

Radiological Emergencies: OPC First Receiver Patient Care Toolkit

Acute Radiation Syndrome

- This resource supports hospital-based health care providers in caring for patients who may have been exposed to radiation (i.e. irradiated).
- Radiation exposure alone is not a medical emergency. Prioritize medical stabilization of the patient and the treatment of trauma, burns and other injuries.
- Irradiated patients do not pose a contamination risk to staff.
- Irradiated patients may be at risk complications of radiation exposure, including Acute Radiation Syndrome (ARS) and Cutaneous Radiation Injury (CRI).

Personal Protective Equipment (PPE)

- No special radiation-specific PPE is required.
- Use standard (universal) precautions as clinically indicated (gloves, gown, mask, eye protection).

Decontamination

- Decontamination is not required for patients who are irradiated but not contaminated.
- If there is concern for radioactive contamination (i.e. radioactive material is on the skin or clothes, or may have been inhaled), refer to institutional guidelines, or to the OPC's Decontamination of the Contaminated Patient.

Patient Assessment

A. History

Event details	Symptoms		
<ul style="list-style-type: none"> • Time of exposure • Duration of exposure • Distance from source • Shielding (walls, protective barriers) • Type of event 	GI <ul style="list-style-type: none"> • Nausea • Vomiting (note time of first episode) • Diarrhea • Abdominal pain 	Neuro <ul style="list-style-type: none"> • Confusion • Dizziness • Ataxia • Loss of consciousness 	Skin <ul style="list-style-type: none"> • Localized pain, burning, tingling • Swelling • Redness • Bruising, petechiae

B. Physical exam

General	Abdominal	Neuro	Skin
Vital signs GCS	Vomiting Abdominal tenderness Ileus or diarrhea	Mental status Focal deficits Ataxia, coordination	Erythema Blistering Moist desquamation Petechiae Ecchymosis

C. Laboratory evaluation

Initial bloodwork (*time and date of blood draw are important)	Ongoing monitoring
<ul style="list-style-type: none"> • CBC with differential • Creatinine, electrolytes • Serum amylase • CRP • Urinalysis 	Repeat CBC with differential every 6 hours for at least 24 hours, and continue until at least 48 hours post-exposure (whichever period is longer).



Acute Radiation Syndrome (ARS)

What is Acute Radiation Syndrome?

Acute Radiation Syndrome (ARS) is a clinical illness that occurs after exposure to a high dose of penetrating ionizing radiation over a short period, typically involving most or all of the body.

Pathophysiology

Radiation damage to rapidly dividing cells, particularly bone marrow, GI tract, and neurovascular system.

Severity of illness

Total radiation dose, type of particles, dose rate, and distribution (whole-body vs partial-body exposure)

Consult for additional support

OPC and/or REAC/TS (Radiation Emergency Assistance Center/Training Site), Available 24/7, Emergency contact line: 865-576-1005)

ARS risk assessment and monitoring

- In most clinical situations, the 48-hour absolute lymphocyte count (ALC) trend is the preferred method for estimating radiation dose and assessing ARS risk, as it is more reliable than symptom-based assessment alone.
- Serial CBCs with differential are required and precise documentation of the exact time of each blood draw is essential for accurate interpretation.
- The online REMM tool can be used https://remm.hhs.gov/ars_wbd.htm#ldk_section

In multiple-victim scenarios (i.e. CODE ORANGE), time to onset of vomiting is a useful early clinical triage marker. Earlier vomiting is associated with poorer prognosis. See: <https://remm.hhs.gov/aboutvomiting.htm>

All exposed patients should be monitored for a minimum of 4 hours post-exposure for the development of vomiting or GI symptoms.

Management of suspected ARS

Supportive Care

- IV fluids
- Electrolyte management
- Antiemetics
- Hemodynamic support as required.

Additional advanced therapies (such as early administration of G-CSF (bone marrow growth factor)) should be discussed with a radiation expert. Consult OPC for assistance, or REAC/TS.



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