



## Radiation Fact Sheet

### ***What is Radiation?***

Radiation is a type of energy moving in the form of particles or waves. Ionizing radiation is energy emitted from unstable atoms.

We are immersed in a constant sea of radiation:

- Cosmic from the sun
- Terrestrial from the earth
- Medical diagnosis and procedures
- Consumer products (watches, televisions, food, smoke detectors, airline travel)
- Atomic weapons fallout (negligible in recent years)
- Commercial nuclear power plants (2/1000 of cosmic dose at 1-mile)

### ***Exposure vs. Contamination***

**Exposure** – Radiation waves or particles penetrate the body.

If someone is exposed to external radiation:

- Do not become radioactive
- Pose no hazard to nearby individuals
- Do not become contaminated

**Contamination** – Unwanted radioactive material in or on the body, or spread about the environment (radioactive material in unwanted places).

If someone is externally contaminated, they can spread contamination:

- About 80% can be removed by taking of clothing
- Most remaining contamination can be removed by gently washing skin and hair

**Internal Contamination** – Can result from inhalation, ingestion, absorption, puncture or open wound.

Internally contaminated persons present a minimal risk to responders, but are usually externally contaminated as well.



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### ***Biological and Health Effects***

#### **Acute and Chronic Radiation Doses**

- Acute Radiation Dose – a large dose received in a short period of time (minutes, hours, days)
  - Overwhelming damage; cells may die before repair can occur
- Chronic Radiation Dose – a small dose received over a long period of time (months, years)
  - Less damage; fewer number of cells needing repair

#### **How Radiation Affects the Body**

- Genetic effects (no proven cases)
- Cancer (slight risk compared to natural occurrences)
- Embryo (can be damaged by high doses)

#### **Damage to Cells Exposed to Radiation – Cells can react in four possible ways**

- May pass through the cell without doing damage
- May damage the cell, but the cell may be able to repair the damage before producing new cells
- May damage the cell in such a way that the damage is passed on when new cells are formed
- Cells may die as a result of the damage

#### **Factors Affecting Biological Damage**

- Total Dose – the greater and longer the dose, the greater damage
- Gender – females are more susceptible
- Age – developing embryo/fetus, young children and the elderly more susceptible
- Organs Irradiated – sensitive organs including the intestinal tract, blood, hair follicles, reproductive organs

### ***How to Reduce Exposure***

#### **ALARA – As Low As Reasonably Achievable**

- **Time** – Decrease the time spent near the radioactive source
- **Distance** – Increase the distance between you and the radioactive source
- **Shielding** – Increase the physical shielding between you and the radioactive source