



Federal Occupational Health Service

Information on Emergency Response to Radiation Exposure Including Use of Potassium Iodide (KI)

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The heightened security alerts across the country have many people concerned about potential attacks using radioactive materials and many agencies have requested information on responding to such events, including the potential use of Potassium Iodide (KI). The following information, excerpted from the Centers for Disease Control and Prevention (CDC), has been gathered to address these concerns.

Potential adverse health consequences from a terrorist radiological attack

The adverse health consequences of a terrorist attack using radioactive material will vary according to the type of attack, the distance a person is from the attack and length of exposure to any radiation. Potential terrorist attacks using radioactive material may include small, conventional explosives containing radioactive material ("dirty bomb"), which would have a limited range of impact, larger crude nuclear explosive devices that would involve a wider area of impact, or a nuclear power plant explosion. Adverse health effects from exposure to radiation range from mild effects, such as skin reddening, to serious effects such as cancer and death. Some adverse health consequences of exposure may not be seen for many years.

What to do to protect yourself from a terrorist radiological attack

In the event of a terrorist radiological attack, a national emergency-response plan would be activated and would include federal, state, and local agencies. You should seek shelter in a stable building and listen to local radio or television stations for national emergency alert information. Your local emergency response organizations, police agencies, and public health facilities may be able to supply you with additional information. ***You should follow the protective action recommendations that are made by your state or local health department in accordance with this plan.*** As a general rule, you can reduce the potential exposure and subsequent health consequences by limiting your time near the radiation source, increasing your distance from the source, or keeping a physical barrier (such as the wall of a building) between you and the source. In some cases, it may be safer to remain inside a building rather than to go outside.

What to do if there is an attack on a nuclear power plant near your work or home

A terrorist attack on a nuclear power plant will initiate a national emergency response that has been carefully planned and rehearsed by local, state, and federal agencies for more than 20 years. ***If you live or work near a nuclear power plant and you have not received information that describes the emergency plan for that facility, you can contact the plant and ask for a copy of that information.*** Other local emergency response organizations, police, and public health facilities have been actively involved in this emergency plan, and may also be able to supply you with additional information. Your agency **and** your family should study these plans and be prepared to follow the instructions that local and state public health officials provide in the event of a terrorist incident involving the nuclear power plant near you.

Dirty bombs

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. This could possibly cause buildings and people to be exposed to radioactive material. The main purpose of a dirty bomb is to frighten people and make buildings or land unusable for a long period of time. Dirty bombs are often characterized as "weapons of mass disruption" rather than "weapons of mass destruction." There has been a lot of speculation about where terrorists could get radioactive material to place in a dirty bomb. The most harmful radioactive materials are found in nuclear power plants and nuclear weapons sites. However, increased security at these facilities makes obtaining materials from them more difficult. Because of the danger and difficulty in obtaining high-level radioactive materials, there is a greater chance that the radioactive materials used in a dirty bomb would come from low-level radioactive sources, which are found in hospitals, on construction sites, and at food irradiation plants.

Dangers of a dirty bomb

If low-level radioactive sources were to be used, the primary danger from a dirty bomb would be the conventional explosive blast itself. Gauging how much radiation might be present is difficult when the source of the radiation is unknown. However, **at the levels created by most probable sources, not enough radiation would be present in a dirty bomb to cause severe illness from exposure to radiation.** Keep televisions or radios tuned to local news networks. If radioactive materials were released, people will be told where to report for radiation monitoring and blood tests to determine whether they were exposed to the radiation as well as what steps to take to protect their health.

Potassium iodide (KI)

KI is a salt of iodine and has been approved by the Food and Drug Administration (FDA) as a nonprescription drug for use as a "blocking agent" to prevent the human thyroid gland from absorbing radioactive iodine by saturating the thyroid gland with normal iodine. Studies from the Chernobyl disaster show that KI reduces the risk of thyroid cancer, especially in children, after an exposure to radioactive iodine. **KI will only protect the thyroid gland from radioactive iodine. It does not reduce the risk from other effects of radiation on the body and it will not protect a person from other sources of radiation other than radioiodine.**

When to take KI

Local emergency management officials will tell people when to take KI. If a nuclear incident occurs, officials will have to find out which radioactive substances are present before recommending that people take KI. In order to be most effective, KI must be taken prior to exposure (for example, if people hear that a radioactive cloud is coming their way) or immediately after exposure (within 3-4 hours). Since there is no way to know at the time of an incident whether radioactive iodine was used in a dirty bomb type of explosive device, taking KI may not be beneficial in these type situations.

Who should or should not take KI when the public is told to do so

Children are the most susceptible to the dangerous effects of radioactive iodine. The FDA and the World Health Organization (WHO) recommend that children from newborn to 18 years of age all take KI unless they have a known allergy to iodine. Young adults between the ages of 18 and 40 have a smaller chance of developing thyroid cancer or thyroid disease from exposure to radioactive iodine than do children. However, the FDA still recommends that people ages 18 to 40, including pregnant and breast-feeding women, take the recommended dose of KI. **KI however can be dangerous to some people, especially those with thyroid disease or allergies to iodide and shellfish. Adults over the age of 40 have the smallest chance of developing thyroid cancer or thyroid disease after an exposure to radioactive iodine, but they have a greater chance of having an allergic reaction to the high dose of iodine in KI.** Because of this, they are **not recommended** to take KI unless a very large dose of radioactive iodine is expected, such as from a nuclear bomb or nuclear power plant explosion. People should consult their doctor if they are unsure whether or not to take KI.

Recommendations for Federal agencies

Because the benefits to most adults of KI are limited to protection against high dose exposures to radioactive iodine only, FOH does not recommend that federal agencies purchase or distribute KI tablets to all their employees. We urge that safety and health officers contact their state or local emergency agencies and follow their recommendations, especially if they are located within a 10-15 mile radius of a nuclear power plant. These recommendations by definition and necessity will vary. If some employees are still very concerned, KI can be purchased as a non-prescription item, but individuals should consult their personal physician for guidance on correct dosage, important precautions and possible side effects.

Additional resources

More detailed information about the health effects of radiation and emergency response is available from the following agencies/websites:

The Centers for Disease Control and Prevention at <http://www.cdc.gov/nceh/radiation/response.htm>

The Nuclear Regulatory Commission at <http://www.nrc.gov/>

The Environmental Protection Agency at <http://www.epa.gov/radiation/>

The Federal Emergency Management Agency at <http://www.fema.gov/hazards/nuclear/radiolof.shtm>.

The FDA recommendations on KI are available at <http://www.fda.gov/cder/guidance/4825fnl.htm>.