

ANTHRAX... Did you know?

- In 2001, the U.S. suffered a multi-site, two-wave lethal anthrax attack matriculated through the US Postal Service. Five Americans died, several were sickened and tens of thousands were prescribed antibiotics with or without vaccine to save their lives. Even now the preeminence of anthrax as a threat continues...
 - In December 2008, the bi-partisan Commission on the Prevention of WMD Proliferation and Terrorism stressed the importance of enhancing the nation's capabilities for rapid response to prevent biological attack – particularly with anthrax.¹ On October 21, 2009, the Commission restated these concerns and asserted anthrax is the most likely near-term threat.²
 - In a September 2008 memo Homeland Security Secretary Chertoff urged HHS Secretary Leavitt, "to employ all relevant emergency powers under 21 U.S.C. Section 360bbb-3 to ensure distribution of pre-need countermeasures that may be effective in preventing the contracting of anthrax by people in the delivery chain, such as: US Postal Service Workers; to first responders, including law enforcement; to essential government and non-government workers; and to the general public."
 - "Based on a credible risk that the threat of exposure to *Bacillus anthracis* and the resulting disease constitutes a public health emergency.", HHS Secretary Leavitt responded on October 1, 2008 with a Declaration under the Public Readiness and Emergency Preparedness [PREP] Act. This action provides targeted liability protection for the use of all anthrax countermeasures (including the vaccine) and compensation to eligible individuals for covered injuries from covered countermeasures. This Declaration stands today haven been renewed by the Obama Administration each year since.
 - In early June 2014, there was an unintentional exposure of personnel to potentially viable anthrax at the CDC's Roybal Campus. This is not the first time such a mishap as occurred at the CDC. Clearly the threat attributed to mishandling by scientists must be taken seriously as well - it adds a new dimension to "friendly fire".
- Strategically-placed detection devices are not the solution. These monitor continuously but most analyze data only once an hour. This means in a medium-sized USPS Processing & Distribution Center handling 5 million letters, a half million flats, and thousands of parcels a day, as many as 230,000 potentially contaminated pieces could whisk through to carriers before an alarm sounds. Irradiation of mail is limited to facilities in Ohio and New Jersey and mail addressed to the White House, Congressional offices, and federal government offices in 202-205 Zip Codes.³
- Personal Protective Equipment (PPE) is useful but not fool-proof. In the October 2001 Hart Senate Office building attack on Senator Daschle's office, 6 of 9 emergency responders were infected before they donned their HAZMAT suits.⁴ Anthrax powder quickly dissipates into the gaseous phase and is odorless, tasteless and invisible. This makes discerning the safe zone, from the exposure zone, nearly impossible.
- The solution is not post-exposure antibiotics for 60 - 100 days (with or without vaccine) because the prudent action is to plan for weaponized anthrax that is resistant to all antibiotics stored in the Strategic National Stockpile (SNS).^{5,6} Antibiotics do not kill the spore form of anthrax.⁷ And it is very difficult to adhere to long courses of antibiotics due to side effects as was the case for victims of the 2001 attacks.⁸
- Anthrax vaccine adsorbed (AVA) is FDA-licensed as safe and effective.⁹ To date, over 11.6 million doses of AVA have been administered to more than 2.9 million individuals. The Institute of Medicine has found that the rate of adverse events for this vaccine is similar to rates with other adult vaccines (flu, HAV, Tetanus).^{6,10} Niu et al. found that out of the 6 million doses administered from 1998 to 2007, there were 79 adverse events per 100,000 doses, or less than 0.1% of all administered doses.^{11,12}

ANTHRAX... What to do?

Pre-exposure immunization with SNS vaccine doses is the best strategy since the immunity induced by vaccination protects against anthrax disease inflicted by both antibiotic-sensitive and antibiotic-resistant organisms.^{10,13} The CDC Advisory Committee on Immunization Practices (ACIP) agrees and supports voluntary, pre-exposure immunization with the anthrax vaccine for "persons involved in emergency response activities including but not limited to, police departments, fire departments, hazardous material units, government responders, and the National Guard."¹⁴ And the United States Strategic National Stockpile (SNS) vaccine is the most expeditious source of vaccine for this strategy.

References:

- ¹ The Commission on the Prevention of Weapons of Mass Destruction Proliferation and Terrorism. World at Risk. December 2, 2008. <http://www.preventwmd.gov/report>. Accessed December 4, 2008.
- ² The Commission on the Prevention of Weapons of Mass Destruction Proliferation and Terrorism. The Clock is Ticking. October 21, 2009. http://www.preventwmd.gov/10_21_2009/. Accessed October 22, 2009.
- ³ EPA. Mail Irradiation. http://www.epa.gov/rpdweb00/sources/mail_irrad.html#mail_irradiated. Last updated on Wednesday, March 11th, 2009; Accessed on November 1, 2009.
- ⁴ Doolan DL, Freilich DA, Brice GT, et al. The US capitol bioterrorism anthrax exposures: clinical epidemiological and immunological characteristics. *J Infect Dis*. 2007 Jan 15;195(2):174-84.
- ⁵ NOVA Online. Interviews with Biowarriors: William Patrick III, Ken Alibek, Sergei Popov. PBS Nov 2001.
- ⁶ Athamna A, Athamna M, Abu-Rashed N, Medlej B, Bast DJ, Rubinstein E. Selection of *Bacillus anthracis* isolates resistant to antibiotics. *J Antimicrob Chemother*. 2004 Aug;54(2):424-8.
- ⁷ Spencer R. C., *Bacillus anthracis*. *J Clin Pathol* 2003;56:182-197
- ⁸ Shepard CW, Soriano-Gabarro M, Zell ER, et al. Antimicrobial postexposure prophylaxis for anthrax: adverse events and adherence. *Emerg Infect Dis* 2002;10: 1124-1132.
- ⁹ Federal Register: Biological Products; Bacterial Vaccines and Toxoids; Implementation of Efficacy Review; Anthrax Vaccine Adsorbed; Final Order. December 19, 2005 (Volume 70, Number 242) p75180-75198.
- ¹⁰ Grabenstein JD. Vaccines: countering anthrax – vaccines & immunoglobulins. *Clin Infect Dis*. 2008 Jan 1;46(1):129-36.
- ¹¹ Niu M, Ball R. Adverse events after anthrax vaccination reported to the Vaccine Adverse Event Reporting System (VAERS), 1990-2007. *Vaccine* (2009), doi: 10.1016/j.vaccine.2009.08.027
- ¹² Sever JL, Brenner AI, Gale AD, Lyle JM, Moulton LH, Ward BJ, et al. Safety of anthrax vaccine: an expanded review and evaluation of adverse events reported to the Vaccine Adverse Event Reporting System (VAERS). *Pharmacoepidemiol Drug Saf* 2004;13:825–40
- ¹³ Institute of Medicine, “The Anthrax Vaccine, Is It Safe? Does It Work?” Committee to Assess the Safety and Efficacy of the Anthrax Vaccine, Medical Follow-Up Agency, Washington, DC: National Academy Press, 2002
- ¹⁴ Centers for Disease Control and Prevention, Advisory Committee on Immunization Practices (ACIP); Provisional recommendations on the use of the Anthrax vaccine. www.cdc.gov/vaccines/recs/provisional/default.htm.

Thomas K. Zink, MD
Adjunct Associate Professor
Director, Project EQUIPP
tkzinkmd@comcast.net
3 November 2009