
ATLANTIC STORM SCENARIO PLANNING ASSUMPTIONS

Distributed at the End of Exercise—January 14, 2005

I. Exercise Background

Premise: An informal group of international leaders was scheduled to meet in Washington, DC, on January 14, 2005, for a “Transatlantic Security Summit” on international cooperation in preparing for and responding to WMD terrorism. On the eve of the summit, it became apparent that people from several European countries were infected with smallpox. Before returning to their home nations to manage the crisis, the assembled leaders agreed to convene an emergency meeting to address the steps that the transatlantic community could take to respond to the crisis.

The exercise was designed to run in real time in the real world of January 14, 2005. No other artificial political or economic context was added.

World Leaders in Attendance:

- Prime Minister of Canada
- President of the European Commission
- Chancellor of the Federal Republic of Germany
- President of France
- Prime Minister of Italy
- Prime Minister of the Netherlands
- Prime Minister of Poland
- Prime Minister of Sweden
- Prime Minister of the United Kingdom
- President of the United States
- Director General, World Health Organization

II. Method of Smallpox Attacks

Smallpox Biological Weapon: Seed stocks of Variola major virus (the causative agent of smallpox) were obtained by Al-Jihad Al-Jadid from a bioweapons facility in the former Soviet Union.

The Al-Jihad Al-Jadid scientists received microbiological training at Indian and U.S. universities. These scientists received additional training when the group hired a scientist who was part of the former Soviet Union’s offensive biological weapons program. This scientist taught the Al-Jihad Al-Jadid scientists how to grow a number of biological agents, including variola major, *Bacillus anthracis*, Ebola virus, and *Burkholderia mallei* (glanders). The terrorist group combined this knowledge with publicly available technical information to develop dry powder preparations of the viruses. Then, with their own microbiology training, the terrorist group was able to acquire all the required laboratory equipment to grow and process the variola major seed stock they had acquired into a relatively high-quality dry powder that was then used in the attacks.

The attacks were carried out by vaccinated terrorists who walked throughout the target locations for several hours during periods of peak occupancy. A commercially available dry powder dispenser the size of a small fire extinguisher hidden in a backpack was used to disseminate the agent.

- Based on reports from Russian scientists, variola viral stocks are believed to exist in at least two and possibly three of the former biological weapons laboratories in the former Soviet Union. Many of those who once worked in these laboratories are now working in other countries, but little information is available as to where they are or what they are doing.¹

- The former Soviet Union made smallpox biological weapons in industrial-scale (i.e., tens and hundreds of tons) quantities.²
- Smallpox virus can be grown in embryonated eggs and a variety of tissue cell culture systems.
- If one were to make a dried powder preparation of a virus, one would have several sources for information on methods. Variola virus can be processed to a stable dried form just as vaccinia virus is dried to make a vaccine. There is a significant amount of open source technical information on the creation of dry powder bioaerosols.
- There are many commercial freeze-dryers available; a simple internet search will pull up a bench-top model that would be adequate.
- The amount of smallpox virions required to infect humans is presumed to be very low.^{3,4}
- Disseminating bioaerosols via dry powder dispensers and sprayers is possible, and a number of these devices are commercially available.

III. BW Laboratory Discovered in Austria

This laboratory was disguised as a small brewery in Klagenfurt, Austria. The facility contained seed stocks of the smallpox and Ebola viruses and the *Bacillus anthracis* bacterium. The laboratory contained all the equipment required for a modern microbiology laboratory, including: incubators, fermenters, freezers, and biocontainment cabinets, as well as instruments and reagents required for modern molecular biology techniques and genetic engineering. All of this laboratory equipment is entirely dual-use, is available on the open market, and could be housed in a building as small as a 3-car garage.

IV. Smallpox Attacks: Sites and Rationale for Attack Size

Frankfurt am Main, Germany

Date of attack: January 2, 2005

Attack site: Frankfurt Airport

Number of infected: 16,000

Rationale: 131,500 people go through Frankfurt airport on an average day. Holiday traffic could be as much as 50% higher.⁵

Rotterdam, Netherlands

Date of attack: January 2, 2005

Attack site: RET Metro System

Number of infected: 8,000

Rationale: The Rotterdam Metro has two lines, the Erasmus line (110,000 people per day) and the Caland line (119,000 people per day). The Caland line includes the Pernis stop, which serves the Port of Rotterdam.⁶

Warsaw, Poland

Date of attack: January 2, 2005

Attack site: Metro Warszawskie

Number of infected: 12,000

Rationale: 280,000 passengers per day⁷

Los Angeles, USA

Date of attack: January 4, 2005

Attack site: Los Angeles International Airport

Number infected: 16,000

Rationale: 150,000 passengers per day; holiday traffic could be as much as 50% higher.⁸

New York City, USA

Date of attack: January 4, 2005

Attack site: Penn Station

Number of infected: 24,000

Rationale: An estimated 600,000 people travel through Penn Station each day.⁹

Istanbul, Turkey

Date of attack: January 1, 2005

Attack site: Grand Bazaar

Number of infected: 8,000

Rationale: The Grand Bazaar of Istanbul is a covered market with 5,000 shops. It has 25,000 employees and 250,000 visitors per day.¹⁰

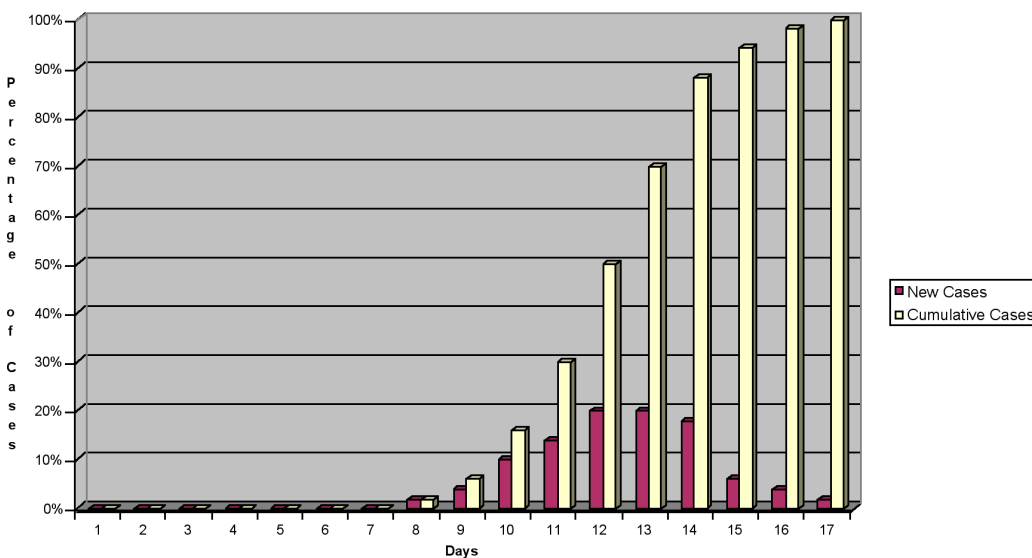
V. Smallpox Epidemiology Planning Assumptions

Total Infected During Attacks: 84,000

- 8,000 infected in Istanbul on January 1 (Grand Bazaar)
- 16,000 infected in Frankfurt on January 2 (Frankfurt Airport)
- 8,000 infected in Rotterdam on January 2 (Metro)
- 12,000 infected in Warsaw on January 2 (Metro)
- 16,000 infected Los Angeles on January 4 (LAX airport)
- 24,000 infected in New York on January 4 (Penn Station)

Emergence of Cases: Epidemiological curve for the emergence of smallpox cases was based on: Figure 4.7, in Fenner, et al., *Smallpox and Its Eradication*. Geneva, Switzerland: World Health Organization; 1988:188.

Time from Initial Exposure to Development of Smallpox Symptoms



Derived from: Fenner et al. *Smallpox and Its Eradication*. Geneva, Switzerland: World Health Organization; 1988:1460.

It was assumed that:

- Smallpox symptoms began (as early as 7 days after infection) with 2 days of fever, followed by a rash.¹¹
- Initial diagnoses in European countries on January 13 were made in people who had at least day 3 of rash. This assumption is based on pictures in Fenner, et al.,¹² and the expert medical opinion of the Center for Biosecurity’s medical doctors, including Dr. D. A. Henderson.
- By January 14, numbers of suspect smallpox cases would begin to reflect reports of smallpox cases in much earlier stages of development (day 1, 2, or 3 of rash). Once the attacks are recognized, smallpox will be suspected in people who exhibit rash or fever but who are, in fact, not infected with smallpox.

Accumulation of cases from 9 a.m. to 1:30 p.m. on January 14 (start to end of exercise) was calculated based on the assumption that by 1:35 p.m. EST on January 14, between 10% and 30% of patients with day one rash and beyond would be reported to health authorities. These reports would include some “false positive” cases.

Calculations of total casualties and deaths for the final video: We assumed a 25% case fatality rate. We assumed a modest decrease in the historic case fatality rate of 30% due to access to modern health care for some victims and some degree of residual immunity in a modest number of adults vaccinated before 1980.

- Person-to-person spread in the first generation of cases was 1:3 in all countries.¹³
- Person-to-person spread in second generation was 1:0.25
- This lower transmission rate is used because highly effective disease control measures had been established by mid-February, including vaccination of millions of contacts and healthcare workers in all the countries that were attacked.
- It was assumed that leaders of countries with large vaccine stockpiles would share vaccine with affected countries that had small vaccine stockpiles.
- It was also presumed that large-scale vaccination would begin within days after January 14, that countries would impose strict isolation of cases, and that residents in affected countries would self-impose social distancing (e.g., cancellation of big public events).
- The spread and fatality assumptions were necessary to create a final video that depicted a possible outcome of the players’ decisions. The *Atlantic Storm* participants may have chosen different actions than what exercise designers believed they would take.

Site of Attacks	1st Generation visible by ~Jan 21	2nd Generation visible ~Jan 21 to Feb 3 (rate of spread = 1:3)	3rd Generation ~Feb 3 to Feb 28 (rate of spread=1:0.25)	Cumulative cases / deaths by end of February
U.S.	40,000	120,000	30,000	190,000 / 47,500
Netherlands	8,000	24,000	6,000	38,000 / 9,500
Germany	16,000	48,000	12,000	76,000 / 6,250
Poland	12,000	36,000	9,000	57,000 / 14,500
Turkey	8,000	24,000	6,000	38,000 / 9,500

VI. Explanation of Increases in Cases and Projections

Suspected cases of smallpox identified on January 14 are all first generation cases in people who were infected during the smallpox attacks, which occurred sometime in early January. The increase in the number of cases reported throughout the course of the exercise is due to increased discovery and reporting of these original victims of the attacks. The rising numbers do not reflect contagious spread of the disease. Symptoms of smallpox

do not usually become apparent until 7 to 17 days post-exposure, so it will take perhaps another week before all of the original victims have begun to show signs of disease.

Historical analysis of smallpox outbreaks suggests that the number of cases reported on January 14, following attacks early in the month, would likely represent just 2% of the total number of people infected during the attacks. The transatlantic leaders were provided with estimates of the future course of the epidemic to help inform their deliberations about response. A disease transmission rate of 1 to 3 was chosen for the first-to-second generation of cases (that is, 1 infected person would on average infect 3 others). For second-to-third generation transmission, a rate of 1 to 0.25 was assumed, taking into account estimates of the effects of vaccination and other disease control efforts that could be employed in the weeks following discovery of the epidemic. Projections of case numbers through February are based on these assumptions.

For a more thorough explanation of the exercise assumptions and calculations of morbidity and mortality, please see the Assumptions document that was prepared for the exercise observers and is referred to throughout this presentation.

VII. Process for Acquiring and Vetting Smallpox Response Plans and Vaccine Stockpiles

Methodology for Summarizing National Smallpox Response Plans: *Atlantic Storm* was designed to illustrate the challenges of mounting an effective international response to bioterrorism. It was not intended to test individual nations' bioterrorism response plans. However, the people playing the roles of national leaders needed to be briefed on their nations' plans. Therefore, the smallpox response plans for the nations involved in the exercise were summarized by the exercise design team. All the summaries distributed during the exercise were reviewed by knowledgeable experts from the respective nations. From these summaries, one-page briefing memos were prepared for each participant.

Methodology for Determining Sizes of National Vaccine Stockpiles: Vaccine stocks for countries were determined in the following manner: First, a search of open source literature was performed by the *Atlantic Storm* team to determine current country stockpiles. Members of the *Atlantic Storm* team then communicated with officials from the World Health Organization, commercial sources, and other knowledgeable experts to assess the status of global national vaccine stocks.

- Population figures were gathered from the CIA World Factbook in December 2004.
- Countries that specifically stated they had sufficient vaccine supplies to vaccinate their populations were assumed to have a number of vaccine doses equal to or greater than their countries' populations.
- Reports of vaccine orders were assumed to be filled unless there was specific information to the contrary.
- For this exercise, we assumed that nations have sufficient bifurcated needles to administer vaccine, regardless of how much the vaccine was diluted.

VIII. Exercise Organizers

Atlantic Storm was developed and convened by:

- The Center for Biosecurity of UPMC
www.upmc-biosecurity.org
 - The Center for Transatlantic Relations of the Johns Hopkins University
transatlantic.sais-jhu.edu
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- ¹ Alibek K, Handelman S. *Biohazard: The Chilling True Story of the Largest Covert Biological Weapons Program in the World—Told from Inside by the Man Who Ran It*. New York: Random House; 1999.
- ² Ibid.
- ³ Henderson DA, et al. Smallpox as a biological weapon: medical and public health management. *JAMA* 1999;281(22): 2127–37.
- ⁴ Wehrle PF, et al. An airborne outbreak of smallpox in a German hospital and its significance with respect to other recent outbreaks in Europe. *Bull World Health Organ* 1970;43(5):669–79.
- ⁵ World's Busiest Airports by Passengers and Cargo, 2003. Available at: <http://www.infoplease.com/ipa/A0004547.html>. Accessed December 30, 2004.
- ⁶ RET Metro. Available at: http://www.ret.rotterdam.nl/ret_eng/bedrijf/metro/met_x.html. Accessed December 30, 2004.
- ⁷ Metro Warszawskie Sp. Z O.O. Available at: <http://www.metro.waw.pl/page.php?id=56&lng=en&PHPSESSID=807bbce72fe7668180d37ca2c5af9a18>. Accessed December 30, 2004.
- ⁸ World's Busiest Airports by Passengers and Cargo, 2003. Available at: <http://www.infoplease.com/ipa/A0004547.html>. Accessed December 30, 2004.
- ⁹ CCA Innovation. Available at: <http://www.archcenter.ru/eng/council/PennStation/default.asp>. Accessed January 4, 2005.
- ¹⁰ Retail Real Estate Summit 2005. Available at: <http://www.icsc.org/srch/mt/descs/2005RWS/2005RWS.pdf>. Accessed January 5, 2005.
- ¹¹ Fenner F, Henderson DA, Arita I, Jezek Z, Ladnyi ID. *Smallpox and Its Eradication*. Geneva, Switzerland: World Health Organization; 1988:1460.
- ¹² Ibid.
- ¹³ Centers for Disease Control and Prevention. What We Learn about Smallpox from Movies – Fact or Fiction? Available at: <http://www.bt.cdc.gov/agent/smallpox/disease/movies.asp>. Accessed January 5, 2005.