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BIOLOGICAL RISKS: PROTECTION FROM PANDEMICS AND BIOTERRORISM

Scenarios for natural outbreaks or intentional dissemination of microorganisms that can cause infectious diseases are currently subject to intense political debate. In formulating strategies for defense against biological risks, most states pursue a variety of approaches depending on the hazard: While the security services focus on bioterrorism, the health sector concentrates on naturally occurring infectious diseases. A comprehensive approach would not only be more cost-effective, but would also provide a greater degree of political sustainability.

ABC-excercise in Rieti, Italy *Max Rossi / Reuters*

The letters laced with anthrax spores that were delivered to US recipients five years ago, in the aftermath of the 11 September 2001 attacks, killed five individuals and gave rise to thousands of copycat pranks worldwide, as well as hysterical, but momentous reactions from politicians. Furthermore, the destructive outbreaks of foot-and-mouth disease, mad cow disease, and previously unknown viruses such as SARS and H5N1 have created widespread awareness of the dangers emanating from microorganisms.

In fact, the challenge is an old one that societies over the centuries have learned to deal with. However, three developments of our age add a new dimension to the risks from biological hazards: the increasing mobility of humans, animals, and goods due to globalization; rapid progress in the life sciences; and the intensification of global terrorism as well as indications that elements of the terrorist al-Qaida network have attempted to acquire biological weapons. The danger from pathogens, whether occurring naturally or deliberately released, poses complex challenges to politics and modern society. Protective measures against a triple threat – emanating from states, non-state actors, and natural hazards – must be planned and executed. Furthermore, many of these measures are interdisciplinary in nature and impinge on many different policy fields, government agencies, and private institutions, necessitating considerable coordination efforts.

A triple threat

States: To assess the extent and quality of states' bioweapons programs is a difficult undertaking. First of all, the distinction between defensive and offensive research programs is a blurry one, and secondly, many of the components required are suited for both civilian and military applications (so-called dual-use goods). Current intelligence estimates assume that a small number of states continue to maintain offensive bio-weapons programs. There are no indications, however, that this circle of states has significantly expanded in the past 20 years.

The likelihood of industrialized democracies using biological weapons is low. The Biological and Toxin Weapons Convention (BTWC) of 1972 outlaws the production, storage, or acquisition of biological weapons by signatory state parties. Violations of its norms, which ban state use of bioweapons, would entail at least a considerable loss of face, and possibly international ostracism. On the other hand, these states already have other means at their disposal for providing security, and do not depend on B-weapons for the protection of their populations. However, what is missing from the BTWC so far is an effective monitoring and verification mechanism. The Convention therefore cannot provide reliable guarantees that states are not engaged in secret research programs, or that know-how and material will not be passed on from states into the hands of terrorists. It is assumed that authoritarian states with a pre-existing military-industrial complex that feel exposed to an existential threat are most likely to be motivated to develop secret B-weapons programs and to choose the biological option as an asymmetric counterstrategy.

Non-state actors: The threat from bioterrorism is a highly controversial one, due to the dearth of historical data and the very limited number of instances of premeditated dissemination attempts. Some voices warn that biological weapons are becoming easier to produce and proliferate because of the rapid spread of biotechnical goods, advances in the life sciences, and the expansion of many national biodefense programs. They also point

out that there has been increasing interest by individual extremist groups in the use of biological weapons as part of a general trend towards "mass casualty" terrorism.

Other, more skeptical voices point out that terrorist groups would hardly be able to carry out the envisaged large-scale and complex catastrophic attacks without state support. Indeed, there is a tendency to underestimate the know-how, procurement activities, and organizational resources required for the production and controlled dispersal of biological weapons. These obstacles, together with the very low number of attempted attacks to date, suggest that non-state actors have other more efficient and conventional methods at their disposal of killing large numbers of people.

Nevertheless, when weighing the pros and cons of different tactics, terrorists are not necessarily concerned with the number of casualties that can be caused by biological weapons. Even small-scale attacks using "simple" pathogens and delivery systems can cause great psychological, social, and economic damage. As illustrated by the anthrax letters (including the fake ones) in autumn of 2001, attacks involving biological pathogens generate huge public attention. This factor, combined with the invisibility of the pathogenic threat, may carry the risk of causing a mass panic, the consequences of which might be more grievous than those of the attack itself.

Naturally occurring infectious diseases: Worldwide, naturally occurring infectious diseases are the most widespread cause of death in humans, killing more than 14 million people annually, according to the World Health Organization (WHO). This figure does not include the potential effects of an influenza pandemic. Such a pandemic statistically occurs about once every 25 to 30 years, with three waves recorded in the past century. The WHO points out that since 1968, the risk of an outbreak has never been as high as its current level. With the arrival of influenza subtype H5N1, all of the conditions for the beginning of a pandemic have been met, except for efficient human-to-human transmission.

The WHO believes that an H5N1 pandemic would kill between 2 million and 50 million victims, depending on a number of assumptions. Tens of millions of people would require medical attention. There is hardly a single national health system that would be able to handle the medical consequences on its own. The situation would likely be compounded by critical psychological and economic effects such as widespread uncertainty, absences from the workplace, restrictions on trade and travel, and goods shortages. The World Bank estimates that an influenza pandemic would cost the global economy about US$800 billion per year.

Examples of biological risks

State B-weapons programs

- Difficult to assess: Soviet program was dramatically underestimated, Iraqi activities overestimated.
- Various sources assume the existence of between 6 and 12 active state programs.

Non-state actors and B-weapons

- 1984: The Rajneesh cult contaminates a salad bar in Oregon with salmonellae
- 1990–1994: The Japanese Aum Shinrikyo cult tries unsuccessfully to carry out an attack using anthrax and botulinum toxin.
- 1999–2001: Failed attempts by al-Qaida to procure anthrax spores and to set up a laboratory.
- 2001: After 11 September 2001, an unknown perpetrator mails out letters containing weaponized anthrax (labeled the "Amerithrax" case by the FBI). The series of attacks kills five people – the only victims to die of a bioterrorist attack since 1900.

Influenza pandemics over the past century

- 1918: The Spanish Flu (H1N1) kills between 80 and 100 million humans worldwide.
- 1957: The Asian Flu (H2N2) claims between one and four million victims.
- 1968: About 750,000 people die of the Hong Kong Influenza (H3N2).

One-sided focus on national biodefense

The US example demonstrates the unintended side-effects arising from a one-sided focus of national biodefense on unlikely catastrophic bioterrorism scenarios. Since 9/11, the US has been expanding its (partially secret) biodefense program in the framework of a narrow program for homeland security. While the related civilian expenditures in 2001 amounted to only US$417 million, that figure had increased to an estimated US$7.6 billion in 2005. At the same time, transparency and openness were diminished in the US biosciences, whose integration into the national security strategy had global repercussions on the perception of the alleged bioterrorist threat and on the implementation of states' responses to it.

Since the urgency of the matter is questionable, a biodefense approach that is slanted towards this scenario may require unnecessary costs. For instance, there are good indications that the al-Qaida network only developed an interest in biological weapons after viewing media appearances by US government officials. Also, massive buildups of the state's biodefense programs increase the risk of unintended transfers of expertise and/or material from high-security laboratories. An exaggerated threat perception can lead to questionable political prioritization. Expertise and funding are provided for national security purposes, at the expense of the health sector and research into natural infectious diseases and their respective vaccines.

Challenges of an "all-hazards" approach

When drafting policies for dealing with biological risks, it makes sense to follow an "all-hazards" approach that is designed for comprehensive protection of the population, irrespective of the nature of the threat. An inclusive understanding of the problem makes it easier to focus on synergies instead of a trade-off between the partners and sectors involved. Apart from the activities of the intelligence services and certain police and military responsibilities, most of the precautionary measures and resources – especially in the health sector – are intended as protection against deliberate or naturally occurring releases of biological pathogens. The fact that natural outbreaks are inevitable, while attempts to intentionally release biological agents are not, makes an all-hazards approach more economical and politically sustainable than a separate approach for each individual threat source.

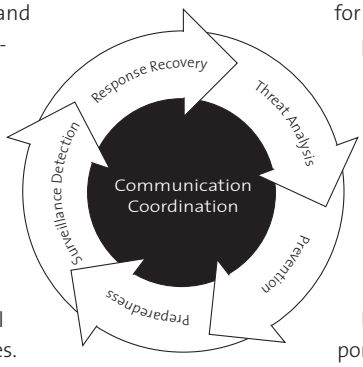
Successful management of biological risks poses comprehensive challenges to public, private, and international actors at all levels of politics (local, national, international) in terms of coordination and cooperation. Biosecurity cannot be provided withoutactive cooperation between states, businesses,

and academia, since much of the required know-how and material reside in the private sector. Accordingly, flexible knowledge networks involving state and private actors are key factors in managing biological risks. Primary responsibility for building and structuring these networks, and thus for providing biosecurity, remains with the state actors.

States are confronted with a plethora of complex tasks in the context of biosecurity that impinge on certain aspects of both domestic and for-eign policy. This applies to a wide variety of policy fields, including such diverse sectors as health policy, policing, the intelligence services, the armed forces, and restrictions on arms sales and exports, to name only the most important ones.

Necessary tasks with respect to the emergency management of biological risks are commonly classified according to the "risk management cycle":

Threat Analysis: The threat analysis involves all activities pertaining to the awareness and assessment of potential biological hazards. Dependent on the exact nature of the threat, inputs for the political leadership are provided by a country's law-enforcement and intelligence services, as well as medical and scientific communities.



Prevention: Preventive measures aim at the restriction of access to biological agents, related technologies, and know-how for certain countries, groups, or individuals, and are one of the most cost-effective approaches to biosecurity. Multilateral arms control and disarmament treaties as well as national export and import control policies are important preventive tools.

Preparedness: An appropriate reaction to a bio-attack or pandemic requires well-founded planning of procedures and responsibilities, training, and education, as well as the procurement of essential equipments. On the basis of specific scenarios, concrete contingency plans are elaborated, which shed light on organizational and material necessities.

Surveillance and Detection: The early warning and detection of biological weapons attacks and emerging infectious diseases is an essential component of a successful response. Epidemiological surveillance systems and sensors in public places allow for the detection of unusual outbreaks.

Response and Recovery: A timely and adequate response may reduce the consequences of a biological incident considerably. The vigilance and fast reaction of first responders, especially health-care workers, is a key factor in mitigating the consequences of an outbreak.

On the policy level, states are required to outline the strategic direction of the emergency preparation and response and have at least four key functions:

Strategic policy formulation: Based on an integrated conception of biological risks, a comprehensive policy for protecting society must be formulated. The states provide the political decision-makers with basic information as the foundation for a continuous process of policy formulation in the context of a comprehensive risk analysis that takes bioterrorism scenarios and challenges arising from natural pandemics into account in equal measure. This is the basis for distributing responsibilities and resources, with special attention being given to effective exploitation of the synergy potential between protective measures in the various areas and national and international efforts.

Banning B-weapons under international law: The BTWC should be strengthened and further developed in the direction of a legally binding protocol. This would urgently require the establishment of a verification mechanism and continuous adaptation of the convention to scientific and technological advances.

National regulation: A comprehensive protection must be regulated by the state. Besides implementing international obligations on the level of national legislation, such regulation would also favor the development and enforcement of work safety standards in laboratories and research activities (biosecurity and biosafety) and would affect cooperation between business and academia in formulating scientific codes of conduct. Furthermore, an export control system should be established that would serve to monitor exports and imports of relevant hazardous materials.

Early warning and crisis management: The interfaces between early warning and crisis management structures in the security and health sectors are subject to particularly serious challenges in terms of coordination and communication. Transparency and rapid information exchange, from the local to the regional and even national levels, are preconditions for efficient crisis management. Roles and responsibilities must be clearly delegated. All of these steps require the establishment of a coordination and communication platform as well as specialized task forces.

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