POLICY FORUM: PUBLIC HEALTH

National Security and the Biological Research Community

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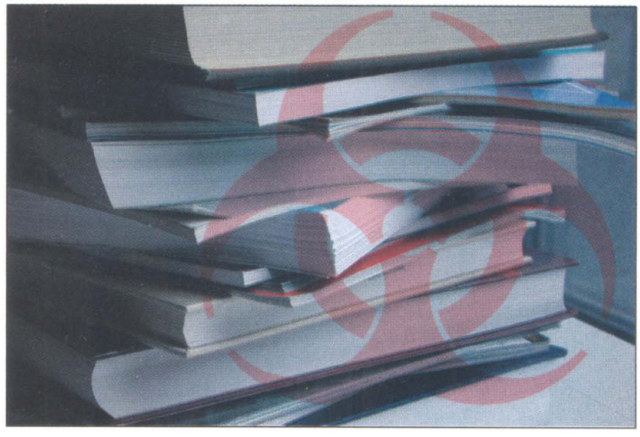
The potential for misuse of scientific information is pitting national security concerns against the traditional openness of biomedical research. The anthrax attacks that followed the horror of September 11 have made scientists and physicians suspects as well as saviors. Thus, even as we embark on an aggressive biodefense research agenda to combat bioterrorism, we fear that information from that research may fall into the wrong hands.

The current level of anxiety recalls the Cold War era. Then the federal government tried to constrain information exchange in some areas of mathematics and the physical sciences that might have aided Soviet nuclear weapons development (*1*). But, even at the height of the Cold War, the National Academy of Sciences (NAS) concluded that greater security would be achieved by open pursuit of scientific knowledge than by curtailing free exchange of scientific information (*2*). The Reagan Administration responded with National Security Decision Directive No. 189, stating: "It is the policy of this Administration that, to the maximum extent possible, the products of fundamental research remain unrestricted. It is also the policy of this Administration that, where the national security requires control, the mechanism for control of information generated during federally funded fundamental research in science, technology, and engineering at colleges, universities, and laboratories is classification (*3*)." With the end of the Cold War, President Clinton issued an Executive Order in 1995 that stated: "Basic scientific information not clearly related to the national security may not be classified." (*4*).

Today, though, conflicting messages coming from the Administration are fueling anxiety within the scientific community. On the one hand, Condoleezza Rice, special assistant to President Bush for national security affairs, affirmed the importance of openness of fundamental research in a letter of November 2001: "The key to maintaining U.S. technological preeminence is to encourage open and collaborative basic research. The linkage between the free exchange of ideas and scientific innovation, prosperity, and U.S. national security is undeniable ... the policy on the transfer of scientific, technical, and engineering information set forth in NSDD-189 shall remain in effect, and we will ensure that this policy is followed." (*5*). However, Chief of Staff Andrew Card, in a memorandum issued 19 March 2002, ordered federal departments and agencies to take steps to protect information regarding weapons of mass destruction and other information that could compromise national security, signaling that even unclassified information can be dangerous and may need constraints (*6*).



Concern about sensitive biological information and the threat of recombinant DNA technology was heightened by publication of a paper showing that insertion of IL-4 genes into mousepox viruses resulted in near total immunosuppression (*7*). Although this study advanced our understanding of the immune response, it evokes the specter of genetic engineering of a horrific strain of smallpox virus, making this information extremely sensitive. It also highlights another problem. Whereas the United States had a virtual monopoly on nuclear weapons development in the 1940s, biotechnology is an international endeavor. The IL-4 mousepox study was done in Australia, beyond the reach of U.S. government regulations. It was, however, potentially subject to restraint, raising the question of ethical responsibility within the scientific community.

A more recent report demonstrating that an artificially synthesized polio virus genome produced infective pathogenic virus (*8*) raised similar questions about the responsibilities of scientists and publishers (*9*, *10*). Congressman Dave Weldon (R–Fla.) and seven other members introduced a resolution in the House of Representatives on 26 July 2002, calling upon the Executive Branch to "...examine all policies, including national security directives, relevant to the classification or publication of federally funded research to ensure that, although the free exchange of information is encouraged, information that could be useful in the development of chemical, biological, or nuclear weapons is not made accessible to terrorists or countries of proliferation concern." (*11*).

The American Society for Microbiology has already adopted specific policies and procedures for its journals (*12*) to provide scrutiny in the peer-review process of submitted manuscripts for national security concerns, particularly those dealing with select agents. This review seeks to determine whether an article contains information that might be misused or might pose a threat to public health and safety. Of the more than 6000 papers ASM publishes each year, a handful have raised specific concerns. The journal editors have yet to reject a paper for national security concerns, but a few authors have decided independently to withhold their papers. The NAS will soon convene a meeting of scientific publishers with the hope that we can achieve harmonized procedures for publishing in the life sciences that protect science and national security.

Issues concerning national security and scientific communication are not new. In fact, the question of secrecy in science was raised in 1626 by Sir Francis Bacon, who established the scientific method. He concluded that there were times when secrecy was appropriate (*13*). Over three centuries later, President Clinton echoed these thoughts: "...our Nation's progress depends on the free flow of information. Nevertheless, throughout our history, the national interest has required that certain information be maintained in confidence in order to protect our citizens, our democratic institutions, and our participation within the community of nations." (*14*).

Thus, there is a long-standing tension between openness in science and the protec-

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tion of national security. Just as the Manhattan Project established a culture of secrecy among nuclear physicists, and as computer scientists and cryptographers must work under the arcane International Traffic in Arms Regulations (ITARs) that limit flow of information of military importance, the biomedical community now finds itself enmeshed by questions of how to protect sensitive information. But there is no clear definition of what constitutes "sensitive information" in the Life Sciences, a condition that has led William Wulf, President of the National Academy of Engineering, to caution that "the concept [of sensitive but unclassified information] is so squishy [ill-defined] and fraught with danger that the only sensible thing for the research community to do is to demand [classification]." (*15*). But many academic institutions, like MIT, reject classified research because it conflicts with their educational missions (*16*).

Remembering the 1975 Asilomar meeting. It may be time to revisit it!

Underlying the debate over classification is a reawakened fear of foreigners. Before this latest wave of xenophobia, the importance of openness and international cooperation in science to national security was articulated by Neil Lane, science adviser during the Clinton Administration (*17*). The wars against terrorism and infectious diseases are global. If government moves toward restraining the flow of information across national boundaries, there will be an inevitable clash with the academic research community that is increasingly seeking international collaborations and partnerships (*18*). Restricting international biomedical communication would certainly adversely impact biomedical research in the United States. Whether it could help deter bioterrorism is far from clear. Limiting information exchange could slow the discovery of vaccines and drugs to treat infectious diseases, including those needed to defend against bioterrorism. Given the potential dual use of biodefense activities, silence also could raise suspicions of U.S. research intentions and lead to illicit proliferation activities by others.

Thus, we are left with a series of perplexing questions that are at the heart of the debate between national security and the openness of biomedical research and publication. Should scientists be constrained regarding questions they ask and should more research be classified? Should journals reject papers containing potentially sensitive information? Should secrecy clearances be required for attendees at biodefense research meetings? Should there be mandatory government review before publishing information, even from unclassified studies and those not funded by government? Finally, perhaps the most difficult questions of all, exactly what is sensitive information, and who is empowered to decide what is potentially dangerous? The controversy is likely to continue until we have a national debate and reach consensus on how to balance traditional openness of science with national security in the new age of bioterrorism.

The closest experience that the biological research community has had with such contentious issues occurred in the 1970s with the advent of recombinant DNA technology. Then, the scientific community paused to examine the consequences of the newly discovered power to alter genetics. Gathering at the Asilomar conference in Pacific Grove, California, in 1975, the leading scientists in the field, working openly in the presence of the press, proposed ways to manage that risk and cautiously move forward. The questions about containing sensitive information we are facing now parallel those raised at Asilomar. One outcome of Asilomar—the NIH Recombinant Advisory Committee (RAC) paradigm with its decentralized Institutional Biosafety Committees—has remained the basis for oversight of the safe conduct of recombinant DNA research within the United States. It also has served as the model used by nations around the world to regulate creation of genetically modified organisms (*19*).

The scientific community should come together again, this time to establish the norms for information communication in the age of bioterrorism (*20–22*). This process should begin by defining what is sensitive and then move to considering how best to protect that information—going beyond classification to ethically responsible citizenship. The scientific and national security communities must establish a dialogue and the outcome must be acceptable to the public.

Like the original Asilomar process, the outcome is uncertain and the road toward an acceptable framework for balancing openness of scientific communication with classification, sensitive homeland security information, and national security will be contentious. However, the scientific community must act responsibly to develop self-policing procedures that protect national security and permit the advancement of science needed for the protection of public health.

References and Notes

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4. Executive Order no. 12958, "Classified national security information," 17 April 1995.
5. Letter from C. Rice, to H. Brown, Cochairman, Center for Strategic and International Studies, 1 November 2001.
6. Memorandum from A. H. Card Jr. for the heads of executive departments, 19 March 2002. The guidance memo that accompanied that order told departments to take steps to protect sensitive but unclassified information that might reasonably be expected to assist in the development or use of weapons of mass destruction. Memorandum for departments and agencies from L. Kimberly, Acting Director Information Security Oversight Office, National Archives and Records Administration, and R. Huff and D. Metcalfe, Codirectors of Information and Privacy, Department of Justice, 19 March 2002.
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