

Dirty Bombs or RDDs

Commonly asked questions

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What is a dirty bomb?

A dirty bomb is also known as a “radiological dispersion device,” or RDD. An RDD is a standard explosive device packed with radioactive material. This material scatters in the air when the bomb explodes. These bombs could be suitcase-sized devices or as big as a truck. Radioactive contamination is left in the immediate area of the explosion site, but contamination may also be spread from the site by wind or by people.

How is a dirty bomb different from a nuclear bomb?

A nuclear bomb, like the ones exploded over Hiroshima and Nagasaki, is a vastly more dangerous and complex device than an RDD. A nuclear explosion involves a fission reaction (where atoms are split), generating enormous energy and heat. The radiating energy from a nuclear bomb would cause massive damage and death from the initial blast site and from subsequent radiation.

A dirty bomb is designed to spread radioactive material and contaminate a small area. It does not include the fission products necessary to create a large blast like those seen in Hiroshima and Nagasaki.

What kind of damage would an RDD cause?

An RDD would not be expected to cause much more physical damage than conventional explosives. Although it is difficult to gauge how much radiation might be present after an RDD explodes, the radiation levels likely would have limited health impacts.

The typical radiation dose from a dirty bomb would be relatively small. Most people receive 0.3-0.4 rem (a unit for measuring radiation dose) per year from natural sources. This is about the same amount that the most potent RDD would be expected to deliver to people within a half-mile radius of the blast site.

Depending on the sophistication of the bomb, wind conditions, and how quickly the area of the explosion is evacuated, a dirty bomb explosion might not result in many more deaths or injuries than a conventional bomb explosion. The radioactive particles from an exploded RDD would settle on buildings, sidewalks, and elsewhere up to several city blocks, and could require many years of disruption to the city while the area is being decontaminated. Cleanup of the contamination could be costly, possibly running into the millions of dollars.

What are the effects of RDD radiation?

If people are not able to evacuate an area or shelter in place, they will be exposed to radioactive material in the dust inhaled during the initial passage of the radiation cloud. If the material is inhaled, ingested or absorbed through the skin, it will stay in the body and lead to long term exposure.

Anyone living in the affected area will be exposed to material deposited from the dust that settles from the cloud. Residents will be continuously exposed to radiation from dust that contains gamma emitters because they are so penetrating. If the material contains alpha or beta emitters, then dust that is pulled off the ground and into the air by wind, automobile movement, or other actions will continue to be inhaled and add to the exposure.

Adverse health consequences of exposure may not be evident for many years. Exposure to lower doses of radiation may lead to an increased risk of developing cancer or other adverse health effects (leukemia, bone cancer, thyroid cancer, lung cancer cataracts, or shortened life span). Existing medical technology is still the best way to screen for cancer in people who may be at increased risk due to radiation exposure.

Like exposure to the sun, radiation exposure is cumulative. Radioactive particles that enter the body through the mouth or the skin continually expose the body to radiation internally.

Children are more sensitive to radiation than adults. Radiation exposure to the unborn child is of special concern because the human embryo or fetus is extremely sensitive to radiation.

Acute radiation syndrome (ARS), or radiation sickness, is usually caused when a person receives a high dose of radiation to the much of the body in a matter of minutes. ARS is unlikely to occur to anyone in the event of a dirty bomb explosion.

How much expertise does it take to make a dirty bomb?

The level of expertise required to make a dirty bomb would be similar to making a conventional bomb. No special assembly is required; the regular explosive would simply disperse the radioactive material packed into the bomb. The hard part is acquiring the radioactive material, not building the bomb.

How does this material get into the wrong hands?

Radioactive materials have many everyday uses in medicine, research and industry. A significant amount of these materials have been lost or stolen from US facilities during the past few years. In the US, sources have been found abandoned in scrap yards, vehicles and residential buildings.

Has an RDD ever been detonated?

In 1995, rebels from Chechnya planted, but did not detonate, an RDD device in Moscow's Izmailovo park. This dirty bomb consisted of dynamite and one of the highly radioactive byproducts of nuclear fission – Cesium 137, taken from cancer treatment equipment. Reporters were tipped off to its location, and it was diffused.

What do I do if a dirty bomb is detonated?

If you are inside a building near the site of the explosion, do not evacuate unless told to do so. You should “shelter in place,” which means remaining inside, shutting windows and outside doors, and turning off ventilation systems. People who are outside when an explosion occurs are advised to quickly move away from the immediate area to avoid inhaling radioactive materials, and then find shelter at least several blocks from the explosion. The affected area will be cordoned off. People should tune in to local radio or TV broadcasts for instructions from emergency officials.

Emergency response officials will arrange medical treatment for those injured by the blast, decontamination those who were contaminated, the evacuation people from the area, and the assessment of any internal or external exposures.

For more information, visit these websites:

<http://www.cdc.gov/nceh/radiation/db.htm>

<http://www.cdc.gov/nceh/radiation/response.htm>

<http://www.doh.wa.gov/ehp/rp/air/index.htm>

<http://www.fas.org>