or so humans that have been infected by it since 2003 (the virus was first identified in 1997). A pertinent comparison is with the 1918 pandemic, which killed only about 1% of those infected. The H5N1 viruses are easily transmissible among birds and are sometimes transmitted from birds to humans, but so far there is no evidence for direct human-to-human transmission.

Scientists have been studying its genome in order to understand why human-to-human transmission has been inhibited to date – knowing that, should this inhibition be overcome, at a time when no vaccine was available, the human death toll around the world could be enormous. Scientists have also been trying to manipulate its genetic structure so as to identify exactly what gene changes would allow it to overcome this inhibition; working with ferrets in the laboratory, they now think they know what kinds of gene changes would enable the virus to move freely among members of a mammalian species. In the press release from Erasmus Medical Center Professor Fouchier explains why this work was done: “We now know what mutations to watch for in the case of an outbreak and we can then stop the outbreak before it is too late. Furthermore, the finding will help in the timely development of vaccinations and medication.”

Now comes the tricky part. The researchers want to publish their work in full, in the journals *Science* and *Nature*, arguing that other researchers working in this same area need to know the details in order to evaluate the results properly. But the U. S. National Science Advisory Board for Biosecurity has asked the two journals not to publish major sections of the papers, specifically the “experimental details and mutation data that

¹ Denis Grady and William J. Broad, “Seeing terror risk, U.S. asks journals to cut flu study facts” (<http://tinyurl.com/89w7cfl>) and Doreen Carvajal, “Security in flu study was paramount, scientist says” (<http://tinyurl.com/76kn2om>), *The New York Times*, 21 December 2011; Fergus Walsh, “When should science be censored?” (20.12.11) <http://www.bbc.co.uk/news/health-16275946>. For a very thorough summary of background information see the Wikipedia article at: http://en.wikipedia.org/wiki/Influenza_A_virus_subtype_H5N1.

would enable replication of the experiments” – lest terrorists seek to weaponize the engineered pathogen to deliberately produce a global pandemic.

Professor Fouchier and others prefer to treat the issue as a matter of practicalities: (1) terrorist groups cannot easily duplicate the expertise, lab equipment, and development time needed to engineer this virus, even with the blueprint in hand; (2) even if the experimental details are restricted to recognized researchers, the results will eventually be circulated more widely; (3) there are other, available candidate materials for producing biological weapons for terrorist purposes that are far easier to work with.

One problem in resolving this issue is that Professor Fouchier has muddied the waters considerably with his comment about nature being the “biggest bioterrorist.” Another scientist, Professor John Oxford, London School of Medicine, further clouded the matter with these remarks: “The biggest risk with bird flu is from the virus itself. We should forget about bio terrorism and concentrate on Mother Nature.”² They should both be forced to wear dunce caps and sit in the corner for a while. As they should know, by the word “terrorism” we refer to deliberate acts of human malevolence and injustice causing great harms in the name of political objectives. Its commonest and age-old form is state-sponsored terrorism, such as that being suffered now by the citizens of Syria and dozens of other countries around the world; non-state actors also employ it, on a much less widespread scale, and sometimes in pursuit of legitimate struggles of political resistance against tyrannical regimes.

But Mother Nature is not a terrorist. In using this provocative language some scientists are trying to sidestep the very difficult issues in responsible decision making that have been raised by the proposal to publish this research in its entirety. These difficulties can be seen if we array the decision problem in the form of offsetting risk scenarios:

1. What is the probability or likelihood that the full publication of this research will enable public health agencies to save many lives – that would otherwise be lost – if and when the H5N1 virus naturally evolves into a form that is directly transmissible from one person to another? And:
2. What is the likelihood that restricting full publication to designated members of the research community will achieve the necessary scientific advance from a public health standpoint?

Versus

² See further Richard Ingham, “Scientists fight back in ‘mutant flu’ research,” *The Globe and Mail*, 22 December 2011, A14: <http://tinyurl.com/77tm52w>.

3. What is the likelihood that the full publication of this research will enable terrorists to weaponize this pathogen and deliberately cause a human pandemic that might not otherwise happen through the virus's natural evolution? And:
4. What is the likelihood that the restricted circulation of these research results will succeed in keeping the information out of the hands of potential terrorists?

Framing the choices we face as a set of contrasting risk scenarios is a way of using a systematic and disciplined approach to identify the trade-offs and assumptions that are otherwise hidden in the narrative problem-formulation. It also acts as a requirement for participants in the debate to specify what types of evidence could be assembled in support of attempts to answer these specific questions.

It would be possible, were sufficient time and resources to be made available, to undertake a formal set of risk assessments to address these four propositions; or we could just decide to rely on educated guesswork, for example, through an established procedure known as “expert elicitation” (http://en.wikipedia.org/wiki/Expert_elicitation). This is unlikely to happen: Some behind-the-scenes jockeying between the scientific journals, the research community, and the U.S. biosecurity committee will produce a resolution of this particular issue that the rest of us will read about later.

However, if either kind of systematic decision analysis were to be carried out and then published, all of us could perhaps learn a bit more about how to make sensible decisions of this type, which might be helpful when the next problem of this type rolls around. Because there is a virtual certainty that there will be more problems of this type. This is a simple function of the increasing power of scientific investigation itself, especially in highly sensitive areas like genetic manipulation and some others, such as synthetic biology and the detailed understanding and potential manipulation of brain functions.