

# Time/Dose Effects in Acute Radiation Syndrome - Acute Clinical Effects of Single-Dose Exposure of Whole-Body Irradiation

## Symptoms/Signs for Dose Range 1.5 to 3.0 Gy in Free Air

Symptoms/Signs	Hours						Days							Weeks							
	4	8	12	16	20	24	2	3	4	5	6	7	2	3	4	5	6	7			
Nausea							30-70 %														
Vomiting (retching)							20-50 %														
Anorexia							50-90 %														
Diarrhea (cramps)	(a)																				
Fatigue	30-60 %																				
Weakness	30-60 %																				
Hypotension																					
Dizziness																					
Disorientation																					
Bleeding							10% (b)														
Fever							10-50% (c)														
Infection							(d)														
Ulceration																					
Fluid loss/electrolyte imbalance																					
Headache																					
Fainting																					
Prostration																					
Death														≤ 5%							

**Severity Scale**

mild to moderate	moderate to severe
unspecified or mild	moderate
moderate	severe

Colors used to improve visualization only.

**Management and Treatment**

**Performance:**

- o DT:PD from 4 hours until recovery.
- o UT:PD from 6 to 20 hours and from 6 weeks until recovery.

**Hospitalization Percentage/Duration**

- o At 3 to 5 weeks medical care for 10 to 50 percent.
- o Survivors return to duty.

**Therapy**

- o Symptomatic treatment with antiemetics and antibiotics.
- o Hematologic surveillance.

(a) Ten percent of the Marshallese victims exposed to 175 rads (cGy) experienced diarrhea during the first exposure day.

(b) Slight to moderate drop in platelets: from  $3 \times 10^5 / \text{mm}^3$  to  $1.8-0.8 \times 10^5 / \text{mm}^3$

(c) Slight to moderate drop in granulocytes: from  $6 \times 10^3 / \text{mm}^3$  to  $4.5 - 2.0 \times 10^3 / \text{mm}^3$

(d) Slight to moderate drop in lymphocytes: from  $3 \times 10^3 / \text{mm}^3$  to  $2.0 - 1.0 \times 10^3 / \text{mm}^3$ . Susceptibility to opportunistic pathogens.

CI = Combat Ineffective (less than 25% performance)  
 PD = Performance Degraded (25-75% performance)  
 DT = Demanding Task  
 UT = Undemanding Task

Adapted from NATO Handbook on the Medical Aspects of NBC Defensive Operations AMedP-6(B), Chapter 6, General Medical Effects of Nuclear Weapons: Diagnosis, Treatment, and Prognosis, 1 February, 1996.