

PREVENTING THE DEVELOPMENT AND USE OF BIOLOGICAL WEAPONS

PREVENTING THE DEVELOPMENT AND USE of biological weapons should continue to be a top priority for the country. There are fundamental issues that make prevention a difficult challenge. The knowledge, materials, and technologies needed to make and use a biological weapon are readily accessible around the world. Pathogens are ubiquitous in nature and can be found in hospital and research laboratories, in culture collections, and in sick people and animals everywhere. The skills and equipment for making a biological weapon are the same as those required for progress in medicine, agriculture, and other fields, so they cannot be locked away. It is now possible to synthesize viruses from nonliving components, with technologies that are becoming cheaper and widespread. Efforts that might be useful in deterring state-sponsored biological weapons programs may have little or no effect in slowing the development of biological weapons by terrorist groups.

In spite of these challenges, there are approaches the U.S. government should take that may increase the chances that we will prevent biological attacks: maintaining international norms and improving surveillance systems, deterring potential adversaries by demonstrating a strong national response, developing better forensic analysis, generating better intelligence, and implementing sensible laboratory practices and security.

Recommendations

► **The U.S. should strongly support the Biological Weapons Convention and other international treaties that prevent terrorism.**

The cornerstone of biological nonproliferation strategies is the Biological Weapons Convention (BWC)—the first agreement among nations that declared an entire category of weapons to be off-limits. The moral force of the treaty has not prevented all of its signatories from developing biological weapons: for example, the Soviet Union, a signatory to the Convention, established an enormous secret bioweapons program during the Cold War, and there are some current signatories to the BWC that the U.S. government judges to have

an offensive biological weapons program. However, it is worth noting that no country openly goes against the international norm and displays an offensive biological weapons capability. This prohibition against biological weapons development should continue to be strengthened with vigorous U.S. support to promote universal adoption of the treaty and with implementation support to other signatories.

Other international agreements intended to prevent terrorism, such as UN Resolution 1540, and measures such as the International Health Regulations (IHR) that seek to limit the medical consequences of an epidemic, also should be actively promoted by the U.S. government. The U.S. should work with these international regimes to bolster bio-surveillance, forensics, training, and biosafety—all measures that could lessen the likelihood of biological weapons development and use.

► **The U.S. should strengthen deterrence of biological weapons by expanding our ability to reduce the consequences of such attacks and by increasing investments in microbial forensics capacities.**

The consequences of a biological attack can be reduced significantly by a rapid medical response to detect, treat, and provide appropriate medical care. If the U.S. has the demonstrated capacity to seriously limit the consequences of a biological weapons attack through a rapid and effective response, this may deter some adversaries from pursuing a biological attack. In addition to this form of deterrence, the U.S. should press ahead with efforts to strengthen its microbial forensics capacity. The nation needs to develop the strongest possible scientific capacity to trace back a pathogen to its natural or laboratory origin—an important part of attributing an attack to its source.

► **The U.S. should support private sector efforts to develop international standards for genomics screening.**

Commercial gene foundries have formed 2 international industry associations to develop standards for screening cus-

tomers orders. The U.S. government should encourage and fund these private sector efforts to expand screening internationally. The goal should be to have all major international gene foundries screen their orders so that all gene orders, from Kansas City to Karachi, are screened using the most updated software.

This should be driven by the private sector for several reasons: (1) gene synthesis is an international business and so will not be subject to U.S. regulation; (2) synthesis technologies are rapidly becoming more accessible to individual laboratories, so scientists will decide to make their own genes if it becomes too onerous to go through a commercial supplier (they will likely do so at some point in any case as costs come down); and (3) the necessary software will need to evolve at speeds greater than formal regulation. Some have called for a U.S. government–curated list of approved sequences or even government-sanctioned screening software for these companies. But a top-down government-led approach would likely rapidly become irrelevant in this fast-paced technological field, very few members of which are part of the government.

► **Intelligence collection should be strengthened to identify and interdict would-be bioterrorists before an attack.**

In 2005, the Commission on the Intelligence Capabilities of the United States Regarding Weapons of Mass Destruction stated that the biological weapons threat is the “mass casualty threat the [intelligence community] is least prepared to face.” Making progress will require placing a higher priority on U.S. intelligence collection against biological threats, finding better ways to reward bioscientific expertise and analytic skills in the intelligence community, building better coordination between the intelligence community and the scientific and health communities, and providing more resources to the intelligence community for these efforts.

► **The U.S. should carefully evaluate new laboratory security measures to preserve the long-term security goals of medical countermeasure availability.**

Recent calls for increased laboratory security by the *World at Risk* report by the WMD Commission should be carefully considered before action is taken. Laboratory security is critical, and it has increased substantially as a result of a series of changes that have been made since the anthrax letter attacks of 2001. But there are inherent limitations to

“securing dangerous pathogens,” given the ready availability of pathogens around the world, in culture collections, laboratories, and the natural environment.

There is also a real danger that excessively intrusive or expensive security measures will discourage scientists from pursuing the research needed to treat emerging infectious diseases or to respond to a bioterrorism attack. Understanding the pathogenesis of microbes is crucial. We should not inadvertently impede progress in this work or in the development of new vaccines and medicines by imposing security measures that make science in the U.S. more difficult, costly, or burdensome while providing minimal, if any, security benefits. This is a particularly important concern because these security measures would not be imposed on scientists working anywhere else in the world.

A balanced and sensible approach to ensuring lab security would be to enact the measures called for by the Select Agent Program and Biosafety Improvement Act of 2008, which was introduced in the 110th Congress (S. 3127 and H.R. 6671). This act calls for increased biosafety oversight of high-containment laboratories, training requirements and standards, and a laboratory accident reporting system. These measures would increase biosafety and biosecurity without impeding scientific progress.

It is also important to recognize that bioscience and biotechnology are likely to serve as powerful engines of economic activity in the coming decades. Bioscience is already a global enterprise. Regulations imposed on scientific investigations should be crafted to be cost-effective, and consideration should be given to the effects such constraints might have on U.S. economic development.

Laboratory security has been a major focus internationally in cooperative threat reduction programs for former Soviet states, as well as expanded efforts in Asia, Southeast Asia, and the Middle East. The main emphasis of U.S. efforts in these countries going forward should be to expand disease surveillance to limit natural disease and detect deliberate epidemics. In addition, the U.S. should increase biosafety training for scientists and public health workers, encourage the formation of professional association chapters, encourage collaborations with U.S. scientists, and pursue joint projects on drugs and vaccines that benefit the populace of these nations and increase interactions with the U.S. scientific community. Increased surveillance and epidemiologic support would help these nations manage an outbreak—whether the outbreak occurs naturally or not.

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