

Development of Generic Scenarios, Alerting System and Training Modules Relating to Release of Chemicals by Terrorists

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Introduction

Chemicals have deliberately been released during a number of conflicts and terrorist attacks, for example

- the release of nerve gas and mustard gas against the Kurd population in the late eighties
- the release of sarin on Matsumoto and Tokyo in the mid nineties or
- the application of a gas containing a derivative of fentanyl by police in Moscow in 2002

Such incidents have contributed to the increase in public concern regarding the impact that such chemicals may have on the population.

In order to address some of these concerns, this project developed a tool for prioritising chemicals in a semi-quantitative manner and then, using the outputs (ie, main chemicals of concern), developed generic scenarios for the dispersion of these chemicals as well as a risk prioritisation toolkit. A key component of this project was also to determine the most appropriate early detection tool to monitor web-based information on deliberate chemical events. All this in turn was used to develop training modules on how to respond to chemical releases by terrorists.



Development of a Tool for Risk Prioritising Chemicals of Concern

A screening tool has been developed to predict the relative risks for environmental chemicals in the context of chemical terrorism. This is in the form of a framework that allows for the prioritisation of chemicals of concern that may be released during a terrorist chemical threat.

This information can collectively be used to aid the response and recovery phase of an incident and thus reduce public health impact by:

- allowing resources to be utilised in a tailored manner
- taking measures to mitigate specific risks
- enhancing public health surveillance
- improving emergency planning and preparedness
- ensuring research programmes specifically address areas of predicted concern
- issuing and implementing policy development in an appropriate manner.

Development of Generic Scenarios

The outputs from the risk prioritisation exercise were taken forward to develop computational modelling of air borne dispersion of chemicals predicted to be of concern for a number of different scenarios. Templates for different chemical release scenarios were developed as examples of generic scenarios using chemicals that may potentially be used by terrorists.

The Event in Kungsbacka, Sweden

On 28 February 2005, a goods-train derailed in the vicinity of Kungsbacka, Sweden. The train was carrying 12 tank wagons, each carrying approximately 65 tonnes of chlorine. Four of the wagons were derailed into a field and fortunately none of the tanks were damaged. The event did, however, generate a number of questions regarding the potential consequences had any of the wagons been damaged.

Using data from the Kungsbacka event, the open space scenario was evaluated, by simulating how chlorine may have dispersed had the tanks ruptured, impacting on the local population.

Presuming that only one tank is damaged, four possible scenarios were developed:

- a full tank of chlorine is released within 60 minutes
- reduction of release after 30 minutes
- reduction of release after 15 minutes
- worst case scenario (content release within one minute)



The volume of chlorine released, the likely dispersion of the gas and the likely impact in terms of the number of fatalities, serious injuries and minor injuries was calculated for each of these scenarios.

Eriksson H, Persson S-A, Berglind R and Cassel G. (2007).
The Train De-railment in Kungsbacka, Sweden 2005-02-28.
Report FOI-R-2272-SE, FOI, Umeå, Sweden.

A multivariate model was used to create five groups of chemicals according to their physico-chemical properties as well as their dispersion properties and toxicity. In addition, four different environments and two chemical volumes deemed likely to be necessary for maximum impact, were identified.

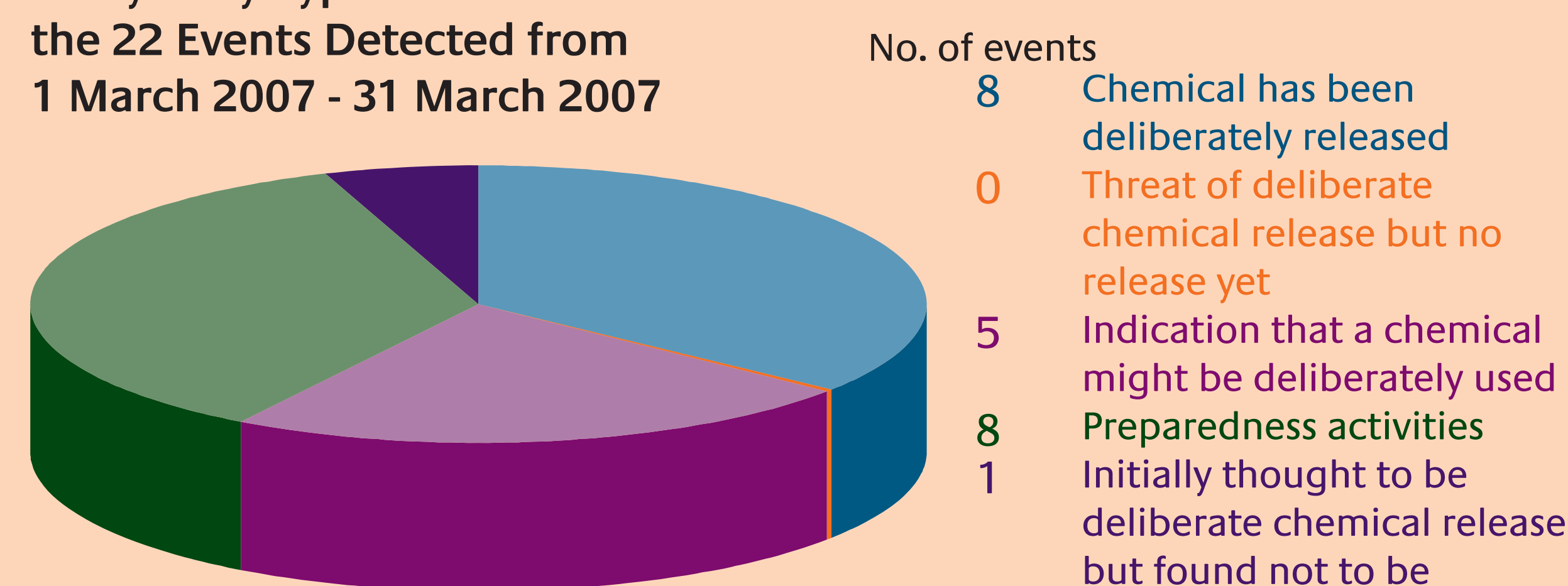
A range of questions and information regarding the needs for handling the terrorist attack were presented as a tool that could be used by crisis management teams and public health professionals.

Pilot Alert System for Chemical Attacks

An appropriate early detection tool was identified, selected and prioritised to allow the EC to monitor web-based information to identify (a) deliberate chemical events and (b) activities and events that might be precursors of deliberate chemical events and may constitute a public health emergency in the European Union (EU) member states.

A number of IT tools were reviewed during the first year of the project and as a result the Global Public Health Information Network (GPHIN) tool, developed and provided by the Public Health Agency of Canada was identified as one of the working tools. GPHIN was tested in March 2007 over a 1-month period to evaluate the ability of the algorithms used to specifically identify news reports relevant to the deliberate release of chemicals from all news reports available in GPHIN's crude database. Out of the 24,000 news reports recorded that month, 22 events were detected.

Analysis by Type of Event of the 22 Events Detected from 1 March 2007 - 31 March 2007



Numerous activities were undertaken to improve the sensitivity and specificity of the tool for recovering news reports relevant to the deliberate release of chemicals. This included the identification of specific search terms and the development of sophisticated search algorithms. Knowledge and information gained was passed to the developers of the EU Medical Intelligence System (MediSys), the surveillance tool currently used by EU Member States, to support the strengthening of its capabilities in terms of the detection of news reports relevant to the deliberate release of chemicals.

Core Training Modules

Improving and standardising the training provided to public health professionals across Europe may be key to rapid and effective response to terrorist chemical incidence. The purpose of this work package was to obtain details of training material on dealing with chemical releases from terrorists which are aimed at professionals with an official remit for emergency preparedness, planning, response and recovery with specific reference to public health professionals.

Core modules and subject matter considered to be of importance when developing and constructing a training package for public health professionals responding to chemical incidents were identified.

Following this a review was undertaken to determine whether relevant courses are currently available that address deliberate chemical incidents to include chemical terrorism. None of the courses identified were found to be directly related to chemical terrorism.

A template training course was constructed and presented along with suggested training material, course content and modes of delivery. The training module is going to be further developed through a separately EC-funded project (Chemical Incident Emergency toolkit) with the aim of delivering appropriate material on how to construct and conduct training courses relating to chemical incidents.

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- (3) Swedish Defence Research Agency (FOI NBC Defence), Umeå, Sweden.
- (4) National Board of Health and Welfare (Socialstyrelsen), Stockholm, Sweden.

