WHAT IS IT?
A biological attack is the intentional release of a pathogen (disease-causing agent) or biotoxin (poisonous substance produced by a living organism) against humans, plants, or animals. An attack against people could be used to cause illness, death, loss of societal disruption, and economic damage. An attack on agricultural plants and animals would primarily cause economic damage, loss of confidence in the food supply, and possible loss of life. It is useful to distinguish between two kinds of biological agents:

- **Human pathogens:** These are pathogens that cause disease in humans and animals. They are often used in biological weapons because they can be transported over long distances and easily infect large numbers of people.
- **Biotoxins:** These are toxic substances produced by living organisms. They can be used to disrupt the environment or to incapacitate or kill animals.

### Availability of Agents

The Center for Disease Control and Prevention (CDC) lists the bioterror agents considered to pose the highest threat (see Table 1). Once obtained, agents must be cultured or grown in quantity and then processed for use in an attack (“weaponized”). Agents can be:

- **Acquired from sources in nature:** The threat agents in Table 1 are either human pathogens or agents that cause disease in other animals—except for anthrax, which is solely a human disease and has been eradicated from nature.
- **Isolated from sources in nature:** This refers to agents that are not typically found in nature, such as smallpox, which is officially studied in only two laboratories in the world. Anthrax is primarily isolated from nature.
- **Animal biologics:** These are materials derived from animals, such as vaccines or antibodies.

### How Biological Agents Could Be Disseminated

For an attack on people, biological agents could be disseminated in one or more of the following ways:

- **Amplified Dissemination:** This is the dispersion of an agent in air from sprayers or other devices. The agent must be cultured and processed to the proper state to maximize human infections, while maintaining the agent’s stability and lethality (ability to produce illness).
- **Amplified Dissemination:** This is the dispersion of an agent in air from sprayers or other devices. The agent must be cultured and processed to the proper state to maximize human infections, while maintaining the agent’s stability and lethality (ability to produce illness). An amplified attack might take place outdoors in a populated area or at a public event, such as a concert or sporting event.

### What Are the Long-Term Consequences?

### After a Biological Agent Has Been Identified, Officials Will Take Steps to Characterize and Contain It

- **Isolation:** This involves separating infected persons from those who have not been infected. Isolation can prevent the spread of disease and can be used to control contagious diseases.
- **Quarantine:** This involves separating susceptible persons from infected persons. Quarantine is used to prevent the spread of disease.

### Table 2: General Medical Treatments for Several Biothreat Agents

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### Prevention and Preparedness

- **Public Health Preparedness:** This involves preparing for and responding to public health emergencies.
- **Bioterrorism:** This involves preparing for and responding to bioterrorism.

### Additional Information

- **Emerging infectious diseases that could be used in a biological attack:** These are diseases that are newly recognized or that are increasing in incidence or geographic distribution.
- **Biological and ecological weapons:** These are weapons that are designed to cause illness, death, fear, societal disruption, and economic damage.

### References

- **U.S. Department of Health and Human Services—** http://www.hhs.gov/emergency
- **U.S. Army Medical Research Institute of Infectious Diseases—** http://www.idsociety.org
- **Infectious Disease Society of America—** http://www.idsociety.org
- **National Academies—** http://www.nap.edu

### Glossary

- **Bioterrorism:** The intentional release of a pathogen (disease-causing agent) or biotoxin (poisonous substance produced by a living organism) against humans, plants, or animals. An attack against people could be used to cause illness, death, loss of societal disruption, and economic damage. An attack on agricultural plants and animals would primarily cause economic damage, loss of confidence in the food supply, and possible loss of life. It is useful to distinguish between two kinds of biological agents:
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<td>Intermediate-risk: These agents are considered to pose a moderate threat and are potentially capable of causing significant harm. Examples include plague, tularemia, and respiratory infections caused by N. meningitidis.</td>
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Biological Weapons Laws and Treaties Governing

Historical Perspective on Biological Attack

• The Geneva Convention of 1925 was the first international arms control treaty to outlaw the development, production, and use of biological weapons. It prohibited “bacteriological methods of warfare,” but did not outlaw the development, testing, or use of biological weapons.

• In World War I, German agents successfully infected Allied livestock with anthrax and dysentery (“warfare,” but did not outlaw the development, testing, or use of biological weapons.)

• In World War II, Unit 731 in Japanese-occupied Manchuria dropped plague-infected dolls in China, allegedly killing over one million people before being discovered.

• In 1984, the cult followers of Baghwan Rajneesh infected 351 people in Oregon by placing salmonella bacteria in salads across 10 restaurants to keep people from eating the food.

• In the 1990s, the cult Aum Shinrikyo failed to accomplish their intentions with anthrax but did succeed in a biological attack on the Tokyo subway system, killing 12 people and injuring 5,500 others.

• In 1985, the U.S. Army released 11 biological and chemical agents, including anthrax bacteria, to the public.

• In 1989, the cult Aum Shinrikyo spread anthrax-infected fruit to the U.S. mail, killing 14 people and causing a significant public health emergency.

• In 1995, Aum Shinrikyo released anthrax-laced letters through the U.S. mail, killing 15 people and causing a significant public health emergency.

• The Biological Weapons Convention (BWC) of 1972 is the first arms control treaty to address biological and chemical weapons. It prohibits “any type of biological or toxin weapons.” The U.S. and 166 other states have agreed to abide by the BWC.

• Length of time it takes to detect and treat those who are exposed or have symptoms of disease.

• Infectivity of the agent (how many particles are needed to cause illness).

• “Host” factors (e.g., age, immune status, other illnesses of the person exposed).

• Dose Response in Humans

• Biothreat agents have the potential to produce a life-threatening illness.

• Table 2. Direct, Health Impacts, and Treatments for Some Agents of Concern

• In the 1990s, the cult Aum Shinrikyo spread anthrax-infected fruit to the U.S. mail, killing 15 people and causing a significant public health emergency.

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Infectious diseases, e.g., in the ventilation system of a building, in the subway, on planes. It takes expertise to process biological agents to maximize the effect of aerosol dissemination, but even relatively crude devices could have an impact.

• Food or water, especially ready-to-eat food (vegetables, salad bars) could be intentionally contaminated with pathogens or toxins. The water supply is less vulnerable because disinfection, filtration, and the addition of chlorine can kill most disease-causing organisms.

• Human carriers could spread transmissible agents by coughing, through bodily fluids, or by contaminating surfaces. Most agents would make people ill or incapacitated before they become highly contagious, thereby reducing transmission of the disease.

• Infected animals can cause people to become ill through contact with the animal or contaminated animal products.

• Insects naturally spread some agents such as plague bacteria (vector borne disease) and potentially could be used in an attack.

For an agricultural attack:

• A point introduction of an insecticide plane or animal or fluid could spread disease through the root of the plant or livestock. Agricultural biopesticide agents (e.g., crop and nursery diseases, avian influenza, soybean rust, and karnal bunt of wheat) do not have to be aerosolized to be effectively disseminated.
Biological Weapons Laws and Treaties Governing

The Australia Group is a loose association of nations that agrees not to export tools and technologies, including pathogens, and forbids States from developing, producing, stockpiling, or acquiring and retaining them in order to prevent the use of biological and chemical weapons. It prohibits “bacteriological methods of warfare,” that is, infecting humans, animals, and plants with biological and chemical weapons. It was first international agreement to address the use of these weapons systems.

In the 1340s, Europeans threw plague-infected cadavers over city walls to infect those within. In 2001, the anthrax attacks through the U.S. mail infected 11 people with inhalation anthrax, of which there were no fatalities. In 2002, Shree Rajneesh sickened 751 people in Oregon by placing salmonella bacteria in salad bars in 10 restaurants to keep people from voting in an election. In 2003, the U.S. army launched a chemical attack with Sarin nerve agent.

The Biological and Toxins Weapons Convention (BWC) was entered into force on 29 April 1975. It is the only international agreement to address the use of biological and chemical weapons. It entered into force on 29 April 1975. The BWC is a legal instrument that aims to prevent the use of biological and chemical weapons.

Infectious agents can be aerosolized to be effectively disseminated. For an aerosol release, the area affected would depend on the quantity of agent released, whether the release is indoors or outdoors, and weather conditions. Agents released outdoors would disperse rapidly in the direction of the prevailing wind and could degrade with sunlight, humidity, and drying out from environmental exposure. Agents released indoors could initially have a higher concentration. Sometimes agents can be re-aerosolized by machinery, foot traffic, or other means.

**Viable Biological Threat Agents**

<table>
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<tr>
<th>заболевание</th>
<th>виды оружия</th>
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**Impact Following the Release of a Pathogen**

Detection of a Biological Attack

Unlike a chemical or nuclear attack, a biological attack may go undetected for hours, days, or potentially weeks (depending on the agent), until people, animals, or plants show symptoms of disease. If there are no immediate signs of the attack as with the anthrax letter, a biological attack will probably first be detected by local health care workers observing a pattern of unusual illness or by early warning monitoring systems that detect airborne pathogens. Evidence of an attack may appear in animals before humans.

**The Area Affected**

For an aerosol release, the area affected would depend on the quantity of agent released, whether the release is indoors or outdoors, and weather conditions. Agents released outdoors would disperse rapidly in the direction of the prevailing wind and could degrade with sunlight and humidity. Agents released indoors could initially have a higher concentration. Sometimes agents can be re-aerosolized by machinery, foot traffic, or other means.

**Finding the Cause and Source of Illness**

There may be uncertainties about crucial facts such as the exact location or extent of the initial release, the type of biological agent used, and likelihood of additional releases. Laboratory science will work quickly to identify the specific agent. Epidemiologists will attempt to trace the path of infections back toward a single person, vector (insect or animal), vehicle (truck or train), or other point of origin. Attribution of a biological attack is typically much more difficult than attribution of a conventional terrorist attack.

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**Spread Potential & Probability**

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**Impact on Human Health**

Biothreat agents have the potential to produce a life-threatening illness. Table 1 lists health impacts and medical treatments for the Category A and some Category B agents.

**Spread**

- **Probability**: High
- **Persistence**: High
- **Persistence in Water**: High
- **Persistence in Soil**: High
- **Persistence in Air**: High

**Persistence**

- **In Water**: High
- **In Dry Environment**: High
- **In Air**: High

**Medical Treatment**

- **Antibiotics**: High
- **Supportive Care**: High
- **Other Treatments**: High
Biological Weapons

Laws and Treaties Governing

The Australia Group is a loose association of countries that has agreed to cooperate to prevent the proliferation of biological weapons. It is one of the main international bodies for the coordination of efforts to control the use of biological weapons.

The Biological and Toxins Weapons Convention (BWC) of 1972 is the first arms control treaty specifically designed to prevent the development, production, and stockpiling of biological weapons. This treaty bans the development, production, and use of biological weapons, and provides for the inspection of facilities and the verification of compliance.

In the 1340s, Europeans threw plague-infected Allied livestock with anthrax in more than 50,000 deaths. Later in attempts to release anthrax and botulinum toxins, no fatalities were reported.

Dose Response in Humans

The exact infectious dose (the number of organisms needed to cause one illness) of most biological agents is unknown. Approximate doses are extrapolated from animal studies. Whether a person becomes ill after exposure to a biological agent depends on a number of factors including:

- Type and amount of agent inhaled into the body.
- Duration of exposure.
- Route of exposure (inhalation, ingestion, insect bite).
- "Host" factors (age, immune status, other illnesses of the person exposed).

Differences in Intentional vs. Natural Outbreaks of Disease

Naturally occurring outbreaks of category A agents have become rare because of improved living standards, hygiene, and health services in developed nations. For example, human bubonic plague, which was transmitted by rats and fleas to humans in past centuries resulting in large losses of life, has virtually been wiped out. However, agents used in an anthrax attack act differently than naturally occurring outbreaks and could produce a form of the disease with a shorter time of onset of illness, making timely diagnosis, treatment, and containment more difficult.

Spread of Diseases

Some transmissible (contagious) diseases can spread through respiratory droplets from coughing and sneezing or when a person comes in contact with a surface harboring a virus or bacteria and then touches their mouth or nose. The viral hemorrhagic fevers and cholera are spread by direct contact with body fluids or feces. People infected with contagious diseases may widely disseminate the disease by travel.

Psychological Impact

Psychological responses following a bioterrorism event may include anger, fear, and social isolation. Following the 2001 anthrax attacks, thousands of people who thought they were infected sought treatment. Trying to distinguish those who haven’t been infected could complicate medical care’s ability to treat those who have been exposed and infected, especially when diagnoses are unclear.

WHAT SHOULD PEOPLE DO TO PROTECT THEMSELVES?

Practical Steps

During a declared biological emergency:

1. People in the group or area that authorities have linked to exposure who have symptoms that match those described should seek emergency medical attention.

2. People who are exposed or have symptoms of illness should seek medical attention.

3. People who have been exposed to a biological agent should follow the advice of local health authorities.

4. People who have been exposed to a biological agent should take prophylactic antibiotics if prescribed.

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49. People who have been exposed to a biological agent should follow the advice of local health authorities.

50. People who have been exposed to a biological agent should take prophylactic antibiotics if prescribed.
Biotoxins are treated with antidotes or antitoxins, if available. Vaccines can prevent or mitigate the effects of a disease. The smallpox vaccine may provide protection even 3 to 5 years after exposure, and the anthrax vaccine can be given after inhalation exposure if accompanied by treatment with antibiotics for a number of weeks.

Controlling the Spread of Contagious Diseases

Methods to control contagious diseases include isolation, quarantine, barrier methods (gloves, filter masks, eye protection), and hand washing. Rapid identification of potentially infected persons increases the effectiveness of these methods.

WHAT ARE THE LONG-TERM CONSEQUENCES?

Monitoring and Clean-up

After a biological agent has been identified, officials will take steps to characterize the space that will be used following clean-up. Clean-up within buildings may entail the use of gas or liquid decontaminants to kill the agent. For example, chlorine dioxide gas was released through ventilation systems of buildings contaminated with anthrax. In some cases, multiple rounds of decontamination may be necessary. Decisions regarding how much clean-up is necessary will depend on:

- The amount of agent released.
- How far the agent has spread.
- How the space will be used following clean-up.

Long-term Health Consequences Following Exposure

The long-term health consequences for those who survive exposure to biological attack agents are unknown. A long-term medical surveillance program would likely be established to monitor potential health effects of those exposed.

Economic Impact of an Agricultural Attack

Once detected, an act of agricultural bioterrorism may quickly halt the movement and export of livestock or the affected crop, resulting in potentially severe economic consequences for producers, shippers, and consumers. It may also disrupt normal trade and commerce.

ADDITIONAL INFORMATION
Monitoring and Clean-up

WHAT ARE THE LONG-TERM CONSEQUENCES?

Methods to control contagious disease include isolation, quarantine, barrier methods (gloves, filter masks, eye protection), and hand washing. Rapid identification of potentially infected persons increases the effectiveness of these methods.

Table 2 lists general medical treatments for several biothreat agents. In general, bacterial illnesses are treated with antibiotics, and viral illnesses are treated with supportive care. Some viruses can be treated with antiviral agents. The long-term health consequences for those who survive exposure to biological agents may include adverse effects in the immune system, side effects of medical treatments, and chronic conditions.

Economic Impact of an Agricultural Attack

Biological agents that may cause adverse effects in exposed individuals but that are not considered to pose the highest threat may cause economic damage, loss of confidence in the food supply, or mitigate the effects of a disease. The smallpox vaccine may provide protection even after exposure, and smallpox can be treated with antiviral agents. In the event of an attack, the country’s economic infrastructure could be disrupted, affecting industries such as agriculture, manufacturing, and transportation. The viability of crops could be compromised, leading to food shortages and economic instability.