2017

New York Regional RITN Exercise: *Tabletop and Functional Components* After Action Report/Improvement Plan

Report Date: November 17, 2017

Table of Contents

EXERCISE OVERVIEW

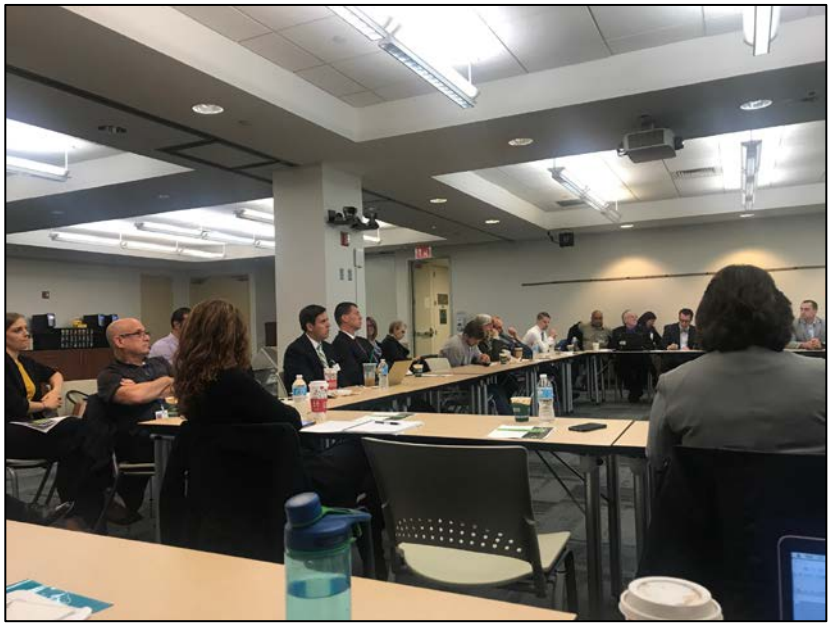
Exercise Name	2017 New York Regional RITN Tabletop Exercise (TTX)
Exercise Date	November 6, 2017 (9:00 AM – 12:30 PM)
Capabilities	Public Health & Medical Services Operational Coordination, Medical Surge, Responder Safety & Health, Mass Care
Objectives	**Objective 1:** Clarify the organizational roles and responsibilities of participating agencies in responding to a surge of casualties with radiological injuries to the New York region. **Objective 2:** Identify the process for casualty reception and distribution within the National Disaster Medical System (NDMS) framework. **Objective 3:** Identify the critical resources available to assist hospitals and treatment centers during a surge of radiation-injured patients and discuss resource gaps. **Objective 4:** Anticipate guidance that non-Radiation Injury Treatment Network (RITN) hospitals will need with regard to receiving radiation-injured patients; of particular concern is triage, treatment, tracking and surveillance of self-referral cases from the area of radiation impact and distribution of medical countermeasures. **Objective 5:** Identify the responsibilities and resources necessary for mass care capabilities to support RITN patients and their families during ongoing treatment at New York RITN treatment centers.
Threat or Hazard	Radiological
Scenario	Medical surge due to a distant detonation of an Improvised Nuclear Device (IND)
Sponsor	Radiation Injury Treatment Network® (RITN)
Point of Contact	Curt Mueller Exercise Coordinator, Radiation Injury Treatment Network Curt.Mueller@nmdp.org (612) 294-4539 Jacob Neufeld Enterprise Resiliency Manager, Memorial Sloan Kettering neufeld@mskcc.org (646) 888-2161

EXERCISE SUMMARY

On November 6, 2017, participants representing 7 local organizations as well as federal participation from the Biomedical Advanced Research and Development Authority (BARDA), Federal Emergency Management Agency (FEMA) and the Radiation Injury Treatment Network (RITN) took part in a tabletop exercise (TTX) to discuss radiation injury patient reception using the National Disaster Medical System (NDMS) framework. The organizations included:

- Memorial Sloan Kettering Cancer Center
- New York University Langone Medical Center
- SUNY Downstate Medical Center
- Northwell Health
- New York State Division of Homeland Security and Emergency Management
- New York State Police/Emergency Management
- Greater New York Hospital Association
- National Council on Radiation Protection and Measurements (NCRP)
- Biomedical Advanced Research and Development Authority (BARDA, ASPR-HHS)
- Federal Emergency Management Agency (FEMA)
- Radiation Injury Treatment Network

Exercise participants addressed five objectives (see Table 1 below) in a scenario-driven, facilitated discussion based on a surge of casualties with radiological injuries arriving to the New York area.



Exercise Scenario

Initial Event

On October 30, 2017 a ten-kiloton Improvised Nuclear Device (IND) was detonated in Chicago.

- Estimated casualties:
  - 300,000 fatalities in the Severe Damage Zone; 150,000 in Moderate Damage Zone.
  - 60,000 urgent casualties in Moderate Damage Zone; 90,000 in Light Damage Zone.
  - 40,000 non-urgent casualties in Moderate Damage Zone; 60,000 in Light Damage Zone.
  - 300,000 worried well across geographical area.
  - **16,400 radiation casualties** across geographical area.
- Secretary of Health and Human Services (HHS) declares a Public Health Emergency and activates the HHS Emergency Management Group.
- The National Marrow Donor Program (NMDP) activates the RITN Control Cell. Control Cell staff begin to monitor the situation and send out Situation Reports (SITREPs) to the RITN facilities as well as notification to fill out and submit the HCS capacity survey.

Initial Event +7 Days

- National Disaster Medical System (NDMS) issues activation protocol for the Detroit Federal Coordinating Center (FCC), indicating the city will be receiving casualties from the disaster zone via NDMS.
- The Department of Veterans Affairs initiates actions to establish a Patient Reception Area (PRA) FCC at the John F. Kennedy International Airport (JFK), where NDMS patients will be received.

Exercise Objectives and Core Capabilities

The following exercise objectives in Table 1 describe the expected outcomes for the exercise. The objectives are linked to core capabilities, which are distinct critical elements necessary to achieve the specific mission area(s). These objectives and aligned core capabilities are guided by elected and appointed officials and were selected by the Exercise Planning Team.

Table 1. Exercise Objectives and Associated Core Capabilities

Exercise Objective	Core Capability	Healthcare Preparedness Capability
Objective 1: Clarify the organizational roles and responsibilities of participating agencies in responding to a surge of casualties with radiological injuries to the New York region.	Public Health & Medical Services	Emergency Operations Coordination
Objective 2: Identify the process for casualty reception and distribution within the National Disaster Medical System (NDMS) framework.	Public Health & Medical Services	Emergency Operations Coordination
Objective 3: Identify the critical resources available to assist hospitals and treatment centers during a surge of radiation-injured patients and discuss resource gaps.	Public Health & Medical Services	Medical Surge
Objective 4: Anticipate guidance that non-Radiation Injury Treatment Network (RITN) hospitals will need with regard to receiving radiation-injured patients; of particular concern is triaging, treatment and tracking/surveillance of self-referral cases from the area of radiation impact and distribution of medical countermeasures.	Medical Countermeasures Dispensing	Responder Safety & Health
Objective 5: Identify the responsibilities and resources necessary for mass care capabilities to support RITN patients and their families during ongoing treatment at New York RITN treatment centers.	Mass Care Services	Emergency Operations Coordination

ANALYSIS OF CAPABILITIES

Question Block 1: Pre-Arrival of Patients

Following the IND detonation in Chicago and federal disaster declaration, notifications would arrive to the New York State level and be communicated to New York City Department of Health and Mental Hygiene (DOHMH) and Office of Emergency Management (OEM). The city agencies would initiate communications with hospitals and other response partners. The State Emergency Operations Center (EOC) would be activated and it is expected that county level EOCs would also activate particularly in the downstate area to support coordination and transportation of patients between jurisdictions. New York City Emergency Management (NYCEM) would work with the VA and Port Authority to set up the Patient Reception Area (PRA).

Hospitals would activate command, augmenting the standard positions with those needed for the RITN response (pediatric, bone marrow transplant [BMT], urgent care). RITN would request bed reports (via HealthCareStandard® [HCS]) within a few hours from hospitals. RITN would send the request for that information along with situation reports (SITREPs) to all RITN hospitals in the network. It was noted that the NYC RITN hospitals are at capacity daily so they would look at decompression strategies to accommodate the surge. An estimate would be that they could take 50-60 radiation injury patients and even more when the outpatient BMT patients were considered. Throughout New York City and the Tri-State area, there are many centers that can be relied upon to support the outpatient surge; it will just be important to assess (both in advance and at the time) what the capabilities and capacity is to do so. There are partnerships that exist on a day-to-day basis and the use of a consultation model could be leveraged to support care in other locations. While hospitals indicated having the space to take patients, the limitations included: staff, laboratory capability, pharmaceutical needs, and the mass care and housing logistics for patients requiring long term stays in the NYC area. There were concerns with double counting the beds (e.g., Hem/Onc beds also counted as med/surge beds) and the need to be able to assess with accuracy the inpatient and outpatient numbers that could be accepted in the area to populate the HCS report to RITN.

While the hospitals are familiar with decompression procedures, it was recognized that that may not be necessary for radiation injury patients (other trauma patients from the disaster may be more likely drive decompression). Being able to triage the patients to the right level of care will drive the need to decompress especially since the patients may arrive with very little information. It is necessary to better understand what type of information is available from the sending hospital/location for an NDMS evacuation in this scenario.

Activation: Following the federal disaster declaration, the Federal Coordinating Center (FCC) would receive an alert for activation from the U.S. Department of Health and Human Services (HHS), which would initiate activities for opening the FCC and the Patient Reception Area (PRA). The VA is leading operations of the PRA so it would be important for the Healthcare Evacuation Committee (HEC) to coordinate information flow between the hospitals and the PRA. The HEC is established as a conduit to the hospitals as far as understanding the bed availability and coordinating transportation resources. It is anticipated that all patients arriving to the JFK PRA would be centralized for triage and then distributed to the five RITN centers and outpatient facilities. This way specialists for triage (e.g., BMT, pediatric), transportation assets, and any other resources could be sent to a single location. A large shelter space (i.e., a hangar at JFK) could be utilized for short term while initial laboratory tests are performed, mental health assessments completed, and then triage for the appropriate level of care. It was noted that before this is accepted as the process, the FCC representative (deployed for hurricane response) should be included in discussions to understand any concerns with this approach. The model is currently arrival to the PRA, send to the definitive care hospital and from there triage as to inpatient/outpatient is conducted.

RITN and NDMS/HHS Coordination: The role of RITN is to provide the specialty RITN bed data/reports to HHS. The RITN hospitals would receive notification to update their RITN beds in HealthCareStandard® (HCS) with current availability and open beds 24 hours later. Hospitals also update information on Granulocyte-Colony Stimulating Factor (G-CSF) availability and outpatient capabilities. RITN consolidates the information and sends it to HHS/ASPR who reviews and utilizes the bed information from across the country to make determinations about where to send patients. RITN requests updates every day following the incident by 2:00 PM so that they can provide a report to HHS/ASPR by 4:00 PM. RITN will also produce and distribute a daily Situation Report (SITREP) to partners nationwide. Based on the information provided from the RITN hospital's during the initial data poll, the RITN Control Cell will provide an estimate of patient numbers to expect.

Operation of the FCC: Due to the hurricane response, the FCC Coordinator was not able to attend the exercise, so there was limited discussion about FCC/PRA operations. Transportation assets were briefly discussed; there is an understanding of the assets that exist and would be utilized (e.g., buses, Uber/Lyft, 30 medical buses) but it is not explicitly tied to RITN response protocols. There is also not a standard operating procedure (SOP) for management of the PRA and the process for distributing patients in this scenario.

Strengths

Strength 1: Hospitals and other response partners can leverage processes established for other disasters to coordinate early on as to how to handle the incoming NDMS/RITN patients; such as activation of command, communications, and decompression protocols.

Strength 2: The New York region has a robust system to accommodate radiation injury patients and can accept many of both inpatients and outpatients arriving through the NDMS system. They did not anticipate issues with providing care except for staff and pharmaceutical resources.

Strength 3: The participants understood the need to include specialists (e.g., BMT, pediatric) in both the hospital incident command structure as well as for triage to prepare for and receive the radiation injury patients.

Strength 4: The practice of using telemedicine/consult to expand outpatient care to off-site clinics is established and could be implemented to keep less severe Acute Radiation Sickness (ARS) patients from crowding the RITN hospitals.

Areas for Improvement

Area for Improvement 1: Identify non-RITN hospitals that have hematology/oncology capability and conduct outreach to include them in the NDMS/RITN response plans. Understanding the capabilities and staff available will inform the number of outpatients that the area could receive.

Area for Improvement 2: Provide resources and opportunities to a wider audience as far as radiation and RITN response training; this should include regional (non-RITN) hospitals and other community response partners. Several resources to consider include:

- RITN Training Resources: https://ritn.net/training/
- Oak Ridge Institute for Science and Education (ORISE) Radiation Emergency Assistance Center/Training Site (REAC/TS): https://orise.orau.gov/reacts/

Area for Improvement 3: Continue discussions with the FCC/PRA and other appropriate partners to determine the feasibility of conducting initial triage and laboratory assessments at the PRA to more strategically arrange transport and destination for care (inpatient or outpatient). Implementing this model would keep outpatients from inundating the RITN hospitals and ensure that those with the most severe ARS get priority treatment. If this model is accepted, it should be tested in a tabletop and/or drill to address any planning gaps.

Area for Improvement 4: RITN should consider in future exercises focusing on the type of information and communications that the sending hospital/region provides to the receiving hospitals

(i.e., looking at the information flow from the other perspective) both to improve understanding/expectations by the RITN hospitals and to identify any gaps that could proactively be addressed.

Area for Improvement 5: Conduct additional planning to obtain a more refined assessment of the number of outpatients that could be accommodated in the region. This information is now required in the HCS form.

Question Block 2: Arrival of Patients

Approximately 8 days after the IND detonation, RITN patients would arrive to the FCC in waves of approximately 30 people per aircraft. The aircraft arriving to the FCC/PRA will contain a passenger manifest and some limited medical information, at most the estimated radiation dose based on proximity to the blast site.

Inpatient/Outpatient Triage

As mentioned previously, a centralized triage location (e.g., at the PRA) was discussed for determining inpatient/outpatient status and arranging for care and transport as appropriate. Symptoms of ARS would be assessed for each arriving patient as well as whether the patient is compromised (e.g., diabetes, pregnant, pediatrics) and the estimated level of exposure. It was noted that a checklist for triage guidelines is needed (easy reference for scoring patients as to inpatient or outpatient status) so that the process is more standardized and defensible. Triage guidelines are in development by RITN and are anticipated to be available in draft form in 2018; in the meantime, there is basic triage guidance available on the Radiation Emergency Medical Management (REMM) website (https://www.remm.nlm.gov).

It would be difficult to discharge patients currently in the BMT unit and the hospital is always at capacity (50-60 patients in this unit). Through the discussion, hospital representatives indicated that they might be able to discharge 5-10 patients. It may be necessary to extend operations of the transplant unit to other areas of the hospital depending on the expected surge. The challenges to this include staffing to care for the additional patients, medication supply, and providing space that is sterile enough for people with bone marrow injury. Creating a protective environment for these patients would not happen quickly but it could be done. It was not clear how much planning has been conducted on transplant unit expansion.

Non-RITN hospitals would receive guidance to keep their existing patients as much as possible rather than flooding the RITN centers. The referral guidelines published to the RITN website could be provided to those hospitals to support their assessment of patients for the need to transfer.

For unaccompanied pediatric patients, the RITN hospital would admit them and work to determine who was the consenting authority for their care. It was mentioned that NDMS could use regional resources for moving pediatric patients.

Behavioral/Mental Health Considerations

All hospitals would activate psychological care in response to the mass casualty incident; there would be concerns about the community at large due to the unprecedented incident occurring in the

U.S. and fears of radiological patients arriving to the New York region for care. It would be necessary to have a strong coordinated message to ensure that the community is hearing from elected officials and medical providers as to the risks and what the healthcare system is doing to protect and provide care. NYC DOHMH has volunteers that can support behavioral health needs as well as the American Red Cross who would be leveraged to augment the internal hospital psychological care teams. New York State Department of Health also has an Office of Mental Health which could provide teams like the DOHMH assets (deployment of these teams would be coordinated by the State EOC).

The DOHMH teams do not have specific training on the radiological risks to accompany their mental health support. Educational resources should be made available to these staff in advance of an emergency but also easily accessible should an incident like this occur.

Spontaneous Patient Arrivals

Spontaneous arrivals (from the incident that self-report and are not part of the NDMS evacuation) would be received as any other patient walking in to the ED. It was recognized that screening/triage questions should be developed in advance and staff prepared to screen incoming patients. It would also be necessary to have proactively set up mechanisms to designate these patients in the hospital tracking systems as an event patient but not part of NDMS. The patients arriving as part of NDMS would have Joint Patient Assessment and Tracking System (JPATS) numbers and would be monitored by the federal Service Access Team (SAT) daily for status and reimbursement.

Patient Tracking and Reimbursement

Many of the hospitals utilize the Epic for electronic medical records; however, MSK does not use this system so would not be able to exchange patient information with the others in the region. A public health information exchange system (Healthix) was discussed to share information locally (would not be linked to the national level or NDMS tracking numbers). All partners just need to agree upon what data is acceptable to be shared by hospitals in this event.

The length of stay would be a challenge as patients requiring treatment would quickly exceed the 30 day NDMS reimbursement. RITN hospitals would need to coordinate with the FCC to submit a waiver that extends the reimbursement period (>30 days). This waiver has not been made available yet for RITN to share with the network. Questions also remained as to how labor costs are processed (i.e., who is that reported to – the FCC, the ASPR Regional Emergency Coordinator [REC], other).

Resource Requests

Resource requests for all patients arriving to the area would follow standard processes; the healthcare coalitions work together first to identify resources and for non-medical resources the EOCs are activated and follow the ESF-8 resource request process through NYCEM. The health systems mentioned working with vendors to identify resources but vendor dependency issues exist where all will be relying upon the same vendor for resupply (nationwide problem after ~1 week).

For the number of inpatients that were anticipated in this scenario, Memorial Sloan Kettering (MSK) didn't anticipate any issues with G-CSF and antibiotic stockpiles in house. BARDA also indicated that there is a stockpile locally of Neupogen® in their warehouse, which puts New York in a better position than several years ago when this was last discussed. However, it was quickly recognized that there would be nationwide shortages in this type of scenario and guidance on how the national supply will be prioritized must be developed to support both inpatient and outpatient treatment decisions. There is a need for federal level guidelines on medication prioritization or at a minimum a regional set of guidelines (e.g., developed with a working group but implemented by the New York State Department of Health in the event of this disaster) so that everyone is making decisions based on the same criteria.

A **functional** component to the exercise was that MSK ambulatory care clinics were polled in real time to determine the Neupogen® stock on hand. The results are as follows:

Clinic Name	Total Doses of Neupogen® 480mcg (vials and syringes)
Memorial Hospital – Main Campus	465
53rd Street	49
BAIC	45
64th Street Outpatient Center	12
60th Street Outpatient Center	0
Brooklyn Infusion Center	10
Josie Robertson	0
Basking Ridge	20
Monmouth	26
Commack	21
Hauppague	0
MSK Westchester	46
Rockville Center	26
Ralph Lauren Center	480mcg x 2 syringes 300mcg x 3 vials

Responses were received within several hours; the RITN metric is within 24 hours.

Outpatient and Mass Care Considerations

As with other RITN hospitals, the mass care and social services considerations remain a key challenge to accepting both inpatients and outpatients requiring care after radiation injury. Since mass care is an ESF-6 function (Mass Care, Emergency Assistance, Temporary Housing, Human Services), the hospital actions would be to set up a family assistance support center to provide information and coordination for patients as to how to work with the emergency management partners to address these needs. It was recognized that many more people beyond just the NDMS/RITN patients will arrive to NYC looking for care or shelter. There are concerns that gaps in the RITN specific plans exist – it needs to be discussed and clearly documented what the role of the RITN hospital is and the role of city/state/federal emergency management as far as the mass care needs.

FEMA and NYCEM have contracts with hotels that could be used to house outpatients. Another idea was the use of cruise ships on the East River (individual rooms and can maintain a cleaner environment for the ARS patients). It was recognized that estimates for outpatients have not been well defined and this requires more discussion and planning as to how best to accommodate that type of surge. Another resource discussed would be distributing the outpatients to centers affiliated with the RITN hospitals and by using those off-site clinics it would spread out the housing impacts.

More information was needed on the federal reimbursement process for housing. Typically, only those arriving on the NDMS aircraft will receive federal reimbursement, not any of the family members arriving on their own or spontaneous arrivals that require care. If hotels, closed schools, or cruise ships are to be used for shelters, established contracts and education to these partners in advance is necessary to ensure that they will accept people arriving to the area who have been exposed to radiation.

Public Messaging

Joint messaging was emphasized throughout this exercise. NYCEM would collaborate with the city and state health departments to make sure the messages are consistent and set up the press conferences. Hospitals would funnel their information up to the health departments as necessary and receive statements back from those entities to communicate internally and with their patients. It was recognized that social media and rumor control would be very important to get in front of, so early on in incident response ensuring that city/state/federal messaging does not conflict. NYC DOHMH monitors social media and would be the lead for handling rumor control. Leveraging existing radiological communications resources to develop message templates specific to radiological responses can be done in advance and then tailored to the specifics of the incident.

Strengths

Strength 1: The participants demonstrated a clear understanding of the factors that would be considered when triaging a radiation patient to inpatient or outpatient status. The appropriate experts would be included in the triage process (e.g., BMT specialists).

Strength 2: Mental/behavioral health resources are robust in New York City and statewide and coordinated processes through the EOC exist for deploying those assets to support the community and reduce the worried well. Hospital psychological teams are also available to respond to inpatient and staff needs.

Strength 3: Hospital and Emergency Management partners were familiar with the ICS resource request process and will implement this to fulfill both medical and logistical (e.g., lodging) needs following the chain from local to state to federal.

Strength 4: MSK Main Campus and ambulatory clinics were able to quickly assess and respond to a poll for currently available Neopogen® stocks (response within several hours).

Areas for Improvement

Area for Improvement 1: Triage guidelines for radiation injury patients are needed; until these guidelines are made available to RITN hospitals it is important to identify local expertise to help assess and make decisions as to prioritization of care and scarce resources.

Area for Improvement 2: Further information is needed from the federal level on how the waiver process works (to exceed the 30 days of care for federal reimbursement). It is not clear or documented how to request that waiver and what exactly would be covered in this type of disaster. If possible, a copy of the waiver template should be obtained from NDMS and distributed by RITN for hospitals to incorporate into plans.

Area for Improvement 3: Continue discussions on the outpatient and inpatient family housing options for extended periods of time, it was recognized that significant gaps exist in the RITN plans as to the roles in coordinating housing (hospital and city/state/federal emergency management). Brainstormed lodging options should also be further considered as part of the planning process (e.g., use of cruise ships, delivering outpatient care where the people are housed rather than transport to the hospital, reliance on off-site clinics). Determine the agency(s) that be involved in these planning discussions in order to develop plans and establish MOU/MOAs with the identified housing options as necessary.

Area for Improvement 4: The transition from the hospital to emergency management and definition of roles requires additional planning as it pertains to the mass care and sheltering functions. NYC DOH may be the most appropriate entity for coordinating across partners (prior to and during a response). State health needs more familiarity with the RITN plans to define their role and the types of resources they need to be prepared to coordinate. Processes to coordinate during an incident such as coordination calls with hospitals, public health, and emergency management should be included in the plans to facilitate information sharing and streamline resource requests.

Area for Improvement 5: Evaluate the use of the Healthix system to share patient information across hospitals and health departments throughout the region. Further discussion is required as to the type of information that can be shared on patients pertaining to this scenario. Beyond the local application of this system, it may be worthwhile to consider promoting it for use by hospitals nationwide and exploring the ability for it to communicate with the federal JPATS system.

Area for Improvement 6: Because federal guidelines on medication prioritization in this scenario are not yet available, develop hospital/region-level guidelines (NYS DOH may need to lead this effort) to determine which patients will have priority in receiving the doses where there is a national shortage of medications (G-CSF). Leverage palliative care determinations for how these guidelines are developed and implemented.

Area for Improvement 7: Additional planning is needed for BMT unit expansion to include the spaces that could be used within the hospital, how to support staffing needs, and identifying/addressing potential resource shortages (e.g., pharmaceuticals).

Area for Improvement 8: Implement screening questions to assess spontaneous arrivals and verify that they were in the blast zone and experiencing ARS symptoms. Screening questions could be developed and distributed by RITN for use at RITN centers nationwide. Include the screening question process in the local/hospital RITN plan and provide to any other response partners (e.g., airport, police) who may encounter potentially exposed people.

Area for Improvement 9: Offer radiological education opportunities to mental health response teams as well as off-site clinics and relevant community members that may support mass care operations.

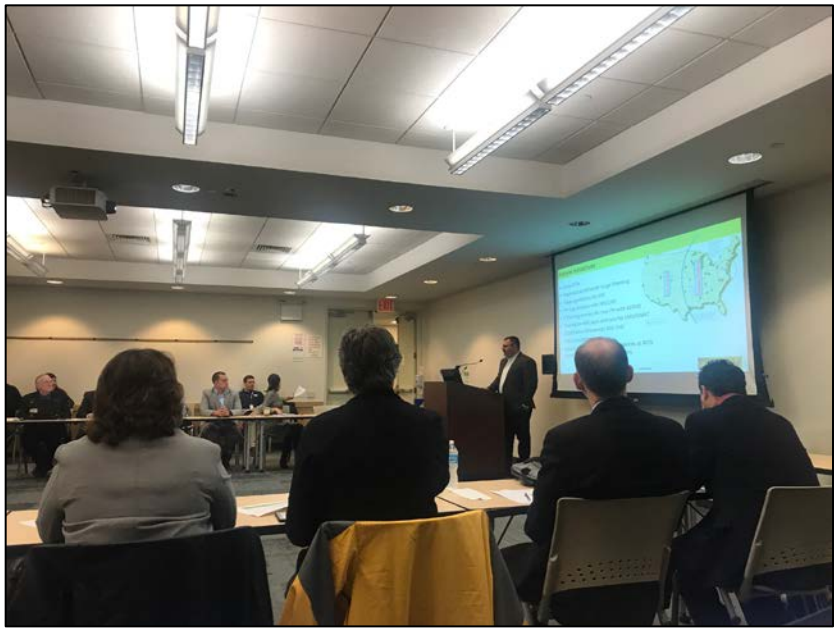
- Explore RITN sponsored Radiation Emergency Assistance Center/Training Site (REAC/TS) training for medical personnel (https://orise.orau.gov/reacts/capabilities/continuing-medical-education/default.aspx)

- Conduct and promote RITN trainings (http://ritn.net/training/) and consider downloading to have access in the event that infrastructure goes down.

Area for Improvement 10: Continue planning to leverage off site clinics for outpatient care. This includes outreach to the centers in advance to 1) pre-identify hotels in the area for housing needs and make arrangements with those facilities, 2) provide staff training on RITN, 3) establish mechanisms to teleconsult with specialists at the RITN centers to guide care, and 4) coordinate with the FCC as these plans are being developed to use off site facilities and any contracts that must be established with hotels in those areas.

Area for Improvement 11: Public messaging strategies should be developed in advance (as possible) and incorporated into existing emergency response plans. References to assist with radiological incident messaging strategies and templates include, but are not limited to:

- U.S. HHS Radiation Emergency Medical Management (REMM) website - Information Resources for Public Information Officers. http://www.remm.nlm.gov/remm_pio.htm
- FEMA. "Improvised Nuclear Device Response and Recovery: Communicating in the Immediate Aftermath" – June 2013. http://www.fema.gov/media-library-data/20130726-1919-25045-0618/communicating_in_the_immediate_aftermath__final_june_2013_508_ok.pdf
- EPA PAG Communication Resources. https://www.epa.gov/radiation/pag-public-communication-resources



HOTWASH

Strengths

- Exercise was an effective way to engage more partners and understand roles – continue to include more and more of these partners going forward.
- Gaps identified in past exercises have improved, for example the training and cross-jurisdictional issues.
- Public health has a better understanding of the conversations and coordination that needs to occur in this scenario and their role in supporting that.

Improvement Planning

- Educate and train non RITN hospitals to implement a tiered system to accept greater numbers of outpatients. Include in future exercises.
- Need to better understand the role and information available from the center/region that is sending the patients.
- Further exploration is needed on the triage occurring at the PRA rather than sending all arriving patients to the hospitals.
- A future meeting with the physicians, RITN hospital representatives, and the federal partners to determine the type and number of patients that can be handled in the NYC area; formalize into guidelines.
- Train mental behavioral health responders on this type of scenario.
- Need a clear policy (guidelines) about medication prioritization.
- Further consideration and planning is needed for the long-term recovery and mass care of patients and families.
- Investigate the use of cruise ships and other outside-the-box options for housing outpatients; this will require contracts be in place in advance of an emergency and that the partners have been educated as to the expectations.
- Consider inviting a DSCA (Defense Support Civil Authorities) representative to the next RITN tabletop exercise to determine if they can integrate/support some of the identified challenges and response activities.
- Further discussion regarding bringing care to the patient rather than transporting patients to the hospitals/clinics for care (use of cruise ships, hotels, etc. and deploying the care to those locations).
- Socialize plans up the management chains (hospitals and city/state agencies) so that they are on board with recommendations as to where patients will receive care (e.g., hospital, cruise ship).

APPENDIX A: IMPROVEMENT PLAN

This improvement plan template has been developed specifically for the RITN centers participating in the 2017 RITN Regional Exercises. The MSK RITN Center and partner organizations can utilize this table to organize the opportunities for improvement to augment and develop their own corrective actions.

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.

APPENDIX B: EXERCISE PARTICIPANTS

Below is a copy of the sign in sheet to document the participants at the November 6, 2017 RITN Regional exercise held at the Greater New York Hospital Association (GNYHA).

RITN TRAINING

NOVEMBER 6, 2017

NAME	FACILITY	EMAIL
Jacob Neufeld	MSK	Neufeldj@mskcc.org
Janine Kennedy	MSK	KennedyJ@mskcc.org
Jeff Groeger	MSK	groegerj@mskcc.org
Nina Pickett	MSK	pickettn@mskcc.org
Andrew Dahl	NYU Langone Health	Andrew.Dahl@nyumc.org
GARRETT T. DOERING	WMC HEALTH	GARRETT.DOERING@WMCHEALTH.ORG
Raul Gomez	FEMA	raul.gomez@fema.dhs.gov
James Salway	SUNY Downstate	james.salway@downstate.edu
Bonnie Arquilla	SUNY Downstate	Bonnie.Arquilla@Downstate.edu
Erik Rudolph	NYSP / NYS OEM	Erik.Rudolph@DHSES.NY.Gov
MYRA KLEIN	NYS DHSES OEM	MYRA.KLEIN@DHSES.NY.GOV
JOHN BOICE	NCRP	BOICE@NORRONLINE.ORG
Lawrence T. Dauer	mskcc	dauerl@mskcc.org
Rob Prins	MSK	prinsr@mskcc.org
PATRICK MEYERS	GNYHA	PMEYERS@GNYHA.ORG
Jenna Mandel-Ricci	GNYHA	jmandelricci@gnyha.org
Robert Bristol	NYCEM	rBristol@oem.nyc.gov

RITN TRAINING

NOVEMBER 6, 2017

NAME	FACILITY	EMAIL
Ashley Cecere	BARDA	Ashley.Cecere@hhs.gov
Mary Mahoney	Northwell Health	mmahonc1@northwell.edu
Eddie Reyes	Northwell Health	EReyes3@Northwell.edu
Ann Jakubowski	MSKCC-RITN	jakubowa@mskcc.org
ROGER GOODWIN	NYS OEM	Roger.goodwin@DHSES.NY.gov
NICOLE MARKS	NYS OEM	nicole.marks@dhses.ny.gov
Cullen Case	RITN	
N. KERNAN	MSLCC	
Erik Talley	MSK	talleye@mskcc.org
Penny Damaskos	MSK	Damaskp1@mskcc.org
King Him Pon	MSK	ponk@mskcc.org

APPENDIX C: PARTICIPANT FEEDBACK SURVEY

Following the exercise a feedback survey was sent to participants to gather candid feedback on the strengths, areas for improvement, and exercise conduct. A summary of the results is captured below. Seven participants provided feedback.

QUESTION	RATING (Scale of 5)
The exercise objectives were met	4.0
The exercise objectives were appropriate	4.0
The unfolding events facilitated a valuable dialogue regarding planning and response elements	4.29
The activities helped me understand my agency/organization's role in the distribution of patients as part of the RITN/NDMS process	3.86
The activities helped me understand the roles and responsibilities of other agencies and organizations in the distribution of patients as part of the RITN/NDMS process	3.71
The facilitators provided participation opportunities for all participants.	4.43
Participation in the exercise was appropriate for someone in my role	4.57
Written materials used during the exercise were helpful	4.0
As a result of the exercise, I learned something new	4.43

Feedback – Strengths

- Strong representations across agencies; willingness to partner
- RITN references and resources website
- Identification and discussion of existing services/processes at the RITN hospitals
- CONOPS for this type of response exists
- Extensive subject matter expertise and knowledge base
- Experience with previous disaster response is helpful and can be applied to this scenario

Feedback – Improvement Areas

- Discussions focused on the initial response and receipt of patients to NYC hospitals but did not broach the secondary response of how to handle decreasing supply and asset shortages
- Roles and responsibilities of the FCC/NYCEM/GNYHA and hospitals are not clear
- Patient housing issues
- Identified the need for centralized triage at JFK PRA
- Unclear how the NDMS will coordinate with local entities to receive patients
- Type of information that will be available on arriving patients and access to bloodwork

- Need more planning on outpatient care
- Need to identify alternate large sites and resources (e.g., airport hangars, cruise ships) in advance of the disaster
- Unclear who will coordinate ESF-6 sheltering plan and integrate with the ESF-8 for RITN patient care
- Transferring patient medical information between facilities
- Need triage guidelines for patient receipt in NYC

Feedback – Exercise Conduct Strengths

- Build connections/relationships with others involved in the response
- Fostered good discussion
- Well organized and facilitator understood the material
- Appropriate scenario, not overwhelming
- Discussion between healthcare/hospitals and other partners
- 3 hours was an appropriate amount of time

Feedback – Exercise Conduct Recommendations

- Need participation from the FCC and other federal partners in future exercises
- Better clarification of the triage process prior to transfer from the incident site in Chicago
- Need to include non-RITN hospitals in planning and exercises
- Too much time and tangents on some of the topics
- More discussion on public communications and sheltering plan

APPENDIX D: ACRONYMS

Acronym	Term
AAR	After Action Report
ARS	Acute Radiation Sickness
ASPR	Assistant Secretary for Preparedness and Response
BARDA	Biomedical Advanced Research and Development Authority
BMT	Bone Marrow Transplant
DSCA	Defense Support Civilian Authority
EOC	Emergency Operations Center
ESF	Emergency Support Function
FCC	Federal Coordinating Center
FEMA	Federal Emergency Management Agency
G-CSF	Granulocyte-Colony Stimulating Factor
HCS	Healthcare Standard (RITN data collection matrix)
HEC	Hospital Evacuation Committee
HHS	Health and Human Services
ICS	Incident Command System
IND	Improvised Nuclear Device
JFK	John F. Kennedy International Airport
JPATS	Joint Patient Assessment and Tracking System
MOU/MOA	Memorandum of Understanding/Memorandum of Agreement
MSK	Memorial Sloan Kettering
NCRP	National Council on Radiation Protection and Measurements
NDMS	National Disaster Medical System
NMDP	National Marrow Donor Program
NYC DOHMH	New York City Department of Health and Mental Hygeine
NYCEM	New York City Emergency Management
ORISE	Oak Ridge Institute for Science and Education
PRA	Patient Reception Area
REAC/TS	Radiation Emergency Assistance Center/Training Site
REC	Regional Emergency Coordinator (ASPR)
REMM	Radiation Emergency Medical Management
RITN	Radiation Injury Treatment Network
SAT	Service Action Team
SITREP	Situation Report
TTX	Tabletop Exercise
VA	Veterans Affairs (Medical Center)