A FEW MINUTES OF RADIATION TRAINING

Today's first responders are very busy with various responsibilities. Responding to a radiation emergency is just only one of them. They may face radiation incidents which may include nuclear bomb, dirty bomb, mishap at a nuclear reactor (e.g., Chernobyl, Ukraine) and a mishandling of a radiation source (e.g., Goiania, Brazil). Detailed information on this complex matter is in references cited on www.jplabs.com.

Basic information: Avoid unnecessary exposure to ionizing radiation (e.g., gamma or X-rays); in large enough amounts they can cause cancer, injuries and death. Diagnostic dosages (chest X-rays = ~0.05 rad/0.5mSv and CT scan = ~1 rad/10 mSv) are considered acceptable risks (except for fetus and children). Public is advised to limit their exposure to 5 rad/50 mSv per year and 25 rad/250 mSv for lifetime and emergency workers to 50 rad/500 mSv. There are no symptoms or medical treatment below ~50 rad/500 mSv exposure. Contact an emergency room if exposed to dosages higher than 50 rad/500 mSv. Depending upon the dose and the dose period, nausea, vomiting and hair loss are usually the early symptoms after receiving radiation doses above 100 rad/1,000 mSv. If you are contaminated go to the nearest place and take a shower.

Nuclear bomb explosion: If you hear a huge explosion and see an extremely bright flash, drop and cover yourself for a few minutes. Keep eyes closed. Dangerous level of radioactive materials can fall (fallout) over a few tens of square miles. The fallout from the explosion looks like sand, ash or grit. Fallout loses 90% of its radioactivity every 7 hours, 99% in 2 days and 99.9% in 2 weeks, so stay indoors far from outside and behind heavy materials.

Dirty bomb/RDD: The major objectives of a radiological dispersion device (**RDD**) are to cause panic, worry and mass disruption. The radioactivity of the barely noticeable fallout is likely to be very low and limited to a few miles. While the area may be deemed unlivable, barely a few people may get doses higher than 5 rad/50 mSv. There is no need to panic.

Accident at a nuclear power plant/reactor: If it is a minor radiation leakage, it is extremely unlikely you will receive a harmful dose. If the accident is major/serious, e.g., a meltdown (as that of Chernobyl nuclear reactor, Ukraine), the dose could be fatal (>1,000 rad/10,000 mSv) for those who are near the reactor. Remain behind a thick object/wall or basement. Wait for instructions from the authority/government.

Improper handling of radiation sources: You will learn about these types of incidents (e.g., that of Goiania, Brazil) only after a handler is seriously injured. Once the incident becomes known, do not go near the affected area unless permitted by the authority. If you had been near the incident for a prolonged time, contact the authority. In case of a mishap with a X-ray or radiation therapy type machine, only the operator or patient may get over-exposed.

To minimize panic & worry purchase a radiation dosimeter: It is less likely that a radiation incident will occur and you will receive a dose higher 5 rad/50 mSv. However, you cannot know how much dose you have received without a personal dosimeter. Accidents due to panic can cause more injuries and deaths than exposure to radiation. Therefore, to minimize panic and worry, carry a suitable dosimeter, they are compared at http://www.jplabs.com/dosimeters comparison.pdf .