## Confirmation and Sources of Assistance and Support (cont.)

- 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 $mm^3$ suggests moderate exposure
  - absolute lymphocyte count <500 $mm^3$ suggests severe exposure
  - Acute, short-term rise in neutrophil count
- Swab both nostrils
- Collect 24 hour stool if GI contamination is possible
- Collect 24 hour urine if internal contamination with radionuclides is possible
- CDC ATSDR Hotline 770-488-7100

## Decontamination Considerations

- Exposure to a beam of radiation generally does not contaminate a patient. Patient contamination generally results from contact with radioactive particles.
- Treating contaminated patients before decontamination may contaminate the facility: plan for decontamination before arrival
- Exposure without contamination requires no decontamination (RSO measurement)
- Exposure with contamination requires Standard Precautions, removal of patient clothing, and decontamination with soap and water
- For internal contamination, contact the RSO and/or Nuclear Medicine Physician
- Patient with life-threatening condition: treat, then decontaminate
  Patient with non-life-threatening condition: decontaminate, then treat

## Treatment Considerations

- If life-threatening conditions are present, treat them first
- If external radioactive contaminants are present, decontaminate
- If radioiodine (reactor accident) is present, consider protecting the thyroid gland with prophylactic potassium iodide if within first few hours only (ineffective later). (Table 3)
- Review http://www.afrri.usuhs.mil/www/outreach/pdf/2edmmrchandbook.pdf or http://vaww.oqp.med.va.gov/cpg

## 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/fo.htm)

# TERRORISM WITH IONIZING RADIATION GENERAL GUIDANCE Pocket Guide

## Diagnosis: Be Alert to the Following

- Acute radiation syndrome (table 1) follows a predictable pattern after substantial exposure or catastrophic events
- Victims may also present individually, as described in table 2, over a longer period of time after exposure to contaminated sources hidden in the community
- Specific syndromes of concern, especially with a 2-3 week prior history of nausea and vomiting, are
  - thermal burn-like skin lesions without documented heat exposure
  - immunological dysfunction with secondary infections
  - a tendency to bleed (epistaxis, gingival bleeding, petechiae)
  - marrow suppression (neutropenia, lymphonenia, and thrombocytopenia)
  - hair loss

## Understanding Exposure

- Exposure may be known and recognized or clandestine as
  - large radiation exposures, such as a nuclear bomb or catastrophic damage to a nuclear power station
  - small radiation source emitting continuous gamma radiation producing chronic intermittent exposures (such as radiological sources from medical treatment or industrial devices.)
  - skin contamination with radioactive material (“external contamination”)
  - internal radiation from absorbed, inhaled, or ingested radioactive material (“internal contamination”)

## Confirmation and Sources of Assistance and Support

- Contact radiation safety officer (RSO) for help

*Continued on back*

*August 2003*

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

Produced by the Employee Education System for the Office of Public Health and Environmental Hazards, Department of Veterans Affairs.

## TABLE 1: ACUTE RADIATION SYNDROME

*1 Gray (Gy) = 100 rads  1 centiGray (cGy) = 1 rad*

| | Whole body radiation from external radiation or internal absorption | | | | | | |
|---|---|---|---|---|---|---|---|
| **Phase of Syndrome** | Feature | Subclinical range | | Sublethal range | | Lethal range | |
| | | 0 – 100 rad or cGy | 100-200 rad 1-2 Gy | 200-600 rad 2-6 Gy | 600-800 rad 6-8 Gy | 800-3000 rad 8-30 Gy | >3000 rad >30 Gy |
| **Prodromal Phase** | Nausea, vomiting | none | 5-50% | 50 - 100% | 75-100% | 90-100% | 100% |
| | Time of onset | | 3-6 hrs | 2-4 hrs | 1-2 hrs | <1 hr | Minutes |
| | Duration | | <24 hrs | <24 hrs | <48 hrs | <48 hrs | N/A |
| | Lymphocyte count | Unaffected | Minimally decreased | < 1000 at 24 hr | < 500 at 24hr | Decreases within hours | Decreases within hours |
| | CNS function | No impairment | No impairment | Cognitive impairment for 6-20 hrs | Cognitive impairment for >24 hrs | Rapid incapacitation, often after a lucid period of up to several hours | |
| **Latent Phase (subclinical)** | Absence of Symptoms | > 2 wks | 7-15 days | 0-7 days | 0-2 days | None | |
| **Acute Radiation Illness or "Manifest illness" phase** | Signs and symptoms | none | Moderate leukopenia | Severe leukopenia, purpura, hemorrhage Pneumonia Hair loss after 300 rad/3 Gy | | Diarrhea Fever Electrolyte disturbance | Convulsions, Ataxia, Tremor, Lethargy |
| | Time of onset | | > 2 wks | 2 days - 2 wks | | 1-3 days | |
| | Critical period | | none | 4-6 wks - Most potential for effective medical intervention | | 2-14 days | 1-48 hrs |
| | Organ system | none | | Hematopoietic and respiratory (mucosal) systems | | GI tract Mucosal systems | CNS |
| **Hospitali-zation** | % Duration | 0 | <5% 45-60 days | 90% 60-90 days | 100% 90+ days | 100% weeks to months | 100% days to weeks |
| **Mortality** | | None | Minimal | Low with aggressive therapy | High | Very high, significant neurological symptoms indicate lethal dose | |

## TABLE 2: SYMPTOM CLUSTERS AS DELAYED EFFECTS AFTER RADIATION EXPOSURES

| | |
|---|---|
| Headache<br>Fatigue<br>Weakness | Partial and full thickness skin damage<br>Hair loss<br>Ulceration |
| Anorexia<br>Nausea<br>Vomiting<br>Diarrhea | Lymphopenia<br>Neutropenia<br>Thrombopenia<br>Purpura<br>Opportunistic infections |

## TABLE 3: POTASSIUM IODIDE DOSAGES:

*The dose of potassium should be taken once a day until a risk of significant exposure to radioiodines no longer exists **

| Age group | Dosage |
|---|---|
| Infants < 1 month | 16 mg |
| Children 1 months-3 yrs | 32 mg |
| Children 3-18 yrs | 65 mg |
| Adults | 130 mg |

** For information regarding preparation of potassium iodine solution: http://www.fda.gov/cder/drugprepare/kiprep.htm*