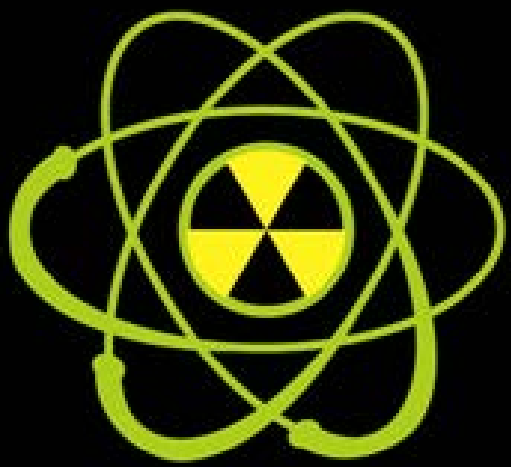
2017

After-Action Report/Improvement Plan
June 19, 2017 Web-Based



EXERCISE OVERVIEW

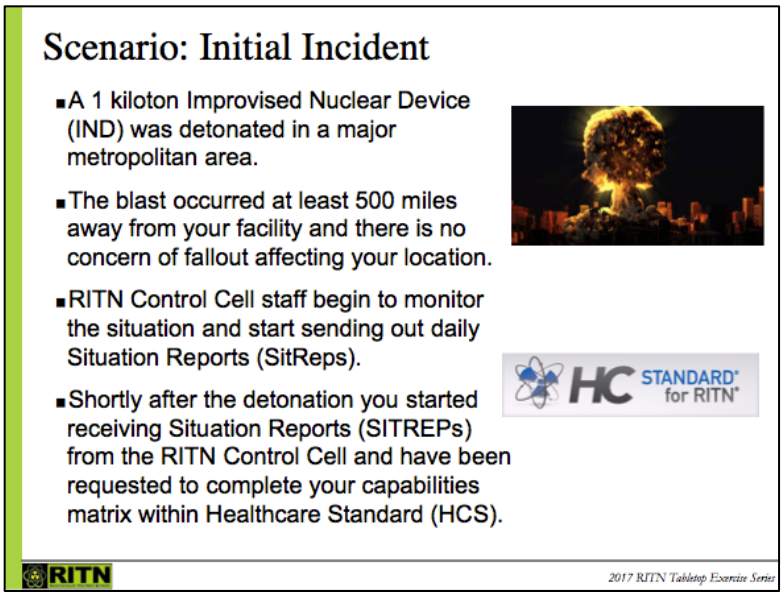
Exercise Name	2017 RITN Tabletop Exercise (TTX)
Exercise Date	June 19, 2017
Scope	This exercise is a distance-based tabletop exercise planned for 2 ½ hours. Exercise play is limited to RITN facilities and their response partners' collective challenges and considerations for improved and effective response.
Mission Area(s)	Response
Capabilities	Public Health & Medical Services
Objectives	**Objective 1:** Hospital staff are able to determine their hospital's capability to receive casualties (inpatient and outpatient) through the National Disaster Medical System (NDMS) following a mass casualty radiological incident. **Objective 2:** Hospital staff are able to discuss the procedures for implementing Crisis Standards of Care (CSC) at their hospital. **Objective 3:** Hospital staff are able to describe their approaches for triaging patients and determining initial treatment actions for patients with Acute Radiation Syndrome (ARS).
Hazard	Radiological
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	See Appendix B
Point of Contact	RITN Control Cell RITN@NMDP.ORG

EXERCISE SUMMARY

On June 19, 2017, RITN centers and the RITN Control Cell participated in a tabletop exercise to discuss RITN centers planning actions for patient arrival, crisis standards of care under austere resource and medical management conditions, and medical care and treatment of arriving patients from radiological exposure. 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 (Figure 1):

Figure 1: Exercise Scenario Ground Truth

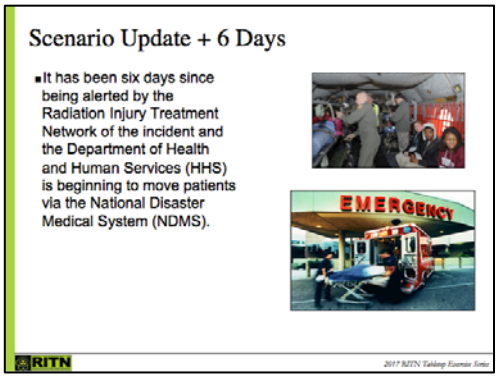


ANALYSIS OF CAPABILITIES

Module 1: Planning for Patient Arrival

Participants were provided the following update to the scenario information (Figure 2). Based on the scenario inject information, RITN Centers were asked to discuss multiple operational considerations regarding the receipt of NDMS patients. Considerations for patient receipt included aggressive changes and overflow into other hospital departments as well as repurposing previously identified space such as dormitories and gymnasiums.

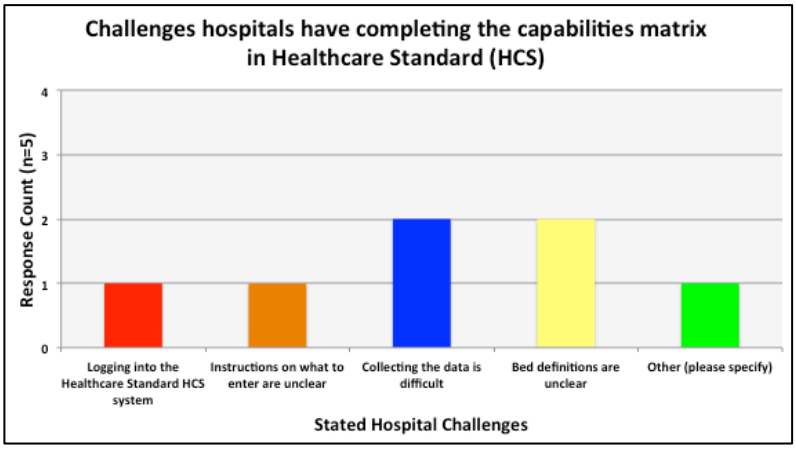
Figure 2: Scenario Update Event + 6 Days



Completion of Capabilities Matrix: Participating centers discussed the challenges they face when completing the Healthcare Standard (HCS) Capabilities Matrix (Figure 3). The challenges cited included:

- Logging into the HCS System
- Data entry instructions are unclear
- Bed census data changes frequently
- Difficulty in collecting data for input into the matrix
- Difficulty with interpretation of the bed definitions
- Other (i.e. Difficult to determine the outpatient capabilities by number)

Figure 3: HCS Challenges



Intake of Patients: Aggressive Changes: Participating centers determined the following: The number of inpatients their RITN center could receive with aggressive changes and spill-over into other areas of their hospital (such as ICU or PACU) under the assumption that alternations in the standards of care were required. Examples provided of aggressive changes included aggressive patient discharges or transfers or a delay in the normal admissions process. The number of inpatients received was reported as (Table 1):

Table 1: Intake of Patients

RITN Center	Number of Patients
Banner University Medical Center	20
Mayo Clinic	20
North Shore University Hospital	50
Spectrum Health	125
University of Mississippi Medical Center	20 – 25
University of North Carolina Hospitals	210
Total Inpatients Received	**445 – 450**

All RITN centers indicated that the number of patients received would be highly dependent on their medical care needs. At least one RITN center indicated that staffing is an issue if 20-25 patients were expected. All RITN centers indicated their surge capacity capabilities did not include the type of bed needed, staffing needed per bed, or availability of their staffing in general. Centers discussed the informational needs (such as staffing, type of beds needed, medical supplies) required in order for them to properly prepare to receive any NDMS patients. NDMS patients would not be transported to a RITN center until a bed is confirmed to be available and that JPATS would provide a system alert to the RITN center regarding transport of the patient.

Intake of Patients: Incorporating Large Facilities: After RITN centers determined the number of inpatients they could receive considering aggressive changes and spill-over, RITN centers determined the number of inpatients they could receive with the previous 2 considerations as well as implementation of crisis standards of care and incorporating large austere emergency treatment facilities previously identified (such as dormitories at local colleges or community colleges or gymnasiums). Given these two additional considerations, centers stated use of other hospitals within their corporate structure (or care network) or use of hotels or local shelters (in coordination/collaboration with the local emergency management agency).

Communication with the FCC: If requested by the RITN Control Cell to communicate bed availability directly to their assigned Federal Coordinating Center (FCC), all participating RITN centers were able to quickly determine their facility's bed availability and provide that information to their local FCC. More than 1 RITN center stated their local healthcare coalition would communicate with the FCC if requested by the RITN Control Cell (i.e. situational awareness teleconference call).

Outpatient Housing: All participating RITN centers indicated that hotels have been identified as part of the planning process to house outpatients during RITN activation as well as traveling family members or others that may have accompanied the transported patient. Participating centers discussed a variety of alternate housing options in the geographic area that have been

identified or have entered a formal agreement with the RITN center, such as local apartment complexes.

Strengths

The following strengths were demonstrated:

Strength 1: All RITN centers demonstrated the capability to receive patients under a variety of special and unique circumstances such as implementation of crisis standards of care, aggressive discharges or transfers, delayed admission processes, and spill-over into other areas or departments of their facility.

Strength 2: All RITN centers demonstrated and discussed the ability to rapidly determine their immediate bed availability if requested by the RITN Control Cell as well as a current process to provide that information to their local Federal Coordinating Center.

Strength 3: All RITN centers indicated identification of local hotels and alternate housing options for outpatients during RITN activation.

Areas for Improvement

The following areas require improvement:

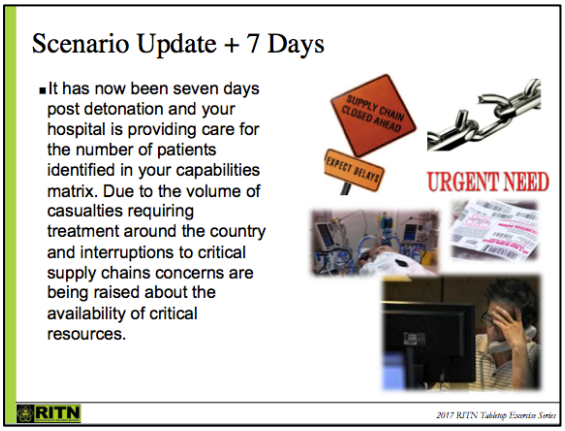
Area for Improvement 1: The data field definitions for the Healthcare Capabilities Matrix should be reviewed to ensure clarity. RITN centers indicated difficulty in accurately reporting the data because they were unclear, for example, on the types of patients being sent and fluctuations in their staffing levels based on the patient demand.

Area for Improvement 2: RITN centers emphasized the need to receive NDMS patient information well in advance of patient transport to the RITN Center. Awareness (or refresher) training should be provided on the NDMS program as well as the end-to-end process to prepare and transport a NDMS patient to a RITN center. The NDMS patient manifest contains the medical information needed by RITN centers to ensure their planning for patient receipt aligns with the level and type of medical care needed. Centers would be able to accurately complete the Capabilities Matrix and plan for patient arrival.

Module 2: Crisis Standards of Care

Participants were provided the following update to the scenario information (Figure 4). Based on the scenario inject information, 7 days have elapsed since the detonation and RITN centers are experiencing disruptions to their supply chains and resources are running low given the volume of casualties requiring treatment across the country.

Figure 4: Scenario Update Event + 7 Days



Implementation of Crisis Standards of Care: RITN centers indicated multiple sources, references, or reliance on several entities in developing their internal guidance for implementation of crisis medical care at their facilities. All participating centers stated coordination of CSC would occur, at some point in time, with their State Health Department. Four (of 5) participating RITN centers stated having a hospital policy in-place to address crisis care, while one RITN center indicated their policy is currently being developed to align closely with their State Health Department's CSC guidance. Lastly, four (of 5) participating RITN centers confirmed that they have ethical codes and/or guidance currently in place, which were provided at either a county, city, or state level; however 1 participating center was unsure whether or not ethical codes/guidance have been provided.

All 5 participating RITN centers indicated that a committee currently exists to make CSC determinations. Examples of these committees or authorities included:

- Ethics Committee
- Administrator On-Call
- House Supervisor
- Corporate Emergency Operations Center
- Hospital Incident Commander

External to the centers themselves, 3 (of 5) participating centers indicated a national disaster declaration would be sufficient to implement crisis standards of care at their facility while 2 centers said the state's authority would be needed for their RITN center (i.e. legal authority at the state level must make a CSC determination) (Figure 5). Finally, RITN centers would notify public health, local emergency management, home care agencies, and other hospitals that CSC had been implemented.

In the absence of CSC codes and guidance (i.e. if the scenario events occurred today), RITN centers discussed a variety of priority factors under consideration for making decisions on use of resources, such as (Table 2):

Table 2: Factors Influencing Resource Decisions

Primary Factors Influencing Resource Decisions	
Age of patient(s)	Comorbidities
Severity of exposure	Dosage
Exposure and likelihood of survival as compared to other patients within the group exposed	Availability of resources (Specifics not provided)

All participating RITN centers described the type or level of assistance that would be requested from public health or emergency management agencies in order to implement CSC. The following table shows a variety of assistance that would be requested.

Table 3: Assistance Requested for CSC Implementation at RITN Centers

Type of Assistance Requested	
Hospital Support	**External Support**
Security	Transportation of patients and families
Medical staff	Housing
Pharmacy staff and supplies	Public health guidance/communications
Laboratory staff and supplies	Social support
Mental health support for staff	Community/mental health support
Traffic management at the hospital	Animal support
	Communication with the schools
	Waivers to postpone inspections

RITN centers indicated that public messaging regarding CSC should be coordinated at all levels (to include corporate health system public relations and state and local public health officials) and messaging should be carefully developed and be consistent, clear, and easily understandable. Messaging should emphasize that the public avoid non-urgent care at the RITN center, changes/alterations in scheduling/hours at clinics, include frequently asked questions, and be translated into multiple languages. Traditional and social media outlets should be immediately utilized to disseminate public messages and all communication should be coordinated through the joint information center.

After 2-weeks post-detonation, RITN centers discussed laboratory resources that may be in greatest demand. CBCs, HLA typing, blood products, and laboratory staff was discussed to be in greatest. Additionally, supplies such as reagents, collection tubes, HLA supplies, blood draw supplies, and their capabilities to perform CBCs and run chemistries would be severely taxed approximately 2-weeks post-detonation and receipt of patients.

Table 4: Laboratory Surge Capacity

RITN Center	Max. CBCs with Differentials (Given Expected Resource Constraints)
Banner University Medical Center	3,000 per day
Mayo Clinic	Not provided
North Shore University Hospital	1,000 per day
Spectrum Health	• 2,000 per day (with 4,000 capacity) • Approximately 8,000 per day with local and regional laboratory support
University of Mississippi Medical Center	2,000 per day
University of North Carolina Hospitals	1,500 – 2,000 per day

One RITN center indicated support for laboratory sample processing is available from other local hospitals. Though capacity would increase, the sample transport time would need to be considered as part of the laboratory surge support. Lastly, all RITN centers generally indicated little to no testing may be delayed given the events in the scenario; however, delays may occur if the testing protocols require more manual manipulation.

Strengths

The following strengths were demonstrated:

Strength 1: RITN centers discussed existing policies or were able to quickly develop a process to assemble the appropriate guidance content, request assistance from the necessary experts or authorities, and implement crisis standards of care if needed.

Strength 2: RITN centers demonstrated plans and protocols to rapidly disseminate information to their staff and to the public and the resources to provide public messaging in multiple languages.

Strength 3: RITN centers demonstrated continuity planning to address laboratory resource shortages over an extended response timeframe to procure necessary staffing and supplies.

Strength 4: RITN centers were able to approximate a maximum number of CBC with differentials that could be processed daily in their laboratories, which at a minimum, would assist their ability to anticipate the type and amount of resource shortages to anticipate under the conditions in this scenario.

Areas for Improvement

The following areas require improvement:

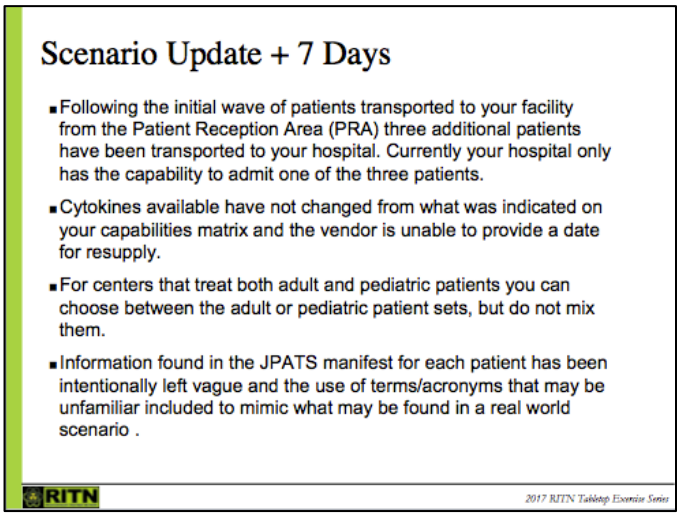
Area for Improvement 1: As part of improvement planning, RITN centers should review their policies or plans for CSC and ensure considerations related to the RITN program (such as the patients they may receive and impacts to their current inpatient population) are included in their crisis care policies and plans.

Area for Improvement 2: All RITN centers should review their laboratory supply chain as part of continuity of operations planning and confirm any existing laboratory supply vendor

agreements that additional quantities of reagents, collection tubes, HLA supplies, blood draw supplies, and supplies related to CBCs and virology testing could be secured under the events described in this scenario. Additionally, RITN centers should identify laboratory technician/staff to augment their existing levels and initiate discussions with those local/regional healthcare partners to explore mechanisms for the RITN center to utilize their staff if needed.

Module 3: Patient Treatment

Figure 6: Scenario Update Event + 7 Days



Participants were provided the following update to the scenario information (Figure 6). Based on the scenario inject information, 3 additional patients were transported to their RITN center following the initial wave of patients from the Patient Reception Area. Hospitals were instructed that they could admit one of the three patients transported to them based on their current capabilities to medically treat and manage the patient. RITN centers were also provided with patient profiles for these 6 patients.

Medical Management of the 1 Additional Patient: All six RITN centers decided to assess the adult patients and admit 1 of them; no participating centers assessed the pediatric patients. The medical management of these patients is as follows (Table 3):

Table 5: Adult Patient Management

Admitted Patient Management: Adults			
Decisions: Adults*	**Patient 1**	**Patient 2**	**Patient 3**
Admit or Outpatient	Yes 2 Centers	Yes 2 Centers	Yes 1 Center
Estimated dose upon arrival	Dose: 4.7 grey Range: 3.0 – 4.9 grey	Dose: 3.2 grey	Dose: 7.0 grey
Administer G-CSF	Yes All Centers	Yes All Centers	Yes 1 Center
Prophylactic antimicrobials	All Centers Ciprofloxin Diflucan Levoquin	4 Centers Ciprofloxin Diflucan Levoquin	3 Centers Ciprofloxin Diflucan Levoquin
Treatment antimicrobials	Yes 1 Center Zocin	Yes All Centers Keflex Vancomycin	No
Hydration (or other treatment)	Yes	Yes	Yes
Lab work, Consultations	• HLA typing, Daily CBC with differentials, Type & screen, chemistries • Heme/BMT consult, Social work, psychology	• Daily CBC with differentials, HLA typing, 3 times per week chemistries • Consult with infectious disease, orthopedics,	• Daily CBC with differentials, blood culture • Patient requires significant psychosocial services

Admitted Patient Management: Adults			
Decisions: Adults*	**Patient 1**	**Patient 2**	**Patient 3**
	• Aggressive supportive care	diabetes, wound care management, medical oncology, endocrinology • Comorbidities (e.g. breast cancer, diabetes, leg wound) require close monitoring and would cause hospital admit	• Palliative care, social work, and psychiatry consultations needed
*Centers did not reach consensus on the prophylactic antimicrobial to administer to each patient, HLA Typing, GCSF administration, admission of patients, hydration administration, or the lab workups needed for each of the patients.			

Strengths

The following strengths demonstrated:

Strength 1: Each participating RITN center demonstrated capability to medically manage admit of an additional patient following receipt of the initial wave of patients including the immediate provision of medical and mental/behavioral consultations necessary based on the patient's need.

Areas for Improvement

The following areas require improvement:

Area for Improvement 1: RITN centers should continue to discuss medical management of complex patient types such as those provided in this exercise. Consensus could not be reached among centers on a consistent approach to medically manage their assessed adult patients and whether or not to admit patients for continued care. Continued discussion through training and exercises will provide an opportunity for the medical care teams to assemble and discuss the complex medical profiles of the NDMS patients they may receive given the events of this exercise scenario.

CONCLUSION

This report augments existing planning/training/exercising programs related to RITN center receipt and medical management of radiologically exposed patients transported to their center and their capabilities to provide medical care in austere situations in which crisis standards of care have been implemented. The strengths validate well-established aspects of the plans while the opportunities for improvement provide information to enhance, refine, or improve existing plans, protocols, policies, procedures, and systems. It is anticipated that the improvement plan will be incorporated into the efforts of each participating RITN center to strengthen the response of the radiation injury treatment network of hospitals and healthcare systems as it relates to the core capabilities identified in this report.

APPENDIX A: IMPROVEMENT PLAN

This improvement plan template has been developed specifically for the RITN centers participating in the 2017 RITN Tabletop Exercise conducted on June 19, 2017. RITN centers 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.

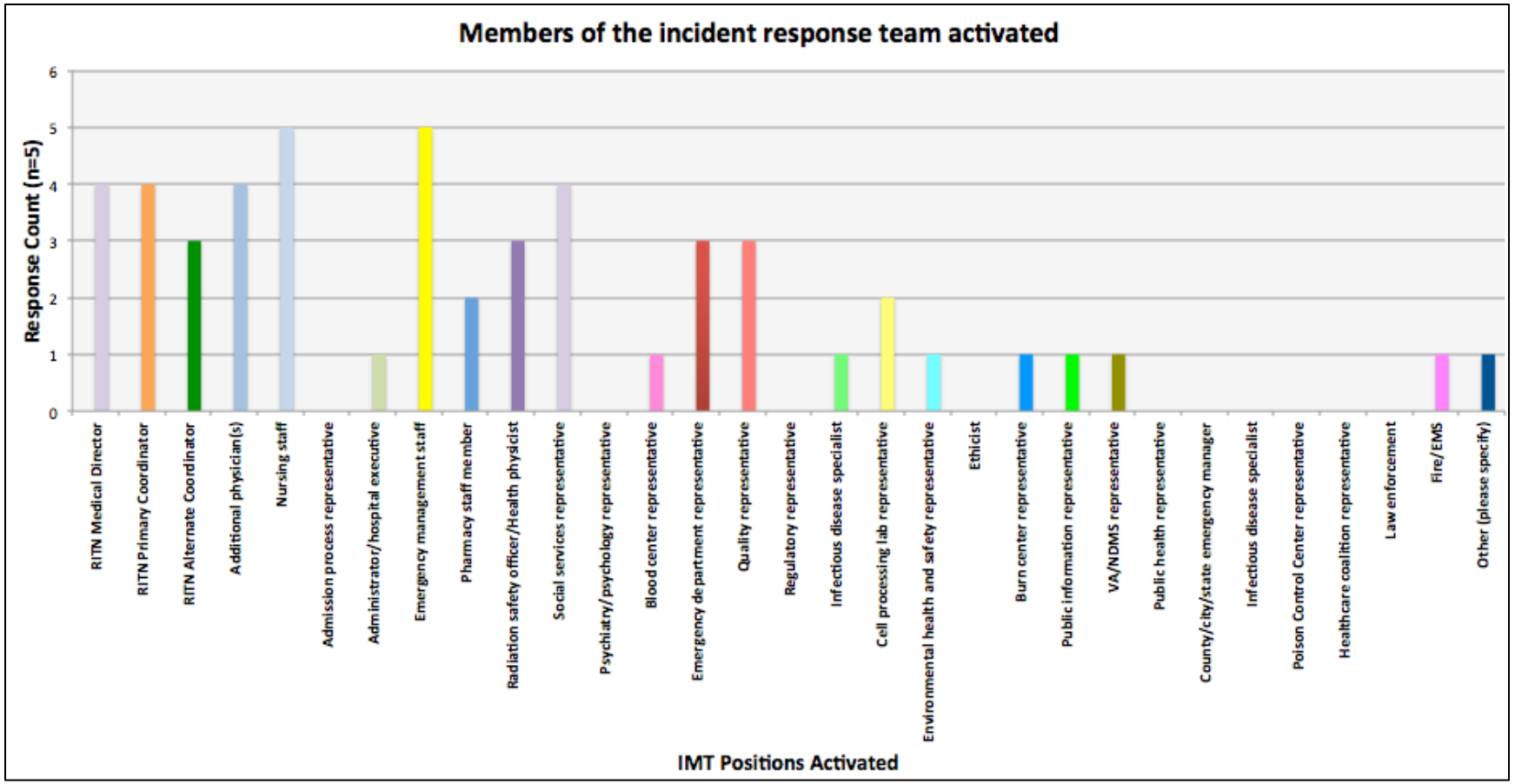
APPENDIX B: EXERCISE PARTICIPANTS

Participating Organizations	
Banner University Medical Center	Don Brazie
Banner University Medical Center	Grace Weiss
Banner University Medical Center	Matthew Knight
Banner University Medical Center	Keri Maher
Banner University Medical Center	Paul Hanny
Banner University Medical Center	Michelle D'Aquino
Banner University Medical Center	Nancy Harrington
Banner University Medical Center	Melissa Daniels
Banner University Medical Center	Cyrstal Fabian
Banner University Medical Center	Lori Marie
Banner University Medical Center	Cathy Grimes
Banner University Medical Center	Andrew Yeager
Mayo Clinic	Jay Johnson
Mayo Clinic	Jo Granberg
Mayo Clinic	Tom Graham
Mayo Clinic	Cydni Smith
Mayo Clinic	Brian Zmolek
North Shore University Hospital	Jane Han
North Shore University Hospital	Suhui He
North Shore University Hospital	Lu Zhang
North Shore University Hospital	Debbie Dobrzynski
North Shore University Hospital	Sandra Martinez
North Shore University Hospital	Miyuki Yoshida-Hay
North Shore University Hospital	Aimee Corke
North Shore University Hospital	Michele Quintina
North Shore University Hospital	Eileen Fitzgerald
North Shore University Hospital	Lisa Randazzo
North Shore University Hospital	Rachel Mavano
North Shore University Hospital	Kirsten Duprez
North Shore University Hospital	R. Bayer
North Shore University Hospital	L Donahue
Spectrum Health	Vick Maharaj
Spectrum Health	Mark Van Dyke
Spectrum Health	Angela Skinner

Participating Organizations	
Spectrum Health	Julie Scholten
Spectrum Health	Stephanie Williams
Spectrum Health	Allison Gillett
Spectrum Health	Ken Causie
Spectrum Health	Sue Krieger
Spectrum Health	Charles Monayhan
Spectrum Health	Nardos Osterhai
Spectrum Health	Chad Fesseuden
Spectrum Health	Kenneth Bresnan
University of North Carolina Hospitals	Caroline Immel
University of North Carolina Hospitals	Martha Tye
University of North Carolina Hospitals	Paula Stinson
University of North Carolina Hospitals	Josh Bradley
University of North Carolina Hospitals	Rebecca Davis
University of North Carolina Hospitals	Wendy Quigley
University of North Carolina Hospitals	Pat Odell
University of North Carolina Hospitals	Brendan Fitzpatrick
University of North Carolina Hospitals	Rhonda Burton
University of North Carolina Hospitals	Betty Hinshaw
University of North Carolina Hospitals	Mark Buchanan
University of North Carolina Hospitals	Tatjana Grgic
University of North Carolina Hospitals	Pat Yee
University of North Carolina Hospitals	Kim Wehner
University of North Carolina Hospitals	Meera Yogarajah
University of North Carolina Hospitals	Alicia Pinto
University of North Carolina Hospitals	Hannah Goulding
University of North Carolina Hospitals	Dalton Sawyer
University of North Carolina Hospitals	Kimberly Kasow
University of North Carolina Hospitals	Sam Elizabeth Sharf
University of North Carolina Hospitals	Darshan Patel
University of North Carolina Hospitals	Karen Mendys
University of North Carolina Hospitals	Lisa Sofferin
University of North Carolina Hospitals	Kristen Lakis
University of North Carolina Hospitals	Deborah Covington
University of North Carolina Hospitals	Marcie Riches

Participating Organizations	
University of North Carolina Hospitals	Andrew Sharf
University of Mississippi Medical Center	Vince Herrin
University of Mississippi Medical Center	Wendy Arindes
University of Mississippi Medical Center	Mary K Gibson
University of Mississippi Medical Center	Margaret Lamb
University of Mississippi Medical Center	Pam Farris
University of Mississippi Medical Center	Melissa Robeston
University of Mississippi Medical Center	Rebecca Dukes
University of Mississippi Medical Center	Maria Dupree
University of Mississippi Medical Center	Vicky Tygart
University of Mississippi Medical Center	April Lampton
University of Mississippi Medical Center	Jason Smith
University of Mississippi Medical Center	Susan Johnson
University of Mississippi Medical Center	Ginger Caldwell
University of Mississippi Medical Center	Ann Young
University of Mississippi Medical Center	David Hargrove
University of Mississippi Medical Center	Brandon Benson
University of Mississippi Medical Center	Ford Lofter
University of Mississippi Medical Center	JW Ledbetter
University of Mississippi Medical Center	Lauren Callaway

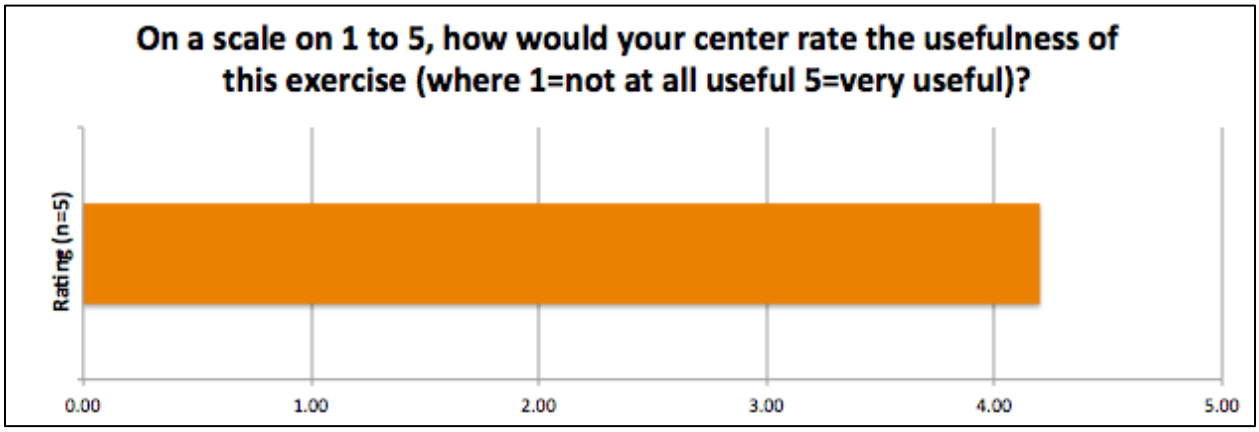
Members of the Incident Response Team Activated for the Exercise



APPENDIX C: PARTICIPANT FEEDBACK

RITN Centers were asked to provide some brief feedback on an online questionnaire following the exercise. The comments below are not in any particular order and are provided unedited to avoid intent changes.

Note: The average rating provided by the participating RITN centers regarding the usefulness of this exercise was 4.20 (out of 5.0). Number of responses = 5.



Based on discussions today, please briefly describe the 1 or 2 strengths demonstrated by your organization's ability to respond to a radiation mass casualty incident as described in this exercise scenario.	
Banner University Medical Center	*The knowledge and education of the physicians and staff to discuss each patient and assess their symptoms and then come up with the treatment plan.*
Mayo	*Not provided.*
North Shore University Hospital	*We saw that we had a cohesive team that would be able mobilize quickly to manage these types of incidents utilizing some of the emergency management responses that already exist within our institution.*
Spectrum Health	*Clinical staff continues to be efficient in clinical care; Pre-planning and lessons learned from RITN exercises continue to help us with these TTX discussions.*

Based on discussions today, please briefly describe the 1 or 2 strengths demonstrated by your organization's ability to respond to a radiation mass casualty incident as described in this exercise scenario.	
University of North Carolina Hospitals	*One strength is the large turnout of so many key players allow for continued communication so in case we were need to activate the system we are used to speaking with all the different areas that could be involved.*
University of Mississippi Medical Center	*Our organization has a strong relationship with our Emergency which prepares for this type of exercise/incident yearly.*

Based on discussions today, please briefly describe the 1 or 2 challenges demonstrated by your organization's ability to respond to a radiation mass casualty incident as described in this exercise scenario.	
Banner University Medical Center	*Getting leadership and other departments to fully understand the importance of this program and why many departments would be involved. This would activate our command center, and we would probably see an influx of media.*
Mayo	*Not provided.*
North Shore University Hospital	*One of the challenges would be to decide who gets treatment based upon established guidance and not based upon emotions. Also ensuring that staff is educated about the fact the patients that would be transferred to our facility would not pose any risk to staff.*
Spectrum Health	*Community partners continue to struggle to understand the impact to RITN type activation. We will need their support for this response.*
University of North Carolina Hospitals	*A major challenge is that we have discussed what we need to do and especially in large patient situations how that would actually come about is somewhat of an unknown. We hope to in the future be involved in an actual drill to see how things would work in practice.*
University of Mississippi Medical Center	*The discussion time frames were a bit lengthy. The scenario did not feel real at all.*

List and briefly discuss elements to address for future RITN exercises.	
Banner University Medical Center	*Our team thought this was a very good TTX. If an incident occurs, there will be multiple departments both clinical and non-clinical and community involved. This year we managed to get a few other departments to attend which was great.*
Mayo	*Not provided.*
North Shore University Hospital	*Use and care of the satellite phones distributed by the NMDP and ways to trouble shoot issues with them.*
Spectrum Health	*This is great, thanks!*
University of North Carolina Hospitals	*Continuing to work on specific pointed questions, it is sometimes easy to be vague about answers. The specific questions sometimes forces discussion by the players for each scenario.*
University of Mississippi Medical Center	*None at this time.*

APPENDIX D: ACRONYMS

Acronym	Term
AAR	After Action Report
BMT	Bone Marrow Transplantation
BMP	Bone Marrow Program
CBC	Complete Blood Count
CMP	Comprehensive Metabolic Panel
CSC	Crisis Standards of Care
EKG	Electrocardiogram
FCC	Federal Coordinating Center
GCSF	Granulocyte Colony-Stimulating Factor
HCS	Healthcare Standard
HCT	Hematopoietic Cell Transplantation
HHS	Health and Human Services
HLA	Human Leukocyte Antigen
IV	Intravenous
IND	Improvised Nuclear Device
JPATS	Joint Patient Assessment and Tracking System
LFT	Liver Function Test
NMDP	National Marrow Donor Program
NDMS	National Disaster Medical System
ONR	Office of Naval Research
PACU	Post Anesthesia Care Unit
PPE	Personal Protective Equipment
RITN	Radiation Injury Treatment Network
SAT	Suicide Assessment Team
TRACES	Web based system to move and track patients
TTX	Tabletop Exercise