Emergency Operations for In-Hospital Disaster

Tracey A. Ross, EdD, CST; Bree Bond, CRNA, MSN; Shreya Jammula, BS; Jo Ann Miller, MSN, TCRN
Lancaster General Health / Penn Medicine
Trauma Services

INTRODUCTION

- In the context of disaster planning, an all-hazards approach has been advocated by various agencies for the latitude it affords in addressing a wide variety of threats.
- Establishment of a proper Incident Command structure along with a well-rehearsed emergency operations plan is vital in mitigating damage and resuming regular operations.

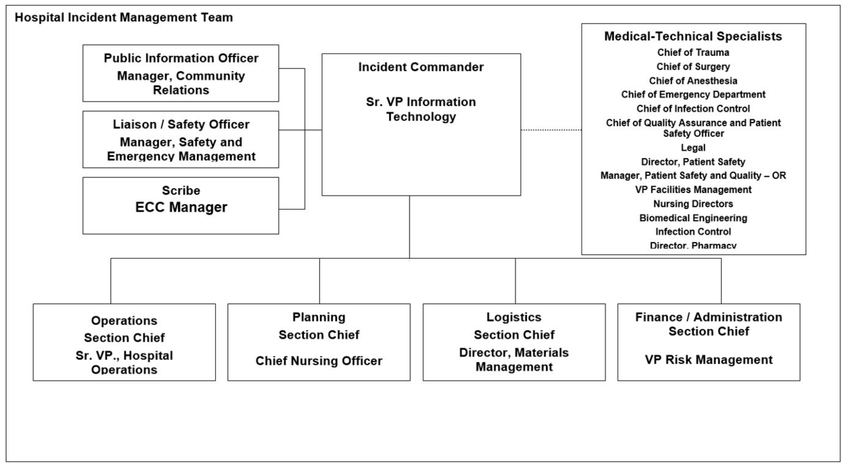

Figure 1. Flow diagram of Incident Command Structure at our level II trauma center.

Lancaster General Hospital

- 533-beds with 28 operating suites averaging 13,500 procedures & >2,200 trauma admissions annually
- Lancaster County's sole trauma center (Level II)

INCIDENT

- An unfortunate malfunction in the Building Automation System resulted in sudden loss of heating, ventilation, and air conditioning (HVAC) system within the entire OR suite.
- Wednesday 5PM: rising temperature and humidity levels noted
- Result: immediate condensation with complete loss of sterility in entire OR suite and compromise of medical supplies and equipment stored in the area.
  - **Forced hiatus of all surgical services**

Figure 2. Water pouring down the walls in the OR suite.

RESPONSE EFFORTS

Immediate Actions

- Prompt initiation of Incident Command (within 30 mins of detection of issue)
- Prompt rectification of identified issues
- Within 5 hours, temperature and humidity levels restored to normal range

Key Decisions: address surgery in progress/future surgeries/trauma, proper OR cleaning, restocking supplies

- Surgery in progress completed with Infection Control monitoring patient status (no infection)
  - Surgery to follow canceled
- OR Safety Team and Infection Control determined supplies were compromised
- Recognition that equipment sterilization, replenishment of supplies and terminal cleaning of ORs was necessary
  - Trauma, Anesthesia and ED leadership deemed trauma/ED divert necessary
  - No trauma patients already at LGH required transfer out for additional surgical interventions
- 8 urgent cases transferred to LGH Women & Babies, HUP or other institutions in area
- Elective cases re-scheduled for following week
- **Priority**: cleaning trauma OR and procuring medical supplies
  - Vendors contacted to obtain supplies
  - Supplies from LGH Women & Babies, HUP

Cleaning & Sterilization

- Oversight from internal infection control and OR experts
- OR cleaning via multiple rounds of Xenex high-intensity UV light flash lamps
- Independent vendor contacted to swab samplings of ORs for bacterial or fungal growth (none detected)
- LGH Biomedical Department and equipment manufacturers evaluated equipment to ensure safe operations

RESPONSE EFFORTS

Day 1 (Thursday)

- Arrival of medical supplies in early AM + successful sterilization of trauma OR
  - Termination of trauma/ED divert (14.5 hrs)
- Independent verification of disposal of medical supplies and proper sterilization techniques of reusable equipment & operating rooms
- Terminal cleaning of all ORs completed

Day 2 (Friday)

- Modified OR schedule for inpatients requiring urgent surgery

Day 5 (Monday)

- Normal OR schedule resumed with medical supplies re-stocked close to pre-incident levels

Figure 3. Compromised OR supplies bagged for disposal.

Overall

- Constant assessment and regular briefings from Incident Command
- Additional updates from Senior VP of Hospital Operations and Chief Nursing Officer to medical staff and hospital leadership

AFTERMATH

- Thorough assessment of HVAC system and BAS to provide redundancies
- After-action review by Incident Command
- Individual review meetings for all impacted areas to assess adequacy of response
- **Special acknowledgement**: contributions of OR staff and administrators who worked tirelessly to resolve the crisis

Penn Medicine
Lancaster General Health