

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

Symptoms/Signs for Dose Range 5.3 to 8.3 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	[Green hatched bar]						90-100%							60-100% [Green hatched bar]						
Vomiting (retching)	[Green hatched bar]						80-100%							60-100% [Green hatched bar]						
Anorexia	[Green solid bar]						100%							100% [Green solid bar]						
Diarrhea (cramps)	[Green hatched bar]						~10%							60-100% [Green hatched bar]						
Fatigue	90-100%						[Pink hatched bar]							[Pink hatched bar]						
Weakness	90-100%						[Pink hatched bar]							[Pink hatched bar]						
Hypotension																				
Dizziness														60% [Yellow solid bar]						
Disorientation														60% [Yellow solid bar]						
Bleeding							(a) 50-100%							[Orange hatched bar]						
Fever							(b) 60-100%							[Orange hatched bar]						
Infection							(c) 60-100%							[Orange hatched bar]						
Ulceration							(d) 50%							[Orange hatched bar]						
Fluid loss/electrolyte imbalance	[Blue hatched bar]						40%							(e) 30% [Blue solid bar]						
Headache	[Blue hatched bar]						50%							50% [Blue solid bar]						
Fainting														50% [Blue solid bar]						
Prostration														60% [Blue solid bar]						
Death														60-90% [Black solid bar]						

Severity Scale

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

Colors used to improve visualization only.

Management and Treatment

Performance:

- DT:PD from 2 hours to 2 weeks; CI from 3 weeks until death.
- UT:PD from 2 hours to 2 days and from 7 days to 4 weeks; CI from 4 weeks until death.

Hospitalization Percentage/Duration

- At 10 days to 3 weeks: medical care for 50 to 100%.
- At low end range death may occur for more than 30% at 6 weeks
- At high end death may occur for 99% at 3 1/2 weeks.

Therapy

- Blood transfusion, antibiotics, rest, antiemetic treatment
- Some fluid replacement and electrolyte therapy may be required

(a) Severe drop in platelets: from $3 \times 10^5 / \text{mm}^3$ to $0.1 \times 10^5 - 0 / \text{mm}^3$
 (b) Severe drop in granulocytes: from $6 \times 10^3 / \text{mm}^3$ to $0.5 \times 10^3 - 0 / \text{mm}^3$
 (c) Severe drop in lymphocytes: from $3 \times 10^3 / \text{mm}^3$ to $0.4 - 0.1 \times 10^3 / \text{mm}^3$
 (d) Epilation.
 (e) Mild intestinal damage.

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.