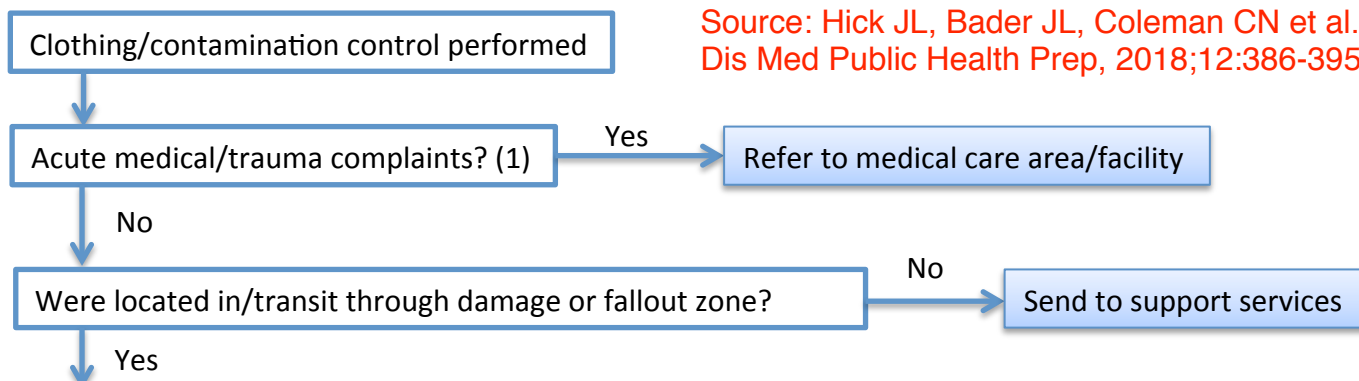


Exposure and Symptom Triage (EAST) Tool to Assess Radiation Exposure after a Nuclear Detonation

Nuclear Detonation Survivor Prioritization for Evacuation / Bone Marrow Cytokines

Source: Hick JL, Bader JL, Coleman CN et al., *Dis Med Public Health Prep*, 2018;12:386-395.



Assess symptoms/data – major predictors listed first (e.g. ALC is best predictor, skin changes unlikely) - base cytokine and evacuation priority on column with **majority or strongest predictive variables** (2)

ARS Severity Prediction	Severe ARS Predicted (>6 Gy)	Moderate ARS Predicted	Mild ARS Predicted (<2 Gy)
ALC/lymphocyte single value estimate (x10 ⁹) (3)	< 0.7 at 24h < 0.4 at 48h	0.7 – 1.1 at 24h 0.4 – 0.9 at 48h	> 1.1 at 24h > 0.9 at 48h
Vomiting onset (4)	Rapid (within 1h) after exposure	Intermediate (1-4h)	Delayed > 4h
Vomiting (per day) (5)	>6 or worsening with time	Moderate 3-6	1-2 or resolved
IMAAC /official 12-24h estimated dose map (6)	>6 Gy (modify to 2-6 Gy if good shelter for 24h)	2-6 Gy (modify to < 2 Gy if good shelter for 24h)	<2 Gy
Location in damage or fallout zone (non-IMAAC map) first 12-24h	In damage or fallout zone with minimal / no sheltering	In damage/fallout zone with good sheltering (e.g. concrete)	Not in damage/fallout zone according to map
Diarrhea (stools / day)	Severe (>6)	Mild / moderate (<6)	None
Headache (7)	Severe, interferes with activities	Mild/moderate	None/minimal
Fever (unexplained)	High/sustained	Low (< 101F) or resolved	None
Skin (beta) burns (8)	Burns / blisters > 3% BSA	Burns/blisters < 3% BSA	None
Match dominant signs/symptoms in column above to suggested triage category in same column below			
GCSF/myeloid cytokine priority (9)	2 – Possible benefit	1 – Most benefit	3 – Unlikely benefit
Evacuation group (10)	2 – Second evacuated	1 – First evacuated	3 - Third evacuated

Complicating Medical Conditions / Vulnerability

(see note 10)

Adjust evacuation priority to a *higher* color (e.g. yellow up to red) if patient has a condition for which local care is not available and that could deteriorate within 48h putting the patient at risk including but not limited to:

- Diabetes
- Dialysis / End Stage Renal Disease
- CHF (Congestive Heart Failure)
- Pregnancy
- Immunosuppression (e.g. AIDS, taking steroids/transplant meds, recent chemo)
- Severe Respiratory Disease (e.g. Asthma, COPD with disability, requiring oxygen, or daily symptoms)
- Vulnerable / at risk in current environment (e.g. pediatric, disability)

Myeloid cytokine (GCSF/other) administration (record dose/time) according to priority/availability (11)

Support – referral to resources for evacuation and basic needs coordination (12)

End notes – turn over

Goal: Initial rapid triage of persons with radiation exposure (no/limited injury) to prioritize them for evacuation/myeloid cytokine administration as not enough capacity in system to provide for all survivors

Setting: Assembly center or screening location in **resource-poor** environment after a nuclear detonation.

Process: Screen patients from highest to lowest precision predictors of ARS and assign priority. This tool is an imprecise guide and should not substitute for expert clinical and radiologic opinion when available. Use of serial ALC values for screening is optimal and should be instituted as soon as blood counts can be performed.

Outcome: One or combination of:

- Triage to acute medical care (depending on situation/severity of condition may have on-site resources to provide care or have to refer to another facility/location)
- Refer to myeloid cytokine administration/other medical support (may be co-located or separate)
- Assign priority for evacuation to area with adequate medical resources
- Refer to shelter/basic needs support

Endnotes:

1. Medical/trauma symptoms that preclude completion of assessment process. Consider oral anti-nausea/anti-diarrhea medications as needed without medical care (MC) referral during and post-assessment. Persons referred to MC may be treated and referred back for assessment or assessed in medical care area/hospital. Combined trauma/radiation injuries should be assessed by physician as worse prognosis when significant combined injury.
2. This tool is ONLY for use in severely resource-constrained environments. In areas with appropriate resources standard assessment tools (BAT, etc.) should be used. (see <https://remm.hhs.gov/newptinteract.htm#skip>)
3. Single values of ALC to predict dose are not precise. Obtain serial values as soon as possible. Use formulas and nomograms even for single values as accuracy is best when the time is precise (see link). Time is start of exposure began (e.g. fallout) NOT detonation (https://remm.hhs.gov/ars_wbd.htm#ldk_section)
4. Vomiting may be due to psychogenic or traumatic effects and time to onset may depend on fallout variables and NOT detonation time. Thus, caution is required when interpreting time to onset.
5. Vomiting can cause irritation of the stomach and other factors that can make the vomiting continue despite a relatively low radiation exposure. Thus, vomiting should be assessed in light of other signs and response to any medical treatment already provided.
6. In damage or dangerous fallout zone during first 12-24 h per IMAAC or other official mapping. Exposure likely significantly less than IMAAC predicted values if good quality (concrete / steel) sheltering for 24h
7. Headaches (HA) can be due to many things including lack of sleep, stress, trauma, and other factors. However, a severe HA in conjunction with other symptoms is likely radiation-related.
8. Radiation related burns occur from direct contact with highly radioactive fallout particles or flash burns from the initial explosion. Absence of skin changes does *not* have predictive value but the presence of skin burns, sloughing, or blistering that is **not** due to thermal burns is a poor prognostic indicator. Estimate 1% body area as the size of the patient's palm.
9. Myeloid cytokines (e.g. GCSF) may not be available in a quantity sufficient for treating all candidates. Priority reflects degree of benefit based on prognosis. Refer to scarce resource triage tool for further information (see https://remm.hhs.gov/triagetool_intro.htm)
10. Evacuation priority is based on prognosis as well as resource demands and assumes that medical care in the area is inadequate. Higher priority for evacuation (e.g. yellow patient moves up to red group) may be assigned if underlying medical conditions could be potentially life-threatening if untreated for > 2d. Vulnerable adults, pregnant women, or children at risk in current environment may also receive higher priority for evacuation. In some cases, experienced providers may *lower* the evacuation priority based on low chance of survival in which case palliative care and scheduled re-evaluation and re-triage should be provided
11. Myeloid cytokine administration may be co-located with other assembly center functions or located at another site. Administration should be tracked – both on a card that remains with the victim and in a retainable/sharable database.
12. Support functions should include re-unification/communication support, shelter and basic needs facilitation, facilitation of evacuation, and provision/referral for mental health and medical services. Some of these may be co-located at the assembly center and others at separate sites.