Infection Control During Disasters
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(2) Japanese Red Cross Ishinomaki Hospital, Japan

Nothing to Disclose

Learning Objectives

• Describe the role of the ICN/ICP during large-scale disasters, both in the hospital and beyond the hospital.

• Describe the importance of community partnership and collaboration in disaster preparedness.

• Describe specific tools the ICN/ICP should use to facilitate disaster recovery in a medical center.

NYU Langone Medical Center Historical Snapshot

• 1841 – NYULMC has its origins as the NYU Medical College
• 1948 – NYU Hospital was first created
• 1963 – the current NYU Tisch Hospital opened
• 2008 – Renamed NYU Langone Medical Center

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NYU Langone Medical Center Fast Facts

- Tisch Hospital / Schwartz HCC Pavilions = 705 Beds
- Hospital for Joint Disease = 190 Beds (Orthopedic Surgery & Rusk Rehabilitation Institute)
- 15,000 employees
- ~65 Operating Rooms, ~39,000 Admissions, ~4,600 Births, >650,000 Outpatient Visits
- IPC Department = 6 RNs, 1:150 ratio
  1 Administrative Assistant, 3 Data Staff
  MD Hospital Epidemiologist, Department Director
  MD Associate Epidemiologist, Antibiotic Stewardship Dir.
  MD Pediatric Epidemiologist

The Storm Approaches – Thursday, October 25

- Hurricane Sandy – Heading Where?

During the Storm, October 29-30, 2012

- Hospital was damaged by superstorm Sandy
- Sudden water incursion into facility, all power lost,
- Key hospital systems not operating
- Some parts of buildings inaccessible due to damage
- Cell phone service was rather limited throughout NYC region
- Hospital evacuated overnight October 29-30, 2012
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City and Surrounding Area Also Battered by Storm

IPC Role in Disaster Planning – Within the Hospital
• Plan around loss of key systems – Careful Risk Assessment
• Computers – Electronic Medical Records
• Phone system
• Heating, Ventilation, Air Conditioning (HVAC)
• Plumbing/potable water
• Loss of main power, temporary loss of emergency power
• Loss of “control” of facility with regard to census

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**IPC Role in Disaster Planning – Beyond the Hospital**
- Risk Assessment, Risk StratifY Your Plans - Bioterrorism event, community-wide (epidemic) communicable disease outbreak, natural disaster, or mass casualty event
- Employee Health Services – Close partnership
- Public Health – May require special cooperation

**IP Role in Community Partnership and Collaboration**
- Partnership with the surrounding communities was not a component of the IPC role during superstorm Sandy
- Surge capacity may affect IP roles/staffing
- Work with government and/or non-governmental agencies
- Work with IPs at area hospitals, LTCFs, adult day care, schools
- Work with public relations – interviews with media

**IP Disaster Recovery Tools**
- Tool: Noun - A device or implement, especially one held in the hand, used to carry out a particular function
- Remember that disaster preparations should be based on risk assessment
- IPs work roles may change after a disaster (not business as usual)
- Superstorm Sandy showed us we were not fully prepared for all elements of a substantial disaster response

**Hospital Recovery – Tools for the Job**
- CDCs first point – keep workers safe
- De-water the facility, remove mold risks
- Develop a risk stratified approach to recovery
- Coordinate the planning – work with:
  - Facilities leadership
  - Plumbing leadership
  - HVAC leadership

**HVAC Recovery for Patient, Visitor, and Staff Safety**
- Conduct HVAC Risk Assessment – Damage, Disuse, Fans, Filters, and Ducts
- Replace flooded ducts, Consider cleaning other ductwork
- Follow ICRA-like controls for all work

**Assessment of HVAC, Air Quality After Duct Cleaning**
- Visual inspection of ductwork
- Environmental sampling:
  - Active Air Impactor Sampling – Cultures
  - Duct surface testing:
    - Tape Lift Specimens
    - Gravimetric Vacuum Cassettes
    - Surface Cultures by Rodac Plates
- Where to sample? Use Risk Stratified Approach! (High Risk, High Volume, Problem Prone)
- Challenge of interpreting results! No national consensus on testing after duct cleaning in a hospital

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Equipment and Supplies

- Use a systematic process to evaluate all supplies & equipment throughout facility
- Checklists make rounds consistent & comprehensive
- Coordinate rounds with Building Services supervisory staff and department manager where possible

Flowchart for Evaluation of Equipment

Flowchart for Evaluation of Supplies

Pre-Opening Checklist

IPC CHECKLIST FOR RE-OPENING INSPECTIONS

<table>
<thead>
<tr>
<th>Building/Unit/Room #</th>
<th>YES</th>
<th>NO</th>
<th>DATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Location in building flooded and/or experienced fluctuations in humidity?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2) Room or location flooded?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3) Assessment, Cleaning and Disinfection of:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a) Visibly Inspected Rooms (Walls, Ceilings, Floors, Windows, etc.) for presence of mold?</td>
<td></td>
<td></td>
<td>COMMENTS:</td>
</tr>
<tr>
<td>b) Durable medical equipment completed per protocol?</td>
<td></td>
<td></td>
<td>COMMENTS:</td>
</tr>
<tr>
<td>c) Supplies completed per protocol?</td>
<td></td>
<td></td>
<td>COMMENTS:</td>
</tr>
<tr>
<td>4) Terminal / Discharge Cleaning performed per protocol?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>COMPLETED/TO BE COMPLETED ON:</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Post-Recovery Surveillance – Now What?

- What you conduct surveillance for will depend on the type of disaster you experience
- Determine ahead of time how you will watch for sentinel infections
- Have a response plan and share with IPC Committee
- Seek help to develop plan – Hospital Epidemiologist, Microbiology, ID physicians, possibly DOH staff

NYULMC Infection Prevention & Control Department

| Hospital Epidemiologist & Director of Infection Prevention & Control | Michael Phillips MD |
| Director of Antibiotic Stewardship | Donald Chen MD |
| Associate Hospital Epidemiologist | Jennifer Lighter Fisher MD |
| Pediatric Hospital Epidemiologist | Anna Stachel MPH CIC |
| Data Analyst | Gabriela Pinto |
| Data Assistant | Alyia Foji |
| Project Assistant | Delia Valentin |
| Administrative Assistant | Laura Lord |
| Practitioners | Steven Bock RN CI CIC |
| | Ranekka Dean RN NPA CI CIC |
| | Alex Rowan-Haliburton RN CI CIC |
| | Tanja Bulbo RN MSN CIC |
| | Sandra Hardy RN MS |
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The Great East Japan Earthquake
Activities of the ICN

Mie Saijo, RN, BSM, CNIC
Nothing to Disclose

March 11, 2011 (Fri)
14:46

The Great East Japan Earthquake strikes

Japanese Red Cross Ishinomaki Hospital
(As of March 1, 2011)

- 402 beds
- Medical Zone population: 220,000
- One of 14 designated disaster base hospitals in Miyagi Prefecture
- Prefectural governor-certified emergency hospital
  - 44,003 emergency patients, 7,234 patients transported (2010)
- 790 employees (100 physicians, 424 nurses)
- 14 Infection Control Team Staff
  - 4 MDs acting concurrently as ICDs
  - 1 full-time ICN (Japanese Nursing Association-certified ICN)
  - 9 other health professionals (pharmacists, lab technicians, and clinical engineers) holding concurrent IC positions


2011.3.11 Japanese Red Cross Ishinomaki Hospital
Record of the Initial Response to the “Great East Japan Earthquake”

(Video Removed)

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**Characteristics of Patients during the Acute Phase of the Disaster**

- **Hypothermia** from exposure to tsunami waters and extreme cold
  - Many communities were flooded.
  - It was snowing, and the temperature was below freezing.
  - Blocked roads hampered rescue efforts.

- **Tsunami-related Aspiration Pneumonia (Tsunami Lung)**
  - Many were engulfed by the tsunami.
  - Many aspirated water contaminated with oil, mud, etc.

- **Exacerbation of chronic illnesses in the elderly population**

- **Few severely injured trauma patients**

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**Hospital Preparedness for Major Earthquake Disasters**

- **System-level**
  - A disaster manual that assigns employee names to specific roles
  - Disaster training repeated throughout the year
  - Large-scale disaster drill that includes patient helicopter transfer
  - Contracts with private businesses for preferential procurement of supplies such as food and tents

- **Structure-level**
  - Seismically isolated structure (earthquake-proof)
  - Electric power transmission from 2 power companies
  - Separate water supply system for drinking water and non-drinking water
  - Ground-level heliport for transport during elevator shutdown
  - 3-days worth of patient food reserves

*High disaster awareness among employees*

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**ICN’s Roles in the Hospital**

- Thorough communication and dissemination of information on standard precaution and transmission-based precautions (hand hygiene, use of PPE, etc.)
- Prevention of influenza in high-risk patients
- Isolation of patients with infectious diseases while ventilation systems were down
- Management of the deceased
- Requesting of supplies from businesses and the Red Cross Society
- Restriction of water use (toilets, cleaning of instruments)
- Revision of sterilization methods while gas supply was interrupted
- Utilization of volunteers to replace diminished numbers of subcontracted cleaning staff
- Establishment of a health management clinic for staff

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**ICN’s Roles outside of the Hospital**

**Emergency Shelter Conditions**

- 50,000 evacuees, 300 emergency shelters
- Half of the designated emergency shelters were damaged
- Life in the emergency shelter continues while essential utilities are lost

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Ishinomaki Zone Joint Relief Team Response

1. ICN Contribution
   - Conducted a survey of 300 emergency shelters
   - Developed a nursing manual on patient isolation space
   - Conducted rounds of the emergency shelters
   - Provided instructions on hand washing and toilet cleaning
   - Provided instructions on isolation of evacuees with suspected infections
   - Conducted countermeasures for food-poisoning
   - Managed wastes, etc.

2. Content of the Emergency Shelter Survey
   1. Physical conditions of the evacuees
      - Number of evacuees at the shelters
      - Number of evacuees with the following symptoms: fever, cough, vomiting, diarrhea
   2. Daily living needs
      - Water, food, electricity, blankets, heating, sanitation of toilet facilities
   3. Medical needs
      - Pregnant women
      - Pediatric, Psychiatric, OB-GYN, Dental needs

Results of the Emergency Shelter Survey

Surveillance by Symptoms
(The graph shows results from District 6)

-Ishinomaki Red Cross Hospital
-Physicians Association Team, University Medical Team, etc.
-1 ICN from Ishinomaki Red Cross Hospital, and 1 ICN from Ishinomaki Municipal Hospital

Issues
- Toilets
  - Structural
    - Indoor Toilets
      - Wastes cannot be flushed, backflows due to damages
    - Temporary Toilets
      - Inadequate emptying, dark, steps, Japanese-style (squatting)
  - Management
    - People unaware of toilet rules

Interventions
- Clarified Toilet Rules
  - Clean high touched surfaces
- Installed wrap-type toilets with solidifying powder
  (90 toilets for Ishinomaki City)

Hand Hygiene

Issues
- With water and sewage functions lost, people were using plastic water bottles for hand-washing
- Fingers touching the nozzle
- Hand towels being shared

Risk of Cross-Infection

- Provided hand hygiene instructions before eating and after using the toilet

Interventions
- Installed a simple water-supply system
- Provided hand sanitizers and hand wipes

A system designed to enable hand-washing with both hands.

Isolation Space

Issues
- People with suspected infections living in crowded shelters
- Difficulty securing space for isolation

Interventions
- Secured isolation rooms by converting a closed hospital ward into a short-term stay clinical shelter

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Maintenance of the Living Environment

**Issues**
- Mold growth and mite infestation on futons (mattresses) placed directly on the floor

**Interventions**
- Cleaned the shelters
- Dried or replaced futons
- Collaborated with volunteer groups that specialized in mite extermination
- Installed cardboard beds

Educating Disaster Relief Supporters

**Issues**
- Relief Team
  - Lack of knowledge on how to properly deal with infected individuals at emergency shelters (e.g. handling of vomitus)
  - Volunteers
    - Inadequate hygiene management during outdoor meal preparation

**Interventions**
- Developed and distributed educational leaflets with information on infection control, infectious diseases and updates/announcements
- Held meetings with the Relief Team members to identify problems and provided instructions for each case
- Visited volunteer group headquarters to give lectures on infection control

Food-poisoning outbreak among supporters
- Norovirus: 9 cases
- *S. aureus*: 15 cases

Recommendations on Infection Control at Emergency Shelters
Written by 26 Japanese Nursing Association-certified ICNs in Miyagi Prefecture
We published a book hoping to share what we have learned from our Great East Japan Earthquake experience.

**Main Topics**
1. Methods for Hand Hygiene
2. Hygiene Management of Toilets
3. Isolation for Infectious Diseases
4. Cleaning and Ventilating the Living Environment
5. Education on Infection Control
6. Conducting Syndromic Surveillance

Summary of ICN Activities during the Great East Japan Earthquake

1. **In the Hospital**
The following were effective in avoiding confusion and continuing safe healthcare in the hospital during the disaster:
- Seismically isolated structure of the hospital
- Preparations through well-planned disaster drills and trainings involving the entire hospital staff
- Daily routine infection control and management activities carried out by the ICN

2. **At the Emergency Shelters**
We were able to collaborate with many disaster relief supporters to promote infection control at the emergency shelters.

The most important roles and contributions of the ICN were: Hand hygiene, toilet hygiene, isolation, maintenance of the living environment, education on infection control.

3. **Future Considerations**
It is important for infection control practitioners to actively participate in disaster preparedness projects in both the hospital and the community.

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APIC Practice Resources

APIC Text Online
• The most comprehensive infection prevention resource from APIC covering the latest guidelines, research, technology and clinical standards.
• The entire contents of the printed APIC Text in an annual subscription-based, online format.
• Completely searchable, updated regularly, and accessible from any computer or mobile device with an internet connection.

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