

Weapons of Mass Destruction

- SRA-211, Threat of Terrorism and Crime
- Penn State Altoona
- Larry Garvin

New Dangers

- Until now, states were the only ones with weapons of mass destruction
- As a result, control of these weapons has been relatively easy
- Unfortunately, these weapons are not longer limited to states

weapon of mass destruction (WMD)

- A **weapon of mass destruction (WMD)** is a nuclear, radiological, chemical, biological or other weapon that can kill and bring significant harm to a large number of humans or cause great damage to human-made structures (e.g., buildings), natural structures (e.g., mountains).
- Originally coined in reference to aerial bombing with chemical explosives, since World War II it has come to refer to large-scale weaponry of other technologies, such as chemical, biological, radiological, or nuclear.

5 Basic WMD's

- **Nuclear** - Nuclear weapons have been used twice in combat: two nuclear weapons were used by the United States against Japan during World War II in the atomic bombings of Hiroshima and Nagasaki. Altogether, the two bombings killed 120,000 people and injured another 130,000 while devastating hundreds or thousands of military bases, factories, and cottage industries.
- The U.S. conducted an extensive nuclear testing program. 1,054 tests were conducted between 1945 and 1992. The exact number of nuclear devices detonated is unclear because some tests involved multiple devices while a few failed to explode or were designed not to create a nuclear explosion. The last nuclear test by the United States was on September 23, 1992
- <https://www.youtube.com/watch?v=vwaA-dbVMW8>

5 Basic WMD's

- **Radioactive** - A radiological weapon or radiological dispersion device (RDD) is any weapon that is designed to spread radioactive material with the intent to kill and cause disruption.
- One type of RDD is a "conventional explosive combined with some type of radiological material", also known as a dirty bomb.
- It is not a true nuclear weapon and does not yield the same explosive power. It uses conventional explosives to spread radioactive material, most commonly the spent fuels from nuclear power plants or radioactive medical waste.

5 Basic WMD's

- **Biological** - Biological weapons are living organisms or replicating entities (viruses, which are not universally considered "alive") that reproduce or replicate within their host victims.
- This type of warfare is distinct from nuclear warfare and chemical warfare, which together with biological warfare make up NBC, the military acronym for nuclear, biological, and chemical warfare using weapons of mass destruction (WMDs).

5 Basic WMD's

- **Chemical** - Types of chemical weapons include blister agents, blood agents, choking hazard agents, nerve agents, tear gas, vomiting agents and psychiatric compounds.
- Chemical weapons work by either making contact to the skin or through consumption.

5 Basic WMD's

- **Cyber** - A cyberweapon is a malware agent employed for military or intelligence objectives.
- One example of a cyber-weapon is the Stuxnet worm that disrupted operations at an Iranian nuclear facility last year. U.S. officials have not acknowledged creating the computer worm, but many experts say they believe they had a role.

4 Ways to Obtain Nuclear Weapons

- **Make it themselves**-Building a nuclear bomb is not difficult if you have the right materials
- **Receive it from a state**-The Iranians would happily supply terrorists with weapons to carry out attacks
- **Steal it**-There are thousands of nuclear weapons in the world, many of them not secured very well
- **Buy it**-North Korea needs money

Terrorist Use of Nuclear Weapons

- Use it to inflict mass casualties
- Nuclear blackmail to force policy changes

Terrorist's Willingness to Launch

- Islamic groups have expressly stated an intent to use nuclear weapons in America and Israel
- Islamic law which mandates that before any attack, Islamists must warn the enemy
- al Queda did this, not to convert the United States, but to prepare the Muslim masses
- Iranian president Ahmadinejad has promised a world without America

Ability to Attack

- al-Qaeda has been trying to obtain nuclear weapons
- No one knows if they have succeeded
- Some argue that they don't have nuclear weapons because no attack has taken place
- Other sources say that they have the weapons and an attack is only a question of when

How Likely is an Attack?

- Some argue that it is unlikely or impossible for terrorists to obtain nuclear weapons
- This is grounded in two premises
 - Prohibitive financial costs
 - Prohibitive political costs

Prohibitive Financial Costs?

- Weapons from the former Soviet Union may be on the black market
- Nuclear know how has been sold by Pakistani scientist to many groups and nations
- Computers are cheap
- al-Queda may have hundreds of millions of dollars

Prohibitive Political Costs?

- Religious nuts don't care about the consequences of their actions
- al-Qaeda doesn't fear political consequences because it is unclear who to strike back against in the event of an attack

The Danger is increasing

- Many countries now have nuclear weapons, materials and know how
- Commercial nuclear reactors provide a source of fuel for dirty bombs
- Criminals may be quite effective at overcoming some countries nuclear safeguards

Radioactive Terrorism/Dirty Bombs

- Dirty bombs don't cause a nuclear explosion
- A great deal of radioactive material is missing
- EXAMPLE - A possible Chechen dirty bomb attack was thwarted in Moscow
- <https://www.youtube.com/watch?v=CrqA3dRlZ08>

Biological Weapons

- Easy to make
- Difficult to detect
- Cheap to manufacture
- Capable of killing many people
- Likely to have a substantial economic impact
- Terrorists with sufficient money shouldn't have much trouble hiring a few scientists to help them

History of Biological Warfare

- Biological warfare has been used for thousands of years
- Poisoned wells and water supplies
- Launching infected cadavers into fortresses under siege
- Biological warfare isn't new, but the lethality of modern biological warfare is new and expanded

Bacteria and Viruses

- Deadly biological weapons include bacteria and viruses
- For the most part, antibiotics can cure individuals infected with bacteria
- Viruses are harder to defend against. The common cold is caused by a virus, and there is no cure, but it's not generally deadly

Weaponizing is Very Difficult

- Biological agents behave unpredictably
- They depend on variables that cannot be controlled such as heat, cold, wind and other factors
- https://www.youtube.com/watch?v=SaFlk4pJz_I

Defending is Equally Difficult

- The attack cannot be effectively stopped
- Relying on the ethical judgment of terrorists doesn't help
- Deterrence is based on the idea that terrorists are rational. They aren't
- Facilities that would be used to make biological weapons have legitimate uses
- Very small quantities are needed to attack

Chemical Weapons

- Extremely deadly
- Easiest to produce
- Cheapest to produce

Historically

- First significant use was during WWI
- Germany shelled Allied lines with chlorine gas, killing 5000 troops
- Five months later, the Allies returned the favor
- The weapons were not used to strategic effectiveness despite killing 500,000
- Italy used chemical weapons when it invaded Ethiopia in 1936
- Iraq repeatedly used chemical weapons during the Iraq/Iran war between 1980-88
- Iraq used chemical weapons on its Kurdish population in 1988

Five Types of Chemical Agents

- Blister agents (mustard gas) burn on contact
- Blood agents (cyanide) prevent the body from using oxygen
- Choking agents (chlorine) damage the lungs
- Non-lethal incapacitating agents (LSD) work by affecting the central nervous system
- Nerve agents (sarin) disable the body's ability to transmit nerve impulses

Easy, Cheap and Unreliable

- Air temperature can evaporate the chemicals
- Ground temperature dictates how long the area will remain contaminated
- Exposure to the sun affects the chemicals
- Humidity enlarges the size of particles
- Rain can dilute or spread the chemicals faster
- Wind can dilute or move the attack
- Soil conditions can affect the chemicals
- Nature of the attacked site can affect toxicity

Aum Shinrikyo

- Sarin chemical attack in Japan in 1994
- They killed seven in a city of 300,000, which illustrates the difficulty of doing it right
- And they had considerable financial resources
- <https://www.youtube.com/watch?v=73gLkuXywAw>

Defending

- Chemical factories are dual use
- Chemicals needed to make weapons are readily available
- Free societies have lots of public targets. A stadium, for example, would be a tempting target
- Many countries have declared chemical weapons programs
- <https://www.youtube.com/watch?v=eWoLc7kPXzY>

Cyber Terrorism

- Defined as a surprise attack via the Internet or other technologies that disrupts a society's electronic and physical infrastructure

Disrupts Infrastructure

- water
- sewage
- electricity
- phones
- television/radio
- traffic lights
- trains/subways
- aircraft

Vulnerability

- Electronics drives everything in American society
- Our dependence on computers presents a tremendous vulnerability
- A cyber attack could cripple the economy, and as a result, protecting against such an attack is critically important

Probable Scenario

- Hack systems to disrupt the distribution of electricity
- Followed by a conventional terrorist attack on infrastructure
- Infect the same area with some sort of biological or chemical attack

State Sponsored

- Cyber terrorism is not limited to terrorist groups
- State supported information warfare is also common as states develop the ability to use and disrupt the information infrastructure of enemies and competitors
- <https://www.youtube.com/watch?v=O-4umGfl-FI>

Thoughts?

- What WMD scares you the most and why?
- Will the original 4 WMD;s be replaced by cyber attacks?
- If you were a terrorist what can of cyber attack would you do?