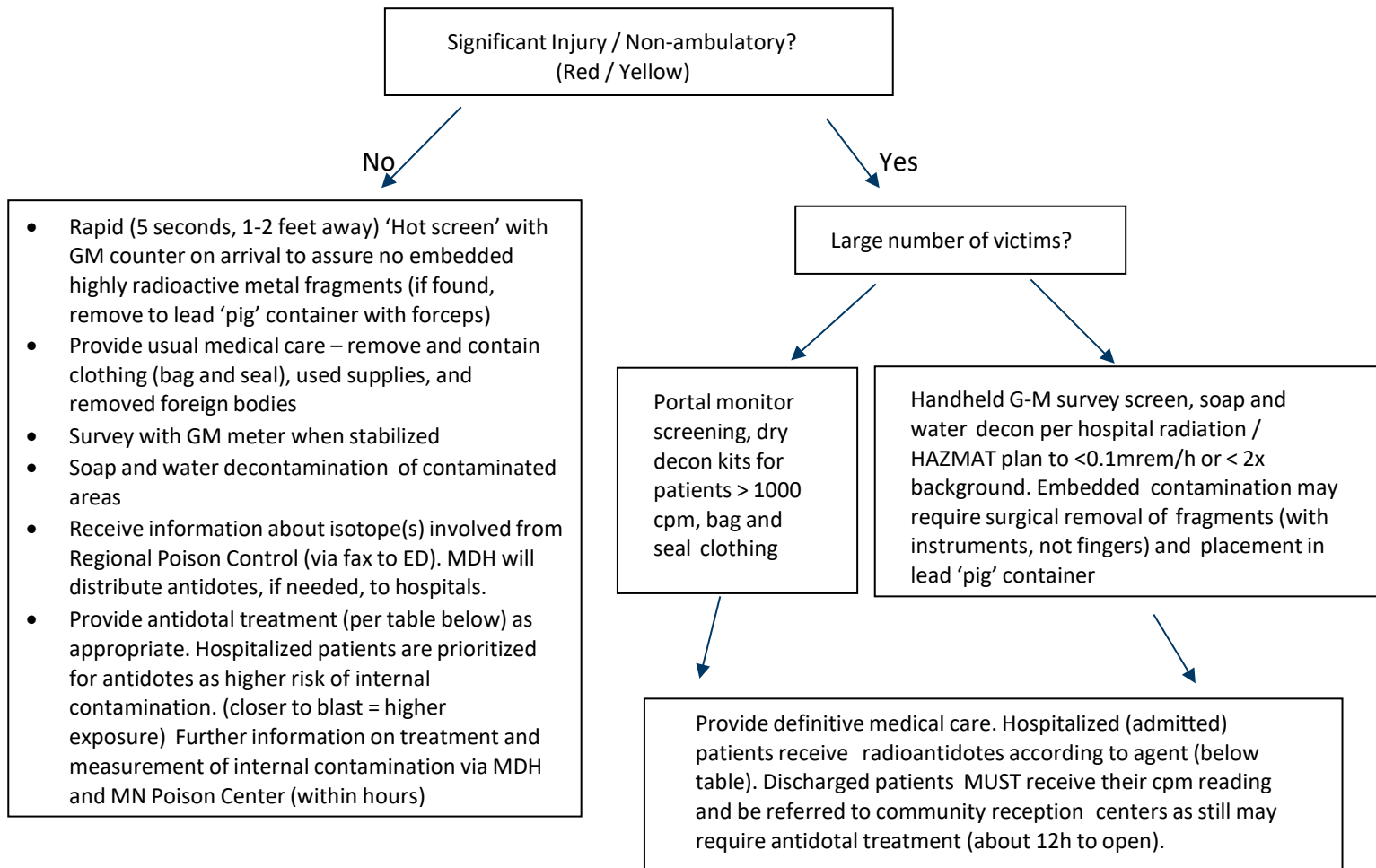


# Radiologic Dispersion Device Injuries – Hospital Triage and Initial Treatment



Isotope	Decay Mode	Radiation Detected			Treatment	Treatment Threshold	Treatment Threshold
		Alpha (α)	Beta (β)	Gamma (γ)			
Americium-241	α	+++	+	+	DTPA	0.01 uCi (1)	Screening Criteria (first priority for penetrating injury, then hospitalized, then exposed / uninjured) Treat all hospitalized, likely treat all with external contamination above waist (i.e. likely inhalation occurred and not contamination resulting from walking in contaminated area)
Californium-252	α (SF, EC)	+++	+/-	+/-	DTPA	0.03 uCi	
Cesium-137	β, IT	-	+	++	Prussian Blue	200 uCi (rough external equivalent about 45-50k cpm)	Treat all hospitalized, then external counts > 25,000cpm if resources available – especially for those with facial / inhaled contaminant
Cobalt-60	β	-	+	+++		N/A	No specific treatment – embedded fragments may be very 'hot'
Iridium-192	β, EC	-	+	++		N/A	No specific treatment
Plutonium-238	α	+++	+	+/-	DTPA	0.02 uCi	See Americium recommendation
Polonium-210	α	+++	-	-	DTPA?, BAL?, DMSA?	0.6 uCi	Assess internal contamination with urine collection and treat accordingly
Radium-226	α	+++	+/-	+/-	Calcium	0.6 uCi	Ca supplements for hospitalized, consider oral Ca for all exposed
Strontium-90	β	-	0.20, 0.94	-	DTPA	20 uCi (approximate external 70k cpm)	Treat all hospitalized, then external contamination > 50,000cpm if resources available – especially for those with facial / inhaled contaminant

## Calcium DTPA Information (abbreviated):

- Intravenous chelator for select isotopes
- Patients should be given Ca-DTPA as soon as the products are available from MDH (will be delivered to the hospital within 1-3 hours)
- For normal, healthy, non-pregnant adults with normal bone marrow and renal function, the recommended dose of Ca-DTPA is 1 gm in 250 mL normal saline or 5% dextrose in water, IV over 1 hour.
- For pregnant patients, Zn-DTPA should be used exclusively, if available (same dose and administration instructions). Otherwise, use Ca-DTPA.
- For children less than 12 years of age, 14 mg/kg, not to exceed 1 g, administered as above.
- For children less than 12 years of age, 14 mg/kg, not to exceed 1 g, administered as above.
- No more than one dose of DTPA per day should be used, and the dose should not be fractionated. Toxicity includes nausea, vomiting, chills, diarrhea, fever, pruritus, and muscle cramps.
- Patients may be switched to Zn-DTPA after the first 24h – watch for further instructions and information from MDH

## Prussian Blue Information (abbreviated):

- Oral ion-exchange drug indicated for decorporation of cesium and thallium.
- Will be obtained from national stockpiles by MDH and delivered to hospitals within 12-24 hours of the event.
- Available from McGuff Compounding Pharmacy, office 877-444-1133, 0700-1730 PacificTime. Fax prescription to 1-877-444-1155.
- Provided as 0.5 gram of Prussian blue in gelatin capsules.
- Usual dose starts at 0.5 g capsule, 2 capsules orally three times per day for up to 3 weeks or longer, as required.
- Children under 2-12 y 1 g po daily
- Doses up to 10-12 g/day for significantly [what would this be?] contaminated adults may be used.
- Feces will turn blue
- Constipation occasional side effect. Minimal other side effects.

## Medical Care Issues and Assumptions:

- Strontium and Cesium treatments are based on the assumption that patients will not inhale a higher quantity of isotope than is present on their bodies. This may NOT be the case if the patient was trapped or immobile in an area with significant radioactive dusts for a prolonged period of time. Also, if contamination is higher than threshold but limited to legs/feet then unlikely. If in doubt, and antidote available, give the antidote and obtain further information from Poison Control or other resources.
- Proximity to the bomb increases the chance of penetrating injury with radiologic contaminated shrapnel, inhalation of radioactive particulate debris, and secondary wound contamination. Majority of injuries are due to blast, and not radiation, though the addition of radiation injury can significantly complicate wound healing and increase overall mortality. Cobalt fragments are particularly likely to result in very 'hot' shrapnel foreign bodies
- Usual trauma care priorities apply until patient is stabilized (though embedded foreign bodies should be handled by surgeons etc. with forceps and transferred if possible, to lead-lined containers available from radiology/nuclear medicine)
- Wounds should be washed and dressed first, then covered, and THEN intact skin and hair decontaminated.
- Soap and water are effective for most decontamination purposes. NO SCRUBBING or ABRAIDING SKIN as this may increase chances of internal contamination.

## RADIOLOGIC DISPERSION DEVICE INJURIES – HOSPITAL TRIAGE AND INITIAL TREATMENT

- Hospital radiation safety officer, radiation oncology, nuclear medicine, and other expert staff will be needed to provide input into secondary contamination clean-up and patient management.
- Acute radiation illness would be highly unusual, however documentation of degree of effect requires:
  - Urine sample on ALL patients prior to antidote administration, admitted patients with alpha-emitting isotope exposure should have 24-hour urine collections started
  - Hospitalized patients should have an absolute lymphocyte count (ALC) sent as soon as resources allow, and extra tubes of blood should be drawn and held for possible further studies.
  - Depending on the degree of radiation exposure, definitive surgeries may need to be performed within the first 48 hours. The 24-hour absolute lymphocyte count can provide triage information to guide these decisions, which should be made with surgery and oncology/hematology staff input.
  - Antidote treatment should be given empirically to the hospitalized injured. Incident-specific guidance may expand or restrict administration after the first 24 hours.
  - Nasal swabs, gamma camera, or stool/urine/blood sample collection may be required to evaluate internal contamination depending on the timing and isotope involved.

Further Information: MN Poison Control System 1-800-222-1222 or <https://www.remm.nlm.gov>

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Minnesota Department of Health

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To obtain this information in a different format, call: ###-###-####.