2023

RITN Tabletop Exercise (TTX) After-Action Report/Improvement Plan

Exercise Date: August 9, 2023

EXERCISE OVERVIEW

Exercise Name	2023 RITN Tabletop Exercise (TTX)
Exercise Date	August 9, 2023
Scope	The exercise was a distance-based tabletop exercise scheduled for 2 hours. Exercise play is limited to RITN facilities and their response partners' collective challenges and considerations for improved and effective response.
Mission Area(s)	Response
Capabilities	Medical Surge
Objectives	**Objective 1:** RITN hospital staff can determine their hospital's capacity to receive casualties (inpatient and outpatient) through the National Medical Disaster System (NDMS) following a mass casualty radiological incident. **Objective 2:** RITN hospital staff can identify staff, equipment, and other resource needs to support patients receiving outpatient care.
Hazard	Radiological
Scenario	Medical surge from a distant radiological incident
Sponsor	Radiation Injury Treatment Network® (RITN) Office of Naval Research (ONR)
Participating Organizations	Children's Hospital of Wisconsin - Milwaukee (Milwaukee, WI) Duke University Hospital Cancer Center (Durham, NC) Froedert Hospital (Milwaukee, WI) Intermountain Primary Children's Hospital (Salt Lake City, UT) Massachusetts General Hospital (Boston, MA) New York University Langone Health (New York City, NY) Texas Children's Hospital (Houston, TX) University of California San Francisco Benioff Children's Hospital (Oakland, CA) University of Colorado Cancer Center (Aurora, CO) Wake Forest University Cancer Center (Winston-Salem, NC)
Point of Contact	RITN Control Cell RITN@NMDP.ORG (612) 884-8276

EXERCISE SUMMARY

On August 9, 2023, ten RITN centers, and the RITN Control Cell participated in an online tabletop exercise to determine hospital capacity (e.g., staff, equipment, supplies) to receive inpatient and outpatient causalities through the National Medical Disaster System (NDMS) following a distant, mass casualty radiological event. A facilitated series of exercise tasks were provided to participants for their consideration, response, and group discussion organized by the exercise scenario summary below.

Scenario Summary: The following illustrate the scenario events considered for participant discussion:

Exercise Scenario

- A 10-kiloton Improvised Nuclear Device (IND) was detonated yesterday approximately 500 miles away from your facility. No threat of fallout and no utility interruptions.
- RITN Control Cell staff begin to monitor the situation and start sending out daily situation reports (SitReps) to hospitals.
- RITN hospitals have been requested to start completing their capabilities report and submitting it daily using the RITN Portal.
- Hospitals were instructed to use their current census for exercise purposes when completing the capabilities report.

ANALYSIS OF CAPABILITIES

Exercise Discussion Module 1: Capabilities Report

Exercise participants were tasked to utilize the RITN Portal to complete the Capabilities Report and provide feedback on the process for compiling the necessary data along with any challenges experienced. The Capabilities Report gathers information on adult and pediatric hematology/oncology and bone marrow transplant (BMT) beds available, ability to provide outpatient care to both adults and pediatrics, and various pharmaceutical quantities available at the hospital to care for acute radiation syndrome (ARS) patients. Participating RITN hospitals reported that the Portal was either very easy to navigate (60%) or somewhat easy to navigate (40%). Challenges described for data entry into the Portal Capabilities Report included:

- Individuals with access to the Portal for data entry are not clinical so require support in interpreting the data entry categories to ensure information is accurate.
- Bio-similar medications are not listed as an option on the CR; having an "other" category to enter this data would be helpful.
- Importance of reporting medication doses available immediately and in 24 hours; similar to bed availability data.
- Add staffed bed definitions.
- Specify doses for pharmacy and BMT staff to more accurately report information; dose per vial is dependent on patient weight and age (i.e., adult versus child).
- In one case, pharmacy took two days to report the information so a better contact (e.g., pharmacy inventory department) should be added to plans.
- Some hospitals only had one person with access and training to enter data into the RITN Portal (no redundancy).

Other hospital teams that would be contacted to provide data for the CR included BMT, incident command, pharmacy, inpatient/outpatient units, and bed availability. Personnel responsible for compiling and entering the data included the RITN Coordinator, emergency management, patient flow, and enterprise resilience. A recommendation was made to have a generic log in or account to ensure multiple backups at the hospital.

Seven of ten participating hospitals were part of the NDMS and three were part of the American Burn Association (ABA). A question was posed as to how they would deconflict available bed counts when reporting to those organizations as well as to RITN. Hospitals that are part of multiple federal systems stated they have a separate entry method for RITN and would not use the same beds that were reported to NDMS or the pediatric disaster network (i.e., reserve BMT

specific beds for RITN). Bed capacity software can help deconflict the burn and NDMS beds after the two different data requests are identified but it has not been thoroughly tested. There are four regions in the nation with a Regional Disaster Health Response System (RDHRS) whose core objective is to facilitate a mechanism for communication with National Specialty Organizations (NSOs) for mobilization of limited clinical subject matter experts (SMEs). Standardizing this interaction with NSOs (e.g., RITN, NDMS) may help with double counting and SME resources.

Strengths

The following strengths were demonstrated:

Strength 1: There were minimal challenges with using the RITN Portal to enter bed and pharmaceutical data necessary to respond to patient care needs. Despite some delays, the required information was completed as part of the exercise.

Strength 2: Hospitals had a clear understanding of the departments/teams that need to be involved to quickly obtain data for completion of the CR.

Areas for Improvement

The following areas require improvement:

Area for Improvement 1: The majority of hospitals had no (or limited) backup staff identified who can access and are trained on the RITN Portal for completion of the Capabilities Report. It is recommended that RITN hospitals review personnel with access and ensure a minimum of 1-2 backup staff. Functional drills to evaluate access to the system for data entry are recommended.

- RITN Recommendation: evaluate whether hospitals can have a generic account to enable anyone available and trained to enter data during a disaster.

Area for Improvement 2: More clarity on the Capabilities Report data fields would enable non-clinical personnel to more easily enter information and reduce delays resulting from side discussions during a response (e.g., staffed beds, pharmaceutical doses – see recommendations below).

Area for Improvement 3: Add an "other" option for pharmaceutical entry on the CR to enable bio-similar formulations to be entered. Ensure the definitions/instructions are inclusive of this.

Area for Improvement 4: Growth factor inventory question is nuanced by pediatric versus adult dosing; be specific that the total amount reported in the CR is adult doses, but the individual hospital can modify for pediatric if needed.

Area for Improvement 5: Clarification is needed as to whether crisis standards of care apply if a disaster of this nature did not occur in the RITN hospital's jurisdiction; this declaration and/or allowance of 1135 waivers would enable RITN hospitals to flex beds when reporting to the CR. Discuss with the U.S. Department of Health and Human Services (HHS) Administration for Strategic Preparedness and Response (ASPR) to receive clarification for RITN response plans.

Area for Improvement 6: Hospitals that are part of more than one federal/national association (i.e., NDMS, ABA, RITN) require more opportunity to test deconfliction of bed reporting using software or other methods described in this exercise.

Area for Improvement 7: Further clarity on bed definitions is requested; for example definition of a pediatric bed (depends on nursing qualifications that are providing care to a given bed) and of hematology/oncology beds (e.g., consider staffing capability to administer chemotherapy or number of beds with positive pressure capability for BMT).

Area for Improvement 8: Add a CR category for medications that can be available in 24 hours (not just current supply) as these can be ordered. Similar to bed data, quantity on hand now and what can be available in 24 hours.

Area for Improvement 9: A future tabletop exercise is recommended that focuses on true surge for a RITN disaster to evaluate how many beds can be created based on space, staff, and other operational assumptions.

Exercise Discussion Module 2: Outpatient Planning

This module focused on the planning and capability for hospitals to receive a surge of outpatients affected by radiation injury, such as surge capacity (e.g., patient care, laboratory testing), communications, and mental/behavioral health considerations.

Outpatient Care: The biggest concerns with regards to outpatient care was staffing, daily case load, current available space/treatment rooms, and ability to expand patient care areas as was done for the COVID-19 pandemic testing/vaccination operations. Nursing and hospital leadership would be consulted to determine space and develop calculations for outpatient care based on duration of the visit/appointment and complexities of the patients. It would be possible to divert existing patients to other facilities in the enterprise to make space for the incoming RITN patients. Outpatient care would occur primarily on the main campus of RITN hospitals as well as satellite outpatient clinics, incorporation of other hospitals/resources by collaborating with the healthcare coalition, implementation of telehealth, and use of roving phlebotomist and/or clinical teams to assist with laboratory tests and patient evaluation. It is expected that laboratory capability would be significantly strained in this response, particularly having sufficient trained staff to perform blood draws as well as specimen transport capacity.

The majority of hospitals in this exercise described plans and practices in place to care for existing outpatients to including housing, transportation, family assistance, and mental health resources (90% had mental health plans, 70% had plans in the other key areas). Hospitals expressed concern over the ability to expand care for a large surge of patients, in particular housing, other than requesting support from local/state emergency management partners. Mental health appeared to be more resourced but family assistance and various logistics would need to be supported by the local health department or other state/local entity. Unaccompanied minors would present a challenge for both clinical aspects as well as the mass care considerations.

As learned through the COVID-19 pandemic response, it was noted that staff mental health resources would also be critical in this scenario. One participating hospital mentioned expansion of hospital incident command positions to address staff mental health needs in a time of crisis.

Literature: Overall, participating hospitals do not have tailored materials on radiation exposure for both staff and patients/families. Current patient-focused education on radiation therapy and exposure exists but for this scenario it would be essential to work with the hospital Radiation Safety Officer (RSO) and consult the RITN website to develop incident-specific materials as well as address the type of injuries.

Screening Questions: Half of participating hospitals indicated having a list of screening questions for a radiation injury disaster. One hospital discussed creating a flow diagram and screening question set that could reside in the electronic medical record system to be accessed by social workers, phlebotomy teams, and nurses providing outpatient care; some of the considerations that were outlined in the *CDC Post-IND Morbidity Surveillance Form* reviewed during the 2021 RITN tabletop exercise series (reference after action report here: https://ritn.net/-/media/project/nmdp/ritn/documents/exercises/tabletop-exercises/2021/ritn-cdc-post-ind-mortality-form-after-action-report-tabletop-exercise-2021-09-20.pdf?rev=2f49fe1220a7446999f7662841e10505&hash=57944A8203A8FF10CE621CA7C3D5BC82).

Strengths

The following strengths were demonstrated:

Strength 1: Hospitals have strong plans in place to expand outpatient care to other units or temporary sites (e.g., tents) following the COVID-19 pandemic response; the use of telehealth and roving phlebotomy/clinical teams is also a best practice.

Strength 2: Recognition of staff mental health needs was a strength, to include plans and capabilities developed for the prolonged COVID-19 response that could be implemented in this type of disaster response.

Areas for Improvement

The following areas require improvement:

Area for Improvement 1: Staffing is the major limiting factor for hospitals to respond to any medical surge event to include radiation injury patients. Just-in-time training and other available online training can be offered to staff to build capability internally (to respond to radiation incidents).

Area for Improvement 2: Continuity of operations (COOP) must be considered when opening additional spaces for clinical care or housing/assistance operations; there are impacts to patients as well as staff so centralization of functions, patient diversion to other facilities, and reliance on other state/local partners must be closely evaluated to reduce downstream consequences of expanded patient care.

Area for Improvement 3: Radiation exposure literature needs to be incorporated into plans. This can be accomplished by leveraging the information available on the RITN website (https://ritn.net/resources/response-planning-and-guidance-resources) and other sources (CDC, educational institutions).

Area for Improvement 4: Specific screening questions for radiation injury outpatients do not exist at half of the participating hospitals. Hospitals should augment standard transplant patient screening tools with radiation incident/exposure specific questions (informed by radiation subject matter experts). The *CDC Post-IND Morbidity Surveillance Form* can also be consulted to

enhance screening questions. It is recommended that hospitals with more robust screening question sets share out to other RITN hospitals as a follow up action to this exercise series.

Area for Improvement 5: Arrival of unaccompanied minors (or adults with mental health issues) requires further exploration to determine the resources and procedures needed to accept and provide outpatient care to them in this type of scenario.

Area for Improvement 6: To address laboratory staffing strain, evaluate other partners that could be leveraged for surge support such as clerical staff that have phlebotomy training, emergency medical technicians (EMTs), other area healthcare centers, and just-in-time training for phlebotomy. Specimen transportation resources (sample to laboratory) also must be evaluated in advance of an emergency.

APPENDIX A: IMPROVEMENT PLAN

This improvement plan template has been developed specifically for the RITN centers participating in the 2023 RITN Tabletop Exercise conducted on August 9, 2023. RITN centers can utilize this table to organize the opportunities for improvement to augment and develop their own corrective actions. The improvement plan is intended to strengthen the response of RITN hospital 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.

APPENDIX B: EXERCISE PARTICIPANTS

Participating Organizations			
Last Name	**First Name**	**Email Address**	**Organization**
Baron	Mike		Children's/Froedtert
Borowski	Jess		Children's/Froedtert
Burdick	Cassidy		Children's/Froedtert
Carpenter	Erica		Children's/Froedtert
DiChiara	Vincent		Children's/Froedtert
Dziedzic	Rachel		Children's/Froedtert
Gorman	Sierra		Children's/Froedtert
Hematti	Peiman		Children's/Froedtert
Konkel	James		Children's/Froedtert
Kusaelak	Jen		Children's/Froedtert
Leow	Lin		Children's/Froedtert
Macklin	Kim		Children's/Froedtert
Narewski	Joseph		Children's/Froedtert
Nelis	Mary		Children's/Froedtert
Peters	Lisa		Children's/Froedtert
Rao	Sid		Children's/Froedtert
Rhoades	Melissa		Children's/Froedtert
Riven	Jose		Children's/Froedtert
Schaewe	Heather		Children's/Froedtert
Sprecher	Christa		Children's/Froedtert
Tieu	Thudung		Children's/Froedtert
Worzalla	Katherine		Children's/Froedtert
Chao	Nelson		Duke University
Delario	Peter		Duke University
Frith	Jennifer		Duke University
Hanlin	Erin		Duke University
Henshall	Bethany		Duke University
Holwitz	Mitch		Duke University
Lynch	Kim		Duke University
Marsee	David		Duke University
Ross	Joel		Duke University
Shiflett	Mike		Duke University
Wang	Chu		Duke University
Zivica	Jason		Duke University
Alluhaydan	Arib		Massachusetts General
Anahory	Lisa		Massachusetts General
Andonian	Jennifer		Massachusetts General
Baugh	Josh		Massachusetts General
Borgella	Marie		Massachusetts General
Collier	Jameson		Massachusetts General
Daigle	Adrienne		Massachusetts General
Denson	Logan		Massachusetts General
DePesa	Christopher		Massachusetts General
DeWitt	Anadelina		Massachusetts General
Eisenbaum	David		Massachusetts General

Gill	Rachel		Massachusetts General
Hanger	Katherine		Massachusetts General
Hartford	Nicole		Massachusetts General
Howard	Megan		Massachusetts General
Koran	Allison		Massachusetts General
Leeber	Jack		Massachusetts General
Nally	Jacquelyn		Massachusetts General
O'Donnell	Susan		Massachusetts General
Parmar	Allison		Massachusetts General
Quinn	Donna		Massachusetts General
Rosato	Erika		Massachusetts General
Schlageter	Alexander		Massachusetts General
Spitzer	Thomas		Massachusetts General
Stanganelli	Nancy		Massachusetts General
Stanton	Eva		Massachusetts General
Tata	LeeAnn		Massachusetts General
Al-Hamsi	A. Samer		NYU Langone
Cole	Kelli		NYU Langone
Easter	Tara		NYU Langone
Gold	Mara		NYU Langone
Ingram	Raymond		NYU Langone
Kobliner	Ben		NYU Langone
Merchan	Christian		NYU Langone
Miele	Johanne		NYU Langone
Munfakh	Andrew		NYU Langone
Resnick	Alex		NYU Langone
Sampson	Britney		NYU Langone
Scaturo	Christopher		NYU Langone
Aker	Ramsey		Intermountain Primary Children's Hospital
Arthur	Kevin		Intermountain Primary Children's Hospital
Ehlers	Julieanne		Intermountain Primary Children's Hospital
Fredrickson	Lauren		Intermountain Primary Children's Hospital
Gerdy	Cheryl		Intermountain Primary Children's Hospital
Hogue	Clair		Intermountain Primary Children's Hospital
Larson	Darin		Intermountain Primary Children's Hospital
Mortensen	Stephanie		Intermountain Primary Children's Hospital
Petersen	Brittany		Intermountain Primary Children's Hospital
Brown	Sandy		Texas Children's
Burttschell	Bernadette		Texas Children's
Craddock	John		Texas Children's
Elmore	Chelsia		Texas Children's
Check	Jennifer		UCSF Benioff

Dugan	Kevin		UCSF Benioff
Holmes	Brandon		UCSF Benioff
Kharbanda	Sandhya		UCSF Benioff
Tom	Maxwell		UCSF Benioff
Witherspoon	Leigh Ann		UCSF Benioff
Dondapati	Anne		Univ. of Colorado
Lebin	Jacob		Univ. of Colorado
Persoff	Jason		Univ. of Colorado
Prabhakar	Beth		Univ. of Colorado
Deland	Michelle		NCRHCC/U of Colorado
Brianza	Mike		Wake Forest
Elmes	Alexandra		Wake Forest
Freeman	Heather		Wake Forest
Holder	David		Wake Forest
Howard	Dianna		Wake Forest
Jennings	Rebecca		Wake Forest
Kassen	Cory		Wake Forest
Lambird	Jonathan		Wake Forest
O'Dell	Terena		Wake Forest
Payne	Michelle		Wake Forest

APPENDIX C: PARTICIPANT FEEDBACK

RITN Centers were asked to provide feedback via an online questionnaire following the exercise. The comments below are organized by observed strengths, challenges, and recommendations for future exercises.

Participating hospitals in the August 9, 2023 were asked to rank the usefulness of the tabletop exercise; **70% rated it as "Very Useful" while 30% rated it as "Somewhat Useful"**.

Strengths

- Integrated emergency management team that works with the transplant group to facilitate emergency care.
- Network of hospitals and clinics to support offloading of patients to provide emergency care.
- Collaboration with the healthcare coalition and RDHRS for regional coordination.
- Planning during COVID-19 better prepared the hospital for future disasters.
- Technical strength on the BMT team.
- Combined adult and pediatric programs at the same campus to collaboratively care for families with both adult and pediatric patients (cross program challenges).
- Confident we can handle a limited number of victims, but rely heavily on government resources.
- Healthcare workers with the proper skill set to support telemedicine at other hospitals within the health system.
- BMT program has a scalable surge plan to address patient influx (acute, outpatient).
- Staff competent in their roles for the incident.
- Patient Reception Center has been tested and revised based on functional exercises.
- Use RITN exercises to engage the hospital community to aid in education about RITN.

Challenges

- Limited space at the hospital, limited outpatient housing options.
- Supporting unaccompanied minors.
- No patient education materials readily available (at least a template or draft that can be rapidly customized).
- Defining types of beds needed, surge capacity, crisis standards of care definitions and regulation.

- Staffing resources, particularly post-COVID-19. COVID-19 surge models may not work so there is a need to develop other strategies based on current staffing realities.
- Receiving self-transports that are not part of the NDMS/RITN system and protocols; do not have adequate facilities to screen large numbers of patients quickly.
- Phlebotomy staffing may be a limiting factor for laboratory tests.
- Challenge to free up beds for RITN patients and still meet the medical needs of existing inpatients and outpatients.
- Coordination of recurring patients and RITN patients depending on the arriving number of RITN patients and duration of stay.
- There are more significant limiting factors than were included in the exercise survey such as identifying viable donors and having specialized personnel to support operations.

Future Exercises

- Inclusion of government agencies in the exercise; it has been some time (>5 years for some hospitals) since government leads have been engaged with RITN and there has been turnover in the positions.
- Management of the patient cohort who are well enough to be managed as outpatients but may need intensive therapy through infusion centers.
- Incoming patient workflows (how to prepare, number of patients and condition) to include Crisis Standards of Care assumptions.
- Decisions for unaccompanied minors.
- Facility communication with the public using social media.
- Family reunification strategies.
- Community and state health services collaboration for RITN response.
- Mental health for patients, families, and staff during an MCI.
- Discuss how patients are selected for each RITN site and the triage/transportation process.
- Housing for families.
- Discussion questions on the social needs of patients.
- Include all exercise questions in the situation manual to enable better preparation.
- Some technical issues with breakout rooms experienced (access instructions, screen share ability).

APPENDIX D: ACRONYMS

Acronym	Term
ABA	American Burn Association
AAR	After Action Report
ARC	American Red Cross
ARS	Acute Radiation Syndrome
ASPR	Administration for Strategic Preparedness and Response
CBC	Complete Blood Count
COOP	Continuity of Operations
CR	Capabilities Report
EMT	Emergency Medical Technician
HHS	U.S. Department of Health and Human Services
ICS	Incident Command System
IND	Improvised Nuclear Device
MOU	Memorandum of Understanding
NMDP	National Marrow Donor Program
NDMS	National Disaster Medical System
NSO	National Specialty Organization
ONR	Office of Naval Research
RDHRS	Regional Disaster Health Response System
RITN	Radiation Injury Treatment Network
RSO	Radiation Safety Officer
TTX	Tabletop Exercise