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Ethical Considerations for Allocating Medical Countermeasures in an Anthrax Incident

Background

Bacillus anthracis (*B. anthracis*), the causative agent of anthrax, requires a unique public health response due to its ease of dissemination as an environmentally stable spore, severe health impact, and potential to cause public panic. The U.S. Centers for Disease Control and Prevention (CDC) currently classifies *B. anthracis* as a Tier 1 select agent subject to the select agent regulations (42 CFR part 73) due to its potential to pose a severe threat to public health. (Federal Select Agent Program, 2014). Transmission of anthrax typically occurs through cutaneous, inhalation, or gastrointestinal exposure to spores. Antibiotics are the first line of defense against anthrax infection. Inhalation anthrax is a more lethal form of disease attributable to breathing spores into the lungs. Inhalation anthrax has an observed incubation period in humans ranging from one to 43 days (Brachman, 1980; Meselson et al., 1994). Prompt antibiotic therapy for up to 60 days can effectively protect individuals who are not yet symptomatic, and prevent spores from germinating into active bacteria, multiplying, and releasing toxins into the bloodstream.

The U.S. anthrax attacks in 2001 infected 22 individuals; 11 had inhalation anthrax, five of whom died. Aerosolized release of *B. anthracis* spores would likely result in a high proportion of cases of inhalation anthrax, which has a high case fatality rate (~50%) even with prompt treatment with antibiotics and antitoxin (Hendricks et al., 2014). An aerosolized release of weaponized spores over a densely populated area could potentially infect thousands of people with a correspondingly high number of fatalities (Inglesby et al., 2002). Under established protocols, upon detection of a localized release of anthrax in the United States, the CDC would send medical countermeasures, medications and other medical material from the Strategic National Stockpile (SNS) to the state health department, which would receive, stage, and store (RSS) these medications and other materials from the SNS at a RSS warehouse (CDC, 2015). From there, the state would then distribute the supplies to the local points of dispensing (PODs). States have developed plans to locate PODs at facilities with high community recognition and visibility (e.g., schools and recreational centers); they will be staffed by public health practitioners and volunteers. Ideally, staff at these PODs will dispense a 10-day supply of antibiotics to 100 percent of the local jurisdiction's population within 48 hours.

Some scenarios may result in a shortage of medical countermeasures (MCMs) that require a prioritization scheme for allocating limited resources. Each day of delay in a mass antibiotic dispensing campaign can result in roughly 5% -6% additional hospitalizations, which could overwhelm hospitals (Hupert et al., 2009). Rapid dispensing is critical for success, but implementing and communicating a prioritization scheme to appropriate stakeholders in the middle of an operation is highly challenging. Therefore, health officials and emergency responders have developed contingency plans for a possible MCM shortage during emergencies affecting large populations (DHHS and DHS, 2007), such as the 2009-2010 H1N1 influenza pandemic (NCIRD, 2009).

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Emergency disaster planning often includes procedures for allocating limited resources should surge capacity be exceeded. It is generally recommended that such plans and procedures be developed and communicated to health providers, emergency responders, and the community prior to an event in order to obtain buy-in from stakeholders, and be perceived as fair and nonarbitrary. Fairness in this situation generally involves procedural justice (usually defined as a fair, transparent, and inclusive process) and distributive justice (usually defined as a fair allocation of resources).

Various allocation procedures have been proposed based on different ethical principles (Knebel et al., 2014; Persad et al., 2009). Generally, public health officials try to maximize the greatest good for the community as a whole, which in extreme emergencies often means trying to save the most lives. In some emergencies, persons with crucial social functions must be prioritized, such as police, firefighters, or healthcare providers, in order to ensure the continued functioning of civil society. The principle of equal access to care means that every person who shares the same health needs should be given the same opportunity to receive treatment as long as it is available. Prioritarianism privileges particular groups, usually the worst off or those with some special vulnerability, such as those most susceptible to disease, the very young or very old, pregnant women, or those who are socioeconomically disadvantaged. In the absence of prior planning, first-come, first-served usually becomes the default. In many situations, first come, first served is easiest to administer, maximizes the community good, and results in equal access. But in other situations, it can privilege those who live nearby or who have transportation, and it can result in services not being administered to those who would most benefit, thus not maximizing the greatest good for the greatest number. Deciding which allocation plan is best will often depend on the input of stakeholders, the local situation, and the nature of the emergency.

Hypothetical Case Scenario for Training Purposes

In this hypothetical case scenario, two days ago, authorities determined that an unknown amount of *B. anthracis* spores were released as an aerosol over your city in a large metropolitan area. Hundreds of people are receiving care for suspected inhalation anthrax in local hospitals. Ten hours ago you opened the POD you manage and began dispensing antibiotics according to your existing plan. However, thousands still need antibiotics, and as people continue to file in, you receive a call from the SNS coordinator at your local health department. The coordinator informs you that a fire has inflicted severe structural damage to the state RSS warehouse. Authorities are still trying to sort out the details, determine whether the fire was intentionally set, and estimate the extent of the damage. Because of the damage to the RSS warehouse, no additional antibiotics will come to your or any other local POD for at least 24 hours while the state prepares the backup RSS site. The lines to receive antibiotics are still long and growing. You determine that you must consider how to prioritize the remaining antibiotics you have.

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Discussion Questions

1. Who are the stakeholders that need to be involved in a decision regarding how to allocate the remaining antibiotics? What values do they bring to the discussion? What ethical principles may be of importance to them?
2. Given the context of this emergency – an aerosolized anthrax release in a large metropolitan area – what are some of the allocation strategies you would consider? What are the advantages and disadvantages of each strategy?
3. Any prioritization scheme that deviates from “first come, first served” will necessarily involve turning some people away while you still have antibiotics on hand. Can such practices be morally and/or legally justified to those sent home without the antibiotics?
4. Could you enforce a prioritization scheme other than “first come, first served” when hundreds of people are already at your POD? Should this inform your decision-making process?
5. How would you go about defending a prioritization strategy against the accusation of it being discriminatory or unethical?
6. How would it affect your decision if your POD were in a high socioeconomic neighborhood where individuals can drive or obtain transportation to the POD? What if your POD was in a low socioeconomic neighborhood, where most individuals must walk with no or little transportation infrastructure or had high numbers of poor, elderly, and already sick individuals?
7. How should this event impact your health department’s future preparedness planning?

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