RITN® Overview

Speaker Name
Speaker Organization
Speaker Telephone
Speaker Email

As of November 14, 2014
Why we should care

“I continue to be much more concerned when it comes to our security with the prospect of a nuclear weapon going off in Manhattan,”

-President Obama on March 25, 2014
Agenda

- What is RITN?
- What is RITN preparing for?
- How RITN fits into the response
- Victim profile
- Is RITN ready?
- Organization structure
- Initiatives
- Resources
Who we are?
Who are RITN centers?

- RITN centers are hospitals that work with the National Marrow Donor Program to facilitate unrelated marrow transplants.
- RITN centers may:
  - Accept patient transfers to their institutions
  - Provide intensive supportive care to victims
  - Provide treatment expertise to practitioners caring for victims at other locations
  - Travel to other centers to provide medical expertise
  - Provide data on victims treated at their centers
  - Facilitate marrow transplant for those who require it
Possible Incidents Involving RITN

- Focus of preparations: Any incident resulting in mass casualties with a marrow toxic injury
- Marrow is damaged by exposure to low levels of radiation
- Possible incidents:
  - Radiological - exposure to ionizing radiation
    - Improvised Nuclear Device (IND)
    - Nuclear power plant accident
    - Less likely to overwhelm existing response resources:
      - Radiological exposure device (RED) a.k.a. open source
      - Radiological Dispersal Device (RDD) a.k.a. dirty bomb
      - Industrial accident
    - Military grade nuclear weapon
  - Chemical: Mustard agent
  - Unknown
“the possibility of a group making a weapon using highly enriched uranium is very plausibly within capabilities of a sophisticated terrorist group.” Matthew Bunn (Harvard Belfer Center) 3/22/2012

“Making a simple “gun-type” bomb, the easiest for terrorists to build, requires at least 50 kilograms of HEU enriched to 90% U-235.” From “Consolidation: Thwarting Nuclear Theft” Harvard Belfer Center, March 2012

“Between 1995-2011 the IAEA has confirmed 2164 incidents, 399 involved unauthorized possession and related criminal activities. Incidents included in this category involved illegal possession, movement or attempts to illegally trade in, or use, nuclear material or radioactive sources. 16 incidents in this category involved HEU or plutonium. There were 588 incidents reported that involved the theft or loss of nuclear or other radioactive material and a total of 1124 cases involving other Unauthorized activities, including the unauthorized disposal of radioactive material or discovery of uncontrolled sources.” IAEA “Nuclear Security Achievements 2002-2011”
IAEA Reported Incidents of Theft/Loss

IAEA Reported Incidents 1993-2013

Unauthorized Possession
16 incidents with HEU or Plutonium

Theft or Loss
Goals

1. To develop treatment guidelines for managing hematologic toxicity among victims of radiation exposure

2. To educate health care professionals about pertinent aspects of radiation exposure management

3. To help coordinate the medical response to radiation events

4. To provide comprehensive evaluation and treatment for victims at participating centers
It is not the Cold War..... It is not a futile effort!
If you see the flash, duck and cover!
Damage will not be as Catastrophic as a Military Nuclear Device
Damage will not be as Catastrophic as a Military Nuclear Device

Anticipated Damage Zones from a 10 kT IND

Epicenter of detonation

Damage Zones
Severe: complete devastation/buildings collapsed
Moderate: buildings damaged & roads impassible
Light: windows & doors blown out

Fallout May Cause the Most Radiation Injuries

- The dose in the Dangerous Fallout zone could cause marrow injury
- Sheltering-in-place is key to reducing dose, as the hazard dissipates relatively quickly

How would RITN fit in?
U.S. Preparedness

• The National Response Framework: [www.fema.gov/nrf](http://www.fema.gov/nrf)

• Teams:
  – **MERRT** - VA Medical Emergency Radiological Response Team
  – **CERFP** - NG CBRNE Enhanced Response Force Packages
  – **CST** – NG Civil Support Team
  – **NIRT** - DHS Nuclear Incident Response Team
  – **ERT** – EPA Radiological Emergency Response Team
  – **NDMS** - HHS National Disaster Medical System
  – **REAC/TS** - DOE Radiation Emergency Assistance Center/Training Site
  – **RAP Team** - DOE Radiological Assistance Program Team
  – **SNS** – CDC Strategic National Stockpile
  – **VIPR** – TSA Visible Intermodal Prevention and Response
RITN is Incorporated into Federal Plans

- DHHS-ASPR: http://www.PHE.gov/about/oem/cbrne
- State and Local Planners Playbook for Medical Response to a Nuclear Detonation
- RDD Playbook
Only a small minority would benefit from intensive care or a transplant
Reality will not be orderly
*** This model does not account for victims with trauma or no injuries.
Expected distribution of victims (in a nutshell)

- **Incident Location:** Victims triaged, decontaminated, then moved to RITN or other care facility through collaboration with HHS-ASPR.

- **Patients transported for intensive supportive care**

- **RITN Centers** receive patients to allow hospitals in impacted area to focus on incident response.
RITN Casualties Will Take ~7-10 Days

### Day 1
- **RITN Centers** - review capabilities & prepare to receive casualties

### Day 3
- Earliest casualties arrive at RITN Centers near incident
- **Daily/Periodic CBCs**

### Day 7
- Expected initial surge of casualties for RITN Centers

### Day 30
- **Discharge and return to home region**

- **Alert and Notification**
- **Early Symptoms** – e.g., nausea and vomiting

- **Initiate G-CSF as soon as possible when indicated**
- **Patient collection and transport to FCCs**

- **Clinical management**
Small Percent Will Require Transplant

Casualty Profile

Only 15% of all casualties would be appropriate for RITN care

85% of casualties will have trauma or combined injuries and receive treatment elsewhere.

15% will have "radiation only" injuries and be sent to RITN centers for definitive medical care.

RITN will need to have inpatient care for 30% casualties.

70% of the radiation only casualties will require outpatient monitoring.
Casualty Profile

Level of severity is correlates to the level of exposure

From: Medical Management of Radiological Casualties (Fourth Edition – July 2013) Military Medical Operations, Armed Forces Radiobiology Research Institute, Bethesda, Maryland 20889-5603
RITN ARS Treatment Guidelines

• Follow standard approaches for patients with bone marrow toxicity from chemotherapy

• Based on severity of cytopenias and presence of complications (e.g. neutropenic fever)
  – Irradiated, leukoreduced transfusions
  – Antibiotics
  – IV fluid and other support
  – G-CSF
  – Hospitalization when indicated
  – Opportunity to apply new mitigation approaches
Biodosimetry of Casualties

• Daily CBCs at RITN centers to determine clinical need for treatment

• Biodosimetry using online algorithms (REMM)
  – Blood counts (before and after arrival at RITN centers)
  – Geographic dosimetry
  – Opportunity to apply new biodosimetry approaches
Is RITN ready?
Radiation Only Casualty Estimates for a 10 KT IND

Estimated Radiation Injury Only Casualties

<table>
<thead>
<tr>
<th>Radiation Dose (Gy)</th>
<th>Care Requirement</th>
<th>Casualty Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mild (0.75-1.5)</td>
<td>Possible self recovery with limited care and some Outpatient monitoring</td>
<td>91,000</td>
</tr>
<tr>
<td>Moderate (1.5-5.3)</td>
<td>Combination of Outpatient care and Specialized Inpatient Supportive Care</td>
<td>51,000</td>
</tr>
<tr>
<td>Severe (5.3-8.3)</td>
<td>Intensive Supportive Care (most possibly including marrow transplant)</td>
<td>12,000</td>
</tr>
<tr>
<td>Expectant (&gt;8.3)</td>
<td>Comfort Care</td>
<td>47,000</td>
</tr>
<tr>
<td>Combined Injury and Radiation (&gt;1.5)</td>
<td>Stabilization and monitoring, pending resource availability</td>
<td>44,000</td>
</tr>
</tbody>
</table>

Estimate of 63,000 casualties for RITN

Combined Injury Kills!!

Table adapted from: Knebel AR, Coleman CN, Cliffer KD; et al. Allocation of scarce resources after a nuclear detonation: setting the context. Disaster Med Public Health Prep. 2011;5 (Suppl 1):S20-S31

***Radiation doses are estimates based on clinical presentation and laboratory values.***
## 2011 Capacity Survey

<table>
<thead>
<tr>
<th>#</th>
<th>Question</th>
<th>Low Estimate</th>
<th>High Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>How many patients could you receive in your existing BMT unit with no changes (e.g., no early discharges/transfers, no delayed admissions, no addition of beds, etc...)?</td>
<td>51</td>
<td>377</td>
</tr>
<tr>
<td>2</td>
<td>How many patients could you receive now in your existing BMT unit with modest changes (e.g., early discharges/transfers, a few delayed admissions, addition of beds from Hem/Onc service, etc...)?</td>
<td>259</td>
<td>1,014</td>
</tr>
<tr>
<td>3</td>
<td>How many patients could you receive now in your existing BMT unit with aggressive changes (e.g., aggressive discharges/transfers, many delayed admissions)?</td>
<td>456</td>
<td>1,528</td>
</tr>
<tr>
<td>4</td>
<td>How many patients could you receive now with spill-over into other areas of your hospital (Hem/Onc, med/surg, ICU), assuming no alterations in standards of care?</td>
<td>665</td>
<td>2,259</td>
</tr>
<tr>
<td>5</td>
<td>How many patients could you receive now in your existing BMT unit with aggressive changes and spill-over into other areas of your hospital (Hem/Onc, med/surg, ICU), assuming some alterations in standards of care?</td>
<td>1,098</td>
<td>3,134</td>
</tr>
<tr>
<td>6</td>
<td>How many patients could you receive now with the above and utilizing additional hospitals in your community?</td>
<td>2,862</td>
<td>8,365</td>
</tr>
<tr>
<td>7</td>
<td>How many patients could you receive now with the above and incorporating large austere emergency treatment facilities that have been previously planned for (e.g. pre-defined: dormitories, gymnasiums, domed stadiums, and assuming major alterations in standards of care)?</td>
<td>7,409</td>
<td>13,636</td>
</tr>
</tbody>
</table>

### Answer Options
- 1-10
- 11-50
- 51-100
- 101-499
- >500
2011 Capacity Survey
Still have more work to do...

- Radiation-only casualties requiring monitoring, supportive care and possible transplant (~38,000)
- Current capacity of RITN (13,000)
To treat that many it would get this bad

Structure
Network Composition:
- 72 total centers
- 59 Transplant centers
- 6 Donor centers
- 7 Cord blood banks

As of November 14, 2013
For the current list of RITN centers, please see the RITN website at www.ritn.net/about/.
RITN Projects

- Exercises
- SOPs
- Training courses (web based and instructor led)
- RITN documents:
  - Treatment guidelines
  - Referral Guidelines
  - Concept of Operations
- Collaboration with REMM.nlm.gov on treatment orders
- Site Assessments
- G-CSF distribution project with ASTHO and CDC
- Review of updated REMM ARS guidelines
- Web based data collection forms
- Member of National Alliance for Radiation Readiness
RITN Preparedness Efforts

Annual Tasks

- Radiological Exercise
- Training
- SOPs
- Communications drills

Summary of RITN Training & Education
Grand Total = 11,525

RITN Site Preparedness Assessments
Grand Total = 27

RITN Exercises by Year
Grand Total = 434
Preparedness Efforts

• Readiness exercises/events
  – Annual RITN directed tabletop exercise
  – Top Officials IV (TOPOFF) (2007) - DHS
  – Pinnacle 07 (2007) – DHHS-ASPR
  – ConvEX 2008 – IAEA
  – National Level Exercise 2010 (NLE 2010)

• Emergency communications equipment
  – Government Emergency Telecommunication Service (GETS) calling cards
  – Satellite telephones
Ongoing Initiatives

- Funding to cover cost of treatment beyond 30 days
- Strengthen relationship with NDMS to facilitate transfer of casualties with ARS
  - Distribution to non-NDMS RITN centers
- Establish guidelines for management of pediatric casualties with ARS
- Support planning of outpatient and inpatient capabilities at non-RITN centers through referral guidance
- Education of non-physician hospital staff
5 Things to Remember About RITN

1. Not 1\textsuperscript{st} Responders or trauma care
   1. Combined injury kills (trauma + 2 Gy = Death)
2. Expect patient surge 7-10 days after incident
3. If incident is local; the local RITN centers focus is on incident response not RITN
4. Casualties should not be significantly contaminated when they arrive at a RITN center
5. Casualty distribution and reimbursement is through National Disaster Medical System
Partners are Critical to Success

• American Society for Blood and Marrow Transplantation
• Department of Defense - Office of Naval Research
• Dept. of Health & Human Services-Asst. Sec. for Preparedness & Response
• Health Resources and Services Administration
• Radiation Emergency Medical Management website: www.remm.nlm.gov
• National Assoc. of City and County Health Officials
• Assoc. of State and Territorial Health Officials
• National Alliance for Radiation Readiness www.radiationready.org
• AABB-Disasters Task Force
• Radiation Emergency Assistance Center/Training Site
• New England Center for Emergency Preparedness
• European Group for Blood and Marrow Transplantation-Nuclear Accident Committee
• Center for International Blood and Marrow Transplant Research

www.RITN.net
Free Resources

- [Disaster Medicine and Public Health Preparedness](http://journals.cambridge.org/action/displayIssue?jid=DMP&volumeld=5&seriesId=0&issueld=S1)
- [Planning Guidance for Response to a Nuclear Detonation](http://www.remm.nlm.gov/PlanningGuidanceNuclearDetonation.pdf)
- [State and Local Planners Playbook For Medical Response to a Nuclear Detonation](http://www.phe.gov/Preparedness/planning/playbooks/stateandlocal/nuclear/Documents/statelocalplaybook-v1.pdf)
- [http://www.ritn.net/About/](http://www.ritn.net/About/)
Treatment Guidelines & Crisis Assistance

www.RITN.net

www.REMM.NLM.gov

For decorporation help or crisis assistance call
REAC/T5: 865.576.1005 (24x7 - Ask for REAC/T5)
http://orise.orau.gov/reacts