Good morning/afternoon. My name is [ ], and I am a member of The Ohio Center of Excellence for Bioterrorism Preparedness and Response. This introductory talk provides an overview of what every health care provider should know about being prepared and responding to bioterrorism, and is a result of funding obtained by the Health Resources and Services Administration.
The purposes of this presentation are to
1. Provide an overview of the new threat we face as a nation.
2. Review the BNICE model, and briefly cover these potential threats. As we will explain, bioterrorism is more than biological weapons - it also includes nuclear, incendiary, chemical, and explosive weapons. And
3. Emphasize the importance for health care providers to be prepared to counter this threat.

Through this talk I will also emphasize four “essentials” that we as health care providers must master. We must be alert and ready to recognize a potential threat early in the course of that threat. We must know how to initially manage this threat, to protect ourselves, our families, and patients. We must also know whom we should immediately contact. And, finally, we need to know how to work in a multidisciplinary team and understand the exact role we have on that team.
Many of you may be asking at this time, “Who cares?”
“Why should I pay attention to this? Aren’t only those who live in New York City are at risk?” Well, one of the intents of this talk is to emphasize the points that…

1. Bioterrorism is a potential threat to all of us, not just to those who live in New York City or Washington DC, and

2. One of the best defenses against bioterrorism is a well-prepared health-care work force.
History of Bioterrorism

- The Assyrians
  - Poisoned enemy wells with rye ergot
- Middle Ages 1300s
  - Plague victims catapulted into Kafka

Bioterrorism is not a new concept. The first recorded event of bioterrorism occurred in the 6th Century BC when the Assyrians poisoned enemy wells with rye ergot, a fungus that causes convulsions when ingested.

Also, during the Middle Ages, it was a common tactic to catapult plague victims into Kafka enemy camps in hopes that the enemy would become infected.
Also, bioterrorism is not new to North America. During the French and Indian Wars, it was suspected that British forces would distribute smallpox-laden blankets to native American Indians who were loyal to the French.
In 1984, the Rajneeshee cult, followers of Baghwan Sri Rajneesh, contaminated salad bars with *Salmonella* in an Oregon town. They did this in an attempt to influence a local election by incapacitating voters. More than 750 people became seriously ill.
Despite these acts of bioterrorism, the minds of Americans were elsewhere. Prior to 1989, we had well-recognized, nation-state adversaries, with our focus being on communism. As a nation, we were concerned about the threat of global nuclear war, which was dangerous but relatively predictable. Our nation’s defense was focused outside of our country, and short of global war, the US homeland was perceived as being secure from any major threat.

Then, in 1989, with the bringing down of the Berlin Wall, our nation took a breath and, perhaps, let our defenses down.
Unfortunately, we dearly paid the price on September 11, 2001, when terrorists attacked both the World Trade Center in New York City and the Pentagon in Washington DC. Also, 40 individuals lost their lives when United Airlines Flight 93 crashed into a Pennsylvania field.
With 9-11 our National Security Environment drastically changed, as we entered the era on the War on Terrorism. The enemy has now become extremist groups which are not hesitant to develop and proliferate “dual use technologies” which we now know as “weapons of mass destruction.” As opposed to the past, our homeland is now non-secure and at risk.
We are now threatened by a select group of Nation States and Extremist or Radical Organizations whose goal is to destroy the American way of life, and to cripple it as a superpower.
Terrorists such as these are not hesitant to use weapons of mass destruction. And these weapons are not just biological (point to the letter B in the circle above), which we think of when we hear the word, “bioterrorism.” These weapons also involve (point at each letter in the circle above) - nuclear, incendiary, chemical, explosive, and cyber terrorism.
The greatest threat to the United States and its citizens in the first decade of the 21st century will not come from a military confrontation. Rather, it will come from an attack within our borders from a single individual or group that has access to weapons of mass destruction, including large conventional explosives and nuclear, chemical or biological weapons.

COL Ed Eitzen, Senior Medical Advisor to the US Assistant Secretary for Public Health Emergency Preparedness.

Dr. Ed Eitzen, the Senior Medical Advisor to the US Assistant Secretary for Public Health Emergency Preparedness, emphasized that,

“The greatest threat to the US and its citizens in the first decade of the 21st century will not come from a military confrontation. Rather, it will come from an attack within our borders from a single individual or group that has access to weapons of mass destruction, including large conventional explosives and nuclear, chemical or biological weapons.”
Terror Is a Weapon Itself

“The real force multiplier in bioterrorism is the panic, misinformation and paranoia associated with it.”


However, the biggest threat is not the weapons themselves, but the terror that is associated with that threat. Recall what our nation went through a few years ago when small towns across the US were trying to prepare for a potential chemical attack. Remember the run on duct tape as people were sealing their basements, often cutting off their own oxygen supply? It has been documented in prior attacks that for every one person who is injured physically, there are four individuals who are injured emotionally. As health care providers, we must be prepared to deal with panic, paranoia, and post-traumatic stress disorder.
The major purpose of terrorism is not to kill, but to create disabling fear and panic.
This theoretical model--developed by Zunin and Meyers in California--outlines phases of a disaster in terms of individual and collective emotional response in the community.

After the initial shock of a disaster, there is often an emotional “high" period--sometimes referred to as the “heroic" phase. This is the time in which people are still running on the adrenaline of the event. Community members and emergency workers may bond together in immediate response activities.

This heroic phase often culminates in a honeymoon period, in which there is great optimism. Media may celebrate stories of dramatic rescues, survival, community spirit, volunteerism and donations of money and resources. Depending on the disaster, this phase may last for a few weeks or months.

Next however, there is typically a time of disillusionment as the true extent of loss sinks in. The spirit of community cohesion may diminish as some aspects of the community recover faster than others. There may be competition for resources. Some may a sense of unfairness or anger at the bureaucracy.

Over time--the healthy emotional recovery process can lead to predisaster emotional functioning--or higher--but on a steady course . . . Our job is to help that happen.
But as Tom Ridge, the Former Director of Homeland Security, points out, terrorism forces us to make a choice. We can be afraid. Or we can be ready. As health care providers, we must choose the latter.
Tom Ridge also noted that we as health care professionals are the first line of defense against bioterrorism, and that the key to that defense is education. That is why we are here today.
The Ohio Center of Excellence for Bioterrorism Preparedness and Response

• Rationale
  • A need exists to train healthcare professional students to be prepared to respond to terrorist acts and other public health emergencies

Today’s talk has been possible through the efforts of over 50 healthcare providers who have come together, thanks to a grant from HRSA, to develop The Ohio Center of Excellence for Bioterrorism Preparedness and Response. This center was created because a need exists to train healthcare professional students to be prepared to respond to terrorist attacks and other public health emergencies and major natural disasters.

This center is a collaborative effort of The Ohio State University, the University of Cincinnati, Ohio University, and Northeastern Ohio Universities College of Medicine in the disciplines of allied medical professions, medicine, nursing, and public health.
The Center’s goal is that each health care professional student, prior to graduation, will be able to

1. Recognize early a potential bioterrorist attack. Nuclear and conventional explosions are easy to detect. However, biological and chemical attacks are often less obvious, and require a heightened sense of awareness and attention to subtle clues.

2. Manage the early events of an attack, including what to do personally, what to do with your colleagues, and what to do with your patients. This task also includes the management of panic and hysteria that commonly follows the attack.

3. Know who to notify if you suspect a terrorist attack. And…

4. Work together in a multidisciplinary team, knowing your role on the team, and the roles of others.
And when we talk about needing to be prepared for a terrorist attack, we are talking about being at the “right place” on the continuum between mindless complacency, which can easily occur when it has been a while since the last attack, and all consuming paranoia, which occurs in the event of an attack.
With that as a background, we now provide to you our introductory talk - BNICE 101. Of course, if everyone was to “be nice”, we wouldn’t need this talk. The intent of the talk is to provide basic background information we believe every health care professional should know.

As mentioned earlier, bioterrorism goes beyond just a biological attack. It also includes nuclear, incendiary, chemical, and explosive weapons.
Bioterrorism Defined

- Unlawful release of biologic agents or toxins
- Intent
  - to intimidate or coerce a government or civilian population to further political or social objectives
- Targets - humans, animals, plants
- First recognized by the astute healthcare provider in the community

Using the BNICE model, we will start with the biological threat. Bioterrorism is defined as the “unlawful release of biological agents or toxins with the intent to intimidate or coerce a government or civilian population to further political or social objectives.”

Targets can include humans, animals, and plants.

It is highly probable that astute clinicians in the community, not the traditional first responders such as fire fighters and law enforcement, will be the first to recognize that a bioterrorist event has occurred.
Terrorist organizations are interested in using biological agents as weapons of mass destruction for a number of reasons. First, these agents typically can be obtained from soil, water, animals, clinical specimens and clinical research labs. Second, technology used to produce antibiotics, vaccines, and other industrial and food products can be converted to making biological agents, which can be easily concealed.
Those biological agents that are ideally used for bioterrorism have these characteristics. They cause disease, which can be severe, at low doses. They result in a high rate of morbidity and death. They are highly infectious, but not always contagious. They are difficult to diagnose and to treat and are insidious in onset. They are easy, fast, and cheap to produce, and can be concentrated for easier distribution. They can be adaptable to weapons systems. And, their names cause fear and panic among the public.
It is quite clear that there is growing concern that the people of the United States might be subjected to bioterrorism assaults. This manifests itself in multiple ways. It shows in the growing press coverage of the threat. It also shows up in popular culture: here are nearly two dozen novels that include incidents of the use of biological agents by criminals and terrorists as a central theme. It also shows up in the increasing number of comments about the threat by non-US government experts and by senior US officials.
In the event of a biological attack, it is essential to be prepared so that you not only protect your patients, but also yourself and your family. The website for the US Department of Homeland Security has excellent advice on what one should do in the event of such an attack. This advice is as follows.

As mentioned before, a biological attack is the release of germs or other biological substances. Many agents must be inhaled, enter through a cut in the skin, or be eaten to make one sick. Some biological agents can be contagious, such as smallpox, while others are not.

A biological attack may or may not be immediately obvious. While it is possible that one can see signs of a biological attack it is perhaps more likely that local healthcare workers will report a pattern of unusual illness in the community.
If you become aware of an unusual or suspicious release of an unknown substance nearby, it doesn’t hurt to protect yourself.

First, get away from the substance as quickly as possible. Also, cover your mouth and nose with layers of fabric that can filter the air but still allow breathing.
Next, you should wash any exposed parts with soap and water and contact the local health department.

At the time of a declared biological emergency be suspicious, but do not automatically assume that any illness is the result of the attack. Symptoms of many common illnesses may overlap. Use common sense, practice good hygiene and cleanliness to avoid spreading the germs, and seek medical advice as needed.
The three major ways in which biological agents can be transmitted are through aerosol, through the GI tract, and through the skin.
Many biological agents are effectively delivered as an aerosol. If a protective mask is not readily available, cover your mouth and nose with layers of fabric that can filter the air but still allow for breathing. Examples include 2 to 3 layers of cotton such as a T-shirt, handkerchief, or towel. Otherwise, several layers of tissue or paper towels may help.

Explosives are inefficient delivery systems because the heat generated by the explosion will inactivate most of the biological agents.
Some biological agents can be distributed through the food and water supply. Heat destroys most pathogens and toxins. So to be effective, most agents need to be used on food that will be served raw, such as on a salad bar, or added after the food is prepared.
Biological Attack
Contamination of Water

- Water purification methods inactivate most pathogens and toxins
- Successful attack on water supply would have to occur after treatment
- Dilution reduces concentration

Standards water purification methods using chlorination and/or filtration inactivate most pathogens and toxins. Therefore, a successful attack on our water supply would need to occur after treatment, such as when it is in a storage tank. Dilution will reduce the concentration of the pathogens and toxins, often below an effective level.
Another concern is possibly the contamination of our milk supply with a pathogen such as botulinum toxin. Easy to find and easy to produce, botulinum toxin is the most poisonous natural substance on earth. In the hands of a bioterrorist, a single gram - the weight of a paper clip - could kill more than one million people.
Although there are hundreds of thousands of biological agents in this world, only a dozen or so could potentially be used as a biological weapon. Of these, the Centers for Disease Control have classified them according to their potential threat. Category A agents are those high-priority organisms that have the following characteristics:

First, they pose a risk to national security because they can be easily disseminated or transmitted from person to person.

Second, they can result in high mortality rates and have the potential for a major public health impact.

Third, they cause public panic and social disruption.

And, fourth, they require special action for public health preparedness.
The CDC has listed these six agents as Category A…

Anthrax,
Smallpox,
Botulism,
Plague,
Tularemia, and
Viral hemorrhagic fevers, the most famous of which is probably Ebola virus.
Anthrax is an acute infectious disease caused by the spore-forming bacterium *Bacillus anthracis*.

Anthrax most commonly occurs in wild and domestic lower vertebrates, such as cattle, sheep, goats, camels, antelopes and other herbivores. However, it can also occur in humans when they are exposed to infected animals or to tissue from infected animals, or when anthrax spores are used as a bioterrorist weapon.

In this slide (point to the gram stain), one can see the endospores, which are green, and the mother cells surrounding them, which are red. The configuration of the spores lined up in a “string of pearls” (see arrow on figure above) is characteristic of Anthrax.

A great web site to learn more about Anthrax can be found at the CDC website.
An anthrax infection can occur in three forms - cutaneous, inhalation, and gastrointestinal.

The important point I want to emphasize about Anthrax is that it is NOT contagious. The illness can NOT be transmitted from person to person. Also, household contacts of individuals infected with anthrax do not need antibiotics unless they have also been exposed to the same source of anthrax.
Anthrax can be used as a bioterrorist weapon. I am sure we can all remember the case in 2001, when *Bacillus anthracis* spores was intentionally distributed through the US postal system, causing 22 cases of anthrax infection, including 5 deaths.
Cutaneous Anthrax

- Develops when bacterium enters a skin cut or abrasion
- Handling contaminated wool, hides, leather or hair products (especially goat hair) of infected animal

Up to 95% of naturally occurring anthrax infections develop when the bacterium enters a cut or abrasion of the skin, such as when handling contaminated wool, hides, leather or hair products, especially goat hair, of infected animals.

In this slide we see Berlin electoral workers equipped with protective masks and gloves as they open mailed votes during the regional elections in October 2001. The protection is used as a precaution against a possible anthrax threat.
When the skin becomes infected, it begins as a raised itchy bump that resembles an insect bite. Within 1-2 days this bump develops into a vesicle and than into a painless ulcer. This ulcer is usually 1 to 3 centimeter in diameter, with a characteristic black necrotic, or dying, area in the center. Lymph glands in the adjacent area may swell.

About 20% of those infected with cutaneous anthrax will die if they do NOT receive antibiotics. In contrast, death is rare when appropriate antibiotics are used.
Inhalation Anthrax

- Initial symptoms may resemble a common cold
  - sore throat
  - mild fever
  - muscle aches
  - malaise
- Symptoms progress to severe breathing problems and shock
- Usually fatal

The second way that anthrax can be spread is through inhalation, most often due to an intentional attack. When the spores are inhaled, disease can occur within one to 43 days. Initially, the disease is very subtle and may resemble the common cold or flu - sore throat, mild fever, muscle aches and malaise. After several days, however, the symptoms typically progress to a more severe illness, to include severe breathing problems and shock. Unlike cutaneous anthrax, inhalation anthrax is usually fatal once it is at this stage, even if treated with antibiotics. Fortunately, with more current treatments available, the mortality rate has improved.
To be infected, a human must inhale anthrax spores. To be inhaled, the anthrax spores must be about 1 to 5 microns in size to reach the alveoli, or air sacs, of the lungs. This table (point to the table above) provides an idea of the size of a micron.
Inhalation Anthrax

- Similar to common cold
- “Flu-like” symptoms
  - Fever, muscle aches, cough
- No runny nose (rhinorrhea) with Anthrax infection

Mediastinal widening with inhalational anthrax.
JAMA 1999:281:1735-45

As one can see from the previous slide, anthrax spores are almost undetectable by the human eye. So, how can one tell if their cold or flu is not due to anthrax? Many human illnesses begin with what are commonly referred to as “flu-like” symptoms - fever, muscle aches, and nonproductive cough. However, in most cases, anthrax can be distinguished from the flu because the flu has additional symptoms. In previous reports of anthrax cases, early symptoms did NOT include a runny nose (rhinorrhea), which is typical of the flu and common cold. In addition, if a chest x-ray is performed, the classic presentation includes a widened mediastinum [point to the chest x-ray and the widened mediastinum] which is the area between the lungs surrounding the heart.
Finally, there is an gastrointestinal form of anthrax, which occurs after one consumes contaminated meat. This infection is characterized by an acute inflammation of the GI tract. Initial signs include nausea, loss of appetite, vomiting, and fever, flowed by abdominal pain, vomiting of blood, and severe diarrhea. Typically, death will occur in 25 to 60% of those infected.
The treatment of anthrax consists of antibiotics. For those exposed to anthrax, but not infected, the CDC recommends oral antibiotics, including amoxicillin, doxycycline, or ciprofloxacin, for up to 60 days following the exposure. Anthrax vaccination is also recommended for those exposed. For those infected, treatment involves the intensive care unit and intravenous antibiotics.
One can be immunized against anthrax. Although the current anthrax vaccination program consists of six shots over 18 months, with an annual booster, newer anthrax vaccines are being developed which require only two shots in a shorter time frame. According to the Advisory Committee on Immunization Practices, these are the following groups that should receive anthrax vaccination:

- Those who work directly with the anthrax organism in the laboratory;
- Those who work with imported animal hides or furs in areas where standards are insufficient to prevent exposure to the anthrax spores.
- Those who handle potentially infected animals while in high-incidence areas. While the incidence in the US is low, veterinarians who travel to work in other countries where the incidence is higher should consider vaccination.
- Finally, military personnel deployed to areas with a high risk of exposure to the organism should receive the vaccination. Others, such as first responders, may wish to receive the vaccine.
The anthrax attacks through the mail system resulted in exactly what the terrorists wanted to do - to create mass hysteria.
Recent events have highlighted the importance of knowing how to handle mail safely. What should you do when you receive a letter or package that contains powder of unknown origin? These are the current recommendations. First, do not shake or empty the contents of any suspicious package or envelope. Do not carry the package or envelope, show it to others, or allow others to examine it. Put the package or envelope down on a stable surface. Do not sniff, touch, taste, or look closely at it or at any of the contents which may have spilled. Alert others in the area about the suspicious package or envelope. Leave the area, close any doors, and take actions to prevent others from entering the area. If possible, shut off the ventilation system.
Next, wash your hands with soap and water to prevent spreading any potentially infectious material to your face or skin. Next, immediately notify your local health department of what you have encountered. The local health authorities will then initiate the first responder system which will include local law enforcement and those trained in handling hazardous material. If possible, create a list of persons who were in the room or area when the suspicious letter or package was recognized, and a list of persons who also may have handled this package or letter. Give this list to both the local public health authorities and law officials.
The last biological agent I would like to discuss today is smallpox, which is due to the DNA virus, Variola major. Smallpox is a serious, contagious disease that is fatal in up to 30% of cases. There is NO specific treatment for smallpox, and the only prevention is vaccination.

The name *smallpox* is derived from the Latin word for “spotted” and refers to the raised bumps that appear on the face and body of an infected person. Humans are the only known reservoir for this virus; it is not known to be spread by insects or animals.
Thanks to the success of vaccination, the last natural outbreak of smallpox in the US occurred in 1949. By 1972, routine smallpox vaccinations for children in the US were no longer required. In 1980, smallpox was said to have been wiped out worldwide, and no cases of naturally occurring smallpox have happened since then.

Today, the smallpox virus is kept in two approved labs in the US and Russia. However, there is credible concern that the virus was made into a weapon by some countries and that terrorists may have obtained it.
There are three ways that a person today may become infected with smallpox. The first involves prolonged face-to-face contact with someone who has smallpox, usually with someone who already has a rash. This was how most people became infected with smallpox in the past. However, a person can be exposed to someone who has smallpox and not become infected. So, smallpox is contagious, but not that contagious.

The second way that a person can become infected with smallpox is through direct contact with infected bodily fluids or an object such as bedding or clothing that has the virus on it.

The third way that a person can become infected is through the aerosol release of smallpox into the air. In the past, rarely the virus was spread through enclosed places such as buildings, buses and trains. However, aerosolization is the major route by which terrorists may spread the virus. Fortunately, the smallpox virus is not strong and is easily killed by sunlight and heat. In lab experiments, 90% of aerosolized smallpox virus dies within 24 hours. In the presence of sunlight, this percentage would be even greater.
After a person is exposed to the smallpox virus, there is an incubation period during which there are NO symptoms. Usually, the infected person feels fine. This incubation period can range from 7 to 17 days, but normally averages about 2 weeks. During this time, the infected person is NOT contagious.
Typically, after this incubation period, the infected person develops a “prodrome” period - he or she has a “flu-like” illness with typically a high fever, fatigue, head and body aches, and sometime nausea.

Within 2 to 4 days, a rash appears, first as small red spots on the tongue and mouth. These spots develop into sores that break open and spread large amounts of the virus into the mouth and throat. At this time, the person becomes most contagious.

Next, a rash develops, first on the face and forearms, which then spreads to the rest of the body. The rash typically is “centrifugal” - that is, it is most prominent on the face and trunk. Also, the rash often involves the palms of the hands and soles of the feet.
By the 4th to 5th day of the rash, the bumps fill with a thick, opaque fluid. Many of these will also have a depression in the center that looks like a bellybutton. This is one of the distinguishing characteristics that differentiates smallpox from chickenpox.
The Smallpox Rash

- 2nd week of rash - scabs develop
- 3rd week of rash - scabs fall off
  - Pitted scars develop
  - Person is contagious until ALL scabs have fallen off

By the end of the 2nd week after the rash appears, most of the sores have scabbed over. The scabs then begin to fall off, leaving marks on the skin that eventually become pitted scars. Most scabs will have fallen off three weeks after the rash appears. The person is contagious to others until ALL of the scabs have fallen off.
The CDC has a nice poster that can help you to identify and diagnose smallpox, and differentiate it from chickenpox and other rash illnesses. This poster can be downloaded from the CDC website.
Edward Jenner, an English country physician, recognized that dairymaids infected with cowpox were immune to smallpox. He deliberately infected James Phipps, an 8-year old boy, with cowpox in 1796, and then exposed him to smallpox. The boy failed to contract smallpox. After repeating the experiment on other children, including his own son, Jenner concluded that vaccination provided immunity to smallpox. However, like today, there was controversy surrounding the vaccination. Here we see a cartoon published in 1802 by the British Anti-Vaccination Society. It depicts inoculated people acting like a bunch of animals and developing cow-like appendages.
As there is no effective cure for smallpox, prevention through vaccination is key, especially for those at risk of exposure to smallpox. The vaccine does not contain the smallpox virus, but is a pox-like virus called vaccinia. It cannot give you smallpox. But, it is a live virus vaccine and the vaccination site must be cared for carefully.

Smallpox vaccination provides high level immunity for 3-5 years. Vaccination within 3 days of exposure will prevent or significantly lessen the severity of smallpox symptoms in the vast majority of people. Vaccination 4-7 days after exposure likely offers some protection from disease or may modify the severity of disease.
Botulism (Clostridium botulinum)

- Spore-forming, anaerobic gram-positive rod
- Produces botulinum toxin
  - Muscle-paralyzing
  - Most lethal substance known
- Foodborne
  - Illness occurs 6-36 hours of ingestion of toxin
  - NO human to human spread

The last biological threat I would like to briefly discuss is botulism, which is a spore-forming, anaerobic, gram-positive rod. It produces botulinum toxin, which paralyzes muscles and is the most lethal substance known. Foodborne botulism occurs when a person ingests pre-formed toxin, and illness occurs within 6 to 36 hours. Botulism is not spread from one person to another.
Symptoms of botulism include double vision, blurred vision, drooping eyelids, slurred speech, difficulty swallowing, dry mouth, and muscle weakness that always descends through the body. First, shoulders are affected, then upper arms, lower arms, thighs, and calves. Respiratory paralysis can occur, and unless mechanical ventilation is provided, the patient will stop breathing and die.

Treatment consists mainly of supportive care, including mechanical ventilation for those who have respiratory paralysis. If given early in the course of disease, antitoxin is effective in reducing the severity of symptoms. Despite the best care, about 1 in 12 infected will die. Most patients eventually recover after weeks to months of supportive care.
The last Class A biological agent I would like to discuss is tularemia, which is a gram-negative bacterial disease found in rodents, such as rabbits. *Francisella tularensis* is considered to be one of the most infectious bacterial agents known, with as few as 10 organisms causing serious, potentially fatal disease in humans.
Symptoms of tularemia include such non-specific flu-like symptoms such as fever, chills, headache, diarrhea, muscle and joint pain, non-productive cough, and weakness. Depending upon the nature of exposure other symptoms can include pneumonia, chest pain, ulcers of the skin or mouth, swollen lymph nodes, and painful eyes and sore throat.

If left untreated, tularemia can be deadly. Antibiotics such as streptomycin, gentamicin, tetracycline, chloramphenicol, and ciprofloxacin are effective. This disease does not spread from human to human, so isolation of victims is unnecessary.
Whom to Contact for Suspected Biological Threat?

Your Local Health Department!

If you suspect a biological threat, the best resource to contact immediately is your local health department. The state and local public health departments play an extremely important role in all-hazards emergency preparedness and response. Public health professionals within these departments have immediate access to guidance and information that will assist them in rapidly establishing priorities and undertaking necessary actions during the response to an emergency or disaster.
The next potential terrorist threat is the use of radioactive material. The most likely threat is not a nuclear bomb which causes a nuclear explosion. Instead, the most likely scenario is a terrorist using what is most commonly known as a “dirty bomb.”
A dirty bomb, or radiological dispersion device, is a bomb that combines conventional explosives, such as dynamite, with radioactive materials in the form of powder or pellets. The idea behind a dirty bomb is to blast radioactive material into the area around the explosion. The main purpose of a dirty bomb is to instill fear and panic. It is typically disruptive, not necessarily destructive. A dirty bomb may also make buildings, land, food and water unusable for long periods of time. The CDC and Homeland Security web-sites have great information about being prepared and ready for such a terrorist event.
A dirty bomb is not a nuclear blast. The force of the explosion and radioactive contamination will be more localized. To limit the amount of radiation you are exposed to, think about shielding, distance, and time.

If you have a thick shield between yourself and the radioactive materials, more of the radiation will be absorbed by the thick shield, and you will be exposed to less.

The farther away you are from the radiation, the lower your exposure.

Minimizing time spent exposed will also reduce your risk.
The next threat for which we need to be prepared to encounter involves both incendiary devices and explosions. Of all that we have discussed, this threat is by far and away the most commonly used by terrorists. It seems that almost daily we hear of car bombs being used to kill innocent bystanders. We are all familiar with the Oklahoma City bombing and the tragedy associated with that event. A more recent event, which dramatically changed an election, is the train bombing that occurred in Madrid, Spain.
And, unfortunately, suicide, or homicide, bombers are increasingly being used as a terrorist threat.
In the event of an explosion, take shelter against your desk or a sturdy table. Once safe, you should exit the building as quickly as possible, avoiding elevators. As you exit the building, check for fire and other hazards.
The Homeland Security website has common sense things to do in the event of a fire. I am sure that all of you know this, but it is important to emphasize to others so that they may be prepared.

If there is a fire present, exit the building as quickly as possible, crawling low if smoke is present. Use a wet cloth to cover your nose and mouth.

Use the back of your hand to feel the lower, middle, and upper parts of closed doors. If the door is not hot, brace yourself against the door and open it slowly. Do not open the door if it is hot. Look for another way out.

If you catch fire, do not run! Remember the stop, drop and roll method. Once you are safe, call the fire department immediately.
In the event you are trapped in debris, use a flashlight, if possible, to signal your location. Avoid unnecessary movement so that you don’t kick up dust. Cover your mouth and nose with anything that you have on hand. Dense weave cotton material can create a good filter. Try to breathe through the material. Tap on a pipe or wall so that rescuers can hear where you are. Use a whistle if one is available. Shout only as a last resort - shouting can cause a person to inhale dangerous amounts of dust.
The last potential terrorist threat I would like to briefly cover is the use of chemical weapons, which have been used in the past. A chemical attack is the deliberate release of a toxic gas, liquid or solid that can poison people and the environment.

During WW I, chemicals were routinely used in battles. Saddam Hussein killed over 5,000 civilian Kurds using chemical weapons in retaliation to their uprising.

In 1994 Aum Shinrikyo committed the world’s first known Sarin gas terrorist attack in Matsumoto in central Japan, killing 7 and sickening more than 200 people. Then, 10 months later, his cult released Sarin gas in a crowded Tokyo subway, killing 12 and injuring more than 1,000.
Sarin (GB)

- 1938 - pesticide
- Nerve agent
  - Toxic
  - Rapidly acting
- More potent than organophosphate pesticides

Properties
- Clear, colorless, tasteless liquid
- No odor in pure form
- Evaporates into a gas

One of the chemicals that has been used in the past, and is a potential threat today, is Sarin, also known as GB. Originally developed in Germany in 1938 as a pesticide, Sarin is a toxic nerve agent that is rapidly acting. It is similar, but more potent, than organophosphate pesticides. It is a clear, colorless, and tasteless liquid that has no odor in its pure form. It can evaporate into a gas which can easily spread into the air. Because it evaporates so quickly, Sarin presents an immediate by short-lived threat.
Nerve agents cause their toxic effects by preventing the proper operation of acetylcholine esterase, the chemical that acts as the body’s “off switch” for glands and muscles. Without this chemical, the glands and muscles are constantly being stimulated. Eventually they may tire and no longer be able to sustain breathing function.

Exposure to Sarin can occur by breathing contaminated air, eating contaminated food, drinking contaminated water, or touching contaminated surfaces.
Those exposed to Sarin may experience some or all of the following symptoms within seconds to hours of exposure: runny nose, watery eyes, drooling and excessive sweating, rapid breathing, diarrhea, and increased urination. More severe symptoms may include loss of consciousness, seizures, paralysis and respiratory failure.

Those with mild or moderate exposure usually recover completely. Severe exposure most likely will result in death.
To be prepared against a chemical attack, watch for signs such as many people suffering from watery eyes, twitching, choking, having trouble breathing, or losing coordination. Many sick or dead birds, fish or small animals are also cause for suspicion.

If you see signs of a chemical attack, quickly try to define the impacted area or where the chemical is coming from, if possible. Take immediate action to get away from any sign of a chemical attack.

If the chemical is inside a building where you are, try to get out of the building without passing through the contaminated area, if possible. Otherwise, it may be better to move as far away from where you suspect the chemical release is and “shelter-in-place.” If you are outside when you see signs of a chemical attack, you must quickly decide the fastest way to get away from the chemical threat. Consider if you can get out of the area or if it would be better to go inside a building and follow your plan to “shelter in place.”
If your eyes are watering, your skin is stinging, you are having trouble breathing or you simply think you may have been exposed to a chemical, immediately strip and wash. Look for a hose, fountain, or any source of water.

Wash with soap if possible, but do not scrub the chemical into your skin. Seek emergency medical attention.

To alert authorities of a possible chemical attack, first try to call your local or state health department, followed by the local fire department.
Regardless of the cause of the disaster, whether it be natural, such as a tornado or flood, or whether it be man-made, such as what we have talked about today, a critical skill that health care providers need to have is the ability to work together in a multi-disciplinary team.

Click to bring forth next image - The team consists of these three major groups. Health Care Providers include physicians, nurses, allied health such as lab, respiratory and x-ray technicians, veterinarians, dentists and psychologists. Public Health Officials include the local and state health departments and the Centers for Disease Control. First Responders include members of the fire and police department, emergency personnel, and, depending upon the disaster, the FBI, Homeland Security, and the Federal Emergency Management Agency. Each have an important role and must work together.

Click to bring forth next image - It is also important to know that most disaster plans call for an Incident Commander, who is responsible for coordinating the effort of all three groups. The Incident Commander is determined by the agent and delivery mechanisms. Typically, the Public Health Commissioner would be the Incident Commander for biological events, while the Fire Chief would oversee the other events.

It is important that you know what your role would be in this team.
Terrorism forces us to make a choice. We can be afraid. Or we can be ready.


As we finish this presentation, I go back to the beginning where I shared with you that it is important that we as health care providers must be ready. No matter how remote you may think it is, preparation for a terrorist event is critical!
Be Prepared

- Review your local Disaster/Bioterrorism Safety Plan
- Review the Ohio Department of Health Disaster Preparedness & Response Plan
  - [http://www.odh.state.oh.us/alerts/alertmain.asp](http://www.odh.state.oh.us/alerts/alertmain.asp)

To be prepared, review your local Disaster and Bioterrorism Safety Plan. Also, review the Ohio Department of Health Disaster Preparedness and Response Plan, which can be found at this website.
Three great websites that will help you to get prepared are presented here. First, the CDC is a wonderful, rich resource for health care providers. Almost everything you wanted to know about what we have touched on today is found at this site.

Both Homeland Security and the American Red Cross have excellent web sites that provide advice on personal and family safety during a disaster.

I would recommend that you become familiar with all three sites.
So, in summary, it is essential that we as health care providers be prepared for a new generation of potential threats to our health. Be alert for subtle warning signs that may be due to a terrorist event. Be ready to manage not only the physical but also the mental health casualties. Become familiar with your local public health department, and know how to contact them quickly. Develop skills on how to work together in a multi-disciplinary team during a disaster, and know your role on that team. And finally, know the web sites where you can go to quickly to learn more about what we discussed today.
Thank you for your attention. Please take a few minutes to complete the evaluation.

If you have any questions, I will be able to answer them once your evaluations are completed.