



APPENDIX 3.5.1.6 RADIATION EMERGENCY SURGE ANNEX

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MARCH 2023

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1. INTRODUCTION

According to the World Health Organization (WHO), radiation emergencies are non-routine situations or events that require prompt action to mitigate a radio-nuclear hazard or its adverse consequences for human life, health, property, or the environment.

Nuclear emergencies involve release of the energy resulting from a nuclear chain reaction or from the decay of the products of chain reaction (e.g., nuclear power plant accidents such as Chernobyl and Fukushima accidents). Radiological emergencies are situations involving a radiation exposure from a radioactive source. When referring to an emergency regardless of its type, “radiation emergency” term is often used.

Radiation emergencies may result from misuse of radioactive sources during industrial, medical or research applications, accidental exposure to uncontrolled (abandoned, lost, or stolen) radiation sources, accidents during transport of radioactive materials, but also can be combined with conventional emergencies (a fire or a release of chemical substances), natural disasters, military conflicts, or malicious acts involving radiation sources.

1.1 Purpose

The Central MN Health Care Preparedness Coalition (CMHPC) Radiation Emergency Surge Annex provides guidance to support a coordinated health care response to a radiation emergency in which the number and severity of exposed or possibly exposed patients challenges the capability of Health Care Coalition (HCC) member facilities. The annex outlines suggestions in planning for, managing, and caring for patients during a radiological emergency.

This annex does not replace other county or local emergency operations plans or procedures; it builds upon the existing plans and their annex. The coalition recommends that members develop their own radiological response plan with input from medical providers. These plans should be shared with local public health and local emergency management partners.

There have been no large-scale radiological emergencies in the United States; however, planning and preparing to respond is imperative to a successful response if an event occurs.

The purpose of the plan is to:

- Identify the local and regional risks such as power plant, industrial/research, radiological dispersal device, and nuclear detonation.
- Discuss the roles and responsibilities for health care, public health, local response agencies, emergency management, community, non-governmental, and local, state, federal and tribal partners in a radiological response in the region.
- Identify the decision-making structure to be used to determine health care coalition response actions and priorities and identify the indicators/triggers and processes for alerting/notifying appropriate members of a radiation emergency.
- Identify processes to consider for patient placement, transfer protocols, and care.
- Identify the coalitions’ role and procedures for sharing and/or prioritizing scarce resources as well as how those activities will relate to cross-regional and statewide efforts. The plan will also identify some specific radiological resources that can support the response efforts.
- Identify the coalitions process for communications and coordination amongst membership and partners. To include initial coordination and information gathering to determine impact and needs
- Describe health care planning and response needs to include triage/screening and the alignment of the coalitions regional plan with local public health and emergency management plans.
- Discuss potential treatment options
- Discuss training opportunities available

- Identify detection and dosimetry equipment options for Emergency Medical Services (EMS)/hospitals
- Briefly identify/summarize decontamination protocols.
- Provide a list of subject matter experts (SME's) to be utilized when necessary, including the Radiation Injury Treatment Network (RITN) (see Addendum A – References)

This annex will NOT:

- Replace local level plans
- Provide specific patient care treatment guidance

The annex will serve as a guide towards response.

1.2 Scope

The annex is part of the regional response plan. This plan includes concepts outlined by the National Incident Management System (NIMS) and will set common goals, strategies and terminology used in other regional plans.

This plan may be used to supplement local plans and will promote the coordination of a response with local, regional, and state agencies involved in the response. Coalition partners involved in the creation of this plan include local health care, local public health, and local emergency management. The regional clinical advisor and the coalition members have reviewed this document.

The annex will be reviewed annually and updated as necessary to ensure readiness to respond and to incorporate any lessons learned in previous response efforts.

1.3 Overview of Health Care Coalition and Situation

The health care coalition has indicated via their hazard vulnerability analysis that a radiological incident is low however having a plan that identifies what the response to a radiological event is necessary regardless of the type of event that occurs (i.e., act of terrorism or nuclear melt-release).

The State of Minnesota is responsible for licensing, rulemaking, inspection, and enforcement activities for:

- i. radioactive materials produced because of processes related to the production or utilization of special nuclear material
- ii. uranium and thorium source materials
- iii. special nuclear material in quantities not sufficient to form a critical mass.

Most of these licenses are for medical and industrial uses of radioactive material.

Minnesota Department of Health (MDH) maintains an environmental monitoring program for radioactivity around the state's two nuclear power generating plants, which are in Monticello and Prairie Island.

The Nuclear Regulatory Commission retained jurisdiction over several activities identified in 10 CFR Part 150, including regulation of commercial nuclear power plants and federal agencies using certain nuclear material in the state. In addition, the Nuclear Regulatory Commission retained authority for the review, evaluation and approval of sealed sources and devices containing certain nuclear materials manufactured in Minnesota and distributed throughout the country.

The Monticello Nuclear Generating Plant is a nuclear power plant in Monticello, Minnesota, which is in Wright County. The plant abuts the south shore of the Mississippi River, which flows west to east along the plant's footprint. The plant is also located within ¼ mile of Interstate 94. Twenty-seven percent of the Central region is contained within the 50-mile radius of the plant. The plant is a single nuclear reactor, which is a boiling

water reactor. It is owned by Excel Energy and operated by Northern States Power. The facility is currently licensed until September 2030.

There are two emergency planning zones around nuclear power plants:

- Plume exposure pathway zone with a radius of 10 miles (16 km), concerned primarily with exposure to, and inhalation of, airborne radioactive contamination.
- Ingestion pathway zone of about 50 miles (80 km), concerned primarily with ingestion of food and liquid contaminated by radioactivity.

According to the 2010 U.S. Census, the population was 62,976 within 10 miles (16 km) of Monticello, an increase of 36.5 percent in a decade; and 2,977,934 within 50 miles (80 km), an increase of 8.6 percent. Major cities within the 50-mile radius and within the central region include St. Cloud (26.8 miles), Buffalo (10.6 miles), and Princeton (32.5 miles). Metro cities within 50 miles include Minneapolis (38 miles to city center) and St. Paul (45 miles to city center).

There are several health care facilities, including skilled nursing homes, assisted living, group homes and clinics included within both the plume exposure zone and the ingestion pathway zone. Other high-risk populations include schools, daycares, home-based elderly and others with access and functional needs. Considerations must also include first responders (law enforcement, fire, and EMS) who would be responsible for responding to a radiological emergency.

Most exposed patients would be transported out of the plume area. Transportation decisions are made based on the direction of the plume. The largest health care provider in the central region is St. Cloud Hospital, which is twenty-two miles northwest of the plant. The larger metropolitan hospitals are east/southeast of the plant.

1.4 Planning Assumptions

Planning assumptions for this plan include:

- Radiation incidents may be accidental (e.g., industrial, or transportation-related) or intentional
- Incidents may require prolonged response and extensive resource management challenges
- Substantial differences in response protocols and priorities exist between power plant / industrial, terrorist (e.g., RDD/dirty bomb) and nuclear bomb detonation
 - The plan should emphasize the scenario(s) most relevant to the community
- The coalition annex does not replace the need for protocols at each hospital and EMS agency
- Different agencies may have authority over management of power plant, transportation, and terrorist incidents, including the authority to implement shelter-in-place and evacuation orders
- The roles and responsibilities of agencies and organizations will change depending on the severity and scale of the incident and the respective level of activation by impacted jurisdictions and should be outlined before an incident
- Federal, state, and local emergency resources will all be needed during a large-scale event
- Staff at coalition facilities may be impacted by exposure, fear of exposure, or family obligations (e.g., child/family care if schools are closed, acute care facilities are affected).
- Fear from the incident will cause a worried well surge to emergency departments and pharmacies
 - Consider how limited understanding of radiation and nuclear contamination will contribute to public anxiety and require multi-modal solutions.
- Public safety (e.g., police, fire, EMS) and other first responder personnel are considered a high-risk population: the implementation of protocols for monitoring control zones and effective contamination control measures will be essential for workforce protection
- Federal resources (e.g., ambulance contracts, National Disaster Medical System [NDMS] teams) cannot

- be relied upon to mobilize and deploy for the first 72 hours
- Management of contaminated waste from decontamination should be managed in consultation with SMEs, Environment Protection Agency (EPA), and local water authorities

As members of the coalition, health care providers should understand that:

- Hospitals and health care systems should have their own plans for a radiation emergency
 - The regional plan is not designed to replace facility-level planning efforts
- Rural areas may be severely impacted by citizens fleeing an affected area and seeking care
- Implementation of surge protocols specific to a radiation emergency will occur quickly and facility staff must be prepared to activate and operationalize appropriate procedures immediately
- Initial trauma care should precede radiation injury management
- Radiation contamination assessments will require rapid protocol and education implementation
- Staff will need to evaluate real versus suspected exposure, internal versus external contamination, and assess overall exposure levels for at-risk patients based on serial blood testing
- Specialized expertise (such as clinical advisors) will be needed to manage the complexities of a major radiological incident (e.g., dose estimation, exposure type, treatment plans, site evaluations, decontamination protocol)
- Contaminated injury care and decontamination may require rapid expert consultation
- Community screening sites will be required to assess low-risk patients
- Depending on the scale of the radiological event, it may be necessary to establish alternate care sites, especially for radiological exposure requiring higher levels of care
- Emergency departments, outpatient care centers and alternate care sites must be prepared to rapidly screen large groups of potentially exposed people, and triage and transport as needed
- Allocation of limited/scarce resources and their distribution should be based on agreed-upon prioritization systems / methods
- Large-scale radiological incidents may require the recruitment of volunteers (e.g., Medical Reserve Corp), retirees, and trainees to support and relieve screeners and health care workers
- Some health care facilities may require large-scale fatality management support
- Community-based interventions will require significant public health effort if an evacuation or shelter in place order is necessary.
- Critical infrastructure will be impacted (e.g., food distribution, isolation assistance, surveillance activities)
- Health concerns, prolonged response requirements, demanding work environments and stress may present behavioral health challenges among staff of coalition members and the public

2. CONCEPT OF OPERATIONS

2.1 Activation

This plan may be activated during any radiological emergency that requires coordination between health care organizations and coalition partners, when the existing resources and plans are limited or inhibit the ability to respond to the event. The plan may also be triggered if the region is requested to support another region, state where an event occurred.

Potential triggers to activate the Radiation Emergency Surge Annex include:

- Regional coordination required to assist with patient care and patient movement, etc.
- Multiple counties affected by the event requiring a coordinated response
- Regional coordination required for risk communication, public information, and/or media response.
- Public health response to a community impacted by a radiological incident

- Multi-agency response to radiation health threat
- Notification by a local public health agency/community health board for the need for regional coordination of coalition members

When the Regional Healthcare Preparedness Coordinator (RHPC) or a local health authority identifies that an event meets the triggers identified above and additional resources may be needed, this plan will be activated at the discretion of the RHPC or their designee. Regional or local partners, a local emergency manager, local public health, or a representative of another health or medical organization may request activation. Coalition staff should consider the likelihood that state and/or federal resources will be employed, the need or potential need for specialized technical assistance, and the status or activation forecast of the state Emergency Operations Center when determining whether or when to activate the Healthcare Multi-Agency Coordination system (HMAC) and the plan.

HMAC activation is likely, and activation protocol may be initiated.

RHPC will coordinate with HMAC representatives to relay responsibilities, provide collected background data from assessments, and aid with priority tasks.

Activation of the HMAC and implementation of the annex will be coordinated with all partners. Members should consider that radiation events might create unforeseen recovery challenges for both state and local agencies, some of which may not be clearly recognized during the response. As a minimum, consideration should be given to:

- Activation of federal assets and following the lead of the federal agencies with the understanding that the federal agencies may not be available for up to 72 hours after the incident or requests have been made
- Expected timing of and challenges associated with deactivation or demobilization of state-owned or controlled resources or teams; and
- Possible recovery needs that may require facilitation, coordination or technical assistance that was provided by the coalition during the response phase.

Refer to the Coalition Response Plan for further information regarding HMAC activation during a response.

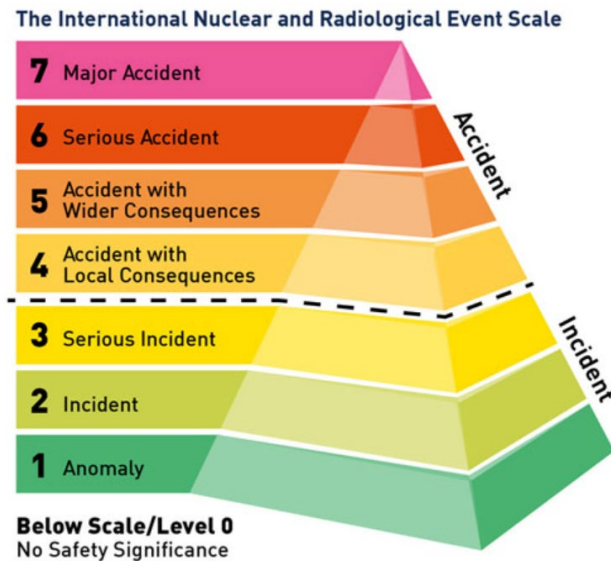
The Coalition will use the seven-level International Nuclear and Radiological Event Scale (INES) as a basis for response activation. According to the United States Nuclear Regulatory Commission, the scale can be applied to any event associated with nuclear facilities, and transport, storage and use of radioactive material and radiation sources. Use of INES serves to promote a common understanding of the significance of reported events among governments, the nuclear community, media, and the public.

Activation of the coalition Radiation Emergency Surge Annex can be determined by the level identified in the INES; however, it is understood that even an incident at level 2 may exceed the available resources and may require activation. As with all coalition responses – activation of the coalition HMAC is based upon the needs of the coalition members and its' partners and will be event driven.

Indicators or triggers to activate this specialty annex vary from the detonation of a dirty bomb to a hazardous spill. If an incident occurs resulting in a nuclear or radiation emergency, the initial response should follow local surge plans and protocols. The Central Healthcare Preparedness Coalition will notify the state by calling the Minnesota Duty Officer at 651-649-5451 or 1-800-422-0798.

A radioactive materials incident can be reported directly to the MDH Radioactive Materials Unit at 651-201-4400 during business hours (Monday-Friday, 8:00 AM – 4:30 PM). MDH Emergency Preparedness and Response can be notified 24/7 by calling 651-201-5700.

The Central Minnesota Healthcare Preparedness Coalition anticipates the involvement of the U.S. Federal Government (USG) in a nuclear or radiological emergency and will communicate any needs or requirements, as necessary.



- The INES consists of a 7-level event classification system.
- Events of greater safety significance (Levels 4-7) are termed "accidents" and events of lesser safety significance (Levels 1-3) are termed "incidents."
- Events without safety significance are termed "deviations" and are classified below Level 0.
- A description of INES, including an explanation of the various levels and a copy of the IAEA INES User's Manual (2008 edition) can be found at NRC's [INES web page](#)

2.2 Activation and Notification Flow

Refer to the Coalition base Response Plan – Section 2.3 for an in-depth description of the coalition activation and notification process.

Refer to Appendix 3.5.5. Regional Communications Plan, which specifically discusses the mechanisms in place to notify/communicate with coalition members and partners.

The central region uses email, phone, a secure web chat, MnTrac, and 800 MHz radios to rapidly gather and disseminate information to HCC partners. The [MDH All Hazards Response and Recovery Plan](#) Healthcare Surge Annex outlines communication pathways between MDH-EPR and the eight regional HCCs.

Following notification, the RHPC and HMAc will identify the appropriate partners to notify.

Partners may include:

- Neighboring local public health agencies
- Local health care organizations/providers
- Local EMS
- Local emergency management
- Central Minnesota Health Care Coalition
- Minnesota Health Care Coalition collaborative members
- Cross-border health care partners and public health
- Minnesota Department of Public Health (preparedness and response)
- CDC/Administration for Strategic Preparedness and Response (ASPR)
- Other health partners as necessary

Upon notification to the above listed partners – additional notifications can be made by the local and state

partners to:

- [Radiation Control](#)
- Homeland Security and Emergency Management
- MN Department of Transportation
- [MN Radiation Emergency Volunteers \(MREV\)](#)
- US Department of Energy
- US Environmental Protection Agency
- [Federal Radiological Monitoring and Assessment Center \(FRMAC\)](#)
- [Nuclear Regulatory Commission \(NRC\)](#)
- Federal Emergency Management Agency (FEMA)
- [Nuclear Emergency Support Team](#)
- Federal Drug Agency (FDA)
- [Radiation Injury Treatment Network \(RITN\)](#)

MDH maintains a [Nuclear and Radiation Emergencies](#) website with multiple planning, education and response resources for health care coalitions, health care facilities, and EMS.

If the incident is catastrophic and the affected HCC forecasts state resources will be depleted and/or surge capacity is exceeded, a request can be made to MDH-EPR to escalate the plan beyond state borders to inter-state partners through the Great Lakes Healthcare Partnership (GLHP) existing plans and procedures. The GLHP is the U.S. Department of Health and Human Services (HHS) Region V coalition.

In response to a national disaster HHS-ASPR will lead the medical portion of the federal response and activate the National Disaster Medical System (NDMS). NDMS will distribute patients for definitive medical care across the United States to NDMS participating hospitals.

2.3 Roles and Responsibilities

COUNTY EMERGENCY MANAGEMENT AGENCY

- Provide knowledge, assessment data, requests, and other needs during incident
- Lead local agency for incident coordination including activation and coordination of jurisdictional EOC as needed
- Serve as point of contact for local resource requests and request resources that exceed local capabilities from the State.
- Request state declaration of emergency if needed
- Assist with dissemination of public information via designated Public Information Officer
- Assist with volunteer and donations management
- Assist with distribution of supplies from the coalition or other partners
- Coordinate or facilitate meetings inclusive of county health care, public health and other agencies as needed
- Act as liaison between local, regional, state and federal assets responding to the incident.

EMS SERVICES / PRE-HOSPITAL PROVIDERS

- Provide knowledge, assessment data, requests, and other needs during an incident
- Lead local agency for first response, treatment, and patient transport
- Interface with local hospitals and EOC to share information/status
- Maintain appropriate staff in county EOC to receive and monitor notifications
- Monitor the MnTrac system for any alerts related to diversions and patient movement.

FRONTLINE HEALTH CARE FACILITIES

- Provide initial treatment and stabilization of any victim/patient transferred or presenting to their facility
- Follow normal organizational referral protocols and transport criteria with respect to radiological patients
- Identify the need for additional staff supplies, pharmaceuticals, and specialized equipment
- Ensure that individuals with access and function needs and patients with limited language proficiencies have access to appropriate medical care and support services
- Determine the appropriate distribution of patients-injured, infected, and psychologically impacted
- Notify the jurisdictional EOC when a surge of patients threatens to overwhelm their facility
- Initiate internal emergency operations plans and call staff back to work, as needed
- Continue to provide triage for patients, even when at capacity, but may limit treatment to the stabilization of critically ill or injured patients and may transfer stable patients to other facilities
- Analyze the facilities capabilities to accept and treat patients over a protracted period
- Track their own disaster/incident-related expenditures and coordinate with local, state, and federal organizations for reimbursement activities, if applicable.
- Monitor for and acknowledge all alerts, notifications, and communications during an incident and provide information as requested to local, regional, and state partners.
- Update MnTrac bed availability as requested by coalition or state agencies.
- When situations of scarce resources follow guidelines from the State or Federal agencies
- Consider activation of continuity of operation plans
- Participate in Regional meetings and respond appropriately to requests made from the coalition and/or the state during the response

LOCAL PUBLIC HEALTH DEPARTMENT

- Establish and monitor surveillance systems.
- Work with local EM to establish a reunification center if applicable
- Work with local EM and local health care to set up a Community Reception Center
- In coordination with local EM and local health care – disseminate appropriate messaging to community members
- Ensure that individuals with access and function needs and patients with limited language proficiencies have access to appropriate medical care and support services
- Provide staffing support to other impacted local public health departments, as needed
- Follow local policies and direction on tracking disaster/incident related expenditures
- Maintain appropriate users in county EOC to receive and monitor notifications
- Work with Minnesota Department of Health and share information with partners.

CENTRAL MN HEALTH CARE COALITION

- The coalition RHPC is the point of contact for the region in support of local response needs.
- Supports a regional health response

- Activate the Radiation Emergency Surge Annex when requested
- Support information sharing and coordination of activities between coalition members
- Support resource coordination between facilities in the region
- Coordinate regional medical response and recovery preparedness, including planning, training, and exercises
- Work with local and regional partners to align plans and procedures and identify potential capability and resource shortfalls
- Synthesize data (case reports, medical resource availability, etc.) at a regional level to improve preparedness and situational awareness
- Support the Local Emergency Managers and Local Public Health as they create a Community Reception Center and consider activation of the Regional HMAC to support and review any requests for assistance with information sharing, PPE and supply acquisition to include staffing support if necessary
- Develop regional coordination systems and maintaining these systems
- Consider activation of the Regional Patient Movement plan to support local health care.
- Identify areas that the region can support the resource needs related to a radiation event and identify ways and means of obtaining additional items.
- Provide situational and operational status reports in response to radiological incident
- Work with cross regional partners in the Minnesota Health care Coalition Collaborative
- Participate in state response meetings and advocate for the needs of the health care facilities and other members of the regional coalition.

CENTRAL MN HMAC

- Communicate with regional and local stakeholders within their discipline area to sense for concerns or areas where support may be needed through emails, conference calls, or other appropriate methods.
- Assess expected medical response and treatment activities to identify potential areas where assistance may be needed.
- Provide information and safety protocols specific to the radiological response.
- Coordinate with the state to develop or refine PPE guidance in a format that can be rapidly distributed and easily understood by partner organizations.
- Ensure that information is shared with entities that they represent
- Coordination of movement of resources
- Coordinate or support the employment of mutual aid assets.
- Facilitate the integration of state and federal response teams as allocated to the region.
- Coordinate the collection of data from facilities and other entities.
- Ensure situational awareness by collecting essential elements of information from LHDs, health care facilities and other providers.
- Identify priority health care related Critical Infrastructure/Key Resources (CI/KR) and assess potential impacts.
- Consider availability of public health tools and resources, as well as situation-specific efficiency and accessibility of facilities and other infrastructure.
- Supporting behavioral health needs within the region, upon request.
- Coordinate all medical surge issues with the facilities.
- Coordinate surge protocols for triage, transport, treatment
- Support decompression of critical hospital beds.
- Coordinate with hospitals/facilities to identify safe and reasonable methods to clear beds.
- Considerations for at-risk individuals and those with medical needs during a potential surge.

- Coordinate logistics and tracking of assets.
- Facilitate consultations with appropriate subject matter experts or medical specialists regarding patient care guidance.
- Coordinate patient transportation issues with EMS Teams (Transport Officer) through Central EMS.
- Monitor medical and medical transport systems.
- Collaborate with appropriate entities regarding patient movement and placement/destination determinations.
- Support identification and deployment of additional or specialized resources as needed.
- Coordinate the need for large-scale patient movement - moving many patients from the impact area.
- Manage key information to support situational awareness and to improve decision making within the coalition and by LHDs, health care providers, and other partners to ensure equitable distribution of health care services.

MINNESOTA DEPARTMENT OF HEALTH (MDH)

- Lead state agency for health-related issues. Works closely with Minnesota Homeland Security Emergency Management for incident coordination and consider activation of the State Emergency Operations Center
- Request state disaster or public health emergency declarations and governor's emergency orders as required to support response
- Request CMS 1135 waivers as required during response to allow patient billing when usual conditions cannot be met
- Request specific emergency orders/actions by the Governor's office if needed
- Provide health related guidance and recommendations for clinicians, local and tribal public health, and community members

MINNESOTA HOMELAND SECURITY AND EMERGENCY MANAGEMENT

- Lead state agency for incident coordination
- Serve as state point of contact for resource requests
- Request State declaration of emergency if needed
- Liaison between state and federal response partners.

2.4 Logistics

2.4.1. Space

Responding to a radiation incident requires adequate space to operationalize decontamination protocols. This includes:

- Emergency Operations Center (EOC)
- Security zone
- Decontamination area (may be multiple locations i.e., scene, hospital)
- Triage/treatment zone
- Patient reunification center
- Decontamination waste cleanup area
- Media room

Health care facilities should plan accordingly to address these factors

Local health care providers are encouraged to work with their local public health and local emergency management to identify appropriate locations for support facilities.

The HCC will support local efforts by activation of the HMAC; either virtually or in person and will also support the local EOC.

2.4.2. Staff

Staffing shortages may be a result of patient surge, staff turnover, staff illness, or illness/exposure to a family member. In a small-scale response, the coalition may be able to arrange staff sharing support among health care providers within the region. Refer to the Regional Allocation Plan and Coalition MOU for more details regarding staff sharing.

Staff shortages are not limited to patient care providers. Back up plans need to consider support services such as dietary, housekeeping and maintenance. The HMAC partners may also be able to support staffing assistance requests for those non-patient care roles.

A variety of staffing alternatives may be used in situations where standard staffing is not available, health care facilities should consider:

- Reaching out to local partners (emergency management, local public health)
- Activation of decontamination teams
- Protocols for revision of staff work hours
- Cross-training staff
- Callback of off-duty personnel
- Use of non-clinical staff
- Local Medical Reserve Corps
- Untraditional patient care providers (e.g., family members, nonprofessional personnel such as city employees)
- Surge plans for home care agencies and clinics
- Tiered Staffing / Team Nursing
- Request the activation of [Minnesota Radiation Emergency Volunteers \(MREV\)](#) through the local emergency manager.

Health care facilities are encouraged to develop a Hospital Emergency Response Team (HERT) who are trained in decontamination – including setting up a decontamination zone at the facility and having the appropriate PPE available for staff. This team should be trained and exercised annually. The HCC offers annual HERT training for its membership.

Health care facilities are encouraged to develop arrangements with subject-matter experts, such as radiologists and radiation oncologists.

The MDH Nuclear and Radiation Emergencies website contains multiple resources for planning, education and just-in-time training tools online at: [Nuclear and Radiation Emergencies - Minnesota Dept. of Health \(state.mn.us\)](#), including direct links to REMM and RITN materials.

Additionally, the MDH Burn Surge website contains just-in-time training resources online: [Minnesota Burn Surge - Minnesota Dept. of Health \(state.mn.us\)](#). These include videos, quick references to determine burn depth and surface area, order sets, and Resource and Triage Cards in the [Patient Care Strategies for Scarce Resource Situations](#).

See Addendum A: References and Emergency Contacts for Help During Radiation Emergencies

2.4.3. Supplies

Response to a radiological event can severely impact the resources available. These resources include but are not limited to:

- Staff
- PPE
- Treatment/countermeasures
- Bed availability

The Coalition maintains a small cache of items that may be available for redistribution during times of scarcity. This includes Powered Air Purifying Respirators (PAPRs), decontamination suits/supplies and decontamination tents. Facilities can contact the coalition and request assistance from the coalition or other facilities. If the supply or resource is located and available, arrangements will be made to move the resource. The receiving facility is responsible for the reimbursement, if applicable.

The requesting site must exhaust all means to procure the resource on their own. The requestor may be required to show proof that the item/resource is not available. This support is not to be used due to increased costs of resources. All health care partners are strongly encouraged to have arrangements with their suppliers and support services in advance of an emergency. Facilities should consider including a clause to increase par levels during emergent situations.

Refer to the Coalition Response Plan - Appendix 3.5.6 Coalition Resource Plan.

Access to treatments and countermeasures may also be limited. Treatment considerations may need to be based on availability. Health care facilities are encouraged to develop plans to address scarcity.

[MDH Crisis Standards of Care - Strategies for Scarce Resource Situations](#)

[Radiation-injury-after-a-nuclear-detonation-medical-consequences-and-the-need-for-scarce-resources-allocation](#)

[Triage and Treatment Tools for Use in Scarce Resources - Crisis Standards of Care Setting After a Nuclear Detonation](#)

2.5 Operational Medical Care

MDH maintains websites with up-to-date materials for both [radiation control](#) and [medical surge considerations](#) in a radiation or nuclear emergency. Minnesota has two Radiation Injury Treatment Network (RITN) hospitals. They are the University of Minnesota Medical Center located in Minneapolis, MN and the Mayo Clinic located in Rochester, MN. RITN hospitals located within Minnesota may be able to provide telemedicine support if requested. If these hospitals are overwhelmed, MDH would look to RITN to connect local hospitals with out-of-state subject matter experts.

The Central Healthcare Preparedness Coalition recommends medical personnel [download the HHS Radiation Emergency Medical Management \(REMM\) application](#) for Android or Apple devices.

The HCC encourages its partners to have well-thought-out plans, obtained through reputable medical experts. The HCC is not made up of expert medical personnel for radiological events and has no relationships with such entities. The annex, however, has been reviewed by the clinical advisor.

As such, the steps below are a high-level overview and not to be considered medical protocol:

1. All patients should be medically stabilized from their traumatic injuries before radiation injuries are considered. Patients are then evaluated for either external radiation exposure or radioactive contamination.

2. An external radiation source with enough intensity and energy can cause tissue damage (e.g., skin burns or marrow depression). This exposure from a source outside the person does not make the person radioactive. Even lethally exposed patients are no hazard to medical staff.
3. Nausea, vomiting, diarrhea, and skin erythema within four hours may indicate very high (but treatable) external radiation exposures. Such patients will show obvious lymphopenia within 8-24 hours. Evaluate with serial CBCs. Primary systems involved will be skin, intestinal tract, and bone marrow. Treatment is supportive with fluids, antibiotics, and transfusions stimulating factors. If there are early CNS findings of unexplained hypotension, survival is unlikely.
4. Radioactive material may have been deposited on or in the person (contamination). More than 90% of surface radioactive contamination is removed by removal of the clothing. Most remaining contamination will be on exposed skin and is effectively removed with soap, warm water, and a washcloth. Do not damage skin by scrubbing.
5. Protect yourself from radioactive contamination by observing standard precautions, including protective clothing, gloves, and a mask.
6. Radioactive contamination in wound or burns should be handled as if it were simple dirt. If an unknown metallic object is encountered, it should only be handled with instruments such as forceps and should be placed in a protected or shielded area.
 - a) Dry, solid waste can be stored in metal or plastic containers provided they have an inner plastic bag have a securely fitting cover and are clearly labeled with a sign saying, "caution radioactive material" or "caution radioactive waste - do not empty."
7. In a terrorist incident, there may be continuing exposure of the public that is essential to evaluate. Initially suggest sheltering and a change of clothing or showering. Evacuation may be necessary. Administration of potassium iodine (KI) is only indicated when there has been release of radioiodine.
8. When there is any type of radiation incident, many people will want to know whether they have been exposed or are contaminated. Provisions need to be made to potentially deal with thousands of such people.
9. Radiation doses to people are expressed in gray (Gy) or sieverts (Sv). The older units for these are rad and rem. 1 gray = 100 rad and 1 Sv = 100 rem.

An approximation of the relative hazard is given:

DOSE	RELATIVE HAZARD
About 10 milligray or 10 millisievert [1 rad or rem] or less	No acute effects and only a very small chance of subsequent cancer
About 0.1 gray or 0.1 sievert [10 rad or rem]	No acute effects, subsequent additional risk of cancer about 0.5%
About 1 gray or 1 sievert [100 rad or rem]	Nausea, vomiting possible, mild bone marrow depression, subsequent risk of cancer 5%
Greater than 2 gray or sievert [200 rad or rem]	Definite nausea, vomiting, medical evaluation, and treatment required.

Contamination:

The amount of radioactivity (contamination) is measured in units of becquerels (Bq) (1disintegration per second). Sometimes, it is expressed in counts per minute.

Decontamination:

Decontamination is usually stopped if the item is reduced to two times the background count rate or if repeated decontamination efforts are ineffective.

10. The principle of time/distance/shielding is key. Even in treatment of Chernobyl workers, doses to the medical staff were about 10 milligray or 10 millisievert.

- Doses to first responders at the scene, however, can be much higher and appropriate dose rate meters must be available for evaluation.
- Radiation dose is reduced by reducing time spent in the radiation area (moderately effective), increasing distance from a radiation source (very effective), or using metal or concrete shielding (less practical).

[Disaster Prep Final.qxd \(aapm.org\)](#)

2.5.1. Triage and Screening

In rural areas, resources for radiological emergencies are limited. The majority of responding EMS agencies are volunteer and staffed with EMTs or First Responders, and carry no medications used for radiological events.

The below triage steps are for reference only – facilities are encouraged to create their own facility-level plans. Facility-based plans should be robust enough to respond to a radiological event. The information provided by the coalition is meant to support the local response planning efforts but does not supersede any local plans.

In case of a radiological emergency resulting in mass casualties.

- 1) Establish the triage/first aid area outside the inner cordoned area and within the outer cordoned area.
- 2) Consider using a flashing blue light to draw people towards the triage/first aid area.
- 3) Categorize people: (you can utilize your existing facility-level triage categorizing system i.e., SMART)
 - Priority 1: Need immediate treatment
 - Priority 2: Need early treatment
 - Priority 3: Can wait for treatment
 - No actions: No need for treatment
- 4) Consider utilizing the Exposure and Symptom Triage (EAST) Tool to Assess Radiation Exposure After a Nuclear Detonation tool. This can be used by both EMS and Local Public Health on scene or at the community reception center.
 - a. The following video explains the tool in detail: [EAST Tool for Medical Triage after a Nuclear Detonation - YouTube](#)
 - b. See Addendum B: EAST Tool
- 5) Tag victims with their medical conditions and category, per protocol.

NOTE: Serious medical problems always have priority over radiological concerns. Those who can respond to a voice announcement to come to the gathering point most probably can wait for medical attention. Keep families together.
- 6) Provide first aid as required.
- 7) Obtain an estimate on the number of victims the transport unit and hospital can handle.
- 8) Take actions to limit the spread of contamination; if there is an indication that people could be contaminated:

People with life-threatening injuries should be wrapped in blankets or sheets and transported to the hospital immediately.

People with non-life-threatening injuries and those without injury should undergo field decontamination/full decontamination, as appropriate.

- 9) Inform the transport unit and the receiving medical facilities on the nature of event, number of injured people, nature of injuries, and cases of suspected or confirmed contamination or radiation exposure.
- 10) Arrange for transportation of injured depending on their injuries:

Life-threatening injuries should be transferred to the nearest hospital.

Non-life-threatening injuries should be transferred to the secondary hospital or designated hospital (for radiation-induced injuries).

- 11) Coordinate activities with law enforcement/security team when possible and if required.
- 12) Have PIO make a public announcement to reduce the number of worried-well (self-presenters) going to the local hospital, unless they are injured. Indicate the place where they can go for monitoring and reassurance.

2.5.2. Patient Care/Management

It is important that EMS do not delay lifesaving actions or transport because of the presence of radioactive materials. EMS should remove outer layer of clothing, wrap patient in blankets, and identify the patient as possibly contaminated prior to transport. If possible gross decontamination should be provided on scene prior to transport.

Patients with marrow toxic injuries or suspected marrow toxic injuries should be prioritized for transportation to RITN centers. [Criteria for considering RITN center consultation/referral](#) can be found on RITN's website. Patients with burn injuries should be prioritized for transportation to ABA verified Burn Centers or a Minnesota Burn Surge Facility (BSF). Referral criteria for ABA verified Burn Center can be found in [Appendix E of the Minnesota Burn Surge Plan](#).

Medical personnel should use the [Exposure and Symptom Triage \(EAST\)](#) Tool to assess radiation exposure after a nuclear or radiological event. Hospitals/clinics/EMs are encouraged to develop their own radiological response plan with input from their medical providers. These plans should contain surge activity, prioritization for treatment, decontamination measures, patient movement/tracking, contamination, palliative care, and how to move from conventional to contingency to crisis care and back, as the situation requires. Resources should be readily available for just-in-time training for health care providers.

The HCC will support local efforts by sharing information and resources as available. The coalition will not supersede the role of the locals during the response but will act as a liaison between the local response and state and federal partners if requested. Patient movement decisions will be made at the local level in conjunction with the receiving facilities. Communications, such as MnTrac Bed Alerts, will assist with identification of bed availability in the region and throughout the state.

The coalition patient tracking plan may be activated – refer to Appendix 3.5.2. Patient Tracking Plan.

[REMM - Radiation Emergency Medical Management \(hhs.gov\)](#)

2.5.3. Treatment

Health care providers should consider the specific circumstances of each patient encountered during an emergency and use their clinical judgment in providing care.

There are several resources available that discuss available treatment options. Health care providers are encouraged to explore these sites prior to an event and establish baseline protocols that can be enacted if/when an event occurs.

In a radiological event the HCC can work with other HCCs to procure medications, equipment, transport, and hospital beds. The HCC will work with its partners to disseminate information, share resources, and liaison

between the membership, local, State and Federal partners. Local Public Health is responsible for open and closed points of dispensing for communities.

[CDC - Medical Countermeasures for Radiation Exposure and Contamination](#)

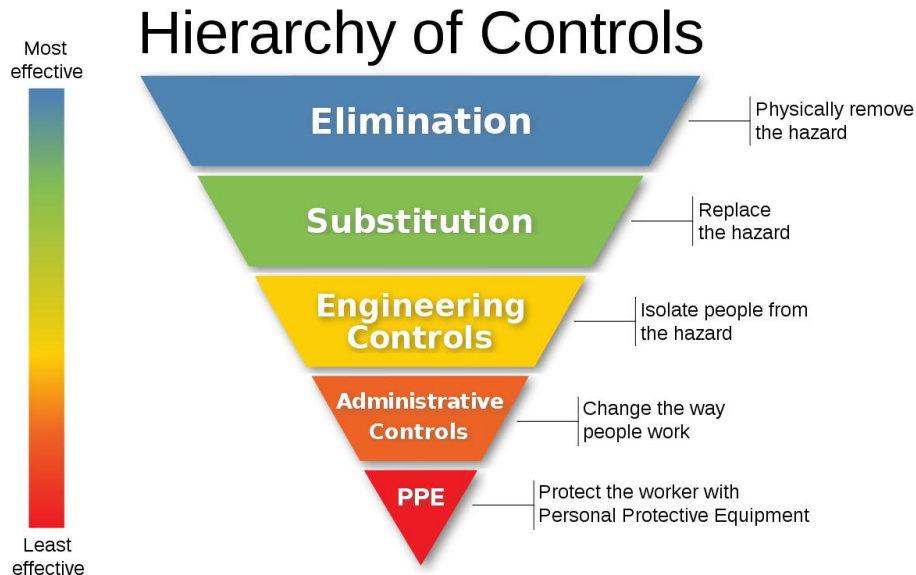
[REMM - Medical Countermeasures](#)

[Mayo Clinic - Radiation Sickness](#)

2.5.4. Safety and Control Measures

Controlling exposures to occupational hazards is the fundamental method of protecting workers.

Traditionally, a hierarchy of controls has been used to determine how to implement feasible and effective control solutions.



Source: <https://www.cdc.gov/niosh/topics/hierarchy/default.html>

Standard precautions include a group of infection prevention practices that apply to all patients in any setting where health care is delivered.

Standard precautions include:

- Hand hygiene
- PPE use
- Safe injection practices
- Safe handling/cleaning of equipment and environmental surfaces
- Respiratory hygiene and cough

Administrative controls include:

- Workplace safety programs
- Vaccination of health care personnel
- Infection control and prevention protocols
- Plans, procedures, algorithms, checklists

For health care, the appropriate PPE is determined by the role of the individual; either first responder or first receiver.

FIRST RESPONDERS:

- First responders are responsible for protecting and preserving
 - Life (e.g., paramedics, emergency medical technicians, ambulance service personnel)
 - Property (e.g., firefighters)

- Evidence (e.g., law enforcement)
- Environment (e.g., HAZMAT teams)
- First responder activities generally occur at the site of an incident
- First responders must have access to PPE that provides the highest levels of skin and respiratory protection

First Responder: Recommended PPE and practices in a radiation emergency	
Emergency Type	Recommended PPE
Radiation plus chemical and/or biological hazard: "combined hazard" event	<ul style="list-style-type: none"> • Before combined hazard(s) are well-characterized: first responders should be instructed to wear PPE ensembles that protect against anticipated (potentially multiple) hazards • After combined hazards are confirmed: first responders should be instructed to wear PPE ensembles that protect against identified hazards
Radiation-only event with substantial risk of contamination (and non-radiation hazards have been excluded): e.g., Radiological Dispersal Device (RDD)	<u>Level C PPE</u> usually provides sufficient respiratory and dermal protection
Radiation-only event with substantial risk of exposure (and non-radiation hazards have been excluded): e.g., Radiological Exposure Device (RED)	<ul style="list-style-type: none"> • PPE confers no protection against high energy, highly penetrating forms of ionizing radiation • Factors that help decrease radiation dose from exposure <ul style="list-style-type: none"> ○ Minimizing time spent near a radiation source ○ Maximizing distance from a radiation source ○ Increasing the physical shielding between a person and a radiation source

In all cases where radiation is suspected, first responders should also wear personal radiation dosimeters that enable them to read dose rate and/or accumulated dose in real time.

FIRST RECEIVERS:

The first receiver is the hospital health care worker and are not at the site of the hazardous release. Since victims may arrive for treatment contaminated with hazardous materials, first receivers need to protect themselves against secondary contamination by putting on appropriate PPE before delivering medical care.

First Receiver: Recommended PPE and practices in a radiation emergency			
Emergency Type	Response Role	Recommended PPE*	Notes, Caveats, & Concerns
Radiation plus chemical and/or biological hazard: "combined hazard" event	First receivers delivering care to contaminated victims	<ul style="list-style-type: none"> • Before incident hazard(s) are well characterized: first receivers should be instructed to wear PPE ensembles that protect against anticipated hazards • First receivers may need to wear a higher level of PPE than they are accustomed to wearing until hazard characterization is complete • After combined hazards are confirmed: first receivers should be instructed to wear PPE ensembles that protect against identified hazards 	<ul style="list-style-type: none"> • Higher level PPE ensembles are generally not available in most hospitals
Radiation only event with substantial risk of contamination (and non-radiation hazards have been excluded): e.g., Radiological Dispersal Device (RDD)	First receivers delivering care to victims more likely to be externally contaminated: i.e., health care providers working in pre-decontamination (triage) and decontamination areas	<ul style="list-style-type: none"> • Level C PPE usually provides sufficient level of respiratory and skin protection • Level C PPE should be worn until risk characterization determines that Level D PPE provides sufficient protection 	<ul style="list-style-type: none"> • Recommended respiratory PPE includes a full-face piece air purifying respirator with a P-100 or High Efficiency Particulate Air (HEPA) filter. • Other respiratory protective equipment (e.g., a simple surgical facemask, N-95 respirators), non-fit tested respirators, or ad hoc respiratory protection do not deliver appropriate or sufficient respiratory protection; environmental testing and hazard assessment by a safety professional can help identify hazards and risk levels and direct choices of permissible PPE. <ul style="list-style-type: none"> • Lead aprons are cumbersome and do not protect against exposure

			from high-energy, highly penetrating ionizing radiation.
	First receivers delivering care to victims less likely to be externally contaminated: i.e., health care providers working in post-decontamination areas of the hospital	<ul style="list-style-type: none"> • Level D PPE provides sufficient respiratory and skin protection for first receivers working in post-decontamination areas of the hospital; this includes those delivering care to persons who may not yet be decontaminated (e.g., patients who self-refer or who arrive by transport with life- and limb-threatening injuries) • Level D PPE also protects skin and personal clothing against possible splashes of contaminated blood and body fluids (urine, feces, wound drainage, etc.) • Level D PPE is equivalent to Standard Precautions PPE worn in medical facilities as protection against transmission of biohazards from patients to providers 	<ul style="list-style-type: none"> • Do not delay stabilization of any patient to first perform decontamination • Perform life- and limb-saving tasks before managing radiation problems
	First receivers delivering care to victims with suspected or confirmed internal contamination i.e., health care providers working in post-decontamination areas of the hospital	<ul style="list-style-type: none"> • Level D PPE also protects skin and personal clothing against possible contamination from blood and body fluids (urine, feces, wound drainage, etc.) • Level D PPE is equivalent to Standard Precautions PPE worn in medical facilities as protection against transmission of biohazards from patients to providers 	<ul style="list-style-type: none"> • Hospital radiation safety officer or health physicist will routinely monitor work areas and patient blood and body fluids for radioactive contamination or elevated radiation levels
Radiation only event with substantial risk of exposure (and non-radiation hazards have been excluded): e.g., Radiological Exposure Device (RED)	First receivers delivering care to victims in all areas of the hospital	<ul style="list-style-type: none"> • Level D (Standard Precautions) PPE should be used by health care workers when caring for victims of radiation exposure 	<ul style="list-style-type: none"> • Patients exposed to radiation but not contaminated with radioactive material pose no threat of exposure to health care providers

In all cases where radiation is suspected, first receivers should also wear a personal radiation dosimeter to monitor their radiation absorbed dose

DOSE MONITORING

Responders must be monitored for exposure to radiation. Priority should be given to those responding to the scene and those conducting decontamination efforts. Detecting a radiation dose rate (radiation dose received over some amount of time) of 10 milliroentgens (mR) per hour (mR/h, or approximately 0.0001 Gy/h) may help employers and workers identify the boundaries of areas with radiation levels of concern.

In areas where there is radiation (i.e., above background), response workers should be equipped with appropriate radiation monitoring equipment. If possible, use equipment that provides unambiguous alarms based on predefined levels (i.e., turn-back doses set by an Incident Commander, ideally well below OSHA dose limits and that indicate when workers should leave an area where they are exposed to certain levels of radiation). Workers should be trained on the specific actions to take during an instrument alarm.

Although there are several types of dosimeters, only alarming electronic dosimeters meet the above criteria.

The Central Coalition does not have dosimeters for HCC members. Members are responsible for obtaining and maintaining the appropriate dosimeters to appropriately respond to a radiological event.

Since it is assumed that there is no radiation dose threshold below which there is no associated risk from radiation, responders who are reasonably expected to receive more than 25 percent of the occupational dose limit should be appropriately trained and monitored. See paragraph (d) of the Ionizing Radiation standard for general industry ([29 CFR 1910.1096](#)).

The coalition provides the opportunity for health care and emergency medical services to receive annual first receiver training.

DECONTAMINATION

Decontamination involves not only the victims but those that are responding to and taking care of patients from the event.

Decontamination activities will occur at the scene by EMS and fire agencies and will also occur at the receiving healthcare facilities. Healthcare facilities should have decontamination plans to address how to do mass decontamination and triage of individuals exposed to radioactive materials.

Decontamination of individuals exposed, patients, and emergency response workers, their clothing, and any equipment, including PPE, is essential to limit radiation dose and prevent the spread of radioactive contamination outside of the response area.

Employers whose workers may be contaminated should establish procedures for radiological monitoring or surveying workers to identify which, if any, are contaminated and, if possible, to what extent.

On-scene decontamination facilities should be established that could:

- Provide an area to remove contaminated clothing
- Provide showers to shampoo hair, wash skin, and put on clean clothes
- Store contaminated waste (including clothing and equipment) at a safe distance from people and animals

Employers should refer to interagency resources that provide guidance on decontamination procedures, including:

[Protective Action Guides \(PAGs\) | US EPA](#)

[Radiation Emergency Preparedness and Response - Overview | Occupational Safety and Health](#)

WASTE MANAGEMENT

Health care organizations will work through their normal vendors and channels to ensure all waste produced in the decontamination process and the care of radiologically exposed or suspected patients will be handled and disposed of appropriately.

- In small radiation events, the collection and containment of contaminated effluent water in appropriate containers may be feasible. This includes large barrels and plastic bags.
- Sampling and suitable disposal of contaminated water may be performed later.
- In large events, collection of wastewater may not be feasible.
- Clothing/personal items must be placed in plastic bags and sealed

2.5.5 Fatality Management

Exposure to radioactive materials can cause injury and death! It is important for medical certifiers such as medical examiners and coroners to understand the health effects of radiation so that they can accurately determine the illnesses or injuries that caused the death.

Deaths from radiation exposure may be initial or delayed.

Initial deaths are related to the actual event and can include blast injuries and thermal injuries. Delayed deaths can include Acute Radiation Syndrome (ARS) or a combination of injuries and ARS.

Handling decedents that have been exposed to radiation requires appropriate safety measures for staff.

Counties should follow their local guidelines with coalition support.

Refer to the Regional Response Plan - Appendix 3.5.1.3 CMHPC Mass Fatality Planning

At any time, the counties can request assistance from The Minnesota Office of the State Medical Examiner. The State Funeral Directors Association may also provide needed supplies, equipment, vehicles, and personnel. If called upon, the State Funeral Directors Association staff are there to assist the Medical Examiner only; they do not work under any local response agency.

The emergency manager and public health may establish family assistance centers around the event and develop plans for those centers.

The following two documents provide valuable information regarding handling decedents with exposure to radioactive materials.

[Guidelines for Handling Decedents Contaminated with Radioactive Materials \(cdc.gov\)](https://www.cdc.gov)

[Reference Guide for Certification of Deaths - Radiological disaster](#)

The coalition will support the information and resource sharing necessary in a radiological response.

2.5.6 Transport

Treatment of a patient with severe medical conditions must be considered prior to decontamination as the delay of treatment will directly impact the success of recovery. This requires first responder units to have the necessary PPE to protect themselves so that they can provide the necessary care.

Transporting a radiological patient who has not been decontaminated:

- Increases the risk to the Emergency Medical Services (EMS) crew
- Takes the rig out of service until it can be decontaminated
- Requires notification to the receiving facility so that appropriate measures can be taken to protect receiving staff

Transportation considerations include keeping already-contaminated rigs in use to transport additional contaminated patients from a scene to the hospital – ideally in a mass casualty situation.

Consideration should be made to ensure that there are enough non-contaminated vehicles available to transport the decontaminated patients either related to the incident or not related to the incident.

During a patient surge situation, emergency medical services (EMS) may be forced to transport patients longer distances for higher levels of care. They may also need to transport patients from higher-acuity facilities to lower-acuity facilities to increase capacity of the higher-level facilities. The process of level loading involves moving patients from lower to higher level care centers and moving patients from facilities that are full to those that have capacity.

Exposed individuals may self-present to a medical facility or require transportation. Should an exposed patient present at a hospital, the patient may need to be transported to a different hospital; one designated to receive the patients from the event. If somebody is determined to be a case, contaminated material may need to be removed from locations visited by the person, and further environmental decontamination may be required. Pets/service animals also may need to be cared for and monitored for symptoms.

Incident command on scene should coordinate with the responding transportation agencies as appropriate. This may include EMS, bus transports, non-emergent medical transport agencies as well as private vehicles.

The HCC will work with the Regional EMS representative and support requests for information and resources as applicable.

[Ambulance Guidelines for Response to Radiation Events](#)

2.5.7 Surveillance, Tracking, and Situational Awareness

The HCC will work with local, regional, and state partners to maintain situational awareness. The Coalition uses MNTRAC as a reporting tool for hospitals that provides data on bed availability. Depending upon the needs of the response, the coalition will support those state and federal partners in obtaining data as needed.

Family reunification efforts are coordinated at the local level via Local Public Health (LPH) and local Emergency Management (EM).

The HCC will keep in contact with the impacted health care agencies and consider activation of the coalition Patient Tracking Plan. Health care providers should plan for an influx of family members requesting updates on loved ones. This influx should be addressed in facility-level plans and include local law enforcement, LPH and EM.

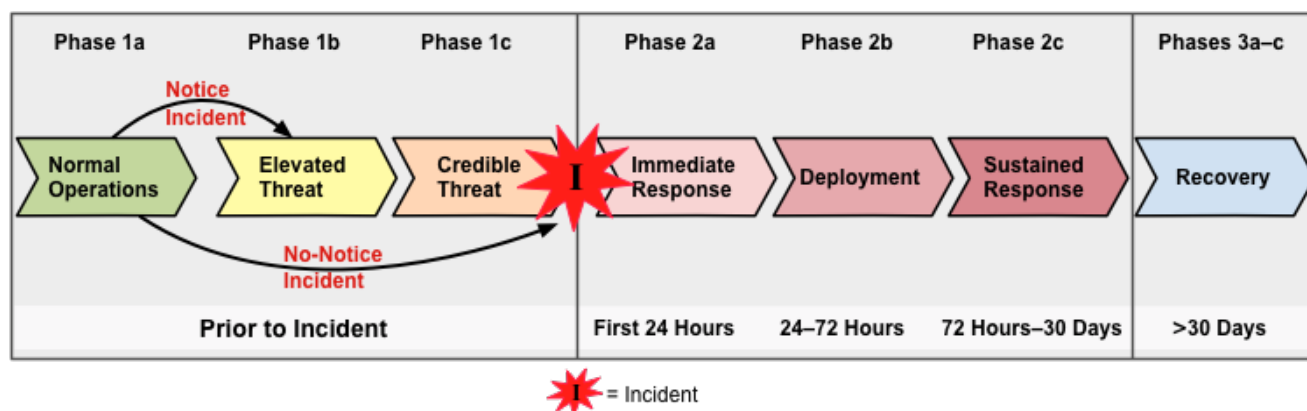
2.5.8 Rehabilitation, Outpatient Follow-up Services

People exposed to radiation require outpatient follow-up and possible continued care. Health care facilities are encouraged to include plans on how to track patients and ensure that they are receiving the appropriate after care.

The coalition patient tracking plan can be used to track the patients and record where patients were transferred.

2.5.9 Deactivation and Recovery

As in any response, demobilization and recovery planning should begin immediately. When a radiological event occurs the recovery phase can extend beyond 30 days.



Patients with exposure may require treatment and monitoring for years. The behavioral health response may also be extended as these situations are outside of normal day-to-day threats.

As local health care facilities, local public health, and local emergency management monitor the coordination and response, they will determine when the response concludes. Consideration will need to include regional, state, and federal decision-making processes as well.

2.6 Special Considerations

2.6.1 Behavioral Health

During a radiological event, a range of mental health, chemical abuse (behavioral health), and stress management problems may surface. The health care response can include working long hours, dealing with issues that are beyond their normal day-to-day practice, and suffer from isolation from support networks.

The State of MN developed a Regional Behavioral Health Coordinator position during the COVID-19 response. Regional Behavioral Health Coordinators are disaster behavioral health subject-matter experts who engage in outreach and educational activities within each of the public health regions across the state to facilitate the resiliency and recovery of survivors and responders from disasters, terrorism, and public health emergencies.

Behavioral health services are limited during the best of times. Access to inpatient behavioral health beds is difficult. Hospitals are often forced to board behavioral health patients waiting for inpatient services.

2.6.2 Pediatric and At-Risk Populations

As a rural health care coalition our whole community is considered at-risk. There is an overall lack of services due to geography and availability of limited resources. One example is that the number of EMS agencies serving a large geographical area often leads to long wait times, long transportation times and limited resources for higher acuity needs.

Pediatric patients may have a higher level of external and internal radiation exposure levels due to shorter and smaller body structure and organs. Facilities' radiation emergency plans should address the specific needs of this population.

[Pediatric Considerations Before, During, and After Radiological or Nuclear Emergencies | Pediatrics | American Academy of Pediatrics \(aap.org\)](#)

All coalition planning involves ensuring that all have equal access to the appropriate care. Considerations are given to those individuals who require resources such as those with language barriers, mobility issues, homelessness, communities of color and the LGBTQI+ population. Many health care facilities and local public health agencies within the coalition have staff available that may be able to assist with translating or have recommendations for language services.

All coalition members are encouraged to include access and functional needs in their planning efforts.

2.6.3 Communications

Essential elements of information (EEI) are any critical information required by coalition members to ensure that they can respond to any event. This allows members to make informed decisions. The EEI are specific to a particular event or thing. The EEI are written before an event, so when an event occurs the information is available.

To ensure situational readiness during a response to a radiological event – the following EEI, at a minimum, should be considered for health care organizations and response partners.

Health care Organizations	Critical Partners
• Facility operating status	• School-related data
• Facility structural integrity	• Road closures
• Decontamination process/needs/resources	• Critical infrastructure status (e.g., electrical, sewer, water)
• Status of critical medical services (e.g., trauma, critical care)	• EOC status
• Critical service/infrastructure status (e.g., electric, water, sanitation, HVAC)	• Local declarations
• Bed or patient status/patient tracking	• Public information
• Equipment, supplies, medications, vaccine status or needs	• Evacuation/shelter-in-place operations/reunification centers
• Staffing status/staff safety	
• Emergency Medical Service (EMS) status	

Refer to the Regional Response Plan – Appendix 3.4.2 Essential Elements of Information

The following link provides a more in-depth look at EEI's related to a radiological event – of note – there is a large amount of behavioral health needs/information:

<https://www.phe.gov/Preparedness/planning/playbooks/rdd/Pages/essentialelements.aspx>

EEI and data sharing among coalition members and response partners is critical for a successful response. Information gathering will be sporadic throughout the response and the information will change frequently as more information is obtained.

Regional situational awareness will use the processes outlined in Appendix 3.5.5 Regional Communications Plan.

The coalition's primary role in a response is information sharing. The Coalition will receive, collect, organize, interpret, and assess information on the incident and its actual and potential impact on the region. Sources of information may include local, state, federal, and international public health agencies, medical providers, response partners, and subject matter experts.

The frequency of the situation report will be event-driven.

Coalition members are responsible for reporting issues that may impact local or regional health care delivery. If the local/county partners are aware of impacts to health care organizations, they should also notify the regional coordinator or designee. It is understood that health care organizations may or may not elect to notify the coalition and/or that notification may be delayed, depending on the situation.

Response data and/or EEI may be gathered by the coalition and reported to the state as requested.

During the response, local health care may request data to support response needs by the state. The State of Minnesota may utilize the MnTrac platform or RedCap surveys to obtain information for health care. It is essential that health care members respond appropriately to these data requests. The coalition will support the state by providing guidance on reporting the data as requested.

2.6.4 Jurisdictional – Specific Considerations

The Central region follows the I-94 corridor (East/West) and borders with Wisconsin. St. Cloud, MN is the largest city in the region, with a population of approximately 72,000. St. Cloud is in Benton, Sherburne, and Stearns counties. Wright county which is southeast of Stearns County has the Monticello Nuclear Power plant. St. Cloud Hospital is designated as first receiver treatment site for any radiological events at the Monticello plant.



Radiation Exposure -
Emergency Department

Two major north/south routes travelling through the region include I-35 and I-169.

2.6.5 Training and Exercises

Facilities should regularly test their plans and communication methods with the staff to ensure the staff knows what to do in a real-world incident.

The coalition also provides two Hospital Emergency Response Trainings for first receivers/decontamination twice a year and can customize trainings for facilities on request. Health care facilities are encouraged to participate in the trainings offered by the Center for Domestic Preparedness – Anniston, Alabama to ensure staff/decon teams are prepared during a radiological event.

[Healthcare Emergency Response Operations for CBRNE Incidents - Center for Domestic Preparedness \(dhs.gov\)](#)

ADDENDUMS

Addendum A: References

Ambulance Guidelines for Response to Radiation Events

American Academy of Pediatrics

Pediatric Considerations Before, During, and After Radiological or Nuclear Emergencies | Pediatrics | American Academy of Pediatrics (aap.org)

ASPR TRACIE:

Access and Functional Needs | ASPR TRACIE (hhs.gov)

Center for Disease Control and Prevention

CDC - Medical Countermeasures for Radiation Exposure and Contamination
Reference Guide for Certification of Deaths - Radiological disaster

Disaster Prep_Final.qxd (aapm.org)

Guidelines for Handling Decedents Contaminated with Radioactive Materials (cdc.gov)

INES (nrc.gov) - The International Nuclear and Radiological Event Scale

Mayo Clinic - Radiation Sickness

Nevada National Security Site (nnss.gov)

Nuclear Emergency Support Team

Nuclear Regulatory Commission (NRC)

Minnesota Department of Health

Radiological Emergencies - EH: Minnesota Department of Health (state.mn.us)

Minnesota Radiation Emergency Volunteers

Minnesota Radiation Emergency Volunteers (MREV) - EH: Minnesota
Department of Health (state.mn.us)

Crisis Standards of Care Plan

Crisis Standards of Care - Minnesota Dept. of Health (state.mn.us)

Patient Care Strategies for Scarce Resource Situations

Patient Care Strategies for Scarce Resource Situations (state.mn.us)

Regional Behavioral Health

<https://www.health.state.mn.us/communities/ep/behavioral/rbhc.html>

Radiation Injury Treatment Network (RITN)

Radiation-injury-after-a-nuclear-detonation-medical-consequences-and-the-need-for-scarce-resources-allocation

REMM - Radiation Emergency Medical Management (hhs.gov)

Triage and Treatment Tools for Use in Scarce Resources - Crisis Standards of Care Setting After a Nuclear Detonation

US Department of Health and Human Services – Essential Elements

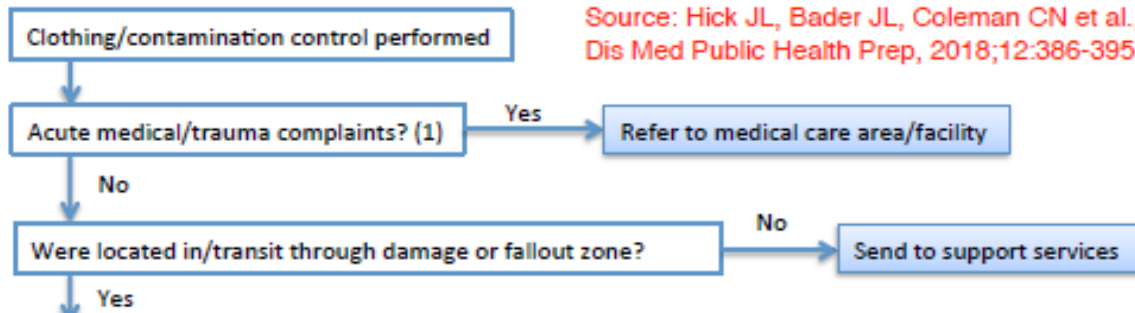
<https://www.phe.gov/Preparedness/planning/playbooks/rdd/Pages/essentialelements.aspx>

US Department of Homeland Security

Healthcare Emergency Response Operations for CBRNE Incidents - Center for Domestic Preparedness (dhs.gov)

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

Date sent to membership	Method of notification	Amendments made	Approval received from membership
3/2/2023	Email	New plan distributed for review and approval by 3/15/2023	3/17/2023