2022

RITN Functional Exercise
Illinois Region 8 & 9 Healthcare Coalition
After-Action Report/Improvement Plan

Exercise Date: September 14, 2022
Report Date: October 10, 2022

Contents

EXERCISE OVERVIEW

Exercise Name	2022 RITN Functional Exercise (Illinois Region 8 & 9 Healthcare Coalition)
Exercise Date	September 14, 2022
Scope	This functional exercise occurred for 3 ½ hours to address the functional elements of the receipt, triage, and care of radiation-injury casualties. Participating organizations included acute care hospitals, emergency management agencies (EMAs), and health departments. Participants minimally exercised command activation, notifications, patient triage, patient decontamination, pharmacy resources, and just-in-time training.
Mission Area(s)	Response
Capabilities	Healthcare and Medical Response Coordination Continuity of Health Care Services Delivery Medical Surge
Objectives	1. Coordinate command and control functions within hospital command centers, emergency management, and local health departments. Hospitals will coordinate with local/county public health and emergency management regarding information sharing, situational awareness, and resource requests. 2. Identify staff, equipment, medications, and supplies necessary to care for a surge of radiation-injury only and burn/blast casualties and combined radiation-blast injuries. 3. Identify resources for the activation of the medical decontamination of radiation injuries. 4. Triage radiation injuries and make treatment determinations for inpatients and outpatients. 5. Coordinate housing, transportation, and other assistance needs for families of radiation-injury casualties that have arrived from distant locations.
Hazard	Radiological (10 Kiloton Improvised Nuclear Device)
Scenario	Medical surge from a distant radiological incident
Sponsor	Radiation Injury Treatment Network® (RITN) National Marrow Donor Program (NMDP) Office of Naval Research (ONR)
Participating Organizations	Advent Bolingbrook Advent Glen Oaks Advocate Hinsdale Advent LaGrange

	Advocate Good Samaritan Advocate Sherman Argonne National Laboratory Cook County Department of Public Health City of Elmhurst Emergency Management Agency (EMA) DuPage County Health Department DuPage County Office of Homeland Security and Emergency Management (OHSEM) Edward Elmhurst Health Gottlieb Memorial Hines VA Illinois Emergency Management Agency (IEMA) Lake County Health Department Linden Oaks Hospital Loyola Medicine Loyola University Medical Center (LUMC) MacNeal Hospital Northwest Community Hospital Rush Copley Medical Center Stickney Public Health District Veterans Administration
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EXECUTIVE SUMMARY

On September 14, 2022, thirteen acute-care hospitals, five health departments, three emergency management agencies, and several other response partners (see complete participant list in Appendix B) participated in a functional exercise to address the receipt, triage, and care of radiation-injury casualties. Participating organizations worked remotely in teams to manage tasks delivered in three modules over 3.5 hours.

Primary Strengths

1. Hospitals are familiar with emergency response plans to request resources from affiliated organizations or to escalate the request to the Regional Hospital Coordinating Center (RHCC), emergency management agency, or state level following established protocols.
2. Staffing aside, hospitals did not experience challenges setting up and conducting decontamination procedures.
3. The ability to directly admit patients rather than arriving at the ED was a recognized strength and best practice in this exercise.
4. Hospital teams demonstrated excellent communication regarding the placement of patients and utilized alternative communication methods when there were technical issues.
5. Hospitals understood that this type of emergency and the associated care would extend beyond an acute period and had plans to staff the ED, inpatient beds, and laboratory to continue testing and treatment.

Primary Areas for Improvement

1. Additional staff should be trained and certified for hazmat/decon response; having just-in-time training/trainers available to augment is critical.
2. Hospitals should develop or revise the radiation annex to the hospital Emergency Operations Plan (EOP).
3. Resources (staff, supplies, equipment) may be limited for decontamination and patient screening response, depending on the size of the anticipated surge. Use this planning scenario to identify gaps and available methods to identify additional resources.
4. National Disaster Medical System (NDMS) hospitals should develop their IT/EMR systems to support patient tracking before an incident; there are other hospitals through the RITN/NDMS network that have modified EMR systems to include a field that indicates the patient is arriving as part of a federal disaster evacuation. Automating or streamlining the process to ensure patients are tracked for reimbursement is critical.
5. Some hospitals were unfamiliar with acute radiation syndrome (ARS) patient care; further education and connection to RITN hospitals for consultation is recommended. These relationships should be formalized and maintained over time.

6. County public health departments and emergency management agencies (EMAs) have existing mass care and family reunification plans. Still, it is unclear how much these have been functionally tested, including evaluating hotel MOUs, identifying sufficient staffing, and coordinating transportation assets.

ANALYSIS OF CAPABILITIES

Exercise Module 1: Resource Assessments and Requests

Before the exercise, participating organizations were asked to complete two tasks. The first was outlining efforts to develop and disseminate internal messaging to staff about radiation and risk; the second was identifying just-in-time training needs. The internal messaging themes centered around the following:

- Incident overview and impacts
- Expectations for the hospital response
- Screening all who enter the hospital for radiation
- Non-invasive evaluation to determine if arriving patients from the blast zone have radioactive contamination
- Information that treating patients exposed to radiation does not present an inherent danger
- Priority is to treat medical injuries
- Including just-in-time training materials (e.g., RITN modules) and a one-page FAQ along with the messaging

Various mechanisms would be used to disseminate the messages via the emergency preparedness committee (e.g., Everbridge, phone, email, radio, and in-person or daily huddle). Some hospitals noted that targeted communications would be provided to leadership.

Capability to offer just-in-time training via Microsoft Teams and/or share the training links on Teams or an internal SharePoint. The type of training included the RITN or REAC/TS training modules, decontamination procedures, and dosimeter use. This was augmented by radiation oncologists, radiation safety officer (RSO), and/or radiation health physicians within the hospital system. A noted best practice was providing all staff awareness level education with more targeted training for clinical providers. At least one hospital also used the exercise to train newer staff on incident command roles.

A poll question was administered to exercise participants asking if the current medical surge plan includes considerations for patients exposed to radiation; 54% indicated that it does.

<u>Resource Assessment</u>

Regarding space, hospitals would activate decompression plans for the ED and the entire hospital. Neutropenic isolation capacity would be assessed. Staffing could be obtained from the entire hospital campus, network hospitals when possible, and offer just-in-time training to build

the staffing capacity. For several facilities, staffing would generally be challenging, particularly for those certified in hazmat and decontamination response.

For supplies, hospitals responded as having a 72-hour (or more) supply of consumables but would engage materials management personnel in the command structure for awareness and support in procuring resources. Some participating hospitals indicated having limited (e.g., 3-5 days) pharmacy supplies (G-CSF, antifungals, potassium iodide), mainly depending on the patient surge. Participating hospitals inventoried blood supply, pharmaceuticals, and burn supplies; these, in addition to phlebotomy consumables, were a concern.

Pharmacy and burn supplies were requested through the RHCC. LUMC had sufficient quantities to fill the requests submitted as part of the exercise. Hospitals also would reach out to vendors or leverage their healthcare system to procure resources based on the anticipated surge. If the situation were particularly dire, push packs from the state or federal stockpile would be requested. Blood product availability would be increased by organizing blood donations.

Other items in short supply for this response included red waste containers and high-reading Geiger counters. Items not requested through the RHCC followed established procedures for emergency management (e.g., decon tents, fire/law enforcement teams, sheltering) or the local health department (e.g., blood drives/products and coordination with the American Red Cross [ARC]).

Radiation Monitoring and Equipment

Hospitals generally had sufficient radiation monitoring equipment to deploy meters to the entrances for screening. When polled, 100% of participating hospitals said they had radiation equipment onsite. If additional monitoring or decontamination team support was needed, it was mentioned that the Mutual Aid Box Alarm System (MABAS) could be activated for hazmat technicians.

Hospitals evaluated decontamination procedures in a range of formats – some doing a tabletop discussion of how screening and decontamination would be done while others exercised functional equipment deployment and decontamination (both wet and dry) of mock patients. The RSO, nuclear medicine and/or designated

radiation safety (hazmat) teams would be deployed for patient screening upon arrival at the facility. This was performed without any reported challenges aside from staffing. Just-in-time training was conducted as part of the exercise to refresh trained personnel and to enable non-clinical staff to support. Seventy-three (73%) of hospitals that responded to a poll question have a trained decontamination team to respond to patients exposed to radiation.

EMAs playing in the exercise did not receive real-time requests for resources. Hines VA Emergency Management received a request to set up a Patient Reception Area (PRA) and simulated how that would be set up and patients distributed. Cook County Department of Public Health received two requests for medication, acknowledged them, and sent them to State partners for fulfillment. The Kane County Health Department also received two resource requests; the first was for G-CSF elevated for fulfillment and the second for phlebotomists to help with blood draws (Medical Reserve Corps (MRC) may be contacted to address this request).

None of the county health departments or emergency management agencies sent guidance to hospitals on radiation response, nor was any requested during the drill.

Strengths

1. Hospitals used this exercise to provide training on incident command roles and basic radiation training for all staff, with advanced training for clinical staff.
2. Hospitals are familiar with emergency response plans to request resources from affiliated organizations or to escalate the request to the RHCC, emergency management agency or state level following established protocols.
3. Hospitals understood what supplies would be needed following a radiological (IND) disaster including both burn and trauma materials and the appropriate pharmaceuticals and blood products. This would enable them to identify alternate sources as patients were still arriving.
4. Staffing aside, hospitals did not experience any challenges setting up and conducting decontamination procedures.
5. For county health departments that received resource requests as part of the drill, they were adjudicated appropriately.

Areas for Improvement

1. Use this scenario to evaluate the supplies/resources that would be necessary, quantity on hand, and time needed, plus methods to procure additional. Sufficient burn supplies, blood products, and phlebotomy consumables were a concern
2. Additional staff should be trained and certified for hazmat/decon response; having just-in-time training/trainers available to augment is critical.

3. Hospital staff could benefit from additional radiation safety, ARS patient care, and resource needs for treatment. The RITN online modules are a recommended starting point (https://ritn.net/training/).
4. Ensure radiation supplies are not outdated; also, that staff has current training on the use of radiation screening/monitoring equipment.
5. While most hospitals had the equipment necessary to perform radiation screening, high-reading Geiger counters are not available at some locations.
6. Include or revise the radiation annex to the HCC EOP.

Exercise Module 2: Patient Triage – Trauma and Burn Patients

Receipt of Patients

Hospitals shared that patient reception would be established in a designated area (e.g., external decontamination tent outside the ambulance bay, in the ED or lobby of the ED, use of closed spaces). All hospitals either notionally or functionally assessed staffing needs to operate a patient reception and decontamination area. One hospital provided a detailed report of the required staffing, minimally one nurse to triage, one public safety personnel, and one technician with training in radiation screening. For decontamination of exposed patients, the support of a minimum of 3-4 first receivers (Level B decontamination training) would be required. Hospital labor pools would be activated to fill staffing positions for patient reception and screening; reporting staff would be briefed before response on incident overview, assignments, and questions. Resources beyond what the hospital had on hand would be requested from the region.

Several other examples provided included:

- Cohorting ARS patients in an overflow unit after decontamination and staffing with oncology nurses as a priority
- Securing access points at the ED lobby entrance for arriving self-transports and using the ED ambulance bay for RITN/NDMS transfers. These would be staffed with radiation and medical screeners to direct patients and visitors appropriately. An alternate care triage tent would be located in the ambulance bay to triage radiation patients.
- Collaborating with Incident Command to arrange for direct admissions to avoid contaminating additional ED rooms with patient body fluids (direct to admission rooms).

Six hospitals tested the decontamination tent setup and procedures as a full-scale exercise; others walked through the process in a tabletop format or set up the equipment but did not fully activate staff for purposes of the drill.

County health departments could provide personal protective equipment (PPE) to help support decontamination efforts. Participating EMAs would follow resource request and fulfillment processes including reaching out to public safety to support hospital decontamination and triage efforts (e.g., police, fire, MABAS for hazmat and decontamination assistance).

Patient Triage and Treatment

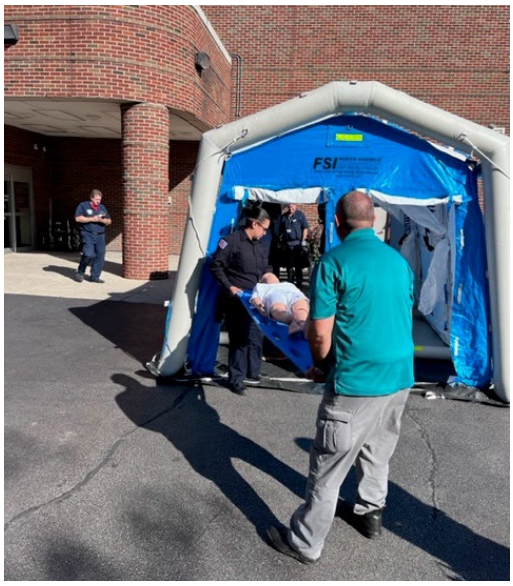
Overall, hospitals performed effectively with the triage and treatment of the mock patient profiles provided as part of the exercise (9 trauma profiles and 11 radiation profiles).

START and JumpSTART triage protocols were utilized to assess the patient profiles. Resource limitations may limit the number of patients that could be triaged and treated unless additional were able to be identified and supplied – some hospitals noted this as a more pressing challenge than others. Bed availability was also anticipated at some facilities depending on the total patient surge. Several specific notes on this task include:

- Dedicated treatment space in one ED POD to treat patients still showing radioactive contaminant post decontamination.
- Triage teams would ask patients where they were specified when the blast went off to obtain more data to augment the laboratory testing.
- Incorporated spot decontamination on affected areas as needed before the patients could be treated.
- Identified the need for alternative clothes after decontamination and a process for handling the hazardous clothes.

Several participating hospitals described the type of personnel that was involved in the patient triage and treatment decision process.

- A trained Advanced Hazmat Life Support (AHLS) medical doctor, radiation subject matter experts, and triage coordinator assessed patients for care.



- Both incident command staff and decontamination tent personnel discussed patient treatment needs.
- ED staff and the Chief Nursing Officer (CNO) triaged the patients and determined the need for admission, discharge, or other needs.
- A local physician expert provided knowledge regarding laboratory levels for radiation-exposed patients to assist in determining the triage of patients.

NDMS Patient Tracking

NDMS hospitals were required to think through patient tracking for those arriving as part of the RITN/NDMS evacuation from the blast site. The responses varied from fairly technical solutions to basic workarounds until there was dedicated time/resources to enter the patients more systematically and streamlined. For example, one would denote a unique electronic medical record (EMR) marker to track NDMS patient arrivals. However, it was not functionally tested in the exercise and is currently a manual process.

Another would have Registration assign beds in EMR under the Disaster Patient category until a clear process was identified to flag NDMS patients. Currently, an icon is available to mark a person as a radiation patient.

Finally, a third hospital would establish a Patient Tracking Unit Leader in command and rely upon the NDMS Standard Operating Procedure (SOP) and NDMS tracking forms it contains.

The VA hospitals are more familiar with federal tracking systems; Hines VA uses TRAC2ES for NDMS patients.

Strengths

1. Hospitals have proficiency in setting up triage tents or other means to screen and evaluate patients; at most hospitals, there are a sufficient number of staff trained on the protocols that others could augment from the labor pool with just-in-time training.
2. The ability to directly admit patients rather than arriving at the ED was a recognized strength and best practice in this exercise.
3. Hospital teams demonstrated excellent communication regarding the placement of patients and utilized alternative communication methods when there were technical issues.

4. Multiple hospitals could articulate the type of staff expertise needed to triage patients arriving from a radiological blast and included them in the exercise to evaluate the patient profiles.
5. VA hospitals (in this exercise, Hines VA) are familiar with federal tracking systems. They could be leveraged to help other NDMS hospitals implement processes to streamline patient tracking in a disaster.

Areas for Improvement

1. Resources (staff, supplies, equipment) may be limited for decontamination and patient screening response, depending on the size of the anticipated surge. Use this planning scenario to identify gaps and available methods to identify additional resources in short order.
2. Finer points of decontamination and patient handling for a radiation scenario require more attention and planning, such as designated clothing for patients to wear after decontamination, disposal of radioactive waste, spot decontamination for affected areas, and access to just-in-time training resources.
3. NDMS hospitals should develop their IT/EMR systems to support patient tracking prior to an incident; other hospitals through the RITN/NDMS network have modified EMR systems to include a field that indicates the patient is arriving as part of a federal disaster evacuation. Automating or streamlining (non-manual) the process and ensuring that patients are tracked for reimbursement is critical.
4. In follow up to this exercise, hospitals should evaluate their decontamination checklists (don/doff procedures, equipment).

Exercise Module 3: Radiation-Only Patients & Outpatient and Family Needs

Triage of radiation injury-only patients would not deviate from standard Emergency Severity Index (ESI triage); the patients would be screened for radiation first and the most critical treated as a priority for care. In very severe instances, immediate medical treatment would come before decontamination. ARS patients would be cohorted and direct admission would be utilized to contain the possible contamination of the hospital. Those that could be treated as an outpatient based on expert medical assessment would be sent to a single designated area to receive further care and/or instructions. At least one hospital implemented guidelines on initial laboratory tests to perform, medications to consider, and inpatient placement based on laboratory results.

It was recognized that staffing demands might extend over time; it would not only be the acute surge of patients but rather those requiring ongoing care. Teams discussed adding staff to the laboratory and the ED to address this.

In general, hospitals understood the types of laboratory tests needed for radiation injury patients and consulted with oncology, hematology, BMT, laboratory, pharmacy, and the burn unit (where applicable). Laboratory testing, at least initially, could be absorbed in the routine throughput of the hospital but for longer-term demand some facilities discussed mobilizing testing and cooperating with outpatient laboratories.

Both hospital pharmacies and laboratories have MOUs to address resource needs in this scenario and the ability to make requests to procure more rapidly. Nationwide demands for the same resources were not discussed.

Family Reunification and Mass Care Services

County public health departments and EMAs were asked to consider their role in family reunification assistance and mass care services. Responses received included the following:

- Request staff to volunteer or utilize the MRC to support family reunification efforts.

- Housing for outpatients and family members could be facilitated through the North East Illinois Community Organizations Active in a Disaster (COAD) and the American Red Cross (ARC).
- Lists of homeless shelters and food pantries could be generated, lists of heating and cooling centers.
- Pace or school buses, other transportation vendors could be coordinated through EMAs.
- Initiate mutual aid.
- Activate Family Reunification Plans to identify available staff and facilities in the county.
- Activate non-clinical staff and community health workers that are members of the Trauma and Disaster Strike Teams to help with behavioral health needs.
- Leverage the State and healthcare coalitions to respond to family assistance needs.
- Identify housing support to include meals for displaced patients and families; health and EMAs would jointly work to activate existing MOUs with hotels and/or emergency shelter locations.

When participating hospitals were asked if they had the means necessary to coordinate housing for outpatients, only 40% indicated that they did.

Strengths

1. Hospitals performed tasks related to screening and triaging radiation injury-only patients without challenges. Standard processes would be implemented, and it was noted that medical care would be prioritized over decontamination in the case of extreme injury/illness.
2. Hospitals understood that this type of emergency and the associated care would extend beyond an acute period and had plans to staff the ED, inpatient beds, and laboratory to continue testing and treatment.
3. Appropriate expertise was available and consulted to determine the radiation patients' laboratory tests and pharmaceutical needs; hospitals outlined the testing and treatment recommendations based on the patient's severity.

Areas for Improvement

1. Some hospitals were unfamiliar with ARS patient care; further education and connection to RITN hospitals for a consult is recommended. These relationships should be formalized and maintained over time (beyond a single point of contact).

2. It may be beneficial to utilize this scenario to focus further on laboratory testing demands and pharmaceutical resources; the nationwide demand for the same resources following an IND detonation was not discussed in detail. Laboratory staffing was not evaluated deeply, and it was unclear if laboratory personnel participated in the drill.
3. County public health departments and EMAs have existing mass care and family reunification plans. Still, it is unclear how much these have been functionally tested, including evaluating hotel MOUs, identifying sufficient staffing, and coordinating transportation assets.
4. Hospitals indicated the need for more robust family reunification plans.

APPENDIX A: IMPROVEMENT PLAN

This improvement plan template has been developed specifically for the Illinois Region 8 and 9 hospitals and response partners that participated in the 2022 RITN Functional Exercise conducted on September 14, 2022. This table can be utilized to organize the opportunities for improvement to augment and develop corrective actions. The improvement plan is intended to strengthen the radiological response and core capabilities identified in this report.

Core Capability	Issue/Area for Improvement	Corrective Action	Capability Element[1]	Primary Responsible Organization	Organization POC	Start Date	Completion Date
Core Capability 1: [Capability Name]	1. [Area for Improvement]	[Corrective Action 1]					
		[Corrective Action 2]					
		[Corrective Action 3]					
	2. [Area for Improvement]	[Corrective Action 1]					
		[Corrective Action 2]					

[1] Capability Elements are: Planning, Organization, Equipment, Training, or Exercise.

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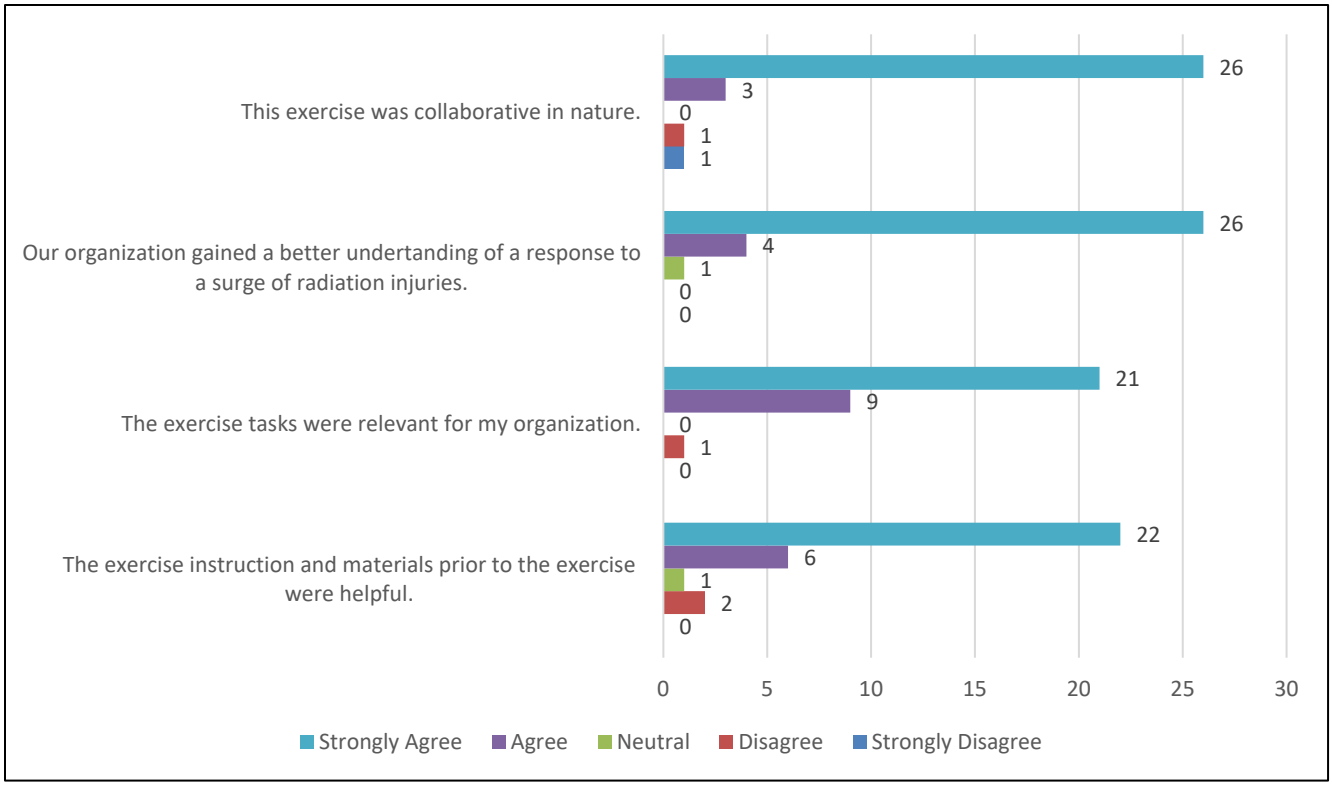
APPENDIX C: PARTICIPANT FEEDBACK

RITN Centers were asked to provide feedback via an online questionnaire following the exercise. Participants were asked to rank their agreement on four questions, total responses for each are below; the majority agreed or strongly agreed with each statement (n=31).



Strengths

- Collaboration and partnerships among the cross-functional teams to deliver patient care
- Flexibility
- Broad range of experience
- Implementation of Emergency Operations Plans
- Capacity for surge space
- Clear communication of information
- Hospital collaboration with external partners (e.g., OHSEM, local health department)
- Having radiation safety officer and physicist on hand
- Decontamination location & space, staff availability
- Identifying partners to assist with needed resources
- Staff knowledge of radiation exposure risks, treatment, and establishment of treatment areas
- Information sharing

- Very knowledgeable Emergency Preparedness team
- Traffic flow and security measures on the campus in the event of a disaster

Gaps/Opportunities for Improvement

Resources:

- The number of team members due to national shortage of health care workers
- Unsure how to obtain potassium iodide
- Need to determine volume of underground storage tank and who empties it
- Lack of space and resources for the treatment of radioactive patients
- Enough dosimeters to monitor and limit staff exposure
- IT response team
- Resources for displaced outpatients and/or their family members
- Laboratory knowledge of available supplies

Plans and Procedures:

- Require a more streamlined/unified chain of command
- Reunification
- Nuclear medicine role in HAZMAT-radiation decontamination protocol
- Lab contacts and process
- Understanding how to address housing/mass care needs at the local level
- Identifying and communicating the role of response partner agencies
- Rapid decontamination and triage of radiation injury patients
- Duration of hospital room closure after a radiation exposure
- Communication improvement among departments
- Handling of contaminated equipment and material with long half-lives
- Prioritization of arriving disaster patients and those with routine complaints
- Updated internal contact information
- Improved understanding of support provided by EMA/health department for reunification of unaccompanied minors
- Include a Radiation Annex in EOPs
- Better understanding & ability to handle collateral issues

Training and Education:

- Geiger counter quality control procedures and training
- Process for mass casualty just-in-time training module
- Lack of knowledge as to how to orchestrate patient flow as not to potentially contaminate other areas of the ER

- More education on radiation exposure injuries and patient placement
- Patient placement guidelines

Additional Thoughts

Exercise Content:

- Communication is always a topic that comes up as an opportunity
- Opportunities exist to educate around radiation exposure
- Best practices/resources for handling contamination of equipment and building materials and employee dose monitoring to help limit exposure
- Collaboration between region hospitals on resource (pharmaceutical) management
- Perhaps a plan to evaluate staffing needs relating to decontamination processes
- Crowd control inside and outside of ER, including parking lots, staging area for decontamination equipment, proper disposal
- Consider how radiation decontamination can be incorporated into the routine decontamination protocols

Exercise Conduct:

- Increased exercise frequency
- Great exercise
- Make controller/evaluator briefing a PowerPoint instead of a prerecorded webinar
- Experienced some confusion regarding the second wave of patients; better clarification of the timing and communication was needed
- It would be interesting to hear the strengths from other organizations
- I am very grateful for this experience, thank you so much!
- Very informative, although not much hands on, it was a worthwhile exercise
- Continued preparation of facilities in disaster events will only help to improve processes and outcomes
- ED and oncology physicians participated, but should have invited trauma surgeons
- Evaluator briefing in advance to provide a better understanding of what is expected in that role; recommend the week of the exercise

APPENDIX D: ACRONYMS

Acronym	Term
AAR	After Action Report
AHLS	Advanced Hazmat Life Support
ARC	American Red Cross
ARS	Acute Radiation Syndrome
CNO	Chief Nursing Officer
COAD	Community Organizations Active in a Disaster
ED	Emergency Department
EMA	Emergency Management Agency
EMR	Electronic Medical Record
EOP	Emergency Operations Plan
ESI	Emergency Severity Index
G-CSF	Granulocyte Colony Stimulating Factor
ICS	Incident Command System
IDPH	Illinois Department of Public Health
IEMA	Illinois Emergency Management Agency
IND	Improvised Nuclear Device
LUMC	Loyola University Medical Center
MABAS	Mutual Aid Box Alarm System
MOU	Memorandum of Understanding
MRC	Medical Reserve Corps
NMDP	National Marrow Donor Program
NDMS	National Disaster Medical System
OHSEM	Office of Homeland Security and Emergency Management
ONR	Office of Naval Research
PPE	Personal Protective Equipment
PRA	Patient Reception Area
REAC/TS	Radiation Emergency Assistance Center/Training Site
RHCC	Regional Hospital Coordinating Center
RITN	Radiation Injury Treatment Network
RSO	Radiation Safety Officer
SOP	Standard Operating Procedure
VA	Veterans Administration

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