

Biodefense: When Technology Goes Global

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Biotechnologies present critical choices for the United States in this new strategic era. These technologies contain both great promise and great risk. Genetically modified crops may provide the means to feed the world's growing population, and new drugs may treat diseases that have plagued humans throughout the millennia. The growth of this sector may provide good jobs and profits for American workers and industry.

At the same time, these technologies pose grave dangers. Their growing sophistication and availability makes possible a catastrophic biological attack by a nonstate actor—an event that could cost thousands or even tens of thousands of innocent lives.

These dangers are especially pronounced given the global diffusion of excellence in biotechnologies. Although the United States remains dominant in biotechnology discovery, the rate of growth in other economies—particularly China and India—is extremely rapid across the full spectrum

of activities from discovery through advanced development and into full-scale production. Few production sites are located in the United States today. Most analysts expect a gradual shift overseas of a greater proportion of the growing biotechnologies enterprise.

Unfortunately, the U.S. government policy response is not changing as much or as swiftly. Current strategies and structures too often continue Cold War-era policies for nuclear nonproliferation that relied on control—using export controls because U.S. and Western allies uniquely had access to nuclear-related technology; inspections to control shifting civilian technology to military purposes; and classification to control access to the technical details about weapon construction. The vast differences between nuclear and biological threats mean that these Cold War approaches are likely to fail to prevent a catastrophic biological attack or effectively defend against it.

While there are irreducible differences between civilian and military nuclear programs, there would be no meaningful difference between a civilian and a military biological program before the immediate pre-attack phase. Similarly, a nuclear weapons facility would generate a large, observable footprint, whereas a bio research lab probably would not.

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International norms for biosecurity need to be developed and then implemented. The norms should be developed through a bottom-up effort rooted in the international life sciences and public health communities. The norms should be built by these communities and, as possible, expanded to a self-enforcing system of facility and individual certification. This system can be reinforced by national law and regulation. The United States must provide stronger leadership to promote such standards.

In addition, biotechnology expertise is extremely diffuse—globally and throughout the research and private sectors. The Manhattan Project and other nuclear-related research meant that nuclear expertise was concentrated in the government. By contrast, biotechnology research is dominated by civilian pioneers, with large numbers and weak or nonexistent professional linkages.

New organizational structures will need to be developed that enable Defense Department scientists to interact more freely and more often with their civilian counterparts. Wholly separating civilian and defense science sectors in the years ahead will assure the defense sector falls behind technically in some key areas, harming, for example, our ability to develop needed medical countermeasures in a biological catastrophe.

Current approaches to the biotechnologies—patterned off of Cold War nuclear nonproliferation efforts—are likely insufficient. These efforts should be complemented by attempts to create government linkages to scientific communities, both through promoting international norms and bolstering knowledge of scientific advances.

These types of efforts will prove beneficial not just within the biotechnologies, but within a number of emerging fields that present similar dilemmas—most notably cyber and nanotechnology. Biotechnologies present only the first of many tests of the United States' ability to adapt to privately developed technologies with significant security implications. ■

(These views are the author's own and do not reflect an official U.S. government position.)