



WEAPONS OF MASS DESTRUCTION Weapon Types and Characteristics

Weapons of mass destruction (WMD) are categorized into five major areas, which include chemical, biological, radiological, nuclear, and explosives (CBRNE). Just how vulnerable is the United States to terrorists using weapons of mass destruction? R. James Woolsey, former head of the Central Intelligence Agency, believes terrorists armed with WMDs represent the single most serious threat to U.S. national security. WMDs are easy to build and easy to hide. The following is a brief synopsis of each category of WMD that could be employed by a terrorist or terrorist organization.

NUCLEAR

The threat posed by nuclear weapons is both lesser and greater than that posed by chemical agents due to what defense experts distinguish between two types: fissile, or explosive, weapons and radiological weapons (RWs). Soon after the collapse of the Soviet Union, it was believed that a stolen nuclear bomb would turn up on the black market. None have surfaced and most experts doubt one will since few terrorist groups have shown an interest in inflicting true mass destruction. The reason may be fear of a nuclear reprisal against their home country and, even if a group were so suicidal as to use a nuclear bomb, obtaining fissionable material and designing and building a nuclear device would be difficult. It is likely that a nuclear bomb built without state sponsorship would be primitive, large and bulky and unsuited for terrorist operations.

Radiological weapons (RWs) pose a more immediate concern and a more probable terrorist weapon since they are not designed to explode, which solves 99.9% of the design problems. RWs emit radiation alone--principally as gamma rays—that destroy individual cells. By killing fast-replicating blood forming cells as found in bone marrow and cells that line the intestinal tract, “radiation poisoning” causes untreated victims to dehydrate and bleed to death. Unlike chemical weapons, which degrade once they come in contact with oxygen and moisture in the air, RWs can continue to inflict damage for years and maintain their lethal effect even if they are dispersed with an explosive. Sources of radiation material used for making RWs can be obtained from nuclear waste and “sources” used in medical equipment.

BIOLOGICAL

Biological weapons are regarded as infectious agents (replicating) such as bacteria, viruses and fungi or toxins (non-replicating), which are poisons produced from replicating agents, other living organisms and plants which are pathogenetic to man. Biological weapons kill by spreading a disease that is normally fatal or by tricking the body's cells into producing a toxin that

overwhelms its defenses. Only a small number of the hundreds of bacteria and viruses make good terrorist weapons because most cannot survive outside narrow temperature ranges or are too rare and hard to grow to be useful. Given these natural limitations, the most serious threat is posed by some of mankind's most ancient diseases, which include anthrax, plague and botulinum.

Biologicals can be handled quite easily and are effective in relatively small amounts. The production process is quite straightforward in that a microorganism is obtained (many times from nature itself) and cultivated in a growth medium. Drying the germs for use in a delivery system, such as an aerosol to spray anthrax, is the most difficult part but nowhere near as difficult as building a nuclear or chemical weapon. Each biological agent kills in a slightly different manner, but the common denominator among them is their size, less than 5 microns across. These diminutive proportions mean they can remain airborne over a target for hours or—in still dry, weather—a day or more. Once inhaled, their small size enables them to bypass the filtering mechanism in the upper respiratory system and enter the lungs and the bloodstream. Unlike chemical weapons, biological weapons have a delayed effect, typically taking several days or weeks of incubation before victims realize they are in danger. The first symptoms of many of the biologicals are a flu-like malaise and fatigue followed by a cough and mild chest discomfort. A victim exposed to anthrax experiences severe respiratory distress, shock and death in a manner similar to pneumonia within 36 hours of the onset of symptoms. A plague victim will experience two to three days of early symptoms like high fever, chills, headaches and shortness of breath followed by intestinal bleeding and ultimately kills by causing the respiratory and circulatory systems to collapse.

CHEMICAL

Chemical weapons are defined as compounds, which, through their chemical properties, produce lethal or damaging effects. They are classified by their effects: nerve (Tabun, Sarin, Soman, VX), blood (hydrogen cyanide, cyanogen chloride, arsine), choking (chlorine, phosgene) or blister (mustards, Lewisite). These weapons kill by destruction or disruption. The infamous “gases” of World War I—chlorine, phosgene and mustard gas essentially burn away parts of the respiratory system. More modern nerve gases—Tabun, Sarin, Soman and VX—disrupt the chemical processes through which one nerve cell communicates with another. When a nerve agent is introduced into a system, it reacts with and ties up the acetylcholinesterase and permits the accumulation of acetylcholine, which results in continuous muscle stimulation. Death occurs when the heart and lungs stop receiving instructions to beat and breathe.

Chemical agents are generally liquid when containerized but are disseminated as an aerosol or gas. To be effective, chemical agents must be dispersed in sufficient quantity to cause serious damage. Chemical agents are heavily influenced by weather conditions (temperature, wind speed and direction, humidity and air stability), which make it difficult to achieve sufficient concentrations to be effective in an open-air environment. Unlike biological and radiological weapons, chemical agents are fast acting. Protection from these agents requires full respiratory and skin protection.