

Lack of Adequate Surveillance of Biological Threats is a Peril to Global Public Health

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Vigilance is essential if we are to be prepared against biological threats stemming from bioterrorist attacks to emerging infectious diseases. Surveillance can provide valuable information for risk assessment and to make decisions on which pathogens to target with the most attention to development and stockpiling of pre- and post-exposure prophylactic vaccines, drugs, or therapies. However, deciding on what probable bioweapon threats and emerging infectious diseases to invest time and resources on poses a challenge, especially during harsh economic times or in poorer regions. Should we thus, attempt to focus on the most plausible threat or the most devastating threat to occur even if it appears to be less probable?

The U.S. Centers for Disease Control and Prevention (CDC) states that an airborne biological agent has the greatest potential to massively spread with an overwhelming impact [1]. Indeed, some of the agents classified as high priority biological threats to national security, or Category A agents, can be transmitted through an inhalational route. Category A agents are those that can be easily dispersed or transmitted, have high mortality rates, can cause public panic, and thus require public health preparedness [1]. Category A agents that can be transmitted through inhalational route or can be aerosolized include *Bacillus anthracis* (anthrax), *Yersinia pestis* (plague), *Variola major* (smallpox), *Francisella tularensis* (tularemia) [2] and filoviruses (viral hemorrhagic fevers) [3]. One can argue that while disease caused by these agents can be devastating, natural exposure to these agents is rare [3]. However, the 2001 anthrax mailings in the U.S. served as a reminder of the looming threat of bioterrorism to cause illness, death, and widespread social and economic turmoil [4]. Furthermore, naturally occurring airborne infectious agents can still emerge and overwhelm us as were the cases during the global outbreaks in 2003 of severe acute respiratory syndrome associated coronavirus (SARS-CoV) and in 2009 of pandemic H1N1 influenza virus. Thus, surveillance for naturally occurring contagions should also be of high priority. Not surprisingly, the World Health Organization (WHO) assures that strengthening the surveillance systems for natural outbreaks is the best approach in preparing for and halting bioterrorist attacks [4].

Lack of vigilance has enabled other naturally occurring diseases to catch us by surprise. One example is that of HIV/AIDS. First identified

in the 1980s, the number of new infections did not become stable until 2000, and about 33 million individuals were affected by 2009 [5]. HIV/AIDS was allowed to rapidly expand throughout the globe for decades before more adequate surveillance, research, and investment caught up to stabilize the number of new infections and provide treatments for those already infected with HIV. In addition, vector-borne diseases, largely ignored after the successful mosquito extermination programs of the 1960s are again contributing to human diseases [4]. Such is the case with emergence and global expansion of flaviviruses, which can be blamed on the current lack of mosquito control, population growth, increased urbanization and globalization, and overall inadequate investment [6].

The point is that at times, a seemingly less important biological threat can actually be more impactful than previously predicted or even observed. Something will always be missed with a minimalistic approach to surveillance. So maybe the answer is not to focus all attentions on any one set of contagious biological agents, but to increase local, state, and global cooperation to more effectively use current surveillance efforts, expand upon others when possible, and to develop treatments. Truly, global cooperation may seem like a very difficult goal to reach, but the world should not wait until the next pandemic calamity.

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