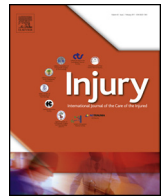




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Hospital evacuation: Exercise versus reality

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ABSTRACT

Introduction: The Dutch Major Incident Hospital (MIH) is a standby, highly prepared, 200-bed hospital strictly reserved to provide immediate, large-scale, and emergency care for victims of disasters and major incidents. It has long-standing experience training for various major incident scenarios, including functioning as a back-up facility for the Netherlands. In 1995, the MIH had experience with overtaking an evacuated hospital when that hospital was threatened by flooding. In November 2014, an exercise was performed to transfer an evacuating hospital to the MIH. The scenario again became reality when a neighbouring hospital had to evacuate in September 2015. This article evaluates the events and compares the exercise to the real events in order to further optimise future training.

Methods: All three events were analysed using the Protocol for Reports from Major Accidents and Disasters, a standardised protocol to evaluate medical responses to a major incident.

Results: During the 2014 exercise, 72 patients were received, compared with 143 and 70, respectively, in the real events in 1995 and 2015. Personnel from the evacuating hospitals accompanied the patients and continued working in the MIH. The patient surge differed on all three occasions. The information technology (IT) systems proved to be more prone to fail during the real event, and legal implications to have staff from another hospital work in the MIH had to be put in protocol during the deployment. The acute phase was comparable in all three events, and performance was good. However, the exercise did not last long enough to analyse the implications on multiday care, as experienced during a multiday deployment.

Conclusion: Large-scale major incident exercises are a great benchmark for the medical response in the acute phase of relief. The MIH was shown to be highly prepared to admit an entire evacuating hospital or large groups of patients in such a scenario. Experiences from the past, combined with regular training that closely resembles reality, guarantee the level of preparedness. Key differences between a true deployment and an exercise are the inability to train multiple days, and in our experience, a successful operation of IT systems in test environments does not guarantee their successful use during live events.

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Abbreviations: MIH, Major Incident Hospital; CMH, Central Military Hospital; CBRN, Chemical, Biochemical, Radioactive, Nuclear; PRMD, Protocol for Reports from Major accidents and Disasters; VUmc, VU University Medical Center Amsterdam; UMC, Utrecht University Medical Center Utrecht; CMT, Crisis Management Team; CCT, Crisis Coordination Team.

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Introduction

The Dutch Major Incident Hospital (MIH) is a government-funded, standby facility located in and under the jurisdiction of the University Medical Center of Utrecht (UMC Utrecht), which has been described previously [1]. In short, it is a standby, highly prepared, 200-bed hospital strictly reserved to provide immediate large-scale emergency care for victims of disasters and major incidents.

Training is one of the key opportunities to improve preparedness for major incidents. The MIH has a long-standing history of preparing for the medical management of major incidents.

Briefly, since the construction of the hospital in 1991, annual trauma exercises are organised to optimise preparedness. Over the years, all procedures have been put in protocol, and lessons learnt from previous exercises have been implemented, leading to progression and maturation of the MIH. Smaller, more specific exercises, such as nuclear, biological and chemical events, have also been implemented to train key players. With the development of more specific major incident exercises, scenarios have focussed on other threats than just a high patient surge situation (i.e., chemical, biochemical, radioactive, nuclear [CBRN] scenarios with decontamination, terrorist attacks and full-scale evacuations of surrounding hospitals to the MIH). In the 24 years of experience, the MIH has been deployed 43 times and 787 patients have been admitted in different real-life scenarios [2]. The MIH has the capacity and infrastructure in place to overtake an entire hospital for a short duration, after which outplacement to other hospitals is initiated. The aim is to keep the patients together during the acute phase, after which outplacement can be started in a calm and orderly manner.

Experience with an evacuation scenario of an entire outside care facility to the MIH was gained in 1995, when 143 patients were evacuated from a local hospital due to flooding of that hospital. Moreover, several real-life deployments have occurred, with whole patient population takeovers for evacuations due to fires in nursing homes and international medical relief [2,3]. Lessons learnt from these deployments have been implemented to mature the MIH. In November 2014, a large trauma exercise was organised to further optimise preparedness for such a scenario. One of the training goals was to have personnel of the evacuating hospital join their patients and have them provide care in the MIH to guarantee the continuity of care. The exercise scenario became reality in September 2015, when a neighbouring hospital had to evacuate all patients from their facilities.

This article describes and evaluates the main differences between the exercise and two real deployments. The deployment of the MIH in both events is evaluated to provide recommendations to improve the validity and design of future exercises and deployments.

Methods

This article compares the medical response of the MIH during a major incident trauma exercise for patient relief due to a hospital evacuation and two real-life deployments (Fig. 1). The evaluation of the prehospital response is beyond the scope of this article. In November 2014, a trauma exercise was designed with the aim of evacuating an entire neighbouring hospital to the MIH. The scenario was based on a chemical threat following a transport train crash, with the hospital positioned in the hazardous zone. The MIH had previously experienced this scenario in 1995 when a complete local hospital in Tiel, the Netherlands, was evacuated into its premises. In September 2015, the lessons learnt from the past and training from the 2014 exercise were put to the test when the VU University Medical Center Amsterdam (VUmc) had to be evacuated due to flooding of the area. In all three occasions, a request was made to

have personnel of the evacuating hospitals accompany their patients to ensure the continuity of care. In the case of a short evacuation, the care is continued to be given by the evacuating hospital personnel, otherwise patients are transferred to the care of the MIH or the hospital to which the MIH refers the patients. Several protocols are available to evaluate and report the medical response to major incidents [4]. The Protocol for Reports from Major accidents and Disasters (PRMD) published in the *International Journal of Disaster Medicine* fits best with the in-hospital response, where most protocols focus on the pre-hospital area of expertise [4,5]. This, combined with previous publications according to the protocol, made it the most suitable format to compare the evacuation takeover exercise with the 1995 and 2015 hospital evacuation [2]. The PRMD is divided into 18 headings to evaluate the different aspects of medical responses to major incidents. The standardised tables from the protocol were used when applicable. Data were gathered from the Patient Barcode Registration System and ABC system [6,7]. The data from the 1995 deployment, although more than 20 years old, have been retrospectively retrieved from the evaluation reports and digital archives of the patient tracking system, which have been fully preserved over the years. Data are descriptive, and no statistical analysis was performed.

Results

The subheadings in this paragraph are analogous to the 18 subheadings of the PRMD.

1/2/3 Short summary of the scenario/hazard, description of the accident

The trauma exercise scenario was based on the derailing of a transport train stocked with a chemical substance that causes respiratory discomfort. These symptoms were not life threatening but caused sore throat and minor respiratory difficulty. Because the derailing took place in the proximity of a hospital, a large-scale evacuation was mandated. All patients fit enough were discharged; the remaining 72 patients were transferred to the MIH.

The evacuation in 1995 of 143 patients was caused by a rise in the river water levels threatening the integrity of the dyke system in the Rivierenland area of the Netherlands, leading to one of the largest evacuations in Dutch history.

The 2015 evacuation was mandated due to a broken main waterline in the vicinity of the VUmc hospital, a large university hospital with 700 care beds. A severe flooding of the streets and several crucial technical installations of the hospital led to a situation in which the primary needs of patients could not be guaranteed. An evacuation was started to several hospitals; the MIH received 70 patients.

4 Prehospital resources available and alerted

Prehospital considerations are beyond the scope of this report.

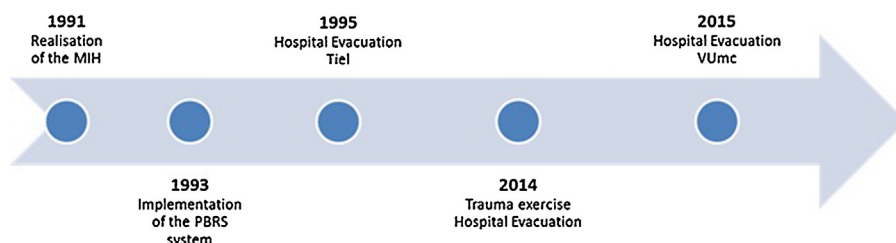


Fig. 1. Timeline of the mentioned events.

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