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Strategies in Fighting Bioterrorism

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Introduction

All countries face the threat of bioterrorism and preparatory defense measures are needed to avoid unnecessary destruction of human, animal and plant lives. Doctrine in fighting bioterrorism should define enemies and the available sources of bio-defense. Strategies that derive from a counter-bioterrorism doctrine are developed in three fields: deterrence, intelligence and prevention. A biodefense strategy should define types of biorisks, their structure and feasibility, levels and ways of their prevention. Biodefense doctrine and strategy constitute a scientific basis for efficient investments preferably in scientific community, and then in public health infrastructure, diagnostic technologies and finally in vaccines and medicines.

Strategy of deterrence

The first step in fighting against real unusual epidemic events (UEEs), is to develop pragmatic models for their detection and identification [1,2]. At the same time it is the best weapon against hoaxes. It is necessary to develop databases with potential bioagents, as well as prompt and accurate networks for their matching with samples from the focus.

Prevention of bioterrorist attacks in classical way, by strengthening intelligence to identify and interdict bioterrorists before they strike, slowly but surely comes to the second place of importance. A reason is simple: a typical or classical terrorist could be only perpetrator, but a top scientist is at the same time both a source of agents and potential perpetrator, as was case in Amerithrax attack in 2001. A priority should be the development of a cadre of highly skilled and competent analysts to build and maintain biosurveillance systems (methods and models) at all levels. The cheapest and the most effective is investment in knowledge and personnel (developing new methods and models). Rapid access to accurate and reliable diagnostic data will be of the highest strategic importance in a catastrophic health event. Clinical laboratory data is very specific and reliable-much more so than syndromic data or physicians' clinical assessments. Technologies to develop rapid, reliable, and cheap diagnostic tests exist (diagnostic tools that will be necessary to manage public health emergencies), but they should be continually improved.

Although some experts state that the most powerful form of deterrence is the ability to catch a perpetrator and prevent future attacks [3], we do not agree with it. Many perpetrators, especially "low sophisticated", could be suicidal or at least easy to be catched.

Should strengthen deterrence of biological attacks by expanding our ability to reduce the consequences of such attacks (build capacity to mitigate the consequences of bioterror attacks).

Strategy of intelligence

While gathering intelligence on nation-states is not easy, gathering intelligence on activities of non-state actors in time to prevent or respond to an attack is even more difficult. The first challenge is the difficulty and impracticality (indeed, impossibility) of limiting the illicit transfer of materials, technologies, and knowledge. Policymakers would want to know immediately following an attack with a bioweapon: what type of system would give us more information about the attacker, how the attack was carried out, and how the next attack could be stopped.

BioWatch does not provide data in real time, and because the system relies on too few sensors that are spread too far apart, it cannot reliably detect an attack with a biological weapon. Consequently, BioWatch does not support interdiction, which is crucial. Any multibillion dollar system that has been years in development but does not allow the U.S. to know who attacked, when, and what with, and then to stop the next attack, is not justifiable. An effective tool for informing decision making must provide real-time information about the nature, location, and perpetrator of an attack; without this capacity, BioWatch is inadequate. BioWatch cannot provide situational awareness. Situational awareness, which depends on real-time data, is imperative for informed and rapid decision making.

The intelligence community should pursue a better means of gathering intelligence on biological threats, not to count on getting tactical warning of a planned bioterror attack or depend solely on our ability to interdict or thwart such attacks. Focus should be on scientific community with three aspects:

a) To follow and up-to-date advanced bioresearch. We have to make a better coordination between the intelligence community and the scientific health research communities, and provide more resources to the intelligence community for these efforts. There are no easily identifiable footprints marking bioweapons development. The work needed to develop a biological weapon is nearly indistinguishable from legitimate biological science and biotechnology, and such efforts are easily hidden in plain sight;

b) Regularly assess dual-use bioresearch. The transformation of a promising drug candidate into a licensed product typically takes 10 or more years from basic research to approval by the FDA, at a cost of hundreds of millions of dollars. It is estimated that of every 5,000 "candidate" drugs that look promising on the lab bench, only 5 enter clinical trials, and only 1 of those achieves FDA licensure [4].

c) Should work internationally to bolster biosurveillance, forensics, training, and biosafety-all measures that could lessen the likelihood of biological weapons development and use. Especially should press ahead with efforts to strengthen microbial forensics capacity. A need 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.

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Strategy of prevention

A strategy that anticipates a wide range of possible scenarios is necessary. A four levels paradigm of prevention has been proposed [5]. Prevention efforts provide only partial barriers and deterrence against biological attacks. A well-planned, well-rehearsed, and rapidly executed epidemic response can dramatically diminish the consequences of biological attacks. The consequences of a biological attack can be reduced significantly by a rapid medical response to detect, treat, and provide appropriate medical care. The demonstrated capacity to seriously limit the consequences of a biological weapons attack through a rapid and effective response may deter some adversaries from pursuing a biological attack.

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