2022

RITN Tabletop Exercise (TTX) After-Action Report Summary Report

Report Date: November 7, 2022

EXERCISE OVERVIEW

Exercise Name	2022 RITN Tabletop Exercise (TTX)
Exercise Dates	June 28, 2022; July 12, 2022; July 19, 2022; July 20, 2022; August 17, 2022; August 25, 2022
Scope	This exercise is a distance-based tabletop exercise planned for 1 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	Healthcare and Medical Response Coordination Medical Surge
Objective	**Objective 1:** RITN hospital staff can assess the ability of their laboratories to handle a surge in demand for complete blood counts with differential, comprehensive metabolic panels, and coagulation parameters. **Objective 2:** RITN hospital staff can identify staff, equipment, and other resource needs to include supply chain disruptions. **Objective 3:** RITN hospital staff can identify medical toxicology resources available and discuss coordination between the hospital and local poison center. **Objective 4:** Assess the ability of the blood bank to meet the increase in demand for blood products.
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)

Exercise And Executive Summary

The number of facilities that participated in this series of tabletop exercises was 70. A detailed listing of each facility can be found in Appendix A.

On the dates of each exercise, RITN centers and the RITN Control Cell participated in an online tabletop exercise to describe coordination of the laboratory and outpatient surge response as well as information sharing, data systems, and supply chain disruptions 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:

Exercise Scenario

- A 10-kiloton Improvised Nuclear Device (IND) was detonated in an urban area approximately 250 miles away from your facility. No threat of fallout and no utility interruptions.
- It is expected that a large number of people with mild to moderate trauma and those seeking evaluation for radiation exposure will self-evacuate to seek medical attention.
- Poison Control Centers (PCCs) throughout the country begin receiving large volumes of calls from people that were in the fallout zone.
- It is necessary to set up a receiving area for the outpatients and perform daily blood counts (i.e., CBCs collected and analyzed once per 24 hours).

Scenario Update

- Approximately 1,800 radiation victims have arrived in the local area, mostly self-evacuating. More expected over the next week. They require initial evaluation and blood tests; daily testing will need to occur for at least 2 weeks for many of them.
- In addition to the outpatients, approximately 500 samples are arriving daily to your laboratory for analysis from overwhelmed shelter locations closer to the blast site resulting in a total daily sample load that is nearly double the routine daily average.
- Due to the unprecedented detonation of an IND, transport of goods has been significantly slowed as inspections are increased at airports and along roadways within the U.S.
- There is a significant demand for blood products both in the immediate area and throughout the region where acute radiation injury patients are being housed. Trauma patients are also impacting total blood supplies. Volunteer donations have increased.

Common Major Strengths:

1. The majority of participating hospitals have a laboratory surge plan in place that includes a radiation incident.

2. The majority of hospitals have at least one medical toxicologist on staff; however less than half have of those have integrated that expertise into the RITN plans.
3. Depending on the size of the RITN hospital, some indicated having a depth of technical resources (medical toxicology, radiation safety) that could support education/training, triage, use of PPE, and decontamination. Additionally, a best practice of requiring hospital laboratory personnel to review the RITN videos was recognized. RITN hospitals should encourage laboratory leadership to require staff to review the RITN videos to augment training and prepare for this type of radiation response.
4. Hospitals have experience with supply chain issues following the COVID-19 pandemic and have strengthened relationships with local partners for resource sharing; with vendors for procurement.
5. Hospitals had sufficient resources to draw upon for blood collection in this surge response.
6. The networks of affiliated hospitals and outpatient facilities are well defined and could be drawn upon as a resource to respond to a significant testing surge.
7. The majority of participating hospitals were able to quantify their laboratory throughput in a 24-hour period; additionally, they were able to describe the decision makers involved if there was a need to prioritize samples should volume exceed capacity.
8. Hospitals are familiar with emergency response plans to request staff and supply resources from affiliated organizations or to escalate the request to the healthcare coalition or state level following established protocols.
9. Hospitals would leverage models developed during the COVID-19 pandemic to respond to the surge in outpatient blood collection such as using paramedics, clinical laboratory assistants, and mobile phlebotomists for sample collection and dedicated couriers for sample transport.
10. Hospitals have protocols in place to expedite priority samples for testing; these would just need to be modified for the criteria related to radiation injury patient condition.
11. The majority of participating hospitals recognized the need to stagger blood donations in order to maintain a steady supply for weeks to months.

Common Areas for Improvement:

1. RITN hospitals should strengthen/expand their relationship with PCCs, in particular as it relates to support for a radiation incident and sharing the RITN referral guidelines.
2. Conduct an evaluation of supplies needed based on the scenario presented in this exercise to ensure a complete list of needs is outlined and the time it would take to receive specialty items (e.g., laboratory supplies). Consider contacting non-RITN hospitals for supplies or laboratory testing support as they may be less overwhelmed and/or not immediately pulled into the response for a radiation incident.
3. Hospitals with a medical toxicologist should ensure that role is formally incorporated into the RITN response plans and outline specific responsibilities for this SME.

4. Consider augmenting laboratory radiation safety training with details specific to a RITN response, such as the estimated number of specimens, test types, and timelines. It may be valuable to further discuss protocols for handling potentially radioactive samples and patients to include PPE use, decontamination, sample storage, and waste disposal. Laboratory staff should be trained on any updated protocols.
5. Hospitals expect challenges with staffing and supplies to perform laboratory testing and data entry associated with sample tracking. Planning efforts should evaluate what other staff can be drawn upon to support this portion of the operation.
6. Staffing to support an increase in blood donations is expected to be a challenge. Using this scenario, continue to evaluate how to augment staffing for this purpose.
7. Hospitals did not consistently archive patient blood samples for possible future HLA typing. If space permits, it may be valuable to do so for a certain period of time (e.g., 3 months, 6 months) in case the patient condition deteriorates, requiring transplant.
8. Use this planning scenario to consider methods for how results would be reported to the hospital physician from outpatient settings that are not part of the electronic health record system. This can include IT solutions or manual processes.

Analysis of Capabilities

Exercise Discussion Module 1: Preparing for a Surge

Participants were tasked with responding to a series of questions at their individual facility then reporting out to the group on capabilities and actions. During the first module, two poll questions were asked of the group:

Question 1: Does a laboratory surge plan exist for radiological incidents? (*note: no data was obtained for the August 25, 2022-Penn AAR)*

	June 28	July 12	July 19	July 20	August 17	August 25
Yes (%)	71%	55%	33%	60%	55%	69%

Question 2: Is the local/state PCC included in RITN planning efforts? (*note: no data was obtained for the August 25, 2022-Penn AAR)*

	June 28	July 12	July 19	July 20	August 17	August 25
Yes (%)	40%	42%	42%	75%	45%	50%

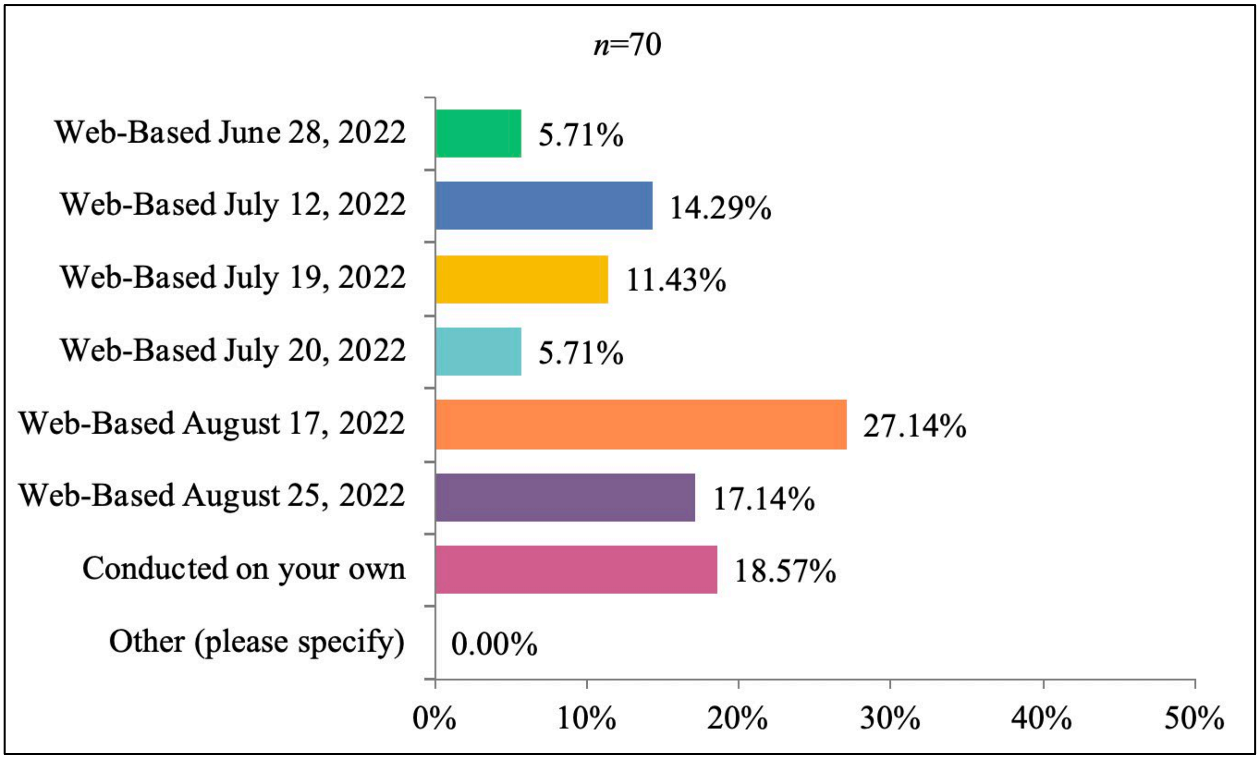
Responses provided in a survey following the exercise were as follows (*note: no data was obtained for the August 25, 2022-Penn AAR)*:

Exercise Discussion Module 2: Laboratory Testing, Result Reporting and Assessment of Blood Products

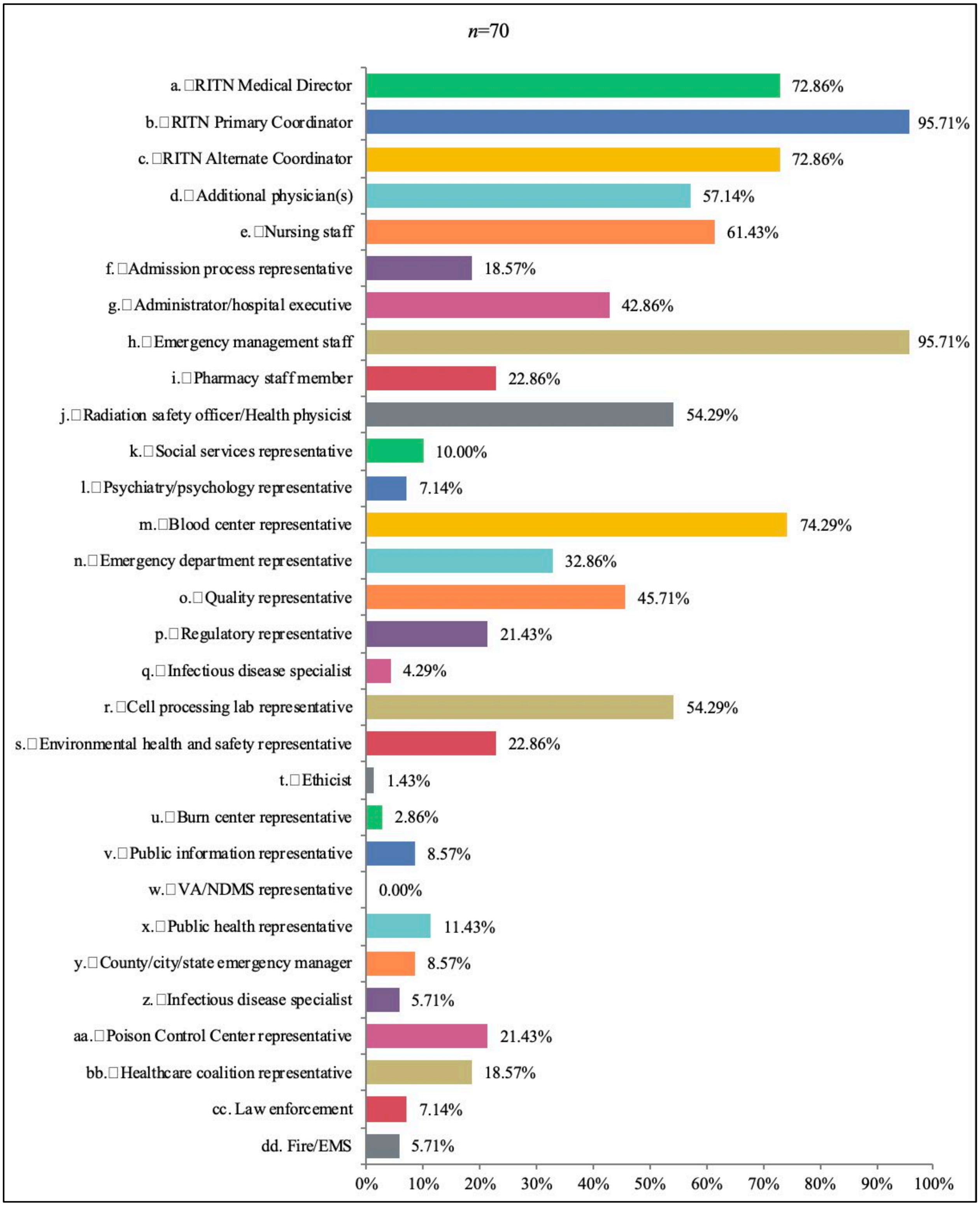
This module focused on the patient arrival and need for laboratory testing, data tracking, and blood products. As above, participating hospitals were given a set of questions to respond to. No poll questions were asked during this module.

Post-Exercise Survey Questions

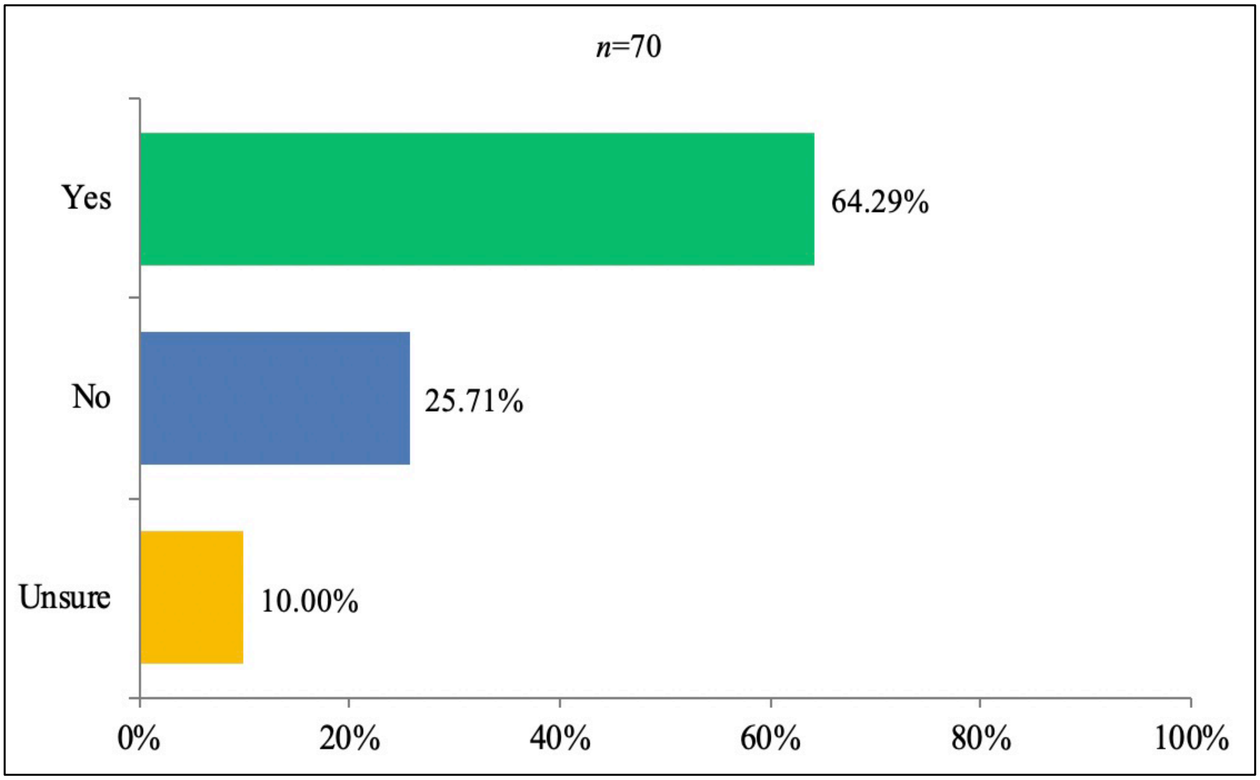
Question 3: What tabletop exercise session did you participate in?



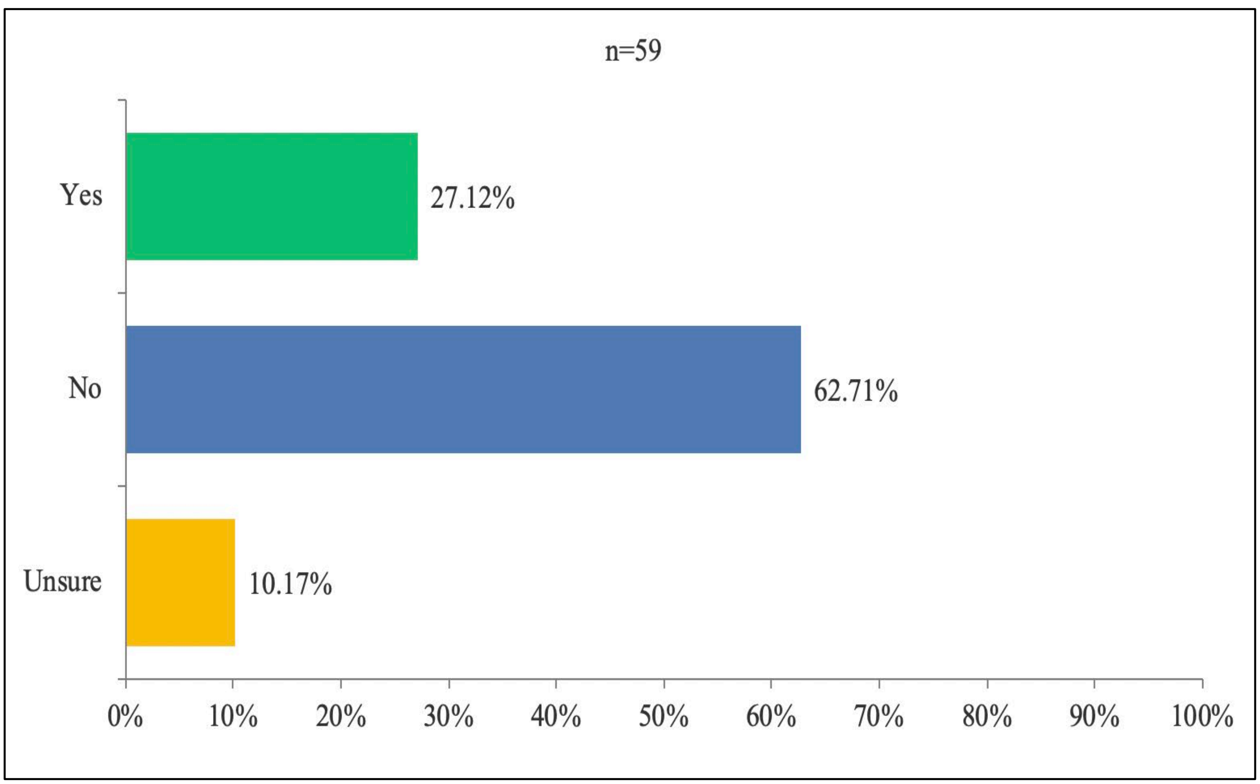
Question 5: Identify all of the members of your incident response team.



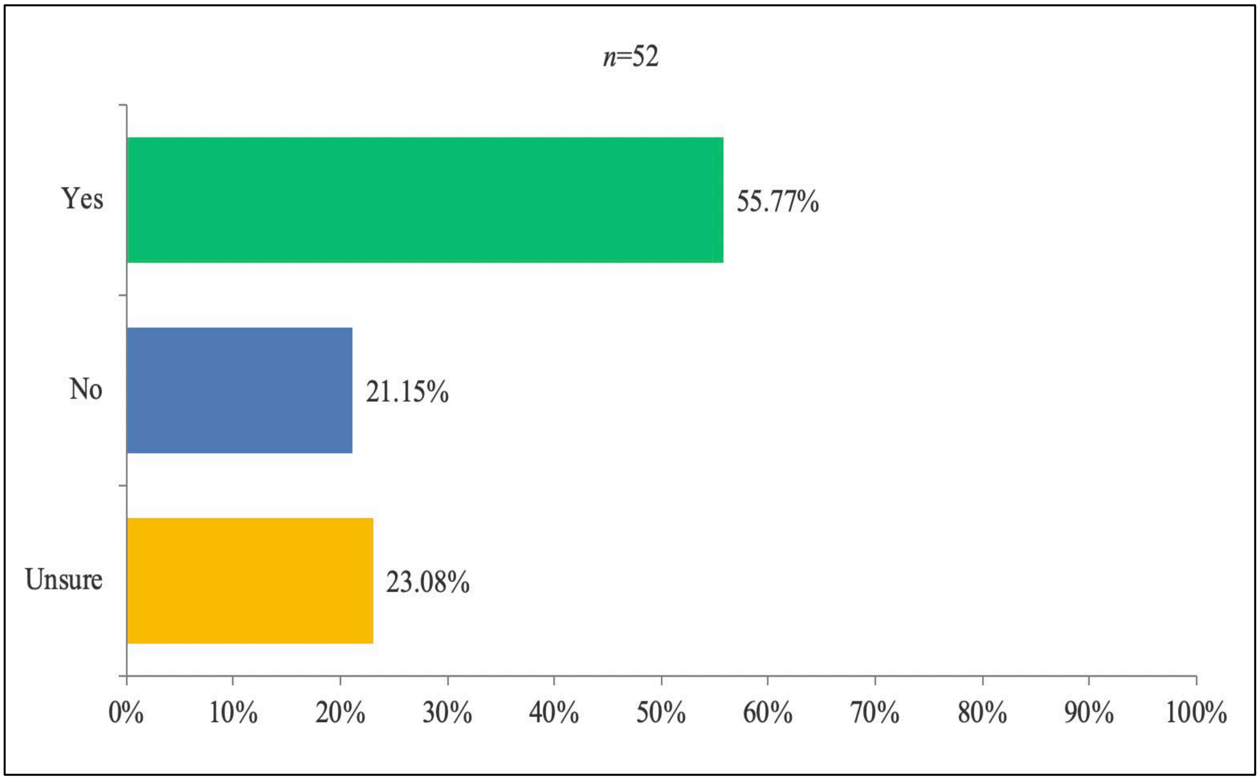
Question 7: Does your facility have on staff at least one medical toxicologist?



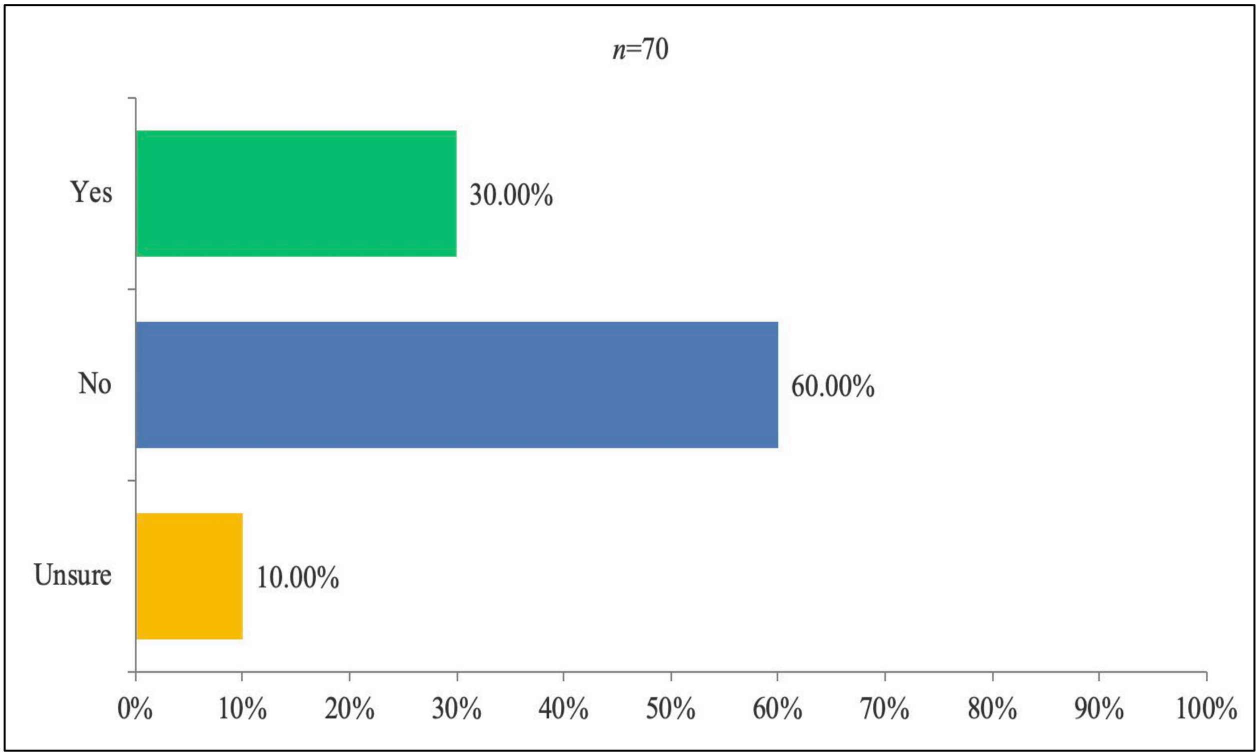
Question 7a: If yes, are they formally integrated into your RITN center's planning efforts?



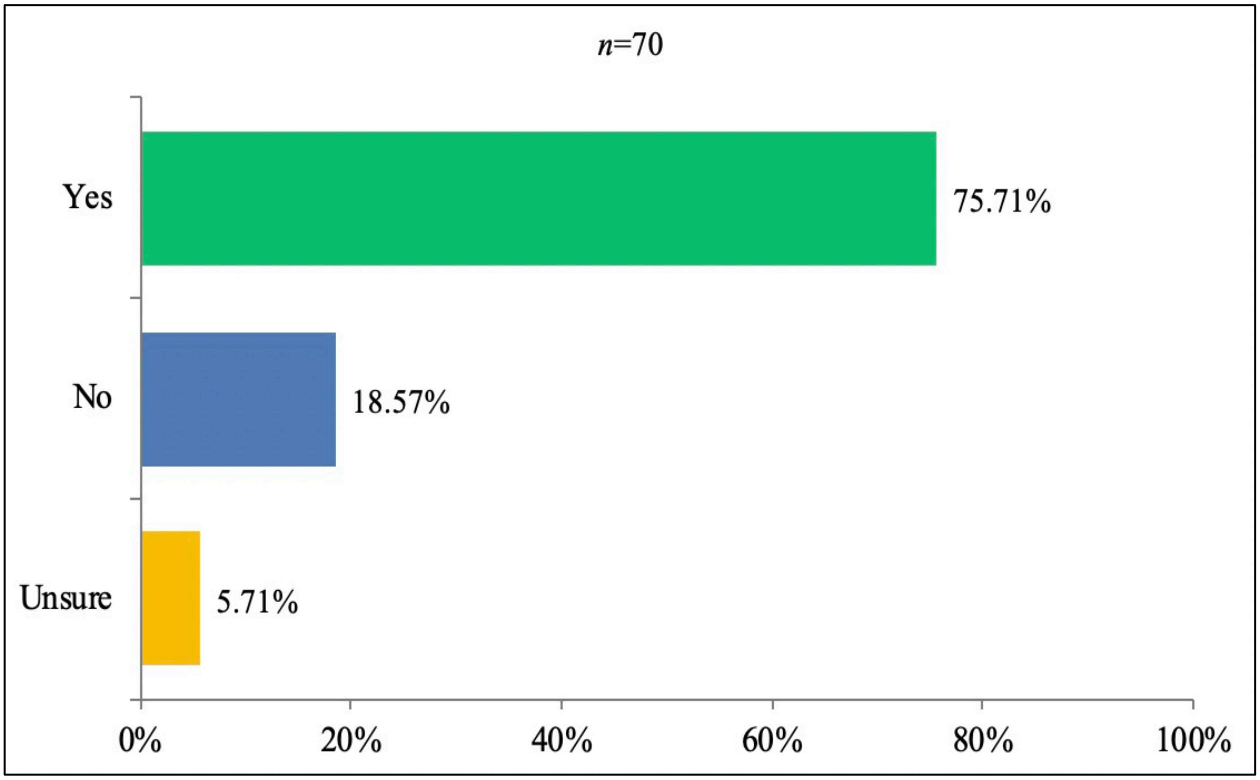
Question 7b: If no, does your facility have a pre-identified process to fill this need?



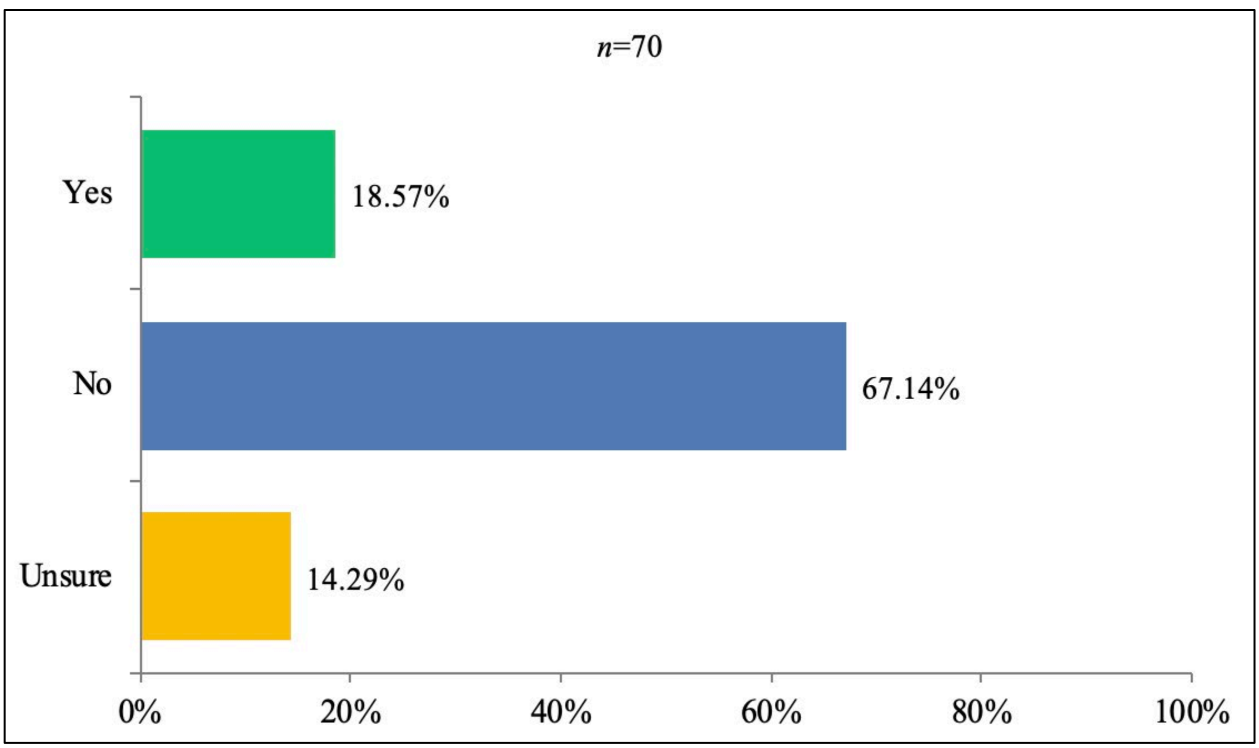
Question 8: Has your RITN center formally included your local or state poison center in its planning efforts?



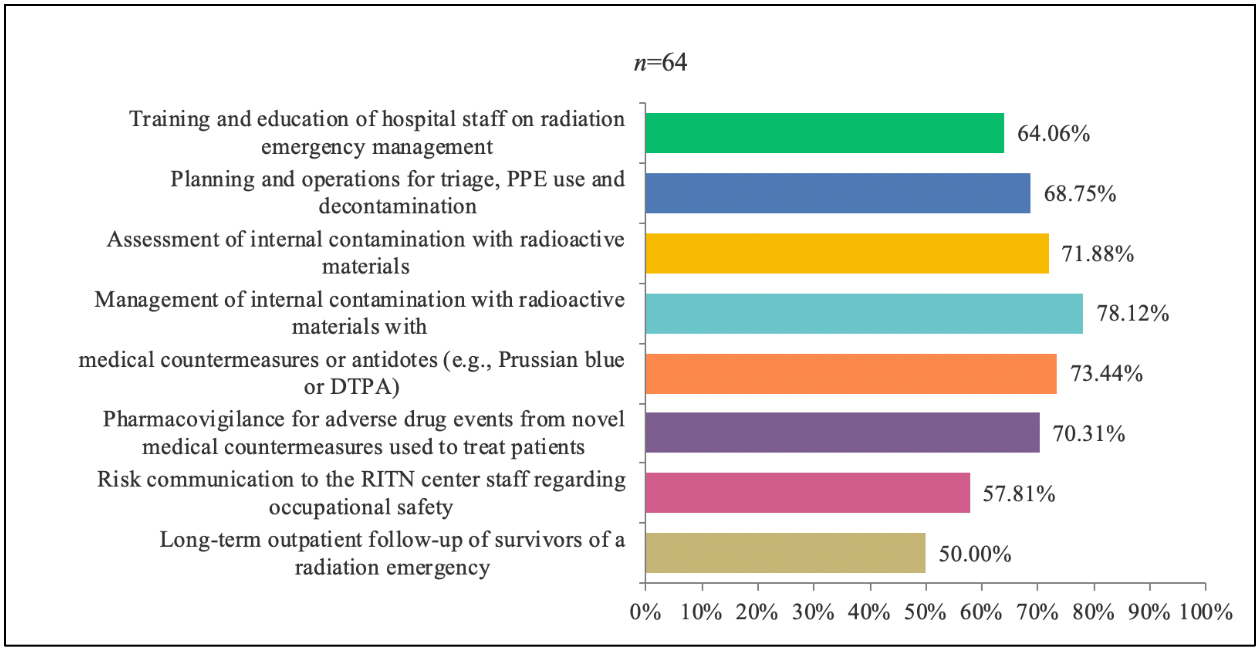
Question 9a: Do they have training about radiation (contact with patients/samples)?



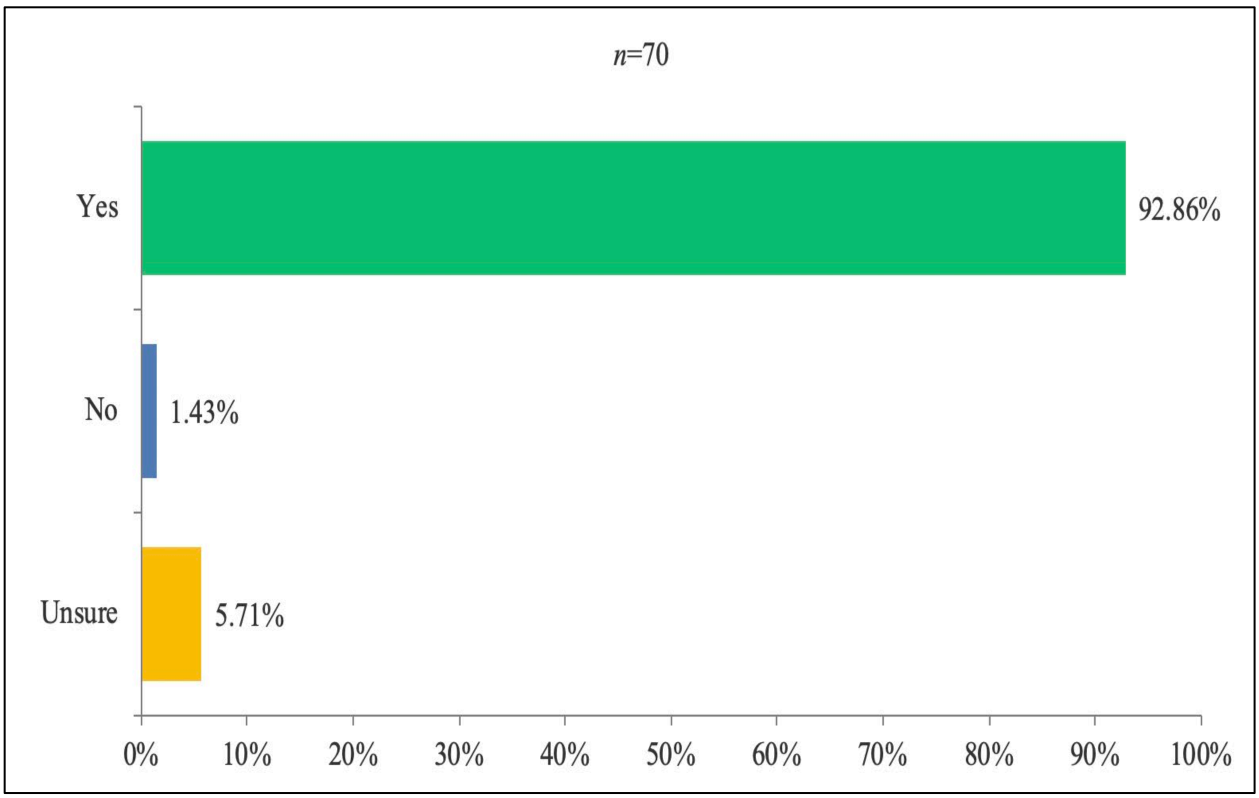
Question 12: Has you RITN center shared with your local or state poison center RITN referral guidelines?



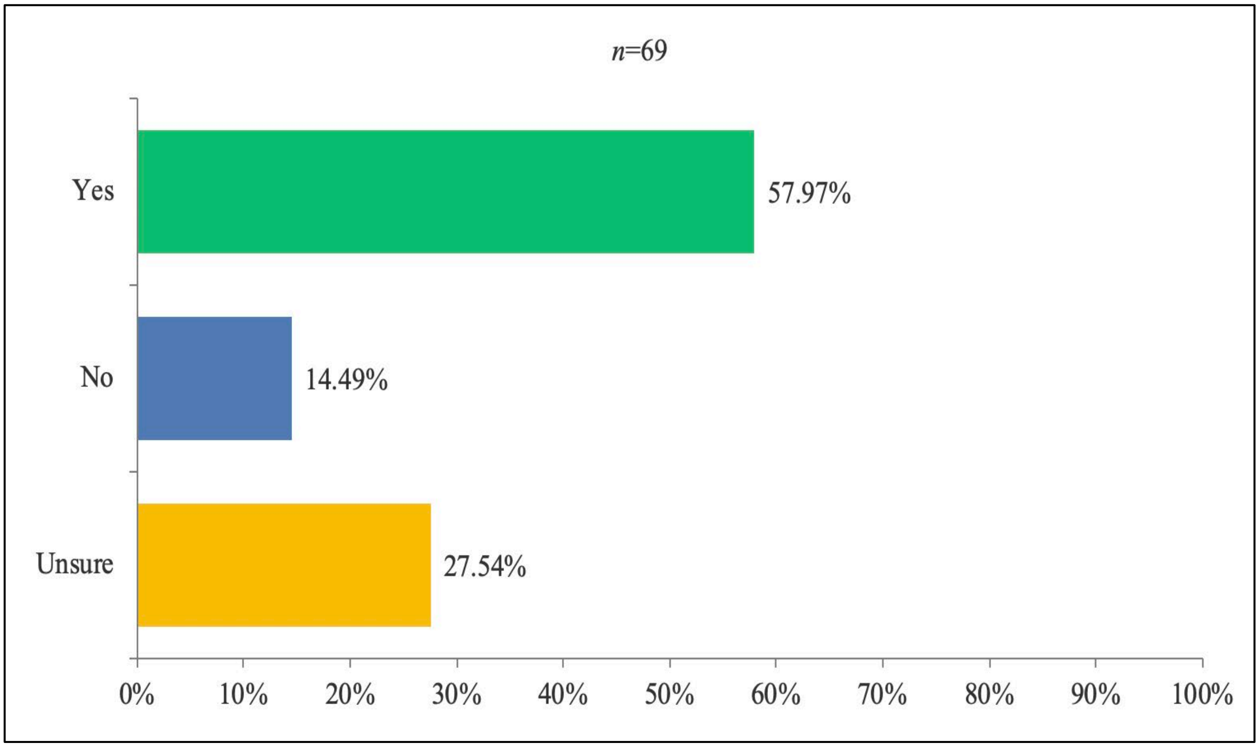
Question 13: Select from the following list, roles that you believe a Medical Toxicologist could play in your RITN center's response or plans (select all that apply)?



Question 14: Would you consider providing telephonic consultation to other hospital physicians on the management of acute radiation syndrome during an emergency?



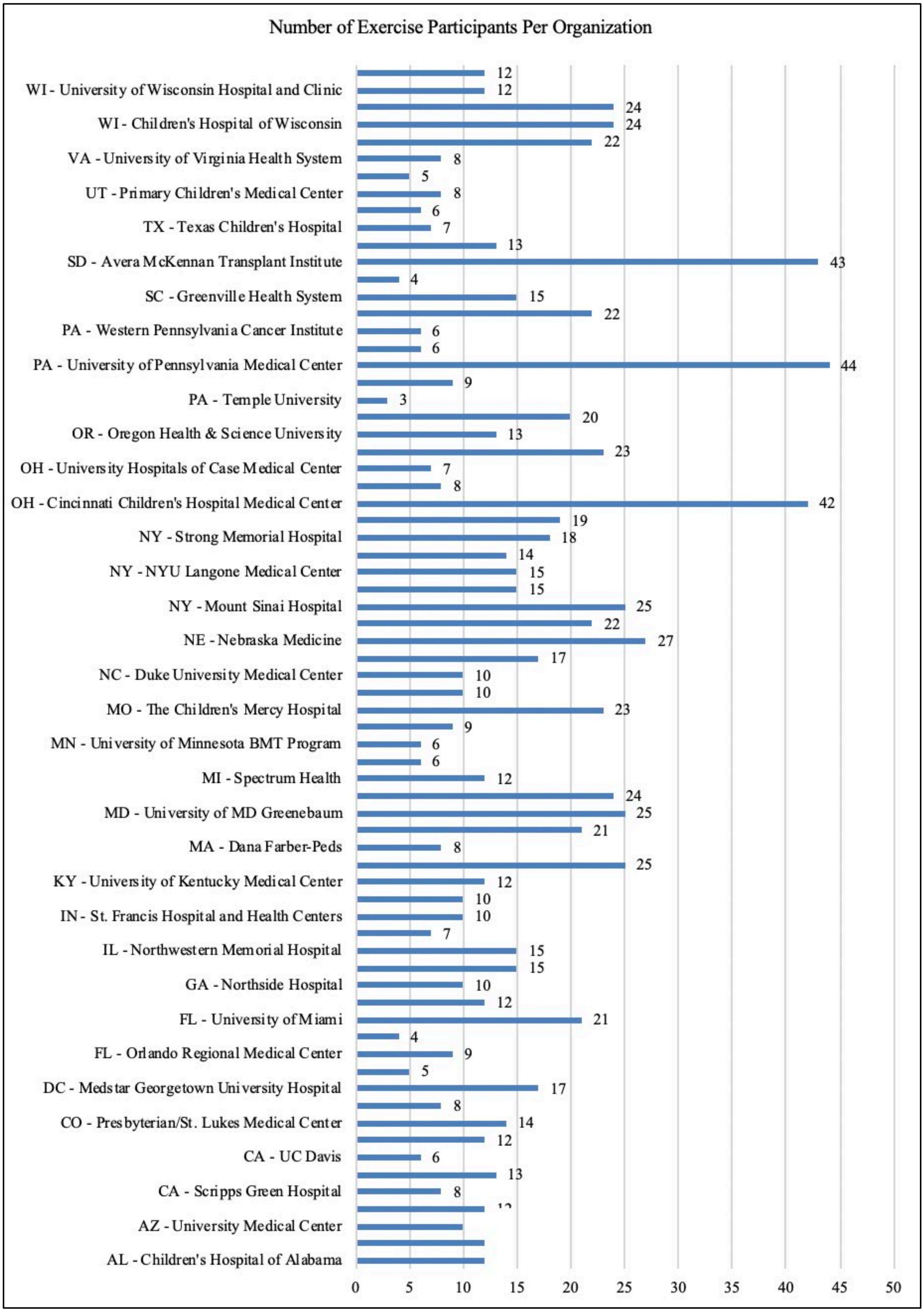
Question 14a: If yes, would you be willing to use your local or state poison center as a call center to facilitate these consultations?



APPENDIX A: EXERCISE PARTICIPANTS

Participating Facility	City	State
Avera McKennan Transplant Institute	Sioux Falls	South Dakota
Barbara Ann Karmanos Cancer Center	Detroit	Michigan
Barnes-Jewish Hospital at Washington	St. Louis	Missouri
Children's Hospital of Alabama	Birmingham	Alabama
Children's Hospital of Philadelphia	Philadelphia	Pennsylvania
Children's Hospital of Wisconsin	Milwaukee	Wisconsin
Cincinnati Children's Hospital Medical Center	Cincinnati	Ohio
City of Hope National Medical Center	Duarte	California
Cleveland Clinic Foundation	Cleveland	Ohio
Dana Farber-Adult	Boston	Massachusetts
Dana Farber-Peds	Boston	Massachusetts
Duke University Medical Center	Durham	North Carolina
Emory University Hospital	Atlanta	Georgia
Froedtert Memorial Lutheran Hospital	Milwaukee	Wisconsin
Greenville Health System	Greenville	South Carolina
H. Lee Moffitt Cancer Center	Tampa	Florida
LDS Hospital	Salt Lake City	Utah
M.D. Anderson Cancer Center	San Diego	California
Massachusetts General Hospital	Boston	Massachusetts
Mayo Clinic Rochester	Rochester	Minnesota
Medical University of South Carolina	Charleston	South Carolina
Medstar Georgetown University Hospital	Washington, D.C.	Washington, D.C.
Memorial Sloan-Kettering Cancer Center	New York City	New York
Mount Sinai Hospital	Chicago	Illinois
Nebraska Medicine	Omaha	Nebraska
North Shore University Hospital	Evanston	Illinois
Northside Hospital	Atlanta	Georgia
Northwestern Memorial Hospital	Chicago	Illinois
NYU Langone Medical Center	New York City	New York
Oklahoma Univ. Medical Center & Children’s Hospital	Oklahoma City	Oklahoma
Oregon Health & Science University	Portland	Oregon
Orlando Regional Medical Center	Orlando	Florida
Presbyterian/St. Luke’s Medical Center	New York City	New York
Primary Children's Medical Center	Salt Lake City	Utah
Roger Williams Medical Center	Providence	Rhode Island
Roswell Park Cancer Institute	Buffalo	New York
Scripps Green Hospital	San Diego	California

Participating Facility	City	State
Seattle Cancer Care Alliance	Seattle	Washington
Shands Hospital at the University of Florida	Gainesville	Florida
Spectrum Health	Grand Rapids	Michigan
St. Francis Hospital and Health Centers	Indianapolis	Indiana
Stanford Hospital and Clinics	San Jose	California
Strong Memorial Hospital	Rochester	New York
Temple University	Philadelphia	Pennsylvania
Texas Children's Hospital	Houston	Texas
The Children's Mercy Hospital	Kansas City	Missouri
Thomas Jefferson University Hospital	Philadelphia	Pennsylvania
UC Davis	Davis	California
UCSF Medical Center	San Francisco	California
University Hospitals of Case Medical Center	Cleveland	Ohio
University Medical Center	Tucson	Arizona
University of Alabama at Birmingham	Birmingham	Alabama
University of Chicago	Chicago	Illinois
University of Colorado Hospital	Aurora	Colorado
University of Iowa Hospitals and Clinics	Iowa City	Iowa
University of Kansas Medical Center	Kansas City	Kansas
University of Kentucky Medical Center	Lexington	Kentucky
University of MD Greenebaum	Baltimore	Maryland
University of Miami	Miami	Florida
University of Minnesota BMT Program	Minneapolis	Minnesota
University of Mississippi Medical Center	Jackson	Mississippi
University of Pennsylvania Medical Center	Philadelphia	Pennsylvania
University of Utah	Salt Lake City	Utah
University of Virginia Health System	Charlottesville	Virginia
University of Wisconsin Hospital and Clinic	Madison	Wisconsin
Wake Forest University Baptist Medical Center	Winston-Salem	North Carolina
West Virginia University Hospitals	Morgantown	West Virginia
Westchester Medical Center	Valhalla	New York
Western Pennsylvania Cancer Institute	Pittsburgh	Pennsylvania


Number of Exercise Participants Per Organization
WI - University of Wisconsin Hospital and Clinic
WI - Children's Hospital of Wisconsin
VA - University of Virginia Health System
UT - Primary Children's Medical Center
TX - Texas Children's Hospital
SD - Avera McKennan Transplant Institute
SC - Greenville Health System
PA - Western Pennsylvania Cancer Institute
PA - University of Pennsylvania Medical Center
PA - Temple University
OR - Oregon Health & Science University
OH - University Hospitals of Case Medical Center
OH - Cincinnati Children's Hospital Medical Center
NY - Strong Memorial Hospital
NY - NYU Langone Medical Center
NY - Mount Sinai Hospital
NE - Nebraska Medicine
NC - Duke University Medical Center
MO - The Children's Mercy Hospital
MN - University of Minnesota BMT Program
MI - Spectrum Health
MD - University of MD Greenebaum
MA - Dana Farber-Peds
KY - University of Kentucky Medical Center
IN - St. Francis Hospital and Health Centers
IL - Northwestern Memorial Hospital
GA - Northside Hospital
FL - University of Miami
FL - Orlando Regional Medical Center
DC - Medstar Georgetown University Hospital
CO - Presbyterian/St. Lukes Medical Center
CA - UC Davis
CA - Scripps Green Hospital
AZ - University Medical Center
AL - Children's Hospital of Alabama
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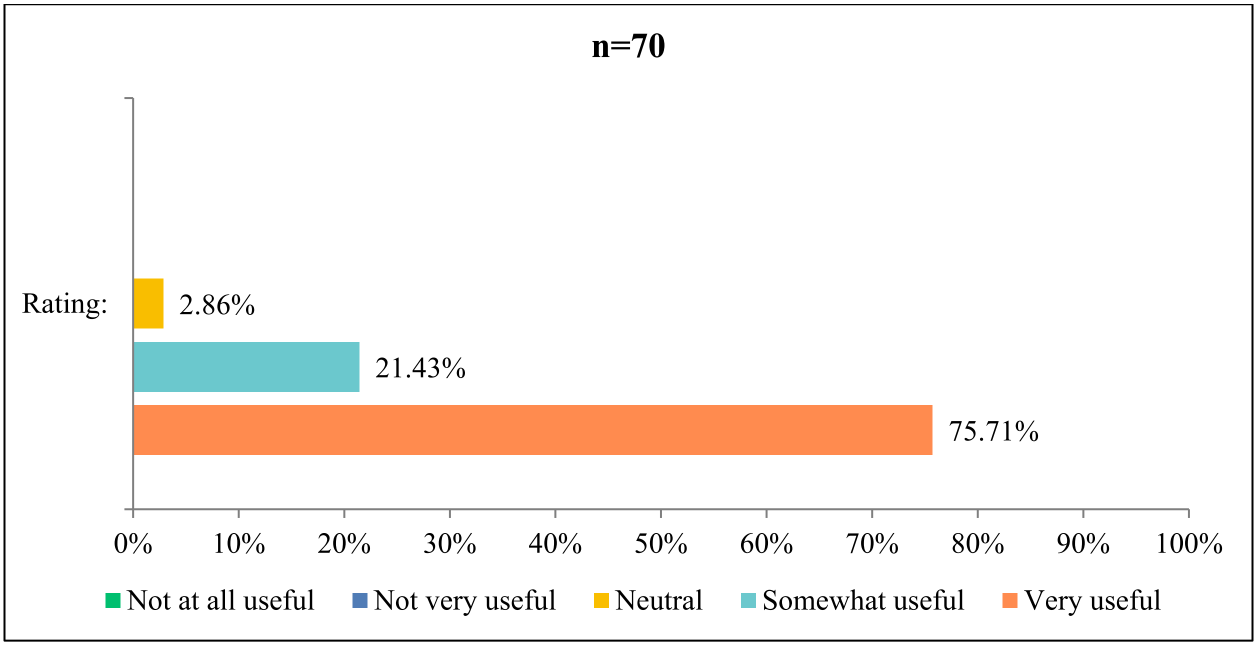
APPENDIX B: PARTICIPANT FEEDBACK

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

Question 33: On a scale of 1 to 5, how would your center rate the usefulness of this exercise (where 1=not useful at all 5=very useful)? (*n*=70)



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.

- *We have many resources available on site. Poison control, multiple labs, etc.*
- *Our main strengths lie in our HEICS. They have responded phenomenally during COVID and many of their solutions can be applied in a radiation emergency. Our supply chain is another strength, again based on lessons learned from COVID and the decision to stockpile more supplies. Our labs also have multiple resources that would make such an emergency more manageable.*
- *One major thing we learned is that our program has both Banner Corporate Resources and University of Arizona Resources at our disposal. Additionally, our Pathology Residency program would play a vital role in our ability to treat patients and triage them.*
- *City of Hope would be prepared enough to receive an influx to best of our abilities and capabilities. having the donor center and mobile blood van increases the ability to take on med surges.*
- *We are ready and prepared. We can identify with the collaboration of past and this one.*

- *Having the right people in the room was wonderful.*
- *1) health physics group to provide radiation safety expertise and a well-established, regularly drilled Radiological emergency medical response plan. 2) In our normal operations, we already process blood from radiation therapy patients so our laboratory and pathology staff have training and familiarity with the process*
- *I think one strength that we have is the ability to pivot the focus of research labs into assisting during a health crisis. The pandemic also helped us with practical logistics of performing our plan- all of the process improvements were recorded for the future.*
- *1. We have a managed contract with Quest diagnostics already in place to use to leverage supply chain support, which is vast. 2. PSL has an in-house blood donor center and we can increase collections and hours of operation if needed. 3. PSL does have 6 HCA affiliate hospitals in the area that can help support us by sending over additional supplies and staff.*
- *Existing incident command would coordinate large scale effect Existing relationship with the poison center would assist with fielding questions and triaging patients.*
- *Strong blood bank and laboratory program that has thoroughly thought through surge capacity and plans to work with the Red Cross.*
- *We have equipment and satellite sites to accommodate a surge of patients*
- *We have a great team that really knows how to come together and collaborate when it matters most. We have a lot of great knowledge, skills, abilities, and resources to get the job done. The team worked very well with one another. We have a Corporate Radiation Safety team that is able to respond and assist 24/7. We have high throughput capacity with the laboratory instrumentation. We have a strong support system with the other Orlando Health Laboratory team through both staffing, reagents, supplies, etc.*
- *1. Cohesive disaster management plan: Working closely with Alachua County Disaster Management, UF Health Shands has a smooth process in place to quickly and efficiently respond to disasters. 2. Back up plans. Through outsourcing, UF Health Shands has solid back up plans in place in the event original course of action isn't feasible.*
- *From a clinical care and lab perspective, we should be able to accommodate the increased demand in the event of said incident based on our capabilities.*
- *Our center is a multidisciplinary facility/healthcare system and we have a toxicologist on our team who is also a representative for the GA Poison Control Center.*
- *I think our biggest strength is that all main leaders of each department are aware of policy for this type of casualty and what we would need to do to come together to conquer. It would start from our chain of command and we would follow our policy for mass casualty. (Let's hope this never happens :() but we would be prepared in a true emergency setting.*
- *Excellent communication and procedures in place.*

- *Familiarity of personnel with surge scenarios based on prior experience Ability to leverage system resources*
- *Due to COVID, we believe we have many of the processes and SOPs in place to respond to this scenario. As a large academic medical center in Chicago, we have a strong radiation safety group and have access to 1)laboratory capable of processing a large volume of samples with access to off-site network locations, 2)our own in-house HLA lab and blood center, and 3)hem/onc group capable of managing patients with ARS. We also are connected with our NDMS local leadership and are involved in our Chicago Healthcare Coalition.*
- *We have some "hands on" experience with the last couple years of COVID to see how we can pull together a Command Center that is effective in making decisions and communicating to the masses. We have had to work through patient surges, staffing shortages, and supply chain issues. We have staff that are interested in RITN that did not know if existed before. Instead of just leaving in the BMT arena - we are branching out to other specialties that would need to assist us in this type of a disaster.*
- *Our site has been involved with RITN for over ten years, our radiation safety staff, including health physicist, and emergency management staff are well versed on RITN and what it means to activate for any number of scenarios. Given the size of our health system, we have lab capabilities that can easily ramp up for the patient volumes described in the TTX packet.*
- *UKHC has a large number of capabilities and depth of resources. UKHC personnel depth allows for minimal disruption of services in 24-hour work cycles*
- *One strength that was demonstrated today was our ability to scale up operations based on the surge. DFCI is uniquely positioned as an institution that serves a majority outpatient population so scaling up would follow the current model that we already practice when it comes to labs. The collaboration with other departments to ensure that service areas would be covered based on a labor pool would contribute to the success. Another strength is the preparation and experience gained in response to the COVID-19 pandemic to prepare supply chain and community partnerships to assist during this incident.*
- *Preparedness of Lab Dept to manage surge of testing needs, and reporting needs. 2. Ability of blood donation center to coordinate a campaign to increase donations.*
- *We have an excellent Center for Disaster Medicine (CDM) department that already has in place a system to alert the hospital to an emergency. They are always working on improving their knowledge about how to respond to a particular emergency.   Our facility is part of a larger organization from which to draw resources. For example, can ramp up blood draws and processing by utilizing other facilities within our network, utilization of beds, supply management, etc.*
- *"Other notes: Triage process to prioritize blood draws and labs; Reverse triage process to “de-prioritize” lab orders; Plan to coordinate resources with Midtown; Redistribute hospital resources (e.g., outpatient staff help with this effort); Plan to call in extra staff*

(e.g., volunteers, retirees, med students, nursing students, etc.); Plan to notify patients of lab results (patient information hotline setup);We have a very strong Medical Toxicology team, and strong support from hospital."

- *Teamwork/collaboration, robust surge planning, definitive SOPs in place. The pandemic afforded a once in a life-time learning experience related to managing just in time situations and crisis intervention.*
- *One the strengths that was shown with Spectrum Health today is its size. With 12 hospitals in West Michigan and now 9 hospitals in the Detroit area due to our merger with Beaumont Health, the testing capability is great. A second strength that was shown throughout was the lessons learned and carried over from our COVID response over the past 2+ years. The ability to flex and pivot was tested and shown. The documentation on those is vast and would be utilized in this type of incident.*
- *There is a strong process for incident command that are regularly practiced and implemented. Considerable clinical adaptability is an aspect of normal operations. Relationships with peer organizations and government agencies are strong and continuously groomed. Existing processes are well defined and accommodate staffing to workload, which means the processes of determining need are readily used.*
- *Our primary strength is our multi-hospital system's ability to draw on staffing and resources to maintain adequate throughput of testing and supplies. Our second strength is the medical Hematology/BMT/Oncology physicians and nurses we have on site and the ability to help find related donors for needed transplants.*
- *Great team work between departments and outside. 2. We are a large medical system and we have a lot of resources available to use outside of our hospital.*
- *1-HICS team practices and responsiveness 2- HICS team is involved with the local/state MARC 3- Updated and accessible emergency preparedness plan / SOP*
- *UMMC has some work to do based on today's discussions. We have never involved toxicology or had discussions with the lab. We are planning on doing this. We have in the past generally relied on handling things in the ER but realize this is much bigger scale. We are prepared to handle a mass casualty in the ER. We have the tools and knowledge. We just have to make sure everyone is on board.*
- *Our incident response system is well practiced after dealing with COVID. We continue to better integrate RITN into the official hospital response plans and working to partner more with additional local and state partners.*
- *Our incident management team has existing procedures and runs efficiently. 2. Our proximity to resources within the community.*
- *We have a strong incident command and processes in place to handle various emergency scenarios. (Some learned from our involvement with Ebola and COVID.)*
- *Strengths for Response: 1. Established process for patient registration will allow for the surge described in the Scenario 2. Hematology labs have capacity over other cancer*

centers. 3. Leverage our experience in treating cancers and ability to expand to an outpatient need.

- *During the exercise we identified our strengths in the following areas that would assist us in responding to a radiation mass casualty incident. Using the SOP to assist staff in the response and processes during an incident, having the ability to reach out to additional contracted vendors if there is an issue with the procuring of supplies, and ongoing training for the lab staff.*
- *The Emergency Management team's contribution in knowing how and when to contact outside required emergency support for these scenarios.*
- *Our supply chain group and pharmacy team are very agile and proactive for upstream supply chain issues during disasters. Our laboratory staff have a high capacity for processing samples from a disaster including surge operations.*
- *1) On site experts and response team that is ready and able to immediately respond and initiate a plan of action. 2)On site things such as blood collection, donor site, and radiation safety training that is already in place for staff prior to an incident. Our Radiation Safety officer with our Response team our well prepared and a great asset.*
- *We have had a lot of experience with COVID and I think we have the ability to respond to a radiation mass casualty. We have a well-oiled Disaster Management Team in the hospital and great support from county, state and federal affiliates. As documented, we can process a huge number of samples!*
- *We have a very strong Emergency Response Command Center that is already in place to lead the effort should an event of the nature occur.*
- *Frequent emergency drills and integration with community resources.*
- *We're a large organization with very many resources & a great emergency management team*
- *Has 3 medical toxicologists to assist with radiation poisoning 2. Transplant expertise*
- *Deeply rooted HICS structure and response methodology. Have an excellent relationship with the HCC to coordinate response.*
- *Today's discussion revealed that our toxicology department and Poison Control Center are well established with operational triage/training and education for hospital staff and public outreach. Additionally, our emergency operations team provided an excellent outline of the NDMS process for patient receipt and tracking. Since March of 2020, our logistics department has developed new roadmaps for supply acquisition.*
- *Close working relationships among departments involved in this scenario that have further developed through work in COVID response. COVID response has given us content across the enterprise to improve surge response to a wide range of hazards.*

- *1) our process in in place - we have first responder training specific to radiological, chemical and biological hazards - we have medical professionals like nuc medicine, rad onc, as well other specialties and involvement of staff with radiation safety and expertise*
- *Strong lab and clinical staff and emergency management expertise. Involvement with RITN.*
- *1. Laboratory Testing - With multiple labs and automated robotics lines, we can process a vast number of labs per day and can easily increase our daily output. 2. Extensive ancillary facilities - Penn Medicine is a vast enterprise of hospitals and facilities spanning from Lancaster, Chester, Valley Forge, Philadelphia, Princeton, and more. Each of these locations can aid in the surge whether through labs, employees, blood donations, or off-loading.*
- *Poison control center is part of UPMC. We can manage a large volume of CBC results. There is a medical toxicology clinic at UPMC. A radiation safety office is part of the established plan. HLA testing process is established. Transfusions can happen same day at Hillman.*
- *We would work as a team internally, and with the other RITN hospital in the city to coordinate care, supplies, etc. We have worked with the other hospital in functional exercises in the past to test communication, sharing of information, etc. We can rely on sister hospitals within the network to support our facility in the event of a surge. Command Center for the facility has recently been upgraded to provide enhanced communication possibilities.*
- *Different departments working very well together. Good foundation by participating in RITN for years.*
- *Supply chain is strong with internal material distribution center. Significant days on hand. New partnership with LabCorp can help with supplies and contract staffing from other areas*
- *Our emergency management team is exception and recently conducted a massive exercise with federal, state and local officials. Our medical team (BMT specific) is also very knowledgeable regarding the RITN.*
- *Thorough laboratory prepared plan that has been tested w/ the pandemic. 2. Existing calling tree with specialists*
- *We have a very wide variety of expertise here at MD Anderson including a large transplant center used to dealing with patients exposed to radiation and having low counts due to their treatment which mimics RITN patients and very robust radiation safety and EH&S/Emergency Mgmt. Departments. We also have connections with TX Medical Center partners and local, city and state partners that can be huge assets during a mass casualty response like RITN.*
- *Strength: Our center previously hosted large-scale exercises and created a triage and reception area when receiving RITN surge patients. We were able to understand the flow*

of patients and how we already have a plan in place for patient registration and lab draws.

- *Key players for our team and hospital administration are aware of RITN and will be able to gather the needed representatives to respond.*
- *We learned a lot through the COVID pandemic that could be applicable to this mass casualty situation. This included registering a large number of patients, ordering the correct testing, increased lab volumes, communicating results and more.*
- *We already have an existing response model that can easily be used for this type of disaster and response. 2. We already have established partnerships throughout the state.*
- *As a collective team we came away with ideas and a plan on how to reach out to other contributors in the organization and community. Great exercise to raise awareness of preparedness.*
- *We have a great incident command system already in place that we can utilize in case of a radiation disaster. Our Emergency Prep Manager already has good communication resources set up with NWHRN and other local entities*
- *We have a strong regional campus and ancillary sites. We have good relationships with vendors for suppliers. We have lab scalability. We already have strong partnerships with our blood bank and have onsite blood bank.*
- *We have a strong regional campus and business partners and ancillary sites. We have good relationships with vendors for suppliers. We have lab scalability. We already have strong partnerships with our blood bank and have onsite blood bank.*
- *Our ability to respond through our Incident Command structure allows for quick response during emergencies. The capacity of our Labs to process samples (assuming adequate supplies) would allow us to monitor and care for a surge of radiation exposure patients.*
- *We learned a lot during COVID. We are able to rapidly mobilize staff, resources and supplies to provide off site testing .*

Based on discussions today, please briefly describe 1 or 2 challenges to respond to a radiation mass casualty incident as described in this scenario.

- *Unsure if volume capability. Ability to get resources when all competing for same resources.*
- *As always, supply chain disruptions would still be a major challenge. Lab supplies remain on short supply still and would be a challenge to maintain. Also, given the mass number of people that would be expected to self-evacuate to our center, we might find ourselves overwhelmed with where to put them all, especially if needed to be hospitalized, given that COVID hospitalizations are still up a bit.*
- *The biggest challenge would be blood donations and the ability to process, test, and turnaround those products for donation fast enough. Phlebotomy supplies would also be*

a concern as this process plays a role in everything from triage, to blood products, typing etc.

- *staffing was identified and materials needed for large number of patients*
- *Need follow up with lab piece. This was new for us on this level*
- *Need more rad surge planning. Plan for MDs receiving critical values in our RITN plan.*
- *Our hospital is already short staffed with high turnover because of COVID burnout and labor market forces. Responding to another large-scale disaster would strain and already strained system*
- *Supply chain issues will be a challenge (as they are currently a challenge) -incorporating toxicology into the RITN plan is not formalized, will look into making that connection*
- *Staffing is probably number one - this was echoed by all the participating institutions. Communication of test results offsite to the appropriate providers.*
- *Weakness identified with lab automation limitations. Weakness identified with lab/patient follow-up limitations*
- *Unclear who our contact is at the DC Poison Control Center-current Emergency Preparedness Manager is out of the office and we are working to identify how to communicate with the Poison Control Center should we need assistance. We are hopeful that the DHS GETS card would help us establish communication with the relative outside parties but did identify that we need more information on this area.*
- *We do not have a Medical toxicologist on site*
- *Availability of reagents, blood products, not having a medical toxicologist, and staffing.*
- *Staffing was a common challenge that was brought up during the exercise. All UF Health Shands employees are assigned positions with regard to disaster response, but not all may actually come in if something was to happen.*
- *The identified challenge during this exercise was lack of involvement on our part with available resources, such as medical toxicologist at our sister hospital.*
- *A challenge for us would be managing supply constraints and staffing resources in the post COVID environment.*
- *Biggest challenge if this was to happen currently, would be staffing as this continues to be a challenge throughout medicine currently.*
- *Supply chain is an issue*
- *Challenges associated with management of the volume noted within the scenario Need for greater clarity among responding departments on elements noted within the scenario (e.g., expectations for coordination with shelters and role of hospital in delivery of results as described in the scenario)*

- *Our challenges will be manpower and supplies due to existing national supply chain shortages. We will also likely need access to housing/local shelter for patients and staff.*
- *Our biggest challenge would be getting patients registered in our computer system in a quick manner so the rest of the processes could flow smoothly. Our next challenge would be getting results reviewed and following up with all patients.*
- *Based on the TTX packet for this year, we have a lot of opportunity for better collaboration with the KUMC poison control center. In the past, the medical director has been invited to the annual TTX's but never attended - this year, several office staff (clinical pharmacists) attended and offered a lot of great information. We see a good opportunity to further collaborate and further imbed them into our RITN response.*
- *We really have no MAJOR challenges.*
- *Current staffing shortages experienced by health care facilities. Space constraints being in a large city center*
- *Advanced coordination with Poison Control center is needed. 2. Supply Chain disruptions are a major concern with no easy answer.*
- *Staffing has been an issue since COVID, so always working on ways to improve. COVID has also affected the supply chain which continues to create problems. Will continue to examine the role of poison control*
- *Staffing, Supplies, Space*
- *Supply chain and human resources are two major challenges.*
- *The coordination with Poison Control has not occurred in the past. This will be investigated.*
- *Gathering reliable information. Communicating effectively to staff, current patients, and patients surging into the catchment. Coordination with Government response and communication.*
- *Our access to a medical toxicologist needs more development into a formal process as does the training of the laboratory staff regarding radiation safety.*
- *Still resources that we have not incorporated into our institutions RITN discussions. 2. Acknowledging staffing restraints. 3. Competing interests and priorities during the incidence.*
- *Staff shortage*
- *Receiving a large number of patients at the same time would overwhelm our capacity. we would have to have assistance from state and national resources.*
- *Staffing and communication. We rely so heavily on the power grid and electronic technology that communication would be a challenge if those resources were not available.*

- *We need to develop a lab surge plan. Challenges with supplies.*
- *Challenges:1. Field service engineers for our lab testing may limit our capability. 2. Coordination with government on housing and transportation*
- *Transport/ logistics may be a challenge as samples may be coming from multiple locations; we would deploy our courier vendor for expertise. There may be a challenge sharing results with the patients being assessed at shelters in the region. We would need to work on a plan to possibly set up telehealth to share results with patients*
- *We have not reached out to the poison control center to inform them that our hospital is part of the RITN network. This is something we intend to follow up on.*
- *Adding training for laboratory staff in the preparedness phase would be valuable and integrating our radiation safety team. Would like to better integrate our medical toxicology team.*
- *We need to reach out to the Poison control to help coordinate. Need to reach out and consult a Medical Toxicologist to assist in our planning*
- *Supply chain and staff are challenges. The other will be the hysteria of multiple people wanting to be tested. Again, COVID has given us some good experience with this.*
- *Supply chain is a potential issue*
- *Population panic overwhelming service with worried well. Would do well with short event but if it is prolonged becomes much more difficult.*
- *We need to further look into engaging poison control*
- *Understand the capacity to deal with surge in terms of laboratory personnel and supplies*
- *Training and education specific to RITN.*
- *In the event of an incident on the west coast, our geographic location pre-disposes us to a large number of self-evacuating patients (fewer RITN centers serving highly populated areas). In addition, a general theme throughout our discussion was our ability to sustain staffing needs for long periods of time (weeks to months).*
- *Volume of lab processing in light of staffing challenges and supply challenges that continue to exist. Need additional consideration for reporting needs in a large-scale event and the surge in staffing needed to accomplish this additional reporting. Can certainly grow our ability/capability to work with our Poison Control Center to better integrate into RITN response (SME, provider consultation, call center work). We established a Center for Public Health Readiness and Response (CPRR) out of our Poison Control Center during COVID response to take on many of the roles similar.*
- *Staffing issues, Supplies, Communication*
- *The main challenge would be the surge in victims and the need for laboratory testing frequently on so many. Regional resources would be overwhelmed as well, so federal response would be needed.*

- *Supply chain disruptions and risks. Minimal information pertaining to supply chain disruptions and risks was discussed during this exercise. We maintain a large venue of couriers and vendors for supplies; however, we did not discuss our alternatives in case those supply chains break down.*
- *Local poison control center should be sent an RITN referral guide. Communication should be established with local poison control center. Medical toxicologist needs to be aware of RITN plan. The capacity of the Family House, which houses patients at Shadyside, needs to be established.*
- *Blood products would be a challenge as regional supplies are already low. Adequate supplies in a prolonged surge could be an issue.*
- *Decon, would be a major challenge due to proximity of detonation. Housing incoming patients is also an issue.*
- *Need to explore and engage LabCorp. Role in Toxicologist into RITN workgroup*
- *Our lab quality manager was not as familiar with the RITN as we would have liked. There have been discussions since the exercise regarding staff meetings and presentations to get the entire staff up to speed on the RITN specifically. The manager has also contacted our radiation safety officers to discuss additional training specific to radiation safety and contact with both patients and samples.*
- *No medical toxicologist on staff. Have access to one, but would be helpful if had one on site 2. No poison control in our health system. Have access to poison control at other health system in the state*
- *MD Anderson still needs to incorporate RITN fully into our surge responses and ensure all departments that may be affected by an activation are aware of RITN and what that means here at MD Anderson and to their area. We do not currently have enough in-house supplies/ test reagents etc. to really address such an influx of patients at one time.*
- *Challenges: Our pathology lab recognized the need for their staff to undergo RITN education and training. Blood bank needs to be more involved and aware of RITN. We need to incorporate our Medical toxicologist into the RITN plan. We need to contact our local poison control representative*
- *For patients being treated as an outpatient, we need more of an understanding of exactly where they will be housed and then seen and who oversees the outpatient clinic.*
- *This was a very helpful exercise in helping us identify areas of opportunity in our preparation for a radiation mass casualty event. We realized that we have much education we need to do with our lab teams and phlebotomists.*
- *We know we have the capabilities but are unsure of our capacity. 2. We have identified gaps in our local RITN partnerships, and knowing their capabilities.*
- *The need to have the right stakeholders involved with the increase in demand and the decrease in supply. Lessons learned from COVID surges can be applied.*

- *A challenge the group hit was that it was hard to answer this question without knowing initial patient numbers and how they might increase daily. Existing supply chain shortages and limitations stress our supply chain capabilities. The group felt like a radiation event could further increase challenges.*
- *Before this exercise we had not incorporated our medical toxicologists into our exercise who also support the poison control call center at Children's Wisconsin. This exercise and brining the medical toxicology team to the exercise showed us how valuable having them be a part of our RITN efforts on campus would be. We have already started conversations with them about future partnership.*
- *Before this exercise we had not incorporated our medical toxicologists into our exercise who also support the poison control call center at Children's Wisconsin. This exercise and brining the medical toxicology team to the exercise showed us how valuable having them be a part of our RITN efforts on campus would be. We have already started conversations with them about future partnership.*
- *The supply chain has been strained ever since the start of the COVID-19 pandemic, and another incident on top of that would create additional strain.*
- *We continue to address supply chain issues. We will include our local poison control center in planning.*

List and briefly describe elements to address for future RITN exercises.

- *More with poison control*
- *This exercise involved multiple disciplines we have not worked with before. They all communicated that they found this very helpful and interesting and would be willing to participate in further exercises.*
- *This was a great exercise. I am excited to work through a scenario where we are actively treating these patients, post HLA typing etc. This was wonderful thank you for the opportunity.*
- *These exercises are helpful to find the gaps and identifying additional resources needed.*
- *This was different and great! Would be interested in seeing state of pharmaceuticals in next exercise!*
- *We would like very much to have a better understanding of what resources we could expect on a national level if something like this were to happen.*
- *In this post-pandemic environment, many critical staff to these exercises are at different locations (different campuses, working remote), and there was not a good way to allow them to fully hear the discussion. I tried sharing the webinar, but there were privacy controls that did not allow screen sharing.*
- *Would like for the RITN to expand the Webinar to allow more staff and outside agencies to listen or participate in the exercise remotely. During the pandemic, we often have*

experts who are unable to attend in person. To allow more than one sign in - perhaps two per center for back up would be ideal for the same reasons stated above.

- *Challenges for short- and long-term follow-up*
- *Inpatient and outpatient nursing capacity and bed management should a lot of patients need blood transfusions, admissions for side effects, etc.*
- *How will patients will arrive (plane, car, bus) to a site during a radiation mass casualty and how will the center be notified of the potential arrival of the patients*
- *Continued practice with maybe some focus on the full throughput of patients through the hospital.*
- *Blood supply is always a consideration and can be a huge problem if local blood banks don't have adequate supply. Using a patient health portal (MyChart) to provide critical results is a wonderful tool but may not benefit all, esp. if there is an interruption to the internet service.*
- *Ability of having more than one person call in for each center. Perhaps by having separate virtual rooms for each participating center, at which point all rooms could disseminate info at debriefing.*
- *Considering managing outpatients for those centers who are going to house patients in proximity to the center for logistics of onsite clinics, phlebotomy, supportive care and transportation.*
- *We like the virtual option and focused exercises i.e., lab, data management etc..*
- *Additional exercises similar in nature to provide context for clinical and support departments involved in RITN. Exercises involving activation and command-level decision making would be helpful, and the interface between RITN hospitals and sheltered populations, expectations for delivery of results, etc. Additional context on the role of the Poison Center and referrals would be helpful as well.*
- *I think it will be helpful to review again the topics of exposure and contamination to help the public understand. The biggest upfront challenge is managing FEAR to avoid chaos, so any efforts to educate the public in that regard will be great. We previously conducted an exercise regarding communication to the public, etc. - it would be good to see this again in a case presentation that involves communication with media, etc.*
- *For those needing transplant - what does that look like? NMDP already very busy - how would we get donors moved through the system? Would RITN assist with those?*
- *I would like to see something similar to this TTX but with medication and the logistics for getting them from the strategic national stockpile. OR, something about lessons learned from the COVID-19 pandemic that can be extrapolated to the RITN responses.*
- *It would be interesting to have a Tabletop where we actually had to receive patients (how many are we prepared to receive?) and do a "tracer" of how the patient(s) presents*

(either ED or scheduled appointment) and how they are managed through the system. Would it be any different than any other BMT patient????

- *Communication between RITN centers to other RITN centers, community partners, local and State public health, etc.*
- *Local radiological event requiring decontamination and management of patient surge.*
- *This exercise was most beneficial because of work done in advance to answer questions and raise concerns. It was helpful to meet and discuss questions but the time limitations really impacted on what we could talk about. Would suggest a few questions that get to the heart of the issue so that we do not get bogged down with nitty gritty questions. Would also like to advocate for a better way to allow for more people to join virtually as we take this annual exercise seriously and want all of our stakeholders, both within our institution and other external partners such as from other hospitals within our area or DPH or HHS, etc., to be able to attend. We had to also have an internal link for a break out session which, in logging in and out of 2 links was time consuming. Please consider other ways to allow more to join virtually.*
- *would really like to do a real-life exercise*
- *Sheltering in place, radiological incident and compromised infrastructure - IT.*
- *I really like the expansion of scope over the last two years. By looking at fatality management last year and lab capability this year, these exercises have increased our focus outside the typical departments. One area to look into more maybe the ongoing support of patients utilizing community assets (housing, food, schooling for kids, etc.) during their extended time receiving care.*
- *State level coordination and NDMS/JPATS information sharing.*
- *Would like to see an exercise for a nuclear power plant meltdown or disruption*
- *There was not enough time to complete the exercise questions.*
- *Accessing the national stock pile hierarchy*
- *I would like to see if we can address staffing for a future exercise. I know we are very short on our floor. What do you do when no one knows BMT or ARS....etc.*
- *Flow of cytokines from SNS to local hospitals.*
- *Telehealth. With COVID, we saw telehealth step into the forefront of Healthcare. This would be an avenue worth incorporating further into our responses.*
- *Intake of a large number of patients (Access services, space, etc.)*
- *Future exercises could focus on the coordination of care. Further explore local, state, and Federal coordination channels.*
- *Mount Sinai does find that this year's questionnaire format was a lot more engaging for the team.*

- *Would really benefit from seeing a video of a full scaled RITN practice exercise (or part of one) that has been completed.*
- *Patient transport from the NDMS system, notification of RITN activation, and family management*
- *Unfortunately, we did have some connection issues and missed hearing other facilities answers to some of it. This was unfortunate as it is helpful to hear what they already have in place and are working on as well. Getting ideas from other facilities is helpful.*
- *RITN staff chain of communication and reporting Our center being the epicenter*
- *Triaging patients closer to the detonation area.*
- *Would welcome some diversity in exercises- we have been doing this for a long time!*
- *This was efficient and effective; like this model*
- *Dedicated time for group discussion. Module 1 felt very rushed.*
- *For future exercises, we would like to have questions to help us decide how to scale back our everyday operations in order to accommodate the surge of patients (i.e., do we cancel elective admissions, day patient surgeries, general ambulatory outpatient visits).*
- *Coordination with NDMS, Federal Coordinating Center on patient arrivals.*
- *Perhaps involve federal agencies including REAC/TS to get a better idea about what we can reasonably expect in what time frame from our federal partners.*
- *Security, volume overload, and patient tracking - in our scenario, an IND was dropped in our neighboring city, Pittsburgh. If this were to happen, an incredibly large volume of patients would be moved to Philadelphia, and we would need to strategize how to handle volume overload, where patients will stay, how to connect family members, and how to maintain order. Decontamination procedures - RITN patients will go through multiple lines of decontamination before arriving at the RITN hospitals; however, the average employee will still be wary of contamination. How will the hospital ensure decontamination? What are the bottle necks of this process? Do we maintain the correct supplies for mass detection and decontamination?*
- *This was a great way to incorporate some other key areas that I had not been involved with previously. Of note, the selection of dates on the very first section of this survey had dates from 2019 listed. I selected that we conducted our own exercise since the dates were incorrect. We participated in the exercise on Tuesday, June 28, 2022.*
- *This was an excellent exercise and tested departments not usually tested during past drills. This will be the start of new partnerships and collaborations. This was more hands on for everyone.*
- *Movement of patients from NDMS with ambulance providers*

- *FYI: THERE WASN'T THE OPTION TO CLICK ON TODAY'S EXERCISE DATE IN THE DROP DOWN ON THE FIRST PAGE. I CHOSE "SELF CONDUCTED" BUT OUR TEAM PARTICIPATED IN THE GROUP EXERCISE ON 6/28 AT 11AM.*
- *Community involvement - where to house outpatients, family members, influx of patients 2. Triaging of patients*
- *Would like to see more about not only the triage and mass numbers of patients we would receive but more about the patients that would be going to transplant and the logistics of that sort of end-line scenario. Would it be trying to track down family, doing cords, doing unrelated donors.*
- *Incorporate more of the HLA lab and Search coordinators into an exercise. We would like to test their capacity and ability to handle a surge of patients. Thank you!*
- *I feel we are very well versed on triaging/treating patients if needed. The questions we have is who will be paying the bill. I don't specifically want an exercise to walk thru how we communicate and bill for our BMT patients. It's more of someone from RITN reviewing with us, how the patients should be put in a system and who is the guarantor or just get the patient's private insurance and see what happens? Should we code the patients a certain way to know exactly who is an RITN patient?*
- *We understand we need to expand our local RITN committee.*
- *Provide local EMS education, present at Grand rounds for physicians, provide more education to outpatient clinics that could be directly impacted, look at opportunities for the poison control center to assist*
- *Clearer instructions on how to participate and facilitate the exercise. If participating in a webinar it would be helpful to do breakout rooms by facilities.*
- *One of our largest challenges for this exercise was how great the scenario was for discussion. We found ourselves with not enough time to get through all the questions.*
- *One of our largest challenges for this exercise was how great the scenario was for discussion. We found ourselves with not enough time to get through all the questions. We also thought that with the shorter exercise we didn't have as much time for dialogue with the other Hospitals to ask questions. As the person coordinating who comes to the exercises I also would find it really helpful if there were a recommended list of players if there are specialized roles e.g., medical toxicologists. We have plenty of others who come from pharmacy, inpatient, outpatient etc. but the more specialized roles it would be helpful to highlight those so we can make sure they are available.*
- *Based on this scenario, patient receiving and decontamination for those that self-transport or are otherwise arrive outside of the RITN.*
- *How to address growth factor shortages and distribution.*

APPENDIX C: ACRONYMS

Acronym	Term
AAR	After Action Report
ARC	American Red Cross
CBC	Complete Blood Count
HLA	Human Leukocyte Antigens
ICS	Incident Command System
IND	Improvised Nuclear Device
NMDP	National Marrow Donor Program
NDMS	National Disaster Medical System
ONR	Office of Naval Research
PCC	Poison Control Center
RITN	Radiation Injury Treatment Network
TTX	Tabletop Exercise