

## **IMMEDIATE ACTION: SHELTER, THEN EVACUATE**

These instructions may feel like they go against your natural instinct to evacuate from a dangerous area. However, if you become stuck in traffic, a car will not provide adequate protection from radiation produced by a nuclear detonation.

Radiation levels are extremely dangerous immediately after a nuclear detonation, but the levels reduce rapidly, in just hours to a few days. This is when it will be safest to leave your shelter and participate in an orderly evacuation.

Health risks from radiation exposure can be greatly reduced by reducing the **TIME** you are exposed, increasing your **DISTANCE** from the radioactive source, and having dense, thick **SHIELDING** materials between you and the source:

During the time with the highest radiation levels, it is safest to stay inside, sheltered away from the radioactive material outside.

Put brick or concrete walls, or soil, between you and the radioactive material outside.

Increase the distance between you and the exterior walls, roofs and ground, where radioactive material is settling.

If there is a nuclear explosion in the metropolitan area, you can greatly increase your chance of survival by quickly taking the following steps.

### **Go deep inside:**

In case of a radiological emergency, the safest place is a centrally-located room or basement with as few windows or doors as possible (CDPH, 2011).

Find the nearest building, preferably built of brick or concrete, and go inside to avoid any radioactive material outside.

If better shelter, such as a multi-story building or basement can be reached within a few minutes, go there immediately.

Basements, which generally are rated with a “Protection Factor” (PF) of 10, will reduce the dose to one tenth of the outside dose (Reduced Dose = Outside Dose/PF). A PF of 10 is considered adequate protection (Buddemeier et al., 2009).

A single family wood frame house without a basement has a PF of 3, which will reduce the dose to one third of the outside dose. This is still better than being directly exposed outside; any protection, however temporary, is better than none at all (FEMA, 2011).

If you are in a car, find a building for shelter immediately. Cars do not provide adequate protection from radiation from a nuclear detonation (cars have a PF of 3 or less). But it

is still better than being directly exposed outside; any protection, however temporary, is better than none at all (FEMA, 2011). If you must remain in a car, keep the windows and vents closed.

Go to the basement or the center of the middle floors of a multi-story building.

Flat roofs collect fallout particles so the top floor is not a good choice, nor is a floor adjacent to a neighboring flat roof (FEMA, 2011). For example, the center of the 5th floor of a 10 story building, or the 10th to 20th floors of a 30 story building, have the highest radiation Protection Factors.

Cover your mouth and nose with a face mask or other material (such as a scarf or handkerchief) until the fallout cloud has passed (CDC, 2011).

In general, to reduce total radiation exposure, the longer you can wait in safety, the lower the amount of radiation you will receive. Everyone needs to be inside a shelter during the first hour following the detonation, when the levels of radiation are at their most dangerous (CBUPMC, 2011).

In general, do not come out until you are instructed to do so by authorities or emergency responders. However, if you know that you are in a poor shelter, and you know that there's a better shelter nearby, wait at least 1 hour before moving. Potential radiation exposure decreases by 55% in the first hour following a detonation. If you move to a different shelter, minimize the time outside (CBUPMC, 2011).

Does a building have to be airtight to keep out fallout? No. Federal guidance has stated that buildings do not have to be airtight to protect against fallout and that broken windows will not greatly reduce the protection offered by a shelter. Nonetheless, you can take steps to "harden" buildings to prevent airborne hazards such as fallout from entering buildings (CBUPMC, 2011).

Turn off the heater or air conditioner. (In-room fans that only recirculate air can still be used, as can heating or air-conditioning systems that do not bring in air from the outside (CBUPMC, 2011).) Make sure the fireplace damper, all ventilation fans, and other air intakes are closed. Seal doors or windows until the fallout cloud has passed. However, after the fallout cloud has passed, unseal the doors and windows to allow some air circulation, if needed (CDC, 2011).

### **Stay inside:**

Do not come out until you are instructed to do so by authorities or emergency responders.

If you are in a good shelter, plan on staying inside a minimum of 1 day and then wait for instructions from authorities about when to come out. By the end of the first day following a nuclear detonation, potential radiation exposure decreases by 80% (CBUPMC, 2011).

Should I go get my children from school after a nuclear detonation? No. Unless you are told to do so, do not try to get to the school to bring your children home. Taking them from the school will put them and you at increased risk (CBUPMC, 2011; CDPH, 2011).

It's safest for your children immediately to go deep inside their school and stay there to avoid fallout radiation. You put both your children's and your own safety at risk by being outdoors or in cars during the time when radiation levels are at their highest. Your kids need you healthy (CBUPMC, 2011).

All schools and daycare facilities should be locked down. Adults and children in those facilities should take the same protective actions you are taking – and they should not be released to go outside for any reason until they are instructed to do so by emergency responders. If your children are at school, they will be sheltered there. Find out ahead of time what the school's plans are for a nuclear detonation (CBUPMC, 2011).

When you leave the shelter, follow instructions from local officials to avoid any harmful materials outside (CDPH, 2011).

If telephones are working, do not use the telephone unless you have a life-threatening condition to keep lines free for emergency responders (NJDHSSb, 2011).

If you must go outside, cover your nose and mouth with a dry cloth or handkerchief and avoid stirring up or breathing in dust as much as possible. (CDC, 2011; NYCDHMH, 2011).

While some experts also recommend using a damp cloth, wet material could actually enhance the amount of inhaled particles. For example, cesium chloride, which is often associated with a dirty bomb, is water soluble, and so a wet cloth could concentrate the radioactivity. It could also cause labored breathing, and there may be leakage around the edges of the damp cloth (Musolino and Harper, 2006)

Inhaling fallout is not a significant source of exposure to the predominant forms of radiation in fallout, which is the gamma and beta radiation that settles on surfaces after the detonation. That said, if you have a mask or want to cover your face with a cloth, it is a sensible thing to do. However, make sure the mask is definitely free of radioactive dust, so you do not accidentally increase your exposure even more (CBUPMC, 2011).

**Stay tuned to television and radio broadcasts for important updates about rapidly changing radiation levels:**

Listen to the local radio or television for information and advice. If your facility has a National Oceanic and Atmospheric Administration (NOAA) Weather Radio, this is a good source of information. If you have been instructed to stay inside, stay tuned because these instructions will change: authorities may direct you to stay in your shelter or evacuate to a safer place away from the area (CDC, 2011).

Radiation levels are extremely dangerous after a nuclear detonation but the levels reduce rapidly, in just hours to a few days:

More than half (55%) of the potential exposure to fallout occurs in the first hour, and 80% occurs within the first day. (CBUPMC, 2011)

Radiation levels fall to one tenth within 7 hours after detonation, one-hundredth within 2 days, and one thousandth within 2 weeks. These lower levels may still be too high to remain, but make it safer to leave your shelter and evacuate (FEMA, 1985).

During the time with the highest radiation levels it is safest to stay inside, sheltered away from the radioactive material outside.

When evacuating is in your best interest, you will be instructed to do so.

### **If you are advised to evacuate**

Listen to the radio or television for information about evacuation routes, temporary shelters, and procedures to follow.

Before you leave, close and lock windows and doors and turn off air conditioning, vents, fans, and furnace. Close fireplace dampers.

Take disaster supplies with you (such as a flashlight and extra batteries, battery-operated or hand-crank radio, first aid kit and manual, emergency food and water, non-electric can opener, essential medicines, cash and credit cards, and sturdy shoes).

Remember your neighbors may require special assistance, especially infants, elderly people, and people with disabilities (CDC, 2011).