Armed Forces Radiobiology Research Institute Biodosimetry Worksheet

(Medical Record of Radiation Dose, Contamination, and Acute Radiation Sickness Response)

Reporting Authority

(person(s) creating this page of the report)

Last Name: _____ First Name: _____ Country of Origin: _____

Unit: _____ Phone: _____ FAX: _____ Email: _____

Location: _____ Date (yymmdd): _____ Time: _____

Casualty

Last Name: _____ First Name: _____ Rank: _____

Country of Origin: _____ Parent Unit: _____ Parent unit location: _____

Parent Unit Phone: _____ Unit Email: _____ Unit FAX: _____ Casualty Location: _____

History of presenting injury (conventional and/or radiation): _____

History of previous radiation exposure: _____

Past medical history (general): _____

Medical Countermeasures (e.g. antiemetic's, transfusion), specify: _____

Administered (when, where, route): _____

Exposure Conditions

Date of exposure (yymmdd): _____ Exposure Location: _____ Time of exposure: _____

Weather conditions (at time of exposure): _____

Describe incident: _____

External Exposure Overview

Body Exposure: ◯ Total ◯ Partial ◯ Uncertain
Shielding confounder: ◯ Yes ◯ No

Contamination Overview

External contamination: ◯ Yes ◯ No
Internal contamination: ◯ Yes ◯ No
Contaminated wound: ◯ Yes ◯ No

If wound(s) are radiation contaminated, provide details: _____

Biodosimetry assays overview	Sampling date, time yymmdd (time)	Estimated time post-exposure (h)	Dose (Gy)	Reference radiation quality and dose rate (Gy/min)
Time onset of vomiting:	_____	_____	____	_____
Lymphocyte counts or depletion kinetics:	_____	_____	____	_____
Urine bioassay:	_____	_____	____	_____
Cytogenetic biodosimetry:	_____	_____	____	_____
Other:	_____	_____	____	_____

ARS Response Category Overview

(maximum grading 0-4: see pages 4-6 for guidance)

N: _____ C: _____ G: _____ H: _____ RC: _____ Days after radiation exposure: _____

Contamination: Dose Assessment

(person(s) creating this page of the report)

Last Name: _____ First Name: _____ Unit: _____

Phone: _____ FAX: _____ Email: _____ Country: _____

Date Dose Assessed (yymmdd): _____ Time dose assessed: _____ Place: _____

Contamination: external/internal

Substance Trademark (if applicable): _____ Solid: ◉ Yes ○ No Comments:

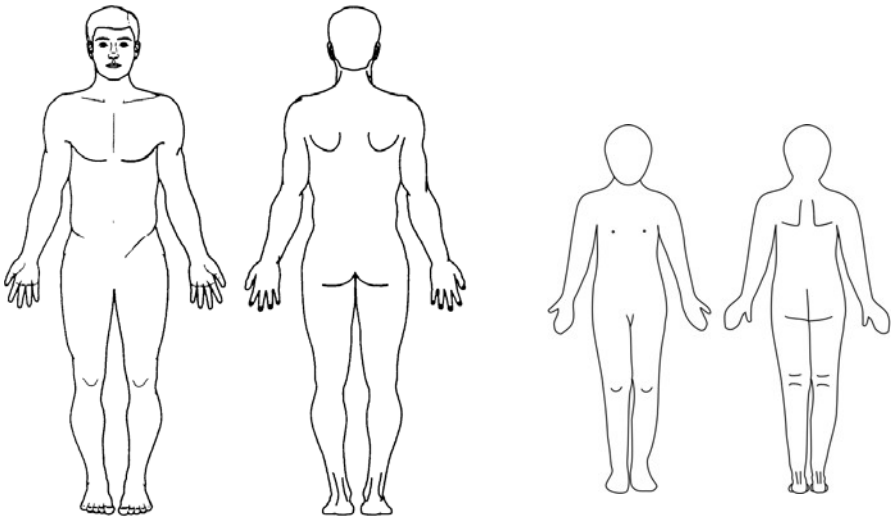
Particulate (P): ◉ Yes ◉ No Gaseous (G): ◉ Yes ◉ No

Liquid (L): ◉ Yes ◉ No Aerosol (L/G): ◉ Yes ◉ No

Radionuclide(s): _____ Aerosol (P/G): ◉ Yes ◉ No

Activity (Bq): _____ Chemical Compounds: _____

Contamination Distribution



Adult **Child**

Route of Intake

(in case of internal contamination)

Inhalation: ◉ Yes ◉ No Ingestion: ◉ Yes ◉ No Other (specify): _____

Cutaneous: ◉ Yes ◉ No Injection: ◉ Yes ◉ No

Contamination Assessment

Contamination Measurement: _____ Detection Device: _____

Counts per minute: _____ Estimated Activity: _____

Decontamination measures: _____ Residual contamination: _____

Measures taken to prevent uptake: _____

Measures taken to increase excretion: _____

External Exposure: Dose Assessment

(person(s) creating this page of report)

Last Name: _____ First Name: _____ Unit: _____

Phone: _____ FAX: _____ Email: _____ Country of origin: _____

Date Dose Assessed (yymmdd): _____ Time dose assessed: _____ Place: _____

Nature of Exposure: radiation source

Alpha (α): ◯ Yes ◯ No Beta (β): ◯ Yes ◯ No Neutron (n): ◯ Yes ◯ No

Gamma (γ): ◯ Yes ◯ No X-ray (x): ◯ Yes ◯ No Mixed (n/γ): ◯ Yes ◯ No

Dose rate (at distance measured from): _____ Distance to source: _____

Activity of source (if known): _____ Duration of exposure: _____

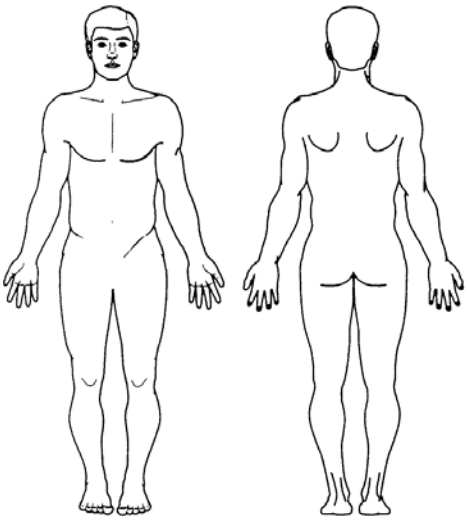
Confounding factors used in dose reconstruction (e.g. shielding): ◯ Yes ◯ No

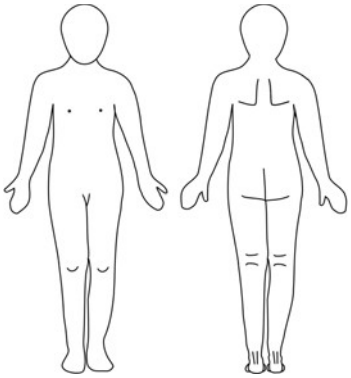
Type of dosimeter (if applicable): _____ Body location of dosimeter: _____

Facility where dosimeter was read: _____ Dosimeter reading: _____

Biological dosimetry type and facility where performed (if applicable): _____

Comments:





	Adult	Child		
Blood chemistry analysis	**First**	**Second**	**Third**	**Fourth**
Data collected (yymmdd):	_____	_____	_____	_____
Time collected:	_____	_____	_____	_____
Data analyzed (yymmdd):	_____	_____	_____	
Time analyzed:	_____	_____	_____	_____
Serum amylase (U/L): (reference value: 21-160 U/L)	_____	_____	_____	_____
Serum C-reactive protein (mg/L): (reference value: ~1 mg.L)	_____	_____	_____	_____
Other: _____	_____	_____	_____	_____

ARS Responses Assessment:

(person(s) creating this page of the report)

Last Name: _____ First Name: _____ Unit: _____ Country of origin: _____

Phone: _____ FAX: _____ Email: _____ Place: _____

Signs and Symptoms

Date assessed (yymmdd):							
Time assessed:							

Neurovascular system **Degree of severity 1 (mild) to 4 (severe); none = 0; see page 6 for degrees of severity**

Nausea:							
Vomiting:							
Headache:							
Anorexia:							
Fever:							
Hypotension:							
Tachycardia:							
Neurological deficits:							
Cognitive deficits:							
Fatigue/weakness:							
Maximum grading N:							

Cutaneous system **Degree of severity 1 (mild) to 4 (severe); none = 0; see page 6 for degrees of severity**

Erythema:							
Priritus (itching):							
Edema:							
Bullae (blisters):							
Desquamation:							
Ulcer or necrosis:							
Hair loss:							
Onycholysis:							
Maximum grading C:							

Gastrointestinal system **Degree of severity 1 (mild) to 4 (severe); none = 0; see page 6 for degrees of severity**

Diarrhea Frequency:							
Consistency:							
Melena (bloody stools:							
Abdominal cramps or pain:							
Maximum grading C:							

Hematopoietic system **Blood cell counts and degree of severity; see page 6 for degrees of severity**

(C=cell count; D=ARS degree)	C D	C D	C D	C D	C D	C D	C D
Lymphocytes (x 10^9 y liter):							
Granulocytes (x 10^9 y liter):							
Neotrophilis (x 10^9 y liter):							
Platelets (x 10^9 y liter):							
Blood Loss:							
Infection:							
Maximum Grading H:							
Response Category (RC) =							
Days after exposure:							

ARS Responses Assessment (continued from page 4)

Date format: yymmdd (time)	ONSET (date/time)	DURATION (hours)	Comments:
Nausea:	_____	_____	
Vomiting:	_____	_____	
Headache:	_____	_____	
Anorexia:	_____	_____	
Fever:	_____	_____	
Hypotension:	_____	_____	
Tachycardia:	_____	_____	
Neurological deficits:	_____	_____	
Cognitive deficits:	_____	_____	
Fatigue/weakness:	_____	_____	
Maximum grading N:	_____	_____	
Erythema:	_____	_____	
Pruritis (itching):	_____	_____	
Edema:	_____	_____	
Bullae (blisters):	_____	_____	
Desquamation:	_____	_____	
Ulcer or necrosis:	_____	_____	
Hair loss:	_____	_____	
Onycholysis:	_____	_____	
Maximum grading C:	_____	_____	
Diarrhea: Frequency:	_____	_____	
Consistency:	_____	_____	
Melena (bloody stools):	_____	_____	
Cramps or pain:	_____	_____	
Maximum grading G:	_____	_____	
Lymphopenia:	_____	_____	
Granulopenia:	_____	_____	
Neutropenia:	_____	_____	
Thrombopenia:	_____	_____	
Blood loss:	_____	_____	
Infection:	_____	_____	
Maximum grading H:	_____	_____	

Adapted from:

1. NATO Standardization Agreement (STANAG 2474). Determination and Recording of Ionizing Radiation Exposure for Medical Purposes. Appendix 1, 2003.
2. Fliedner TM, Friesecke I, Beyrer K, eds. Medical Management of Radiation Accidents: Manual on the Acute Radiation Syndrome. Oxford: British Institute of Radiology; 2001. p. 1-66.
3. Gorin N-C, Fliedner TM, Gourmelon P, *et al*. Consensus conference on European preparedness for haematological and other medical management of mass radiation accidents. Ann Hematol. 2006; 85(10):671-679.
4. Radiation Event Medical Management (REMM). Guidance on Diagnosis & Treatment for Health Care Providers. Accessed 42 Oct 2007, from http://www.remm.gov/ars.htm. *(Link no longer valid)*
5. Waselenko JK, MacVittie TJ, Blakely WF, *et al*. Medical management of the acute radiation syndrome: recommendations of the Strategic National Stockpile Radiation Working Group. Ann Int Med. 2004:140:1037-1051.

APPENDIX

Grading System for Response of Neurovascular, Gastrointestinal, Cutaneous, and Hematopoietic Systems

Neurovascular System

Symptom	Degree 1	Degree 2	Degree 3	Degree 4
Nausea:	Mild	Moderate	Intense	Excruciating
Vomiting:	Occasional (one per d)	Intermittent (2–5 times per d)	Persistent (6–10 times per d)	Refractory (> 10 times per d)
Headache:	Minimal	Moderate	Intense	Excruciating
Anorexia:	Able to eat & drink	Intake decreased	Intake minimal	Parenteral nutrition
Fever:	< 38°C	38–40°C	> 40°C for < 24 h	> 40°C for > 24 h
Hypotension:	Heart rate >100 beats/ m; blood pressure > 100/70 mm Hg	Blood pressure < 100/70 mm Hg	Blood pressure < 90/60 mm Hg: transient	Blood pressure < 80/? mm Hg; persistent
Neurological deficits:	Barely detectable	Easily detectable	Prominent	Life-threatening, loss of consciousness
Cognitive deficits:	Minor loss	Moderate loss	Major impairment	Complete impairment
Fatigue/weakness:	Able to work	Interferes with work or normal activity	Needs assistance for self care	Prevents daily activities

Cutaneous system

Erythema:	Minimal, transient	Moderate (< 10% body surface area)	Marked (10–40% body surface area)	Severe (> 40% body surface area)
Pruritis (itching):	Sensation of itching	Slight and inter- mitten pain	Moderate and persistent pain	Severe and persistent pain
Edema:	Persistent, asymptomatic	Symptomatic, tension	Secondary dysfunction	Total dysfunction
Blistering:	Rare, sterile fluid	Rare, hemorrhage	Bullae, sterile fluid	Bullae, hemorrhage
Desquamation:	Absent	Patchy dry	Patchy moist	Confluent moist
Ulcer or necrosis:	Epidermal only	Dermal	Subcutaneous	Muscle/bone involvement
Hair loss:	Thinning, not striking	Patch, visible	Complete, reversible	Complete, irreversible
Onycholysis:	Absent	Partial	Partial	Complete

Gastrointestinal system

Diarrhea:

Frequency, stools/d:	2–3	4–6	7–9	≥ 10; refractory diarrhea
Consistency:	Bulky	Loose	Very loose	Watery
Melena (bloody stools):	Occult	Intermittent	Persistent	Persistent; large amount
Abdominal cramps/pain:	Minimal	Moderate	Intense	Excruciating

Hematopoietic system

Lymphocyte changes: (reference value, 1.4–3.5 × 10^9 cells/L)	1–2d: ≥ 1.5 3–7d: ≥ 1	1–2d: 1–1.5 3–7d: 0.5–1	1–2d: 0.5–1 3–7d: 0.1–0.5	< 0.5 < 0.1
Granulocyte changes: (reference value, 4–9 × 10^9 cells/L)	1–2d: ≥ 2 3–7d: ≥ 2	1–2d: 4–6; mild 3–7d: ? 2	1–2d: 6–10; moderate 3–7d: ? 5	? 10; marked ? 5
Thrombocyte (platelets) changes: (reference value, 140–400 × 10^9 cells/L)	1–2d: ≥ 100 3–7d: ≥ 100	1–2d: 50–100 3–7d: 50–100	1–2d: 50–100 3–7d: 20–50	50–100 < 20
Blood loss:	Petechiae, easy bruising, normal hemoglobin level	Mild blood loss with < 10% decrease in hemoglobin level	Gross blood loss with 10%–20% decrease in hemoglobin level	Spontaneous bleeding or blood loss with > 20% decrease in hemoglobin level
Infection:	Local, no antibiotic therapy required	Local; only local antibiotic therapy required	Systemic; p.o. antibiotic treatment sufficient	Sepsis; i.v. antibiotics necessary