

A conversation with Paula Olsiewski on July 19, 2013

Participants

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Note: This set of notes was compiled by GiveWell and gives an overview of the major points made by Dr. Olsiewski. Please note that her views are hers personally and do not necessarily represent the views of the Sloan Foundation.

Summary

GiveWell spoke with Dr. Paula Olsiewski of the Alfred P. Sloan Foundation as part of its preliminary investigation of biosecurity issues. Conversation topics included: the Sloan Foundation's work on biosecurity issues, the scope of biosecurity threats, and the organizations that currently work in this space.

Background on the Alfred P. Sloan Foundation

The Sloan Foundation makes grants totaling about \$75 million per year to philanthropic causes. Outside of a few long-running programs, the Sloan Foundation typically funds program areas in 10-year cycles.

The Sloan Foundation's work on biosecurity issues

Overview

From 2000 to 2010, the Sloan Foundation spent approximately \$44 million on its biosecurity program. The Sloan Foundation's grant process involved studying the field, identifying and vetting potential grantees, and then inviting proposals from a small number of key people and organizations. One of the Sloan Foundation's key grantees in its biosecurity program was the University of Pittsburgh Medical Center (UPMC).

Projects in the biosecurity program

The Sloan Foundation's projects in this area included:

- Addressing the risks of bioterrorism. In particular, Sloan worked with building engineers to develop improved methods for air filtration in large buildings (people spend 90% of their time indoors).
- Preventing people from mail-ordering DNA of potentially harmful viruses. DNA sequences for harmful agents like smallpox are publicly available, so it is important to ensure that companies that sell DNA strands are not accidentally selling dangerous ones.

- Establishing new scientific norms. It sponsored the Fink Committee report, which outlines an improved culture of responsibility for scientists and discusses what kinds of experiments are potentially dangerous.

Impact

Partly because of the Sloan Foundation's work, the U.S. government developed guidance to track the buying and selling of potentially dangerous DNA. Also, Sloan's work helped engage the FBI in synthetic biology and do-it-yourself biology.

Although the Sloan Foundation does not participate in lobbying, some of its work on bioterrorism played a role in public policy change by providing information and educational materials to the public and to academic communities.

Transition to other biological programs

Since ending its biosecurity program, the Sloan Foundation has funded programs that address other biological issues and risks. It expanded its work on indoor microbiology and entered the synthetic biology space. One aspect of the Sloan Foundation's synthetic biology program focuses on life science research that could have potentially harmful effects, also known as "dual-use" research.

Biosecurity problems

Three main risks in biosecurity are bioterrorism, pandemics, and scientific accidents. These three issues are often grouped together under the banner of biosecurity because better public health preparation would be helpful for addressing them all.

Bioterrorism

Probability and magnitude of bioterrorism risk

Dr. Olsiewski is not aware of any estimates of the likelihood of bioterrorism attacks or the estimated risk magnitude.

However, one can analyze components of bioterrorism risk:

- Does anyone have the intent to carry out acts of bioterrorism?
 - Evidence about this is difficult to collect, but it seems plausible that people are trying to carry out bioterrorist attacks.
- Does anyone have the capability to carry out acts of bioterrorism?
 - There is a high number of people with science Ph.D.'s who live all over the world; it is plausible that there are people with the capability to commit acts of bioterrorism.
- Could any government programs lead to bioterrorism?

- The former Soviet Union had about 20,000 people working in a covert bioweapons program even after it had signed the Biological Weapons Convention (BWC). Some countries still have not signed the BWC.

Though the level of risk is highly uncertain, it does not appear as if the risk of a bioterrorist attack is any less likely today than it was in 2001.

Scope of bioterrorism impact

The scale of the impact of bioterrorism depends on a variety of factors, including:

- Whether the biological agent is contagious and how deadly it is. For example, anthrax is not contagious but it is lethal, so it poses a significant risk to a small group of people. The flu is contagious and generally kills a small portion of the people who contract it, so releasing a flu virus could have a large global impact.
- Whether a vaccine exists for that agent and whether the vaccine is stockpiled. For example, the existence of a smallpox vaccine and the fact that some countries, like the U.S., have stockpiles of the vaccine, mitigate the threat from a bioterrorism attack involving smallpox.
- The existence and efficacy of medical countermeasures other than vaccines.

It is difficult to protect against bioterrorism because many different harmful biological agents exist and they can be released in many different ways (e.g., by infecting food and water supplies, by releasing in public areas, etc.).

Pandemics

A harmful biological agent might develop naturally and evolve into a pandemic. For instance, avian flu could feasibly evolve into a disease transmissible between humans.

Scientific accidents

Scientists could accidentally create and release a harmful agent from a laboratory. Such accidents can be prevented by prohibiting risky experiments, such as experiments that attempt to change the host range of a pathogen.

Risky experiments have happened before. For example, the National Institutes of Health recently funded experiments that tried to change the host range of the H5N1 flu virus to include ferrets. The National Science Advisory Board of Biosecurity (NSABB) originally voted against the publication of these experiments but later the work was published. In the wake of the resulting controversy, the scientific community debated whether or not such experiments should be allowed.

Few laws and agencies in the U.S. restrict risky scientific experiments. The BWC prohibits certain kinds of research. In addition, the National Institutes of Health (NIH) has guidelines that cover federally funded recombinant DNA research and it has

developed some new guidance for oversight of dual-use research. There are few explicit restrictions on experiments run by private companies.

Some European countries have weaker standards for safety and security in the laboratory than the U.S. does.

Organizations working on biosecurity

The government

The U.S. government funds departments and agencies that work on biosecurity issues, some of which are listed below:

- The Department of Homeland Security works to prevent and/or mitigate the effects of bioterrorism and pandemics.
- The Environmental Protection Agency (EPA) is responsible for decontamination after bioterrorist attacks, such as attacks involving anthrax.
- The Recombinant DNA Advisory Committee (RAC), part of NIH, oversees the safety of scientific research that receives NIH funding.
- The Defense Advanced Research Project Agency (DARPA) does some biosecurity work.

Sequestration has decreased funding for some agencies working on biosecurity. For example, some employees at DARPA have been furloughed.

In the past, the U.S. government has usually only protected against biological weapons that it has the capability to use against others, which may not be the best strategy.

Foundations

The Skoll Global Threats Fund may fund some work in this area.

The Carnegie Foundation and the MacArthur Foundation, like the Sloan Foundation, funded work on biosecurity but have exited the space. Many groups that the Sloan Foundation funded, however, are still working on issues related to biosecurity.

There may be other funders that Dr. Olsiewski is not aware of, since she no longer primarily focuses on this space.

Businesses

Businesses do not usually work on drugs that would be helpful for protecting against pandemics and bioterrorism primarily because they would not be profitable. Many pharmaceutical companies do not produce vaccines because of litigation costs or other difficulties.

International cooperation

Even though many biological threats are potentially global in nature, preparedness for biological threats usually occurs at the national level. For example, the U.S. has smallpox vaccines stockpiled for its citizens in case of a smallpox outbreak, but no organization coordinates global smallpox vaccine stockpiles. A U.S. government project called Bioterrorism International Coordination Exercise (Black ICE) tried to model an international response to a smallpox outbreak.

There are also complications in who would be covered by national governments in the case of a major threat. For example, a country with a large guest worker population may choose to treat its citizens first.

The World Health Organization (WHO) does some international coordination involving biosecurity risks.

Biosecurity problems vs. other WMDs and nuclear weapons

Dr. Olsiewski is unsure about how biosecurity risks compare to the risks posed by other WMDs, such as nuclear weapons. But it seems to her that there is more funding to address nuclear risks than biological risks.

Reasons for funding gaps on biosecurity issues

Biosecurity is not high on the current political agenda. After bioterrorism occurs, such as the post-9/11 anthrax attacks, public awareness of bioterrorism is high, which encourages political action to address it. When major bioterror attacks have not happened for several years, as is the case today, people do not exert political pressure to work on bioterrorism issues. As a result, protection against bioterrorism is often underfunded.

Other people to talk to about biosecurity

- Thomas Inglesby
- D.A. Henderson
- Gigi Gronvall
- Mike Osterholm
- Mark Smolinski

Resources to learn more

- A PwC report about Sloan's biosecurity program
- "Preparing for Bioterrorism; the Alfred P. Sloan Foundation's Leadership in Biosecurity," by Gigi Gronvall

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