FIELD
Report from the

Evacuation of a Mental Health Center During a Forest Fire in Israel

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ABSTRACT

Tirat Carmel Mental Health Center was successfully evacuated in December 2010 during a ravaging forest fire in the nearby Carmel Mountains. A total of 228 patients were successfully evacuated from the center within 45 minutes. No fatalities or injuries associated with the evacuation occurred. We believe that the efficient functioning of the administrative and medical staff provides a replicable model that can contribute to the level of awareness and readiness of hospital staff members for natural and manmade disasters. (*Disaster Med Public Health Preparedness*. 2014;8:288-292)

Key Words: evacuation, forest fire, hospital, disaster

When targeted by disaster, hospitals might need to transfer patients to alternative facilities.[1,2] Throughout the world, many hospitals and health care facilities can be affected by floods, hurricanes, cyclones, earthquakes, and other natural disasters. In these emergency situations, the physical and functional integrity of health care facilities and hospitals must be maintained. Evacuation of a health care facility is considered the last option.[3] Hospitals are only truly safe from disasters when they are available and functioning with maximum efficiency immediately after the incident.

An investigation of a serious fire that occurred on October 26, 2011, in a psychiatric ward in a Suffolk hospital in the United Kingdom described the outcome. A patient had set the bedding in the room on fire and remained in the room as the fire developed. The closed-circuit television showed that the staff did not respond immediately to the alarm and did not follow the unit's fire emergency plan. Because of the delay, the patient became unresponsive, and the conditions were so poor that staff-assisted evacuation was not possible. Consequently, the patient could not be removed from the smoke-filled room until rescued by firefighters. The patient then spent 2 weeks in critical care for serious smoke inhalation.[4]

The Central Arkansas Veterans Healthcare System evacuated seriously mentally ill veterans following hurricanes Katrina and Rita. After the evacuation, the staff noted the ways they could improve how psychiatric evaluations of relocated patients were performed. As circumstances dictated rapid assessment and intervention, it would have been beneficial to focus on the elements of the psychiatric evaluation that are imperative for safe and effective evacuation.[5]

Health care facilities must have operational plans in place for a full evacuation, including detailed procedures for the transport of patients from the hospital, when an impending disaster presents a significant risk to patients and staff. Two main sources of evacuation risk are the threat risk (reason for the evacuation) and the transportation risk. The transportation risk is a function of the types of patients, the vehicles used for evacuation, and the time required to transport the patients to receiving hospitals.[6]

A review of 5 London hospital fires and their management described the successful evaluation of hospitals. Evacuation processes were facilitated through excellent pre-planning, staff teamwork, and leadership.[7] Regardless of the outcomes, incident reports and evaluations of evacuation procedures have been important to facilitate the sharing of information with other hospitals and health care facilities that can benefit from the lessons learned.

EVENTS BEFORE THE EVACUATION

On December 2, 2010, a forest fire erupted on the outskirts of the Druz village Isfiya, and the flames rapidly spread to the Carmel Mountains, near Haifa, Israel. A total of 44 people died in the fire, and many more were wounded. The fire damaged 42 000 hectares of forest, burning about 5 million trees.

https://doi.org/10.1017/dmp.2014.53 Published online by Cambridge University Press

FIGURE 1

Fire at the Gates of Tirat Carmel Mental Health Center

TABLE 1

Distribution of Patients in the Hospital Before the Evacuation

Department	Closed Ward	Open Ward
Psychogeriatric	30	0
Long-term treatment	16	15
Acute care No. 5a	15	16
Acute care No. 6a	20	15
Acute care No. 6b	19	15
Acute care No. 8	11	11
Children's	5	16
Residential treatment	0	14

It also demolished 74 buildings and damaged an additional 173. During the fire approximately 17 000 residents were evacuated, and 11 emergency centers provided shelter for evacuees.

Tirat Carmel Mental Health Center (MHC) is located at the foot of the slopes of the Carmel Mountains. The hospital grounds include 120 acres with 10 buildings, administrative offices, therapeutic facilities, and storage areas. The hospital has 228 beds in 7 departments including an adolescent department, a psychogeriatric department, and 4 acute care departments. Each department has closed and opened wards. In addition, a long-term residential treatment department contains 20 beds. Occupancy before the fire was 212 inpatients, and another 16 patients in the long-term residential unit (Table 1).

The majority of patients at MHC were acutely ill, but none was in physical restraints before the evacuation. The hospital staff during the evacuation included 3 physicians on duty, 1 head nurse, 28 caregivers (nurses and nurses' aides), 3 kitchen workers, 3 housekeeping employees, 2 guards, and 1 driver.

INITIAL PREPARATION FOR POSSIBLE EVACUATION

From the beginning of the shift, staff members monitored ongoing reports of the fire on the Carmel Mountains. The atmosphere was tense. At 6:00 PM the hospital director instructed the staff to prepare the patients for transfer. The call for evacuation was received at 7:00 PM. All department heads, physicians, nurses, social workers, psychologists, volunteers, and maintenance personnel arrived at the hospital to assist in the evacuation. The staff maintained a calm environment (Figure 1).

Patients were given time to call family members, who were asked to come and take the patients home, if possible. The lists of patients who could be sent home were prepared based on current mental and physical examinations. All families, parents, and guardians of children and adolescents were informed of the evacuation plan. All departments prepared lists of the names of patients to monitor the evacuation. Patients received their medication ahead of schedule. All departments collected their medications, sedatives, first-aid kits, injections, needles and syringes, and sphygmomanometers and stored them in designated cabinets. All cabinets containing toxic medications were locked.

EVACUATION

The majority of patients who were evacuated were acutely ill, with diagnoses such as psychosis, suicidality, dementia, eating disorders, mania, or major depression. Most were mobile and not restricted to their beds. However, some had limited cognitive capacity, disorientation, and impaired judgment that required monitoring and close supervision. All patients were accompanied by staff members and police to safe areas.

Head counts were performed as the patients boarded the buses. The children and adolescent patients were separated from the rest of the hospital's population for transport. At the same time, some families arrived to take their relatives home. For families that were unable to reach the hospital before the evacuation, another meeting point was arranged. The atmosphere before and during the evacuation was generally calm and relaxed. There was a feeling of organization and control, a sense of togetherness, and a professional atmosphere of good cooperation among staff members.

Patients boarded the buses by department. Patients were accompanied on foot by the nursing staff to the boarding areas for the buses. The nursing staff boarded the buses with the patients and remained with them through their admission to the receiving hospitals. Additional nurses' aides provided further support by accompanying patients from the closed wards. A security ring of police officers ensured a quick, secure evacuation (Figure 2).

In addition, the head nurse of the psychogeriatric department who was not on duty during the outbreak of the fire,

https://doi.org/10.1017/dmp.2014.53 Published online by Cambridge University Press

FIGURE 2

Evacuation "Under Fire" at Tirat Carmel Mental Health Center

came to the hospital to accompany the patients during their relocation. Patients who were unable to walk to the buses were taken in wheelchairs. Before leaving the premises, the staff counted the patients and prepared a list of all patients being transferred to receiving hospitals. Patients in the adolescent department who were unable to be temporarily discharged and taken home by their parents were transported on a separate bus with the department staff. Staff remained with the patients until they were successfully relocated.

The evacuation process took place under the threat of a raging fire approaching the boundaries of the hospital. The evacuation, therefore, was crucial and immediate. Even so, it was conducted efficiently (Table 2).

DISCUSSION

The published literature describing how to implement a disaster plan that involves the transport of an entire psychiatric hospital, including patients, nurses, physicians, and staff, to other facilities is scant. Thus, the knowledge gained from the experience of a successful evacuation can benefit psychiatric professionals and their organizations in establishing or modifying their disaster plans.

Post-Fire Evaluation

After the successful evacuation of the Tirat Carmel MHC, the administration conducted a comprehensive investigation together with a research team to analyze and evaluate the management of the evacuation. The purpose of this investigation was to examine the hospital evacuation process from various aspects and organizational standpoints to draw conclusions, and systematically elicit lessons learned from the incident.

Structured questionnaires were completed by all staff members who participated in the evacuation. The focus of the investigation was on the following: management of the evacuation; process of evacuating the various departments; management of the relocation process in alternative facilities; communication with families of patients; maintaining continuity of care and medical information of relocated patients; and medical and therapeutic aspects of care during the evacuation.

Results of the Evaluation

To improve the level of preparedness for future evacuations, 2 models for hospital evacuation were defined: (1) total arranged evacuation, in which patients are evacuated when the hospital receives an evacuation alert; and (2) urgent evacuation, in which an onsite decision is made to evacuate patients, without receiving an evacuation alert.

The operational logistics of the 2 plans are similar, but their order of operations and priorities differ. During the Carmel Mountain fire, Tirat Carmel MHC operated according to the urgent evacuation model. The challenge of an urgent scenario is to evacuate patients and staff as quickly as possible while ensuring safety and security. During this fire, 228 patients were successfully evacuated from the hospital grounds within 45 minutes. No fatalities or injuries associated with the evacuation occurred.

The 2 phases of a hospital evacuation are (1) the internal evacuation phase, which entails the order in which the hospital is evacuated; and (2) the external evacuation phase, which includes the development of a control component, communication with external officials, and transfer of patients to alternative inpatient facilities.

Six principles of action guide the internal evacuation phase:

1. Keeping the departments organized throughout the evacuation process;
2. Structuring the sequence of actions within the departments to prepare patients for evacuation;
3. Arranging immediate access to transportation to reduce the risk of exposure;
4. Creating an alliance with the security services to ensure control and to strengthen the sense of protection;
5. Maintaining control of patients throughout the evacuation process from departure from the department into the open space and while boarding buses; and
6. Conducting a prompt exit from the departments, boarding evacuation vehicles rapidly, and departing quickly.

Alternative frameworks for evacuation planning should be based on an emergency plan that predetermines potential facilities that are able to receive the evacuated patients. In Israel, the emergency plan must be approved by the Ministry of Health Department of Emergencies and the Mental Health Services. It also must be coordinated among hospitals.

https://doi.org/10.1017/dmp.2014.53 Published online by Cambridge University Press

TABLE 2

Timeline of the Evacuation from Tirat Carmel Mental Health Center

Phase 1 Routine	
12:00 PM	Hospital routine
12:30	Security officer receives first notice of the fire; it does not yet pose a risk to the hospital; instructed to receive hourly updates
2:45	Ministry of Health notifies the hospital that the situation is under control
Phase 2 Before the decision to evacuate	
3:15	Hospital director is informed of 44 fire casualties, opens an emergency situation room
4:30	Hospital director instructs physicians to consider temporarily discharging patients whose conditions permit, but only if accompanied by family members
6:00	Nursing staff is instructed to keep patients inside the departments and to close all doors and windows because of the smoke
	Patients are forbidden to exit the departments
6:30	Police notifies the staff that the fire is spreading and to prepare for evacuation
6:45-7:00	All department heads called to come to the hospital
	Nurses begin to call families to pick up patients that can be temporarily discharged
Phase 3 Evacuation	
7:00	Commanding police officer gives evacuation order
7:45	30 Police officers assigned to each department to assist in evacuation
	Nursing staff instructed to prepare for evacuation within 10 min
	Nurses verify that no patients are left in rooms, lock all doors, and group all patients next to the exit door
	Hospital director receives offers from potential receiving hospitals and decides where to relocate patients accordingly
8:05	Patients are ready for evacuation
	Police locate buses and lead them to the hospital gates
	Firefighters notify the security officer that evacuation must be completed within the hour
8:20	First bus arrives to psychogeriatric department
	Police create a security ring and assist the staff in accompanying the patients to the bus
	Handicapped patients are taken to bus by club car, wheelchairs, or carried by staff members
	Patients are accounted for, and permission to depart is granted
	Second bus arrives, police escort patients and staff from 2 additional departments to board the bus
	After patients are all accounted for by the supervising department nurse, permission is granted for the bus to proceed to the main gate to await instructions as to which facility to go to
	Third bus evacuates patients from 2 additional departments in the same manner
	To distance the patients and staff from the last department to be evacuated from the advancing flames, police and security staff escort them to the back gate of the hospital to ensure a safe and quick evacuation
	The police instruct to the buses to go to the bus station on the coast, where they will receive further instructions as to which hospitals will receive the patients from each department
	The nursing staff remain on the buses with the patients and on-call physicians also board the buses to accompany patients to the receiving hospitals
	The department heads follow the buses in their own cars to the coastal bus station
	The security officer documents the number of patients evacuated from the hospital
	All buses leave the hospital for the coastal bus station, where instructions are given regarding the receiving facility for each department
9:00	A communication channel is opened between the receiving hospitals and the hospital server
9:10	Chief security officer and director of logistics check all departments to verify that no patients or staff are left on the premises
9.15	Chief security officer reports to the police commander that no patients remain in the hospital
	Firefighters enter the hospital
	Hospital director meets with senior staff for updates and patient lists, and required medications are drawn from the hospital database
	Head nurse's office establishes direct communication with the nursing staff accompanying patients on the buses, providing necessary information for the transfer of patients
Phase 4 Relocation	
9:30	Senior staff leaves the hospital and continues to supervise the relocation from the home of a staff member in Tirat Carmel
	First busload of patients admitted to Shoham facility
9:30-10:00	Buses arrive at Sha'ar Menashe Mental Health Center, Mazra Hospital
10:45	Security officers return to the hospital to secure the hospital until return to routine
1:00 AM	Bus arrives at Hahlama Venofesh Hospital
3:00	The last bus, with patients from adolescent department, arrives at Abarbanel Hospital
Dec 3, 2013; 1:00 PM	Hotline for family of patients from Tirat Carmel Hospital opened at Sha'ar Menashe Mental Health Center

https://doi.org/10.1017/dmp.2014.53 Published online by Cambridge University Press

Because an unaccounted for patient during the evacuation process may delay the transfer of patients, keeping track of the number of patients during all stages of the evacuation process is critical. Also critical is effective communication during the evacuation, because efficient time management determines the outcomes. Location of the information center should be predetermined and appropriately equipped. The ongoing communication between the information center and the media plays a significant role during evacuation. Information must be updated regularly to keep the relevant services aware of the status of the patients.

We concluded that hospital evacuation is a medical event with management and security challenges and not vice versa. The basis for decision-making is the medical care of patients once the decision to evacuate is implemented until the patients are admitted to alternate facilities. Thus the evacuation process begins with the immediate exit of the first patient from the department and ends when the last patient is admitted to the receiving facility.

The evacuation of Tirat Carmel MHC began with the decision of the Israeli police force on Thursday, December 2, 2010, at 7:00 PM and ended on Friday, December 3, 2010, after all of the patients from the children's department were admitted to the designated hospital at 3:00 AM.

The inspiration and organizational planning of the staff at Tirat Carmel MHC during the Carmel Mountain fire not only saved lives but may serve as a replicable model for responding to a challenging disaster that requires evacuation of an entire psychiatric hospital.

RECOMMENDATIONS

Although the following recommendations provided here are somewhat specific to the local community in terms of the role of the Israeli Ministry of Health, this approach, however, might parallel health departments or other government facilities in other countries.

1. Yearly drills for coping with disaster situations, with participation of the police force and other community-based emergency services in cooperation with the Ministry of Health Department of Emergencies.
2. Improved communication between hospital directors and the Ministry of Health Department of Emergencies. A designated individual in the Department of Emergencies should serve as the point of contact who communicates with the hospital director and coordinates all medical and logistic operations involved in the evacuation of the hospital.
3. Readily available hotline in the Ministry of Health where families can receive regular updates and to allow improved communication with the public.
4. A database of alternative facilities for patient evacuees, with reference to special populations such as the elderly, children and adolescents, and patients in court-ordered hospitalization who need to be escorted and relocated in settings with appropriate physical facilities.

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Acknowledgment

Daniel Ben Shushan provided professional assistance throughout the process of the investigation, analysis, and evaluation of the management of the evacuation, and Rena Kurs assisted with the preparation and proofreading of the manuscript.

Published online: July 3, 2014.

REFERENCES

1. Blaser MJ, Elliso RT III. Rapid nighttime evacuation of veterans hospital. *J Emerg Med.* 1985; 3:387-394.
2. Bagaria J, Heggie C, Abrahams J, Murray V. Evacuation and sheltering of hospitals in emergencies: a review of international experience. *Prehosp Disaster Med.* 2009; 24:461-467.
3. Wise J. Hospitals must plan for full evacuation, concludes review of fires. *BMJ.* 2009; 339:b4268.
4. Suffolk Fire and Rescue Service. Investigation report into the fire safety arrangements at Woodlands Psychiatric Unit, Ipswich Hospital site, Ipswich, Suffolk, in relation to the serious fire incident on 26th October 2011; November 2012. http://www.suffolk.gov.uk/assets/suffolk.gov.uk/Emergency%20and%20Safety/Fire%20and%20Rescue/Workplace%20Fire%20Safety/2012_12_20%20Report%20of%20Investigation%20Final.pdf. Accessed June 6, 2014.
5. McClain TC, Hamilton FC, Clothier J, McGaugh J. Opportunity missed: a lesson learned from evacuating mentally ill patients following hurricanes Katrina and Rita. *Acad Psychiatry.* 2007; 31:188-189.
6. Bish DR, Agra E, Glick R. Decision support for hospital evacuation and emergency response. *Ann Oper Res.* 2011; doi 10.1007/s10479-011-0943-y. http://www.emse.fr/~xie/PapersToRead/Decision%20support%20for%20hospital%20evacuation%20and%20emergency%20response.pdf. Accessed June 6, 2014.
7. Wapling A, Heggle C, Murray V, Bagarta J, Philpott C. Review of five London hospital fires and their management: January 2008-February 2009. London, England: National Health Service; September 2009. http://www.preventionweb.net/files/13954_reviewoflondonhospitalfires1.pdf.

https://doi.org/10.1017/dmp.2014.53 Published online by Cambridge University Press