



What is the value of health emergency preparedness exercises? A scoping review study



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ABSTRACT

Emergency exercises involving the health community are considered an important and integral part of emergency preparedness activities. However, little is known about whether these exercises are effective at improving individual and/or organisational preparedness for responding to emergencies. This paper reviews and summarises published evidence on the effectiveness and benefits of exercises to prepare health emergency professionals for responding to emergencies and disasters. A literature search strategy was designed to identify the relevant publications from four major medical databases (Medline, Embase, Global Health and CINAHL). Studies meeting our inclusion criteria were analysed in detail (N=86). Both qualitative and quantitative data were reviewed. Data analysis involved a descriptive summary and a thematic analysis.

Health emergency preparedness exercises were found to be effective (post exercise) at improving participants' knowledge of emergency activities, policies and procedures and improving overall competence and confidence. Other immediate individual benefits included improved perceptions of preparedness and improved understanding of individual roles and roles of partners. Whether these improvements persist over time and translate into improved emergency response is not clear. The most commonly reported post-exercise organisational benefits were: identifying gaps or limitations in plans, protocols or procedures and providing opportunities to share lessons. Only a few identified studies reported the long-term impact of exercises on job practices and on real emergency response. Published evidence of exercises impact on individual and organisational levels of emergency preparedness and response over the long term is very limited. The majority of the studies included (n=65, 76%) were US-based.

1. Introduction

Recent acts of international terrorism, the increased frequency of extreme weather events and newly emerging health threats (e.g. Ebola Virus Disease (EVD)) highlight the importance of effective emergency response plans and capabilities for responding to large-scale health emergencies. Emergency preparedness is a key activity in the health agenda in the UK and the Civil Contingencies Act placed a legal responsibility for emergency preparedness with NHS organisations [1,2].

Emergency preparedness activities comprise many components and include a complex cycle of planning, equipment, training, exercises and improvement [3] with emergency preparedness exercises often considered the most vital part of the cycle [4,5]. There are different types of emergency preparedness exercises which can broadly be combined into

two major groups and which test different aspects of an organisation and/or systems' emergency preparedness: discussion-based exercises (often referred to by different names, including tabletop or desktop exercises, workshops or seminar-based exercises) and operation-based exercises (such as drills, functional exercises/ command post exercises, and field exercises) [6].

Discussion-based exercises can be used to familiarise participants with their plans, roles, and procedures (which is often the focus in a workshop or seminar-based exercises), or to allow participants to practice their roles and emergency plans through taking part in a facilitated discussion of simulated emergency situations (which is more commonly a focus in tabletop exercises). Discussion-based exercises are typically led by facilitators and presenters to keep participants on track in meeting the exercise objectives.

Operation-based exercises typically involve responding to a scenar-

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Table 1
Emergency preparedness exercise types.

Exercise category	Exercise type	Exercise features	Exercise objectives
Discussion-based	Seminar	An informal discussion or a lecture, designed to orient participants with emergency plans, policies, procedures and their roles	To identify improvements [e.g. in evacuation plan] through discussion
	Workshop	Similar to seminar but is used to build specific products, such as draft plan or policy	To develop a multi-year training and exercise plan
	Tabletop Exercise (TTX)	Facilitated discussion on a simulated emergency situation in a relaxed atmosphere	To assess plans, policies, procedures
Operation-based	Drill	A coordinated supervised activity usually employed to test a single, specific operation or function within a single entity (e.g. emergency department), typically under time pressure	To test staff training, response time, resources and equipment
	Functional Exercise (FE)/ Command Post Exercise (CPX)	Exercises and/or validates the coordination, command and control between various multi-agency coordination centres, typically conducted from emergency operation centres	To test and evaluate the capabilities of an emergency response system
	Field Exercise /Full Scale Exercise (FSE)	A multi-agency, multi-jurisdictional, multi-discipline exercise involving functional and field response	To test and evaluate a major part of the emergency operations in an interactive manner over an extended period

Referenced from: Handbook on simulation exercises in EU public health settings (www.ecdc.europa.eu); Emergency preparedness, Preparing Hospital for Disasters (www.calhospitalprepare.org/post/types-exercises); International Standards ISO/FDIS 22398, Societal security – Guidelines for exercises.

io designed to simulate an emergency situation under more realistic conditions. Such exercises can range from smaller activities such as drills to practice specific skills or procedures (such as triage, evacuation or communication) to field-based exercises designed to replicate as closely as possible a response to a real emergency. Operation-based exercises are more difficult to conduct and they demand significantly more resources than discussion-based exercises. However, they allow the testing of tools, plans, procedures, resources, technologies, inter-agency coordination, and command centres, under conditions closely matched to a real emergency event. [Table 1 provides a summary of different types of emergency preparedness exercises].

Since health emergencies, that require a major response, happen quite infrequently, organisations and staff need to exercise the procedures and skills for these events in order to be prepared to respond. Scenarios may include a simulated response to a mass casualty incident, hospital or community evacuation, initiating and operating a point of dispensing, as well as practising response to chemical, biological, radiological and nuclear (CBRN) “public health threats”. Regulatory bodies often mandate or recommend that organisations draw up long-term exercise plans, which are developed in accordance with organisational, regional, national, or supra-national priorities and include a combination of different exercise types to accomplish specific aims and objectives [7].

Even though universally accepted as an important component of health emergency preparedness activities, there is little research that provides a comprehensive overview of the benefits of emergency preparedness exercises themed around the health response. Two previously published systematic literature reviews, which attempted

to look at the effectiveness of emergency exercises as a training opportunity, failed to produce conclusive evidence [8,9]. A statistically significant change in knowledge, measured by a test score, was used as the outcome measure to demonstrate the effectiveness of emergency preparedness training, including drills for health-care providers [9]. Studies with quantitative data, such as pre- and post-knowledge scores or statistics showing significant improvement in performance from exercising were not identified in sufficient numbers to produce conclusive evidence about the effectiveness of exercises. Heterogeneity of methods used to evaluate the outcomes of exercises and poor quality of the studies have also been acknowledged as part of the issue.

Therefore, the present study sought to address these shortcomings by presenting a comprehensive review of the literature related to the perceived benefits of health emergency-preparedness exercises using a scoping study approach. A scoping review is warranted where insufficient quantitative evidence is available, and can include both quantitative and qualitative studies [10]. We aimed to synthesise existing literature reporting the benefits to both individuals and organisations of health emergency preparedness exercises, as well as any lasting impact these exercises have on emergency preparedness and response.

2. Methodology

This study uses a scoping review approach, which is intended to allow the breadth of knowledge and practice in an emerging domain to be explored and documented [11]. It is especially valuable when there is not a clear consensus on the boundaries of the domain, or on the

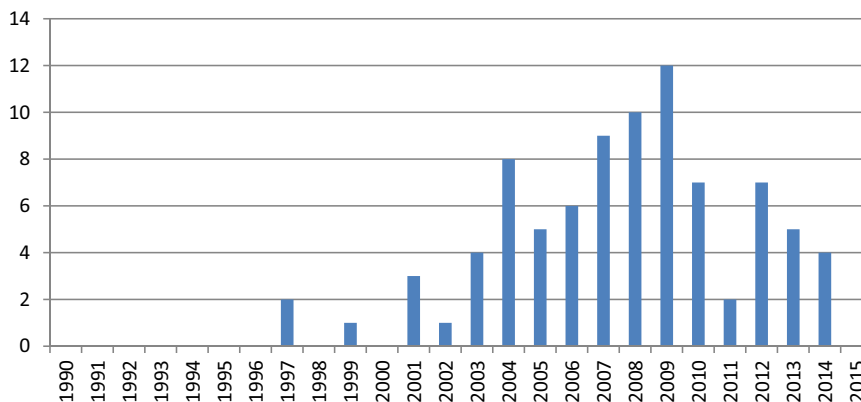


Fig. 1. Publication by year (Number of studies reviewed N=86).

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