The Alerting, Reporting and Surveillance System for Chemical Health Threats, Phase III (ASHTIII) – Final Public Report

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Introduction

The Alerting, Reporting and Surveillance System for Chemical Health Threats phase III (ASHTIII) project was designed to aid the co-ordinated response to cross border chemical incidents and poisonings to reduce their impact on public health. The project sought to support implementation of the Decision of the European Parliament and of the Council of European Union on serious cross border threats to health (Decision 1082/2013/EU)¹² that addresses gaps within the response to cross border chemical health threats. This report highlights the main findings and recommendations from the project.
Background
A wide range of chemicals are used in the manufacture of products, production of food and other agricultural and industrial processes. Some of these chemicals have toxic properties and can cause harm if they are not safely managed. International chemical safety conventions and European Directives aim to ensure the sound management of chemicals throughout their lifecycle (extraction, synthesis, use and disposal). Successful implementation of such instruments has helped to ensure that these chemical processes are safer. However accidents involving chemicals do occur. The impact of such incidents is usually local and the vast majority of the population are very rarely affected by such events. However, history demonstrates that chemical incidents such as those listed in table 1 can have a major impact on society in terms of health, well-being, living conditions, travel, trade, economics and politics across boundaries. These effects can be amplified when the event affects more than one country.

Table 1. Examples of chemical incidents.

<table>
<thead>
<tr>
<th>Category</th>
<th>Incident Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industrial accident</td>
<td>Buncefield oil depot fire, UK (2005);</td>
</tr>
<tr>
<td></td>
<td>Bhopal methyl isocyanate release, India (1984)</td>
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<tr>
<td></td>
<td>Seveso industrial accident, Italy (1975)</td>
</tr>
<tr>
<td>Incidents involving foodstuff</td>
<td>Methanol contaminated alcohol, Czech Republic (2012)</td>
</tr>
<tr>
<td></td>
<td>Melamine in milk, China (2009)</td>
</tr>
<tr>
<td></td>
<td>Dioxins in pork, Ireland (2008)</td>
</tr>
<tr>
<td>Incidents involving consumer products</td>
<td>Liquid laundry detergent capsules (2011)</td>
</tr>
<tr>
<td></td>
<td>Aquabeads, Australia (2007)</td>
</tr>
<tr>
<td></td>
<td>Magic nano-spray, Germany (2006)</td>
</tr>
<tr>
<td>Deliberate releases</td>
<td>Use of chemicals against civilians in Syria (2013, 2014)</td>
</tr>
<tr>
<td></td>
<td>Chemical release in subway, Tokyo (1995)</td>
</tr>
</tbody>
</table>

There is an on-going need to deploy capability and expertise from within organisations across nations to provide a collaborative, coordinated, community-level response to potential emerging serious cross-border chemical threats. However, dealing with these types of events is not straightforward, partly due to the rarity of these events makes it difficult to access the relevant experts during a cross border emergency; also development of standard protocols is not as straightforward as with other public health challenges due to a number of reasons. The broad scope and diversity of chemical events is dictated by numerous factors a non-exhaustive list might include:

*What chemical or chemicals are involved? Do we even know? Is it toxic to people or the...*
environment? Is it present at levels that could be toxic? Is it a fast or slow event? Could people be exposed to toxic levels? Will it affect more people? Is it deliberate? Can we stop potential exposures? Can we clean it up to safe limits? Will the event affect other civil sectors? The list goes on and changes with each type of event. For 10 years the European Centre for Disease Control and Prevention (ECDC) has played a central role in monitoring, assessing, preventing and controlling the spread of infectious diseases in Europe. ECDC is the authoritative voice for communicable disease in Europe and provides a good reference point for activities that are undertaken for communicable diseases that could similarly be employed for other public health hazards such as chemicals. Other International organisations have competencies and legal requirements to tackle emerging chemical threats including food borne hazards, contaminated medicaments and illicit drugs. However the Decision for serious cross-border threats to health recognises that, due to the multiplicity and diversity of chemical events, they can exist both outside and overlap with the remit of such authorities. The caveat that exists is therefore ‘how can the EU protect its citizens from potentially serious, but relatively rare, chemical events that affect the health of people in more than one country?’

The need for rapid and harmonised communication of emerging event information has been addressed by the development of an IT platform that allows health risk assessors from different countries to alert each other and assess the risks of new chemical events. The platform is called the Rapid Alerting System for Chemicals (RASCHEM) and helps to ensure that countries are aware of events and that the same information is shared between them. RASCHEM is hosted by the European Commission (EC) and is a risk assessment platform for poison control centres and public health authorities. Should an event discussed via the RASCHEM platform be deemed to be a public health emergency of international concern will be notified by the national health authorities through the Early Warning and Response System (EWRS), which is the alerting system for serious cross-border threats to health in Europe. The EWRS links the national public health authorities in the Member States who will coordinate, with the Commission, the risk management and response to the event under the current EU legislation. By December 2014 there were 38 RASCHEM users in 12 Member States.

To address gaps in our preparedness and response to chemical health threats ASHTIII has:

- Explored requirements to ensure the continued support and operation of a RASCHEM to allow for the informal notification and technical discussion of emerging chemical incidents.
• Enhanced situational awareness by developing an Event-Based Surveillance (EBS) strategy to detect emergent chemical threats in the EU.
• Developed a library of guidance documents for the emergency public health and medical response to events involving high risk, toxic chemicals.
• Demonstrated that producing high quality, accurate and defensible documents, during the acute phase of a cross border incident, for use by EU MSs and the Commission is feasible with a relatively small budget and limited pool of experts.
• Explored the use of standard codes and methodologies to enable the comparison of data on human exposures and determined whether overlapping regulatory requirements for reporting toxic exposures could be consolidated into one system.
• Studied if the concept of automatic data exchange and processing of poison control centre (PCC) case data could be adopted for ad-hoc surveillance purposes in the event of a cross border chemical public health incident.
• Considered how these activities could be taken forward into the future and how this could be achieved with a simple affordable infrastructure.

Results
RASCHEM became operational in June 2014 and is being rolled out to all EU MSs. The project has provided support to ensure a smooth roll-out of the platform. ASHTII activities to support this (e.g. guidance and exercising) are still on-going and being taken forward by the European Chemical Emergency Network (ECHEMNET) project².

An event-based surveillance methodology to help identify events to be posted to RASCHEM, or notified to the Commission, or WHO under the International Health Regulations (2005), was developed. The event based surveillance, which has run since July 2014, has detected 8 events in Europe that have been posted to RASCHEM; a further 15 events outside Europe have been notified to WHO.

An IT tool (Toxidrome Tool) was developed to help risk assessors identify chemical hazards from presenting signs and systems. The tool facilitates identification of a toxic agent from its toxic effects in an event of suspected poisoning, especially mass poisoning. The continuous use of the tool in daily work of PCCs for the past 2 years has shown its value not only in risk assessment of mass poisoning events, but also for regular poisons centre work mainly focussed on individual poisoning cases. Recommendations were made to integrate the tool into the RASCHEM platform to enhance its
utility. For RASCHEM to be a useful tool for the whole poison control centre and public health communities then further training, recognised implementation via MS authorities, updates and modifications, on-going expert moderation and exercising is required.

Ad hoc surveillance for emerging chemical health threats proved to be feasible using PCCs but for it to be robust then exposure data and case data must be recorded and exchanged in the same manner by all PCCs. Further, the technical requirements for ad hoc surveillance for serious cross-border chemical health threats\textsuperscript{1-2} is the same for other European legislation covering toxic exposures to specific group of chemicals (e.g. pesticide) and has read-through to other emerging health hazards (e.g. liquid laundry detergent capsules, e-cigarettes). A unified and robust coding system has been developed to enable different MSs to compare pesticide exposure data (i.e. exposures to plant protection agents and biocides). The proposed code was successfully applied to classify pesticides exposures identified in five EU countries. Whilst the proposed system requires further testing on more groups of pesticides, the exercise carried out clearly indicated that an additional effort and support at the policy level would be needed in Europe to implement standardization of data recording and classification of pesticide exposure in particular, and of toxic exposures in general. Results of a consultation with the PCC community showed that further coordination of data coding and collection activities is supported.

To aid the provision of rapid, independent and authoritative advice during emerging incidents, a library of structured chemical data sheets were developed. Chemical Emergency Risk Management Monographs (CERMs) were drafted for high risk agents along with a methodology for producing the documents at short notice to aid discussion and decision making at the European level.

The added value and strategic relevance of the CERMs are that they:

- can be produced for EU stakeholders at very short notice,
- promote high-quality knowledge and practices,
- reduce variations in decisions/measures/health-care,
- optimize use of limited resources/ improve cost efficiency,
- combine the best features of toxic agent-oriented electronic resources,
- maintain the continuity of outputs of the past EU funded projects in a central resource (CARIMEC, MASH, CIE-Toolkit, ASHTI, ASHTII, ASHTIII, ECHEMNET)\textsuperscript{5-13},
- can be used to help identify gaps and differences in best practise to chemical hazards,
support the response to cross border chemical health threats including the coordination and derivation of Rapid Risk Assessments, Hazard Statements and Case Definitions.³

The CERM sheet library and rapid CERM response needs to be updated and maintained if the resource is to be a viable tool for use in emergencies in the future.

ASHTIII has shown that different types of models could be used to provide European level support for different chemical poison control centre and public health related activities. Through consultation and via the Decision we suggest that the combination of a formal and informal network, such as the EU Scientific Committees for Health and Environmental Risks (SCHER), supported by experts from European Poison Control Centres and Public Health Authorities could work for many of the proposed activities. It is important to ensure that the remit of bodies like SCHER³ accommodate the additional tasks that go beyond the risk assessment of emerging health threats and that there is clarity on the need for these broader requirements in dealing with complex chemical incidents.

Box 1. Commission Statement

‘The Commission will, as a priority, have recourse to the Scientific Committees established by Commission Decision 2008/721/EC of 5 August 2008 setting up an advisory structure of Scientific Committees and experts in the field of consumer safety, public health and the environment and repealing Decision 2004/210/EC.

Where the specific expertise needed is not immediately available in the advisory structures of Scientific Committees and where the urgency so requires, the Commission will inform without delay the Member States and relevant scientific bodies about the particular expertise needed to help identify the experts it is looking for. The Commission will then appoint experts to contribute to the risk assessment needed.

The Commission will ensure the independence of the experts providing this assessment, in accordance with its established internal rules’

¹ The SCHER Committee provides opinions on health and environmental risks related to pollutants in the environmental media and other biological and physical factors or changing physical conditions which may have a negative impact on health and the environment (e.g. in relation to air quality, waters, waste and soils). It also provides opinions on life cycle environmental assessment. It also addresses health and safety issues related to the toxicity and eco-toxicity of biocides.
Discussion
This project has demonstrated that a small coordinating group supported by a larger pool of allied experts can provide a robust assessment of emerging threats. However there is a need for further depth to the capability. This includes: the need for reach-back into MS authorities for specialist advice or capability (e.g. plume modelling, access to proprietary toxicological databases such as TOXBASE® and POISINDEX®); greater linkage with other competent authorities (e.g. ECDC, WHO) and other experts groups in particular the European Association of Poisons Centres and Clinical Toxicologists.

The cost of maintaining these activities in the longer term also needs to be considered at the MS and Union level. However the project has demonstrated, with a limited budget and MS level support, it is possible to enhance European capability for dealing with emerging chemical health threats in a coordinated manner. The group intend to continue to pursue the activities under the ASHT (& ECHEMNET) umbrella by underlining and continuing to support the need for a Joint Action to widen these efforts and include more European Member States in these activities.

Box 2. ASHTII Recommendations

Further action at the EU and MS level is required to enhance health security from future chemical health threats that impact upon more than one Member State. Continued support for the following activities should be considered::

- **RASCHEM system:**
  - Continued expert moderation and periodic case data reviews
  - Updating the system, improving functionality and revising guidance material
  - Engagement and training with new and current users.
- **Ad hoc (toxico)-surveillance strategies and global situational awareness**
  - Continuation of event based surveillance
  - Further support and development indicator based surveillance with EU PCCs
- **Provision of timely independent and impartial risk assessment (e.g. hazard characterisation) or medical management (e.g. antidotes, triage) advice:**
  - Rapid Risk Assessments [1082/2013/EU] – via SCHER Committee
  - Further development of Chemical Emergency Risk Management Monograph resource
  - Development of Hazard statements and Case definitions for high risk agents.
- **Development of standard terms, codes and tools to describe chemical products, features of**
poisoning and identify chemical hazards
  o Harmonising codes for hazardous products
  o Deriving clinical effect profiles for hazardous and high risk agents
  o Working with other sectors to define common coding systems for different legal requirements
  o Working with PCCs, EC & EU MSs to agree upon a common means of collecting and/or coding data in a sustainable manner

The ASHTIII project was a joint effort by medical and scientific experts from UK, Germany, France, Italy, Czech Republic, Lithuania and other countries to help address gaps in the response to cross border chemical health threats. Experts in the project group work in European poisons centres (which provide advice on chemical exposures and treat poisoned patients) and public health authorities.

Figure 1. ASHTIII Group at Interim Meeting in Vilnius: (L) Sergey Zakharov, Herbert Desel, Laura Settimi, Daniela Pelclova, Erik Andrew, Martin Ebbecke, Fabrizio Sesana, Charlotte Hague, Gabija Dragelyte, Rob Orford, Franca Davanzo, Robertas Badaras, Alvin Bronstein, Laima Gruzdyte, Monique Mathieu-Nolf

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Bibliography


