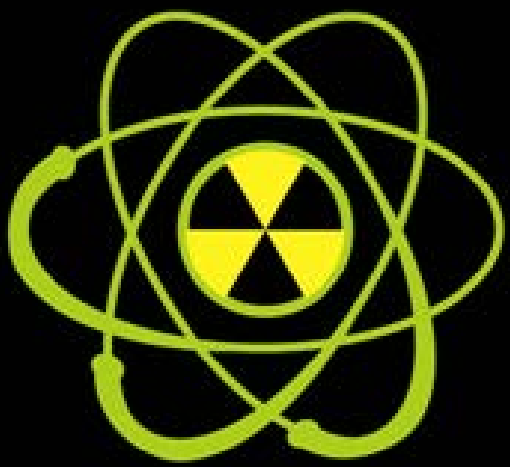
2018

After-Action Report/Improvement Plan
June 21, 2018



EXERCISE OVERVIEW

Exercise Name	2018 RITN Tabletop Exercise (TTX)
Exercise Date	June 21, 2018
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:** RITN hospital staff is able to identify staffing strategies and plans to ensure adequate staffing during a surge caused by a distant radiological event. **Objective 2:** RITN hospital staff is able to describe their approaches for triaging patients and determining initial treatment actions for patients with Acute Radiation Syndrome (ARS). **Objective 3:** RITN hospital staff is able to discuss their procedures for the use of medical countermeasures and other pharmaceuticals in high demand.
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	Children's Hospital of Wisconsin – Milwaukee, WI Cleveland Clinic Foundation – Cleveland, OH Duke University Medical Center – Durham, NC Froedtert Memorial Lutheran Hospital – Milwaukee, WI Temple University Hospital – Philadelphia, PA
Point of Contact	RITN Control Cell RITN@NMDP.ORG (612) 884-8276

EXERCISE SUMMARY

On June 21, 2018, RITN centers and the RITN Control Cell participated in a tabletop exercise to discuss RITN centers planning actions to identify staffing strategies and plans to ensure adequate staffing during a surge, describe their approaches for triaging patients and determining initial treatment actions for patients with ARS, and discuss their procedures for the use of medical countermeasures and other pharmaceuticals in high demand following a distant 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 Ground Truth

- A 10-kiloton Improvised Nuclear Device (IND) was detonated in a major metropolitan area.
- The blast occurred at least 500 miles away from your facility and there is no concern of fallout affecting your location.
- RITN Control Cell staff begins to monitor the situation and start sending out daily Situation Reports (SitReps).
- All centers are requested to submit daily Healthcare Standard (HCS) capabilities matrix.

Day 4

- The National Disaster Medical System (NDMS) issues activation protocol for your region and the local Federal Coordinating Center (FCC) establishes a Patient Reception Area (PRA) and expects patients to start arriving in the next 24-48 hours.

Day 5

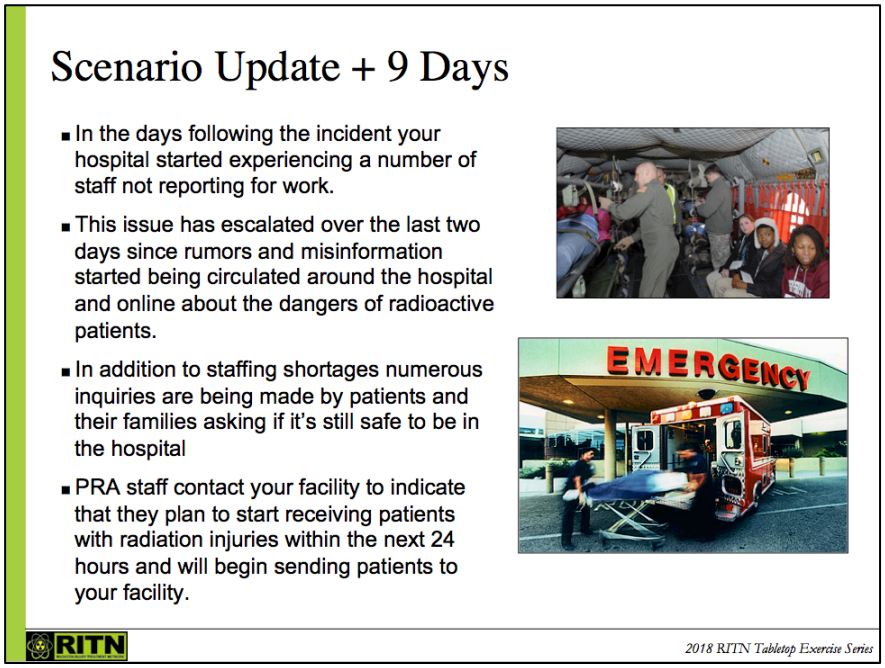
- The first NDMS aircraft begin to arrive at the PRA carrying patients with traumatic injuries. These patients are sent to NDMS hospitals in the area, but your facility has not received any patients at this time.

ANALYSIS OF CAPABILITIES

Module 1: Messaging and Staffing

Participants were provided the following update to the scenario information (Figure 1). Based

Figure 1: Scenario Update Event + 9 Days



on the scenario inject information, RITN Centers were asked to discuss multiple considerations related to their staff to include messaging. Considerations for messaging included current plans to keep staff safe and the type and method of communication used to inform staff.

Steps to Ensure Staff Safety: Participating RITN centers indicated activation of their incident command team is one of the primary steps taken to ensure staff safety, which would be followed by just-in-time staff training on radiation safety. Generally, all participating centers stressed the importance of staff education; whether it comes from internal and external subject matter experts crafting messages and facility marketing material or from memos, blast emails from hospital leadership, town hall meetings, or information sessions, employee education was paramount to ensure staff safety.

Staff Messages: Participating centers stated the main message communicated to staff is one of safety; no risk of radiation and that staff are safe. Employees, their families and the patients would be educated on the facts of radiation and the assurance the hospital is a safe work environment, the measures taken to continue a safe work environment, and assurances that staff would not become contaminated. The incident management team in collaboration with radiation

safety and Public Relations Department would draft and approve the messages. One such example is that a series of emails would be drafted and disseminated to maintain confidence by keeping all staff well informed. Staff would be reassured that it is safe to come to work because they are not at risk and patients and their families would also receive similar assurances.

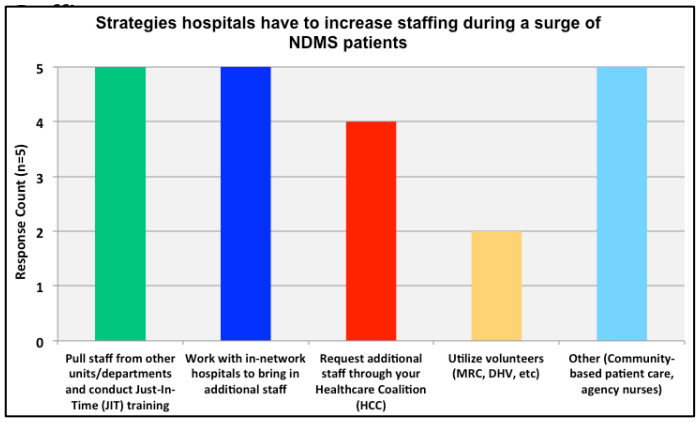
Specific messages would be developed and distributed for both internal and external audiences. External message dissemination via a Joint Information Center (with coordination from the hospital Communications/Public Relations Department, city, county, state, and VA/FCC) would involve social media, facility webpage, and traditional media outlets. Examples of internal message dissemination provided were:

- Internal email
- Hospital paging
- Hospital intranet
- Town hall/leadership meetings
- Videos
- Lunch and learn sessions
- Phone calls

Staff Increases: RITN centers discussed multiple strategies to increase staffing levels during a NDMS surge of patients (Figure 2). All participating centers utilized 3 strategies:

- Pull staff from other units/departments and conduct just-in-time training (such as staffing bone marrow transplant staff, intensive care units, and hematology/oncology staff)
- Reassign staff from in-network hospitals
- Request staffing support from their local healthcare coalition

Figure 2: Strategies to Increase



Though three of the five participating centers have a process in place to request a waiver so staff/patient ratios can be adjusted, the participating RITN centers are large regional facilities that would be able to reassign staff internally to support a NDMS surge of patients. Multiple RITN centers discussed their surge plans, which currently either adjust for staff ratios by utilizing nursing pools or virtual labor pools, or receive support from regional hospitals within

their own system or community-based facilities also within the RITN center's system. Given the staffing depth and the number of days prior to the arrival of NDMS patients, RITN centers demonstrated the capability to quickly identify staff for reassignment to support a surge.

RITN Radiation Safety Course: Four of the 5 participating RITN centers have a predefined course for non-medical staff for radiation training. The Radiation Safety Officer has included radiation content from Radiation Incident Response Plan, for example, in the non-medical staff-training course.

Volunteers: Given the events in this scenario, the RITN centers indicated use of volunteers, but may consider volunteer use for non-critical roles and non-medical care support. RITN centers provided a variety of processes to ensure credentials are appropriate, such as:

- Standard Credentialing Office
- Existing volunteer policy in which credentials are verified within 72 hours
- State identification verification program

All RITN centers indicated a type of partner/shadow policy for credentialed volunteers.

Strengths

The following strengths were demonstrated:

Strength 1: All RITN centers demonstrated that current emergency operations plans contain detailed procedures and protocols the ensure staff safety and the ability to quickly communicate to staff, patients, and families.

Strength 2: All RITN centers demonstrated and discussed the ability to rapidly augment staffing levels to treat a surge of NDMS patients. Centers identified specific departments within their facilities to reassign staff to medically manage such a surge.

Strength 3: For RITN centers without a predefined radiation training course for non-medical staff, these centers discussed established processes to develop and deliver just-in-time radiation training to non-medical staff by utilizing the framework to train all staff on Ebola medical management and seasonal influenza.

Areas for Improvement

The following areas require improvement:

Area for Improvement 1: The Radiation Safety Officer should ensure that all medical and non-medical staff completes a predefined radiation safety course. If a predefined radiation safety course is not available, the RSO should work with RITN to identify and complete said course.

Area for Improvement 2: For those without an established credentialing process, RITN centers should include planning initiatives to develop such a process. RITN centers should research existing software platforms to determine if their existing IT infrastructure can support the

applications necessary to electronically credential volunteers if a NDMS surge occurs at their facility.

Module 2: Patient Triage and Medical Countermeasures

Participants were provided the following update to the scenario information (Figures 3 and 4).

Figure 3: Scenario Update Event + 10 Days

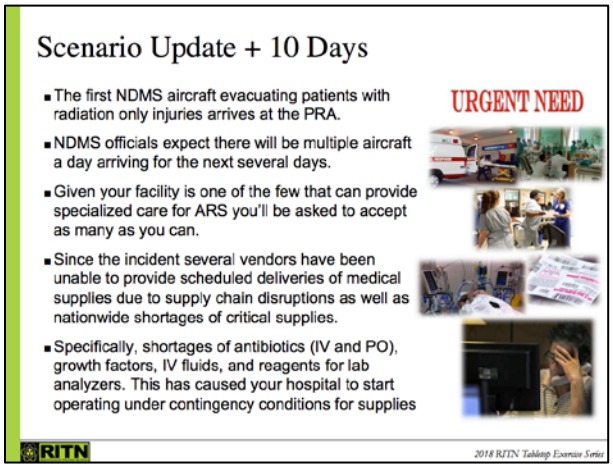
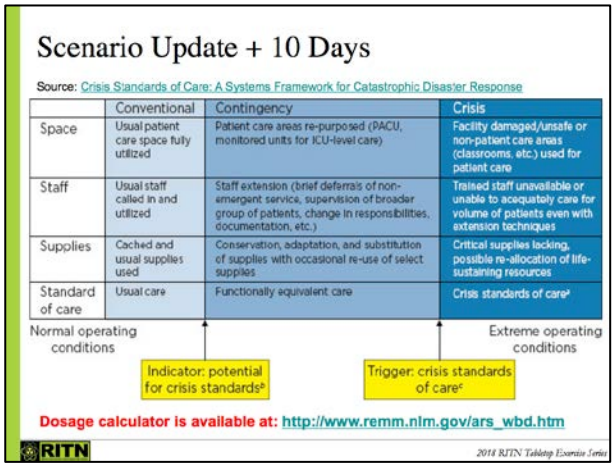


Figure 4: Scenario Update Event + 10 Days



Based on the scenario inject information, 10 days have elapsed since the detonation and RITN centers are experiencing disruptions to their supply chains and resources as there are nationwide shortages of critical supplies (e.g. IV and PO, growth factors, IV fluids, and reagents for lab analyzers). RITN centers are being asked to accept as many ARS patients as possible.

Patient Reception Area: All participating centers indicated having a formal plan that outlines the process to designate a location to receive patients from the Patient Reception Area where they will be triaged and processed for care, but RITN centers varied in their processes to receive patients. Three of the 5 RITN centers stated all patients would arrive at their ambulance bay and be processed by the emergency department. Two of these RITN centers indicated that this process does not differ for ambulatory patients that do not have immediate life threating issues. The other RITN center stated that the ambulatory patients would be treated in a separate area of their emergency department, which is large enough that other patients would not be impacted.

Of the remaining two participating RITN centers, one indicated that the number of patients expected determines the arrival area at the medical center. For this RITN center, their process does not differ for any ambulatory patients that do not have immediate life threatening issues. The other RITN center stated that the patients would be directly admitted to each unit depending on their medical need. This process also would not differ for any ambulatory patients.

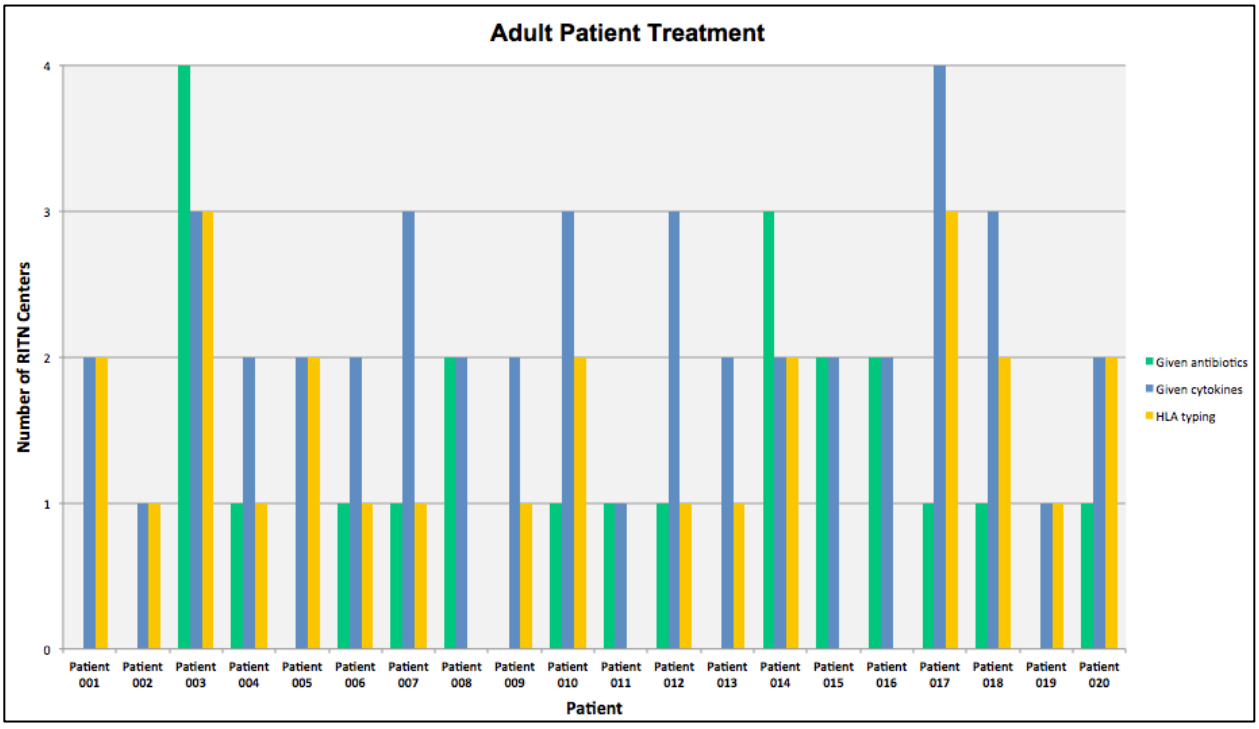
Adult Patient Treatment: Four of 5 participating RITN centers chose the adult patients to triage and treat. Of note, none of the patients had received growth factors prior to arrival at the RITN center (See Appendix B). Based on the initial triage of patients, RITN centers reached consensus on treating the following patients:

Adult Patient	Treatment Decision
Patient 3	Admitted to BMT Bed
Patient 4	Treated as Outpatient
Patient 16	Treated as Outpatient
Patient 17	Admitted to BMT Bed

Patient identified for outpatient care would be educated on the signs and symptoms to observe (i.e. the standard outpatient BMT information) including neutropenic precautions. Also, these patients would be monitored daily (vitals, blood draws for CBC or CBC with differentials, CMP, ABO) and asked to stay within 2 hours of the RITN center. They would also be provided with local hotel information and emergency contact information for the clinic.

The following graph displays the number of adult patients that would receive cytokines, antibiotic therapy, and HLA typing. Other than Adult Patient 3 receiving antibiotics and Adult Patient 17 being given cytokines, the participating RITN centers did not reach consensus on

Figure 5: Adult Treatment Therapies



medical management of the adult patients. Patients identified for palliative care did not receive antibiotic therapy.

Pediatric Patient Treatment: The pediatric RITN center discussed the pediatric patients for triage and subsequent medical management (see Appendix B). Of note, none of the patients had received growth factors prior to arrival at the RITN center. The incident command determined that triage would occur at the airport and then transported to the hospital. Exposure levels of Gy = 3.5 or above is criterion used to identify the patient for transplant along with any comorbidities. Six of the 20 patients would all be admitted to the bone marrow transplant unit because of their exposures and comorbidities. Two of the pediatric patients were designated for palliative care management only and would be re-assessed once in the palliative care for intensive treatment or admission elsewhere for psychosocial issues. Ten patients were treated as outpatients because their exposures were very low and none of the pediatric patients would be discharged and sent home. Three of the pediatric patients would receive cytokines, antibiotics, and HLA typing.

The RITN center triaging and treating the pediatric patients would distribute the standard outpatient BMT information. Those patients identified for outpatient care would be educated on neutropenic precautions and schedule for routine visits and instructed to seek medical care if needed.

All RITN centers indicated that given the medical profile information, they had adequate supplies either at their facility or within their hospital systems or regionally and would not need to reuse or sterilize otherwise disposable equipment. In the event supplies reached critical shortages, the incident command teams would need to consider any reuse options for supplies.

Strengths

The following strengths were 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: The REM dose calculator is difficult to use and delays the treatment of NDMS patients at RITN centers. The RSO should provide guidance and training on the use of the REM dose calculator to medical staff involved in the treatment of NDMS patients.

Area for Improvement 2: All participating RITN centers should develop and or augment their existing just-in-time training for HLA typing and medical countermeasures pertaining to the receipt of victims that were exposed to radiological material. This training should be developed as part of improvement planning following this exercise.

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 2018 RITN Tabletop Exercise conducted on June 21, 2018. 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.

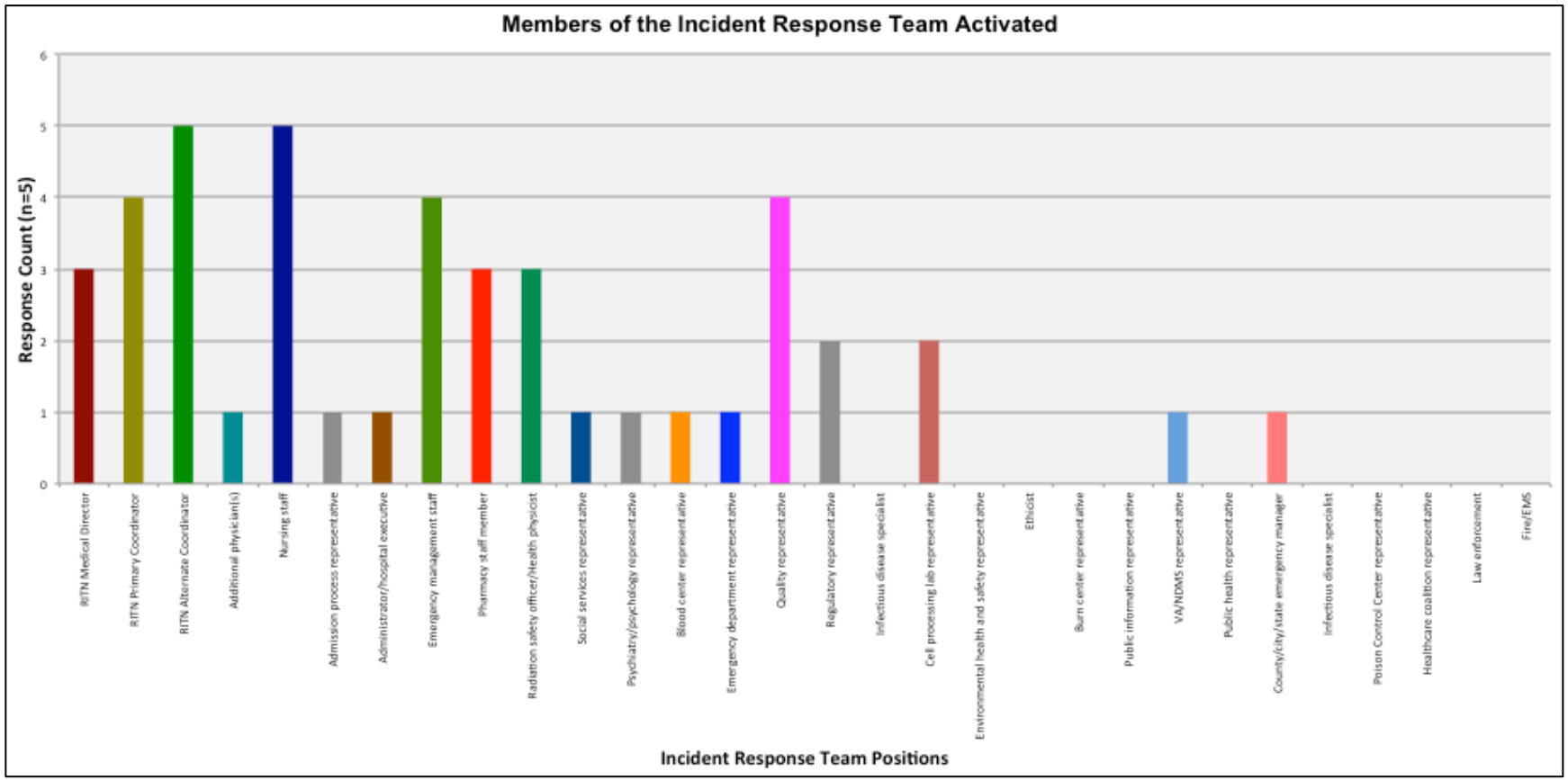
APPENDIX B: PATIENT DECISIONS & INCIDENT MANAGEMENT TEAM ACTIVATION

The following tables depict the adult and/or pediatric patient medical management decisions.

Adult Patient Triage						
	Admitted to BMT bed	Admitted to hematology/oncology bed?	Treated as an outpatient	Discharged to home / shelter	Provided palliative care only	Total
Patient 001	0	0	3	1	0	4
Patient 002	1	0	2	1	0	4
Patient 003	4	0	0	0	0	4
Patient 004	0	0	4	0	0	4
Patient 005	2	1	0	0	1	4
Patient 006	0	1	3	0	0	4
Patient 007	1	0	3	0	0	4
Patient 008	2	0	0	0	2	4
Patient 009	0	0	3	1	0	4
Patient 010	2	0	1	1	0	4
Patient 011	0	0	1	1	2	4
Patient 012	1	2	0	0	1	4
Patient 013	2	0	0	0	2	4
Patient 014	1	2	1	0	0	4
Patient 015	1	1	1	0	1	4
Patient 016	0	0	4	0	0	4
Patient 017	4	0	0	0	0	4
Patient 018	1	1	2	0	0	4
Patient 019	0	0	3	0	1	4
Patient 020	0	2	2	0	0	4

Pediatric Patient Triage						
	Admitted to BMT bed	Admitted to hematology/oncology bed?	Treated as an outpatient	Discharged to home / shelter	Provided palliative care only	Total
Patient 021	0	0	1	0	0	1
Patient 022	1	0	0	0	0	1
Patient 023	1	0	0	0	0	1
Patient 024	0	0	1	0	0	1
Patient 025	1	0	0	0	0	1
Patient 026	0	0	1	0	0	1
Patient 027	0	0	0	0	1	1
Patient 028	1	0	0	0	0	1
Patient 029	1	0	0	0	0	1
Patient 030	1	0	0	0	0	1
Patient 031	0	0	1	0	0	1
Patient 032	0	0	1	0	0	1
Patient 033	1	0	0	0	0	1
Patient 034	0	0	1	0	0	1
Patient 035	0	0	1	0	0	1
Patient 036	0	0	1	0	0	1
Patient 037	0	0	0	0	1	1
Patient 038	1	0	0	0	0	1
Patient 039	0	0	1	0	0	1
Patient 040	0	0	1	0	0	1

Members of the Incident Response Team Activated for the Exercise



APPENDIX C: EXERCISE PARTICIPANTS

Participating Organizations	
Children's Hospital of Wisconsin	Matthew Chinn
Children's Hospital of Wisconsin	Tay Kitzke
Children's Hospital of Wisconsin	Steve Konings
Children's Hospital of Wisconsin	Nalissa Wienke
Children's Hospital of Wisconsin	Lisa Hass-Peters
Children's Hospital of Wisconsin	Jill Evans
Children's Hospital of Wisconsin	Todd Senglaub
Children's Hospital of Wisconsin	Kathy Jodarkski
Children's Hospital of Wisconsin	TiTi Tieu
Children's Hospital of Wisconsin	Peter Lawinger
Children's Hospital of Wisconsin	Elizabeth Malosh
Children's Hospital of Wisconsin	Sauranth Chlahoba
Cleveland Clinic Foundation	Mark Myers
Cleveland Clinic Foundation	James Media
Cleveland Clinic Foundation	Tom Pauer
Cleveland Clinic Foundation	Andy Miller
Cleveland Clinic Foundation	Sharen Caronis
Cleveland Clinic Foundation	Betty Hamilton
Cleveland Clinic Foundation	Brian Colcanbe
Cleveland Clinic Foundation	Sheila Serafino
Cleveland Clinic Foundation	Kristin Ricci
Cleveland Clinic Foundation	Laura Bernhal
Cleveland Clinic Foundation	Seth Rotz
Cleveland Clinic Foundation	Aron Flagg
Cleveland Clinic Foundation	Robert Dean
Cleveland Clinic Foundation	Theresa Urban
Cleveland Clinic Foundation	Kelly Gaffney
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Duke University Medical Center	James Payne
Duke University Medical Center	Ashley Potter
Duke University Medical Center	Robert Reiman
Duke University Medical Center	Joel Ross
Duke University Medical Center	Krista Rowe

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Duke University Medical Center	Jeanne Verrecchio
Duke University Medical Center	Terry Yoshizumi
Duke University Medical Center	Jason Zivica
Duke University Medical Center	Ryan Campbell
Duke University Medical Center	Amy Puglia
Froedtert Memorial Lutheran Hospital	Anissa Johnsen
Froedtert Memorial Lutheran Hospital	Deb Stawicke
Froedtert Memorial Lutheran Hospital	Brenda Milota
Froedtert Memorial Lutheran Hospital	Matt Wolf
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Temple University Hospital	Dan Rudoph
Temple University Hospital	Margaret Bellerjeay
Temple University Hospital	Suzanne McHale
Temple University Hospital	Engaleisha Llewellyn
Temple University Hospital	Wes Light
Temple University Hospital	Jennifer Costello
Temple University Hospital	Cheryl Brown
Temple University Hospital	Michael Dugan
Temple University Hospital	Henry Fung
Temple University Hospital	Chrisbana Carns

APPENDIX D: 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 4.0 (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.	
Children's Hospital of Wisconsin	*Because we are a medical campus we have the ability to share resources. We have teams that collaborate across our organization and are privileged for both hospitals. Our BMT teams meet regularly to discuss BMT cases and collaborate.*
Cleveland Clinic Foundation	*Our biggest strength is our physical size and size of our resources. The readiness, preparedness of our emergency management staff and plan.*
Duke University Medical Center	*We already treat a large number of our transplant patients in a outpatient setting normally. This means we have space, equipment, and experience at utilizing this treatment modality. Our emergency response team has very strong links to city/county emergency management and the VA/FCC manager. These per-existing relationships would be of great help in this sort of scenario.*
Froedtert Memorial Lutheran Hospital	*Because we are a regional campus with both a medical school and 2 hospitals CHW and FH we are able to share resources. We also have satellite sites that we would be able to pull staff and resources from as needed to address shortages.*
Temple University Hospital	*Proper communication/collaboration. T3 system. Appropriate SOP's.*

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.	
Children's Hospital of Wisconsin	*One question we discussed not part of the scenario was how we would handle families that are all exposed. With the two hospitals we would have to decide how to handle adult and pediatric patients while trying to keep families together.*
Cleveland Clinic Foundation	*Unfortunately there would most likely still be staff that would decide to not show up to work.*

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.	
Duke University Medical Center	*The main concern would be patients that self-present and are not part of the RITN/NMDS patient distribution process.*
Froedtert Memorial Lutheran Hospital	*We are limited in the number of volunteers we can use.*
Temple University Hospital	*Limits on how many patients we can admit, how many injections we have to use etc.*

List and briefly discuss elements to address for future RITN exercises.	
Children's Hospital of Wisconsin	*Further education is appreciated.*
Cleveland Clinic Foundation	*More discussion between institutions as to their rationale for admitting patients, treating as an outpatient and use of cytokines/antibiotics/tissue typing. It would be nice to hear and share best practices.*
Duke University Medical Center	*Two topics were identified. Explain how RITN and NMDS work together at the front end of the process and how communications flow to the local FCC. Would RITN be involved in messaging and communications so there was a nationwide consistency?*
Froedtert Memorial Lutheran Hospital	*More education opportunities would be great.*
Temple University Hospital	*Guidelines/suggestions for treatment after radiation injury.*

APPENDIX E: ACRONYMS

Acronym	Term
AAR	After Action Report
ARS	Acute Radiation Syndrome
ASPR	Assistant Secretary for Preparedness and Response
BMT	Bone Marrow Transplantation
CNE	Continuing Nursing Education
COA	Commission on Accreditation
DHV	Disaster Health Volunteer
FCC	Federal Coordinating Center
G-CSF	Granulocyte-Colony Stimulating Factor
Gy	Gray
HCC	Healthcare Coalition
HCS	Healthcare Standard
HCT	Hematopoietic Cell Transplantation
HEM	Hematology
HHS	Health and Human Services
HLA	Human Leukocyte Antigen
HPP	Hospital Preparedness Program
IND	Improvised Nuclear Device
IV	Intravenous
JIT	Just-In-Time
MRC	Medical Reserve Corps
NMDP	National Marrow Donor Program
NDMS	National Disaster Medical System
ONC	Oncology
ONR	Office of Naval Research
PACU	Post-Anesthesia Care Unit
PO	Orally
PRA	Patient Reception Area
RITN	Radiation Injury Treatment Network
RSO	Radiation Safety Officer
SITREP	Situation Report
SME	Subject Matter Expert
TTX	Tabletop Exercise