

**Repairing the Regime:
Stopping the Spread of Weapons of Mass Destruction**

Appendix VI

Examples of Biological Warfare Agents(1.)

BW Agent (<i>causative organism</i>)	Incubation Period(2.) (days)	Symptoms/ Clinical Manifestations(3.)	Vaccine Available?	Direct Person to Person Aerosol Transmission?	Weaponized U.S.(4.) FSU Iraq		
Bacterial Agents							
Anthrax (<i>Bacillus anthracis</i>)	2-43(5.)	Fever, malaise, and fatigue which may be followed by an improvement in symptoms for 2-3 days. Alternatively, initial symptoms may progress directly to severe respiratory distress. Death normally follows within 24-36 hours of initiation of symptoms. 70-80% fatality rate if untreated.	Yes	No	X	X	X
Brucellosis (<i>Brucella suis</i>)		Fever, chills, malaise. Symptoms may last for weeks or months. Fatalities in less than 5% of untreated patients.	No	No	X	X	
Glanders (<i>Burkholderia mallei</i>)		Fever, sweats, muscle pain, headache, chest pain, and generalized papular/pustular eruptions. Almost always fatal without treatment.	No	No		X	
Tularemia (<i>Francisella tularensis</i>)		Fever, exhaustion, and weight loss. 35% fatality if	Yes(6.)	No	X	X	

<i>tularensis</i>)		35% fatality if untreated.					
(Pneumonic) Plague (<i>Yersinia pestis</i>)	2-3	Pneumonia with malaise, high fever, chills, headache, muscle pain, and productive cough with bloody sputum. Progresses rapidly, resulting in shortness of breath, stridor, bluish discoloration of skin and mucous membranes. Untreated pneumonic plague is usually fatal.	No(7.)	Yes		X	
Viral Agents							
Smallpox (Variola major)	7-17	Initial symptoms include fever, malaise, vomiting, headache, and backache. Rash and lesions develop in 2-3 days on face, hands, and forearms, followed by the lower extremities and then centrally. Fatalities in 20-40% of untreated patients	Yes(8.)	Yes		X	
Venezuelan Equine Encephalitis (VEE)	2-6	Initial symptoms include general malaise, severe headache, and fever. Full recovery usually occurs within 1-2 weeks. Fatalities in less than 1% of untreated patients.	Yes(9.)	No	X	X	
Viral hemorrhagic	4-21	Fever, muscle aches, and	No(10.)	Unclear(11.)		X(12.)	

hemorrhagic fevers (RNA viruses from several families, incl. : Filiviridae -Ebola -Marburg Arenaviridae -Lassa -Junin -Machupo Flaviviridae -Yellow Fever)		aches, and exhaustion. Can be complicated by easy bleeding, hypotension, flushing of the face and chest, and edema.					
Rickettsial Agents							
Q Fever (<i>Coxiella burnetti</i>)	10-40	Fever, chills, headache, excessive sweating, malaise, fatigue, loss of appetite, and weight loss.	Yes(13.)	Rare	X	X	
EpidemicTyphus (<i>Rickettsia prowazekii</i>)	14	Severe headache, sustained high fever, depression, delirium, and eruption of red rashes on the skin. Fatalities in 30% of untreated patients.	Yes(14.)	No		X	
Toxins							
Aflatoxin (<i>Aspergillus flavus</i> and <i>Aspergillus parasiticus</i>)	Years to decades	Powerful liver carcinogen. Aflatoxicosis in humans has been reported following ingestion of contaminated food. Short-term effects include vomiting, abdominal pain, pulmonary edema, gastrointestinal hemorrhage, convulsions, coma, and death. The only documented	No	No			X

		only documented health effect from low level exposure would be an increased prevalence of liver cancer years to decades after exposure.					
Botulinum toxin (<i>Clostridium botulinum</i>)	1-2	Ptosis, generalized weakness, dizziness, dry mouth, blurred vision, and difficulty in speaking and swallowing. Progression to muscle paralysis and respiratory failure.	Yes(15.)	No	X		X
Ricin (castor beans)	18-24 hours	Weakness, fever, cough, and pulmonary edema. Progression to severe respiratory distress and death within 36-72 hours.	No	No			
Staphylococcal enterotoxin b (<i>Staphylococcus aureus</i>)	1-6 hours	Sudden onset of fever, chills, headache, muscle pain, and non-productive cough. Fever may last for 2-5 days. Cough may persist for 4 weeks.	No	No	X		

Notes

- [1.](#) The Non-Proliferation Project would like to thank Dr. Thomas Inglesby of the Johns Hopkins Center for Civilian Biodefense studies for reviewing this table.
- [2.](#) Incubation periods apply to inhalation of the causative organism.
- [3.](#) Symptoms/clinical manifestations apply to inhalation of the causative organism.
- [4.](#) The United States' offensive BW program was unilaterally terminated by executive order in 1969. All offensive biological research and production were discontinued, and pathogen and biological weapon stockpiles were destroyed.
- [5.](#) Military textbooks often cite an incubation period of 1-5 days. However, the 1979 accidental aerosolized release of anthrax spores from a military microbiology facility in Sverdlovsk, Russia, resulted in cases from 2 to 43 days following exposure.
- [6.](#) Investigational new drug.

7. Vaccine is available but has been shown to be ineffective against aerosol challenge.
8. Vaccine is available in limited quantities. Initiatives in progress to augment supplies.
9. Investigational new drug.
10. Licensed vaccine available for yellow fever. A vaccine for Argentine hemorrhagic fever is available as an investigational new drug. This vaccine may provide cross protection against Bolivian hemorrhagic fever.
11. It is unclear how easily filoviruses can be transmitted from human to human. Transmission clearly occurs via direct contact with infected blood, secretions, organs, or semen.
12. According to Alibek, the Soviet program weaponized the Marburg virus.
13. Investigational new drug.
14. Vaccine production in the United States has been discontinued.
15. Investigational new drug.

SOURCES:

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