

March 17, 2003

STANFORD GRADUATE SCHOOL OF BUSINESS — At a news conference today Prof. Lawrence Wein discussed his research into anthrax policy by the U.S. government.

Transcript of Prof. Lawrence M. Wein's Remarks

March 17, 2003 Press Conference

Good afternoon. Thank you for coming.

The two most feared biological terror agents are smallpox and anthrax. If you go to the web site of the Centers for Disease Control and Prevention, you'll find a detailed plan for how the government will respond in the event of a smallpox attack. Despite the fatal delivery of anthrax in the US mail in 2001, no government response plan exists in the event of an anthrax attack. Consequently, my colleagues and I developed a mathematical model to compare various emergency responses to an airborne anthrax attack.

Our base scenario involves 2 pounds of weapons-grade anthrax being dropped from a height of 300 feet just upwind of a large US city containing 11.5 million people. 1.5 million of these 11.5 million become infected. Our base case response strategy is reasonably aggressive: early symptomatics are correctly diagnosed and intervention begins 48 hours after the attack. As soon as 1 person in a 10,000-person neighborhood exhibits symptoms of inhalation anthrax, the other 9,999 are placed into a waiting line to get prophylactic antibiotics. Antibiotics can be delivered to the entire population within 4 days. Even under this scenario, our model estimates that 123,000 people would die. The reason for the catastrophic death toll: not enough people receive antibiotics quickly enough to prevent symptoms from developing, and those that develop symptoms overwhelm the medical facilities, that cannot provide adequate care to everyone.

Four Key Elements of a Successful Response

My colleagues and I then asked ourselves: what would it take to reduce the death toll from 123,000 to 1000. In answering this question, we identified what we think are the 4 key elements to a successful response: (1) the person in charge needs to put the intervention process in motion as soon as the first case is diagnosed, (2) prophylactic antibiotics need to be distributed as rapidly as possible to everyone in the affected region, (3) the affected population requires aggressive education about the importance of adhering to the full course of treatment, and (4) we need to quickly create a surge in our capacity to aggressively treat the symptomatic patients.

Let me elaborate on 3 of these 4 points. There are two options for rapid antibiotic distribution: we could try to distribute them say, within 6-8 hours after an attack — after all, if we can vote in a day, we should be able to hand out pills in a day — or we can distribute them before an attack. The best option may vary from city-to-city, depending upon the risk of an attack to that city, and the city's ability to distribute antibiotics quickly. Pre-distribution of antibiotics can save 10,000 lives for every day that it takes to hand them out post-attack, and may also significantly reduce the panic that could ensue. However, there are some risks and costs to pre-attack distribution of antibiotics. But some of these risks depend on whether the government gives the medication to the people or the people pay for it with their own money. If people buy it themselves, they are much less apt to use it for other reasons. If only the rich buy them, then it at least helps those who can't afford it, because the latter people will receive their antibiotics quicker in the event of an attack. The government also needs to manage this process to ensure we don't exhaust our supply; for example, only 1 week's worth of antibiotics could be distributed before the attack.

The third element of a successful response is education about drug adherence. In the 2001 postal attack, only 40% of postal workers who were told to take a 60-day course of Cipro actually adhered to the full regimen. Our model optimistically assumes that 90% of people will adhere. The government needs to educate people now — before an attack — about the importance of adherence. And if an attack occurs, government and health workers need to go into the neighborhoods and make it clear that adherence is a life-or-death matter.

Finally, there are three ways we can create surge capacity for aggressive medical care. First, we can cast a wide net locally. We need more than emergency doctors and nurses and pulmonary specialists. We should train non-emergency and non-pulmonary doctors in the basics of inhalation anthrax treatment. We can offer basic training for respiratory therapists and EMTs with advanced life support training. Second, we can organize federal and military resources, and indeed I believe the government has made some progress in this regard. We need to take full advantage of the National Guard, the Red Cross, the VA hospitals, and to scale up the Disaster Management Assistance Teams program that has been developed by the government. However, our calculations suggest that even if we get antibiotics out rapidly, to reduce the death toll from 123,000 to 1000 would require one anthrax medical care provider for every 700 people in the affected region. This is a very difficult ratio to achieve. Hence, we propose that the government start a National Volunteer System of pulmonary specialists, which would behave in much the same way as a volunteer fire departments in rural areas. For example, if there was an anthrax attack in New York, then doctors from LA, Chicago, Miami and San Francisco would jump on the next airplane, take some Cipro and bring some ventilators along, and would arrive 6 hours later ready to save some lives. If the attack occurs in LA, then the NY doctors would jump on the plane. I believe that there are many brave and selfless medical workers in this country who would volunteer, and this is the only way I can see that we could avoid a catastrophic number of fatalities.

Our analysis also suggests that the deployment of biosensors would act as a substitute for rapid antibiotic distribution, but they would be a much, much more expensive and much less reliable substitute. And given that we distribute antibiotics rapidly, the additional savings from biosensors is quite incremental: we are already getting people the antibiotics quickly enough, and the challenge now shifts to adherence education and the creation of surge capacity. That is not to say that biosensors are not helpful more generally. They might well help for a smallpox attack, where the early symptomatics don't appear until 7 or 8 days. But the early symptomatics for anthrax appear on the second day, and biosensors don't provide much bang for the buck.

Finally, we believe that a much better case can be made for pre-attack mass vaccination of anthrax than for smallpox. An anthrax attack is significantly more likely than a smallpox attack, and its consequences are much more difficult to manage, due to the rapidity of the disease progression. Unfortunately, there is only one producer of an anthrax vaccine, and they are having difficulty just satisfying the military's requirements, and this is not a feasible option for at least the next several years, and so our response planning needs to continue in earnest.

In summary, the government currently has no detailed response plan in place for a large-scale anthrax attack. We have outlined the elements of a successful response plan. Unlike the case of smallpox, where our response can be measured in days, our response to an anthrax attack needs to be measured in hours.

Thank you.