20 Questions – Chemical and Biologic Weapons

1. You are called to the government center on 'one down'. When you pull up, you notice three people lying in the interior of the building. What should you do?
2. Does the PAPR protect against terrorist poison gas, anthrax, and smallpox, and all the horrible panic-inducing doomsday stuff out there?
3. Is anthrax contagious?
4. Is the anthrax that causes inhaled and cutaneous forms different?
5. How bad is inhaled anthrax?
6. You respond to a scene where someone has had an asthma attack after opening a letter filled with white powder. She still has powder on her. IF this is anthrax, how much of a threat is it to you?
7. How sophisticated is the stuff that's showing up in the mail these days?
8. While transporting your third SOB of the morning, you hear that the doctors (who don't know much, admittedly) think that it's plague. Should you buy a ticket and go on vacation?
9. While vacationing in Kikwit, Zaire, you are enlisted to help care for victims of an Ebola epidemic. Based on their prior experience, how effective will the gloves, gown, and surgical mask they give you be?
10. What highly dangerous respiratory disease is affecting the Arabian peninsula?
11. A mutual aid request takes you to the Mall of America, where terrorists lobbed a bottle of liquid marked "anthrax" onto the Snoopy statue. Should you respond, or drive the other direction?
12. Do the affected persons need transport to the hospital?
13. Later that afternoon, the same terrorists state that they have released anthrax into the US Bank ventilation system. Can you safely enter the building?
14. Unfortunately, you were on US Bank Stadium duty at the time Anthrax was released into the stadium and had no protective gear on except a pair of souvenir horns. Is it too late to think about your life insurance needs?
15. What are the cardinal signs of organophosphate poisoning? (eg: nerve agents / pesticides)
16. What is in a Duodote kit?
17. How many Duodote kits should be used to treat a significantly poisoned patient (decreased LOC, seizure, SOB)?
18. Why are we so worried about measles?
19. Want a little mustard (gas) with that sandwich?
20. If there's a regular old explosion, we don't have to worry about any of this right?

20 Answers – Chemical and Biologic Weapons

1. If you get this one wrong, consider yourself dead. Anytime you have an unexplained down in a closed space, think about the common causes (e.g. CO poisoning), and the uncommon causes (e.g. nerve agents) If something isn't right about the situation GET OUT! Notify MRCC immediately and advise them of the situation, stage a few blocks away. Make sure your PPE is working! Wait for the Hazmat team to check the area with their tools that include atmospheric monitoring.
2. Yes. The PAPR contains a HEPA filter, which is maximal bio protection, also filters for organic and acid gas agents plus others so it covers basically all the terrorist chemical and biological weapons. Of note it is designed for normal oxygen containing environments with relatively low concentrations of chemical per OSHA. Although it is significantly better than the gas masks for nerve gas that the armed forces use in combat. It will not save you from a low oxygen environment. Hypoxia still matters. Use them if the warm zone comes to you or under orders from the IC after the agent and concentration is determined.
3. NO. Anthrax is not spread via the respiratory route. You should still use appropriate universal precautions and contact precautions with blood/body fluids. The only way to get inhalational anthrax is to be exposed to a large concentration of spores (i.e. white powder).
4. It's the same bug. Cutaneous anthrax occurs when spores get under the skin (usually due to a cut), and the dose to cause the local black scab (termed "eschar") is much lower than the

inhaled dose to cause disease (about 8,000-40,000 spores). Cutaneous anthrax is not a big deal, and responds to antibiotics.

5. Horrible. 90-95% death rate, initial flu-like symptoms followed by rapid progression to respiratory failure and death, often with hemorrhagic meningitis.
6. You should wear a PAPR and barrier precautions, but your risk with these precautions is zero. Visible contaminant should be moistened, clothing affected removed, and the patient should soap and water wash areas in contact with the powder. Anthrax spores are tremendously difficult to re-aerosolize. A letter is a lousy delivery device UNLESS you reflexively smell your fingers to see just what the heck the powder is, in which case you're probably dead.
7. Medium. It's not the refined, high-grade stuff the USSR weaponized, nor is it your usual home brew, it suggests that some time and money were put into this project.
8. Plague is very responsive to doxycycline, so in this case we would be treating exposed providers with a week's worth of doxy. Plague is spread by droplets, so a simple surgical mask is all that you need IF it's truly plague. The patient should also wear a mask. Finally, a three-foot distance is all you need even without masks to be (relatively) safe, as the droplets fall to ground readily.
9. You should still be working with your travel agent to book that flight home, but during the biggest outbreak in recorded history, Ebola transmission to healthcare workers is preventable with strict adherence to universal precautions. Remember the donning and doffing drills from a year or so ago…
10. Middle Eastern Respiratory Syndrome – Coronavirus (MERS-CoV). Roughly 30-40% of pts with this illness have died. First reported in 2012, this is spread by close contact with infected patients. Likely spread via respiratory secretions (droplet) but the exact mechanism isn't known.
11. The chance of this being real are remote at best. If you wanted to truly create havoc and not get caught, you would announce it after people started to get sick. Further, unless you're in direct contact with liquid or powder, you are at no risk. If contaminated, simple washing and clothing removal is sufficient protection.
12. Not unless they are having symptoms in which case it was either a chemical event or they are having symptoms of anxiety or underlying disease (eg: asthma) but NO biologic agents have effects within the first 12h.
13. The building should be considered a "hot" zone, so let fire handle the work inside, but if Fire was busy, as long as you had your PAPR on you would be protected. The only real threat is if a sprayer is used that can generate 1-5 micron particles. These are taken care of by your HEPA filter. Once the patients are washed and de-clothed, they are not threat to you. A patient that has been in a highly concentrated exposure zone may warrant use of the PAPR in addition to barrier precautions.
14. You're not dead yet. Beginning antibiotics, including ciprofloxicin or tetracycline/doxycycline and continuing on them for 60d or while getting 3 vaccinations against anthrax will get you through with flying colors. If you wait until you develop pulmonary symptoms, you have only a 5% chance of surviving, with or without treatment.
15. Look at the eyes!! Miosis (small pupils) are present in ALL significantly poisoned patients. This, along with other signs like seizures, muscle fasciculations, excess salivation and pulmonary secretions are good clues to this syndrome.
16. Atropine 2mg (to dry up secretions) and Pralidoxime 600mg (to prevent the agent from permanently damaging its target enzyme and to reduce the muscular effects). Note that neither drug will change the size of the pupils, so don't use this as a guide to treatment effect.
17. Give 2 sets (total 4 injectors) to the patient, if there is inadequate ability to ventilate after 5-10min or they continue to seize, etc. they should be given an additional injector set.
18. Although not weaponized, measles is as excessively contagious. 90% of people who are in close contact with an infected person and are not immune will become infected. Therefore, we require N95 precautions on potentially infected patients. Patients less than 5 y/o and older than 20 y/o are most susceptible to complications. 1 in 20 children will get a concomitant pneumonia (most common cause of death from measles). About 1 in 1,000 will get encephalitis. Overall about 1 or 2 in every 1,000 children will die from complications of measles. When you take into account how aggressively contagious it is, these numbers add up to a lot.
19. No thanks! We're unlikely to see mustard used, more routine caustics are much more likely but mustard behaves like radiation in that it alters DNA within cells, so with a significant burn

(20%BSA) you die from the radiation-like effects on the immune system and not the burn itself. Make certain that patients with cutaneous burns from chemicals have been decontaminated fully and protect yourself with double gloves (nitrile or latex under-glove and butyl rubber over-glove). (Note that this glove combo protects against the vast majority of agents but does not protect against chlorinated hydrocarbons like carbon tetrachloride which may show up at industrial sites. This class is not a particular terrorist threat and the gloves protecting against that class fail for more common substances).

20. Wrong. Based on national recommendations regarding terrorism - any explosion should be considered a bomb and therefore terrorism until proven otherwise. You have to use common sense and grandpa smoking with his oxygen cylinder is different than an explosion in a mall, but stay vigilant. Often, terrorists will include biologic and chemical agents with their conventional weapons to exacerbate the damage and spread fear. Always maintain universal precautions at a minimum – they'll protect you from a lot.

Let's be careful out there!

Any questions? Check out www.nbc-med.org, poison control 1-800-222-1222.