

# TERRORISM WITH IONIZING RADIATION GENERAL GUIDANCE Pocket Guide

## Confirmation of cases

- Contact radiation safety officer (RSO) for help
- For help in projecting clinical effects, contact
  - nuclear medicine physician
  - Medical Radiological Advisory Team (MRAT) at Armed Forces Radiobiology Research Institute (AFRRI) 301-295-0530
- Obtain complete blood count
  - absolute lymphocyte count <1000 mm<sup>3</sup> suggests moderate exposure
  - absolute lymphocyte count <500 mm<sup>3</sup> suggests severe exposure
  - Acute, short-term rise in neutrophil count
- Swab mucosa (all body orifices – each nostril, both ears, mouth, rectum)
- Collect 24 hour stool if GI contamination considered
- Collect 24 hour urine if contamination considered

## Treatment Considerations

- If trauma is present, treat
- If external radioactive contaminants are present, decontaminate
- If radioiodine (reactor accident) is present, consider giving prophylactic potassium iodide (Lugol's Solution) within 24 hours only (ineffective later)
- Review <http://www.afri.usuhs.mil> or <http://www.orau.gov/reacts/guidance.htm>

## Decontamination Considerations

- Exposure without contamination requires no decontamination (RSO measurement)
- Exposure with contamination requires Universal Precautions, removal of patient clothing, and decontamination with water
- For internal contamination, contact the RSO and/or Nuclear Medicine Physician
- Treating contaminated patients before decontamination may contaminate the facility: plan for decontamination before arrival
- Patient with life-threatening condition: treat, then decontaminate  
Patient with non-life-threatening condition: decontaminate, then treat

## Institutional reporting

- If reasonable suspicion of a radiation event, contact hospital leadership (Chief of Staff, Hospital Director, etc)
- Immediately discuss hospital emergency planning implications

## Public Health Reporting

- Contact local public health office (city, county or State)
- If needed, contact the FBI (for location of nearest office, see <http://www.fbi.gov/contact/fo/info.htm>)

*\* The information in this card is not meant to be complete but to be a quick guide; please consult other references and expert opinion.*

## Diagnosis: Be alert to the following

- Acute radiation syndrome (table 1) follows a predictable pattern after substantial exposure or catastrophic events
- Individuals may become ill from contaminated sources in the community and be identified based on syndromes as specified in table 2 over much longer time periods
- Specific syndromes of concern, especially with a 2-3 week prior history of nausea and vomiting, are
  - thermal burn-like skin effects without documented thermal exposure
  - immunological dysfunction with secondary infections
  - a tendency to bleed (epistaxis, gingival bleeding, petechiae)
  - marrow suppression (neutropenia, lymphopenia, and thrombocytopenia)
  - epilation (hair loss)

## Understanding exposure

- Exposure may be known and recognized or clandestine through
  - large radiation exposures, such as a nuclear bomb or damage to a nuclear power station
  - small radiation source emitting continuous gamma radiation producing group or individual chronic intermittent exposures (such as radiological sources from medical treatment devices or environmental water or food pollution)
- Exposure to RADIATION may result from any one or combination of the following
  - external sources (such as radiation from an uncontrolled nuclear reaction or radioisotope outside the body)
  - skin contamination with radioactive material (“external contamination”)
  - internal radiation from absorbed, inhaled, or ingested radioactive material (“internal contamination”)



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VA access card: <http://www.oqp.med.va.gov/cpg/cpg.htm>  
DoD access card: <http://www.cs.amedd.army.mil/qmo>

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**TABLE 1: ACUTE RADIATION SYNDROME**

Whole body radiation from external radiation or internal absorption							
Phase of Syndrome	Feature	Subclinical range		Sublethal range		Lethal range	
		0-100 rad (cGy)	100-200 rad (cGy)	200-600 rad (cGy)	600-800 rad (cGy)	600-3000 rad (cGy)	>3000 rad (cGy)
<b>Initial or prodromal</b>	Nausea, vomiting	none	5-50%	50 - 100%	75-100%	90-100%	100%
	Time of onset		3-6 hrs	2-4hrs	1-2 hrs	<1 hr	<1 hr
	Duration		<24 hrs	<24 hrs	<48 hrs	<48 hrs	<48 hrs
	Lymphocyte count			< 1000 at 24 h	< 500 at 24h		
	CNS function	No impairment	No impairment	Routine task performance Cognitive impairment for 6-20 hrs	Simple and routine task performance Cognitive impairment for >24 hrs	Progressive incapacitation	
<b>Latent</b>	Duration	> 2 wks	7-15 days	0-7 days	0-2 days	None	
<b>"Manifest illness" (obvious illness)</b>	Signs and symptoms	none	Moderate leukopenia	Severe leukopenia, purpura, hemorrhage Pneumonia Hair loss after 300 rad (cGy)		Diarrhea Fever Electrolyte disturbance	Convulsions, ataxia, tremor, lethargy
	Time of onset		> 2 wks	2 days - 2 wks		2-3 days	
	Critical period		none	4-6 wks		5-14 days	1-48 hrs
	Organ system	none		Hematopoietic and respiratory (mucosal) systems		GI tract Mucosal systems	CNS
<b>Hospitalization</b>	%	0	<5%	90%	100%	100%	100%
	Duration		45-60 days	60-90 days	90+ days	2 weeks	2 days
<b>Fatality</b>		0%	0%	0-80%	90-100%	90-100%	
<b>Time to death</b>				3 wks - 3 months		1-2 wks	1-2 days

**TABLE 2: INTERMITTENT/CHRONIC EXPOSURE AND EFFECTS**

Headache	1°, 2°, 3° burns
Fatigue	Epilation
Weakness	Ulceration
Anorexia	Lymphopenia
Nausea	Neutropenia
Vomiting	Thrombocytopenia
Diarrhea	Purpura
	Opportunistic infections