DELAWARE HEALTH AND SOCIAL SERVICES
Division of Public Health

Medical

RADIATION FROM URANIUM (U)

Agent information: Uranium radioisotopes (U-238 and U-235) are a class of highly toxic and unstable (radioactive) atoms that give off radiation as they decay. Uranium radioisotopes primarily emit ionizing radiation in the form of alpha particles. This ionizing radiation disrupts molecules in cells and deposits energy in tissues, causing damage. A naturally occurring radioisotope, uranium, is enriched to fuel nuclear power reactors and for use in some nuclear weapons.

Route of exposure: Because uranium decays by alpha particles, external exposure to uranium is not as dangerous as exposure to other radioactive elements because the skin will block the alpha particles. Inhalation and ingestion are the most likely routes for internal contamination from uranium radioisotopes. Ingestion of high concentrations of uranium can cause severe health effects, such as cancer of the bone or liver. Inhaling large concentrations of uranium can cause lung cancer from the exposure to alpha particles. Uranium is also a toxic chemical, meaning that ingesting uranium can cause kidney damage from its chemical properties much sooner than its radioactive properties would cause cancers of the bone or liver.

Signs and symptoms: Long-term risks, including increased cancer risk, are a function of the specific radioisotopes involved, and the route, magnitude, and duration of exposure.

Protective measures: Emergency medical care to save lives is the first priority. Effective patient decontamination is important to limit the spread of radioactive materials in the hospital and prevent exposure to other patients and staff. Dose reduction can be achieved by limiting the time people are exposed, avoiding direct contact, maintaining distance from the source, and using shielding. If airborne uranium is present, use respiratory protection. Deceased victims from a radiological event involving release of airborne uranium radioisotopes could be contaminated both internally and externally and should be handled using reverse isolation.

Lab samples requested for evaluation: CBC with absolute lymphocyte count. Repeat measurements for at least 48 hours.

Prophylaxis: Appropriate Personal Protective Equipment (PPE) to avoid secondary contamination.

Treatment: Supportive care and decontamination. Treatment is indicated for known uptake of uranium radioisotopes, by administering sodium bicarbonate in saline, or oral tablets until urine reaches a pH of eight to nine, to reduce risk of acute renal tubular necrosis. Expert guidance on medical treatment is available from REAC/TS at: 1-865-576-1005 (24/7 coverage).

Reporting: Immediately report suspect cases to the Division of Public Health, 1-888-295-5156 (24/7 coverage).

Additional information: Visit the Centers for Disease Control and Prevention website: https://www.cdc.gov/nceh/radiation/emergencies/isotopes/uranium/index.htm.