Chemical Hazards and Poisons Division

Public Health Surveillance of Chemical Incidents

Surveillance report 1st October – 31st December 2005

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Summary

• Between 1st October and the 31st December 2005, 221 acute chemical incidents were recorded by CHaPD in the on-line database.

• Of the 221 reported incidents 85 were designated ‘actual’, 107 ‘potential’ and 29 for ‘information’. Twenty eight incidents were chronic, 183 were acute and 10 were not classified as acute or chronic. This report summarises the characteristics of all 221 incidents.

• Following the introduction of improved data ‘cleaning’ the completion of the chemical involved field improved from 52% to 81%.

• The chemical groups most frequently identified were products of combustion (20%, n=44), followed by organic chemicals (15%, n=34) and metals (10%, n=21).

• For the reporting period chemical incidents were most frequently reported in London (27%, n=58), followed by the South East (15%, n=32) and the East of England (12%, n=26).

• The most common source of reports was from Health Protection Units (HPUs) (20%, n=44), via the media (13%, n= 29), Fire Service (11%, n=24), National Poisons Information Service (10%, n=21), ambulance service (9%, n=19) and Multi Agency Initial Assessment Team (9%, n=19). This pattern of notification is expected given the hotline is used by HPUs, Emergency services and Primary Care Trusts to contact the division for advice.

• In 16% (n=35) of reported incidents 1-10 people were exposed to the chemical hazard and in 6% (n=14) 1-10 people showed clinical symptoms. During the reporting period an explosion at Buncefield oil depot was reported, and in addition to being included in the data for this report (annex II) is considered in more detail in a review published by AEA Technology (Environment)1 to which CHaPD made a contribution.

Introduction

1. This report provides a summary of the acute chemical incidents recorded in the on-line database2 between the 1st October and 31st December, logged by all the CHaPD units.

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2 http://www.publichealth.bham.ac.uk/chapd/staffpages/index.htm
2. Retrospective analysis of the incident management log has been undertaken to improve data completeness. Past analysis of surveillance data identified incomplete database fields resulting in under-reporting and in particular of the chemicals involved in incidents and the geographical location. Data extraction from the incident log drafted by the first and second tier responders has enabled completion of some of the missing database fields. The results are presented in figures 1, 2, and 4.

3. The on-line database allows incidents to be classified as actual (an incident which has occurred and in which a chemical with the potential to cause harm to human life was released into the environment), potential (a possible event which could result in the exposure of the public to chemical substances and endanger public health), information (general enquiries for factual material, advice or data not relating to a specific chemical incident) and exercises. During the reporting period ten exercises were logged but not been included with the data for this report. Annex I includes the definition of an acute chemical incident.

4. A database extract has been provided by Local and Regional Services surveillance of chemical incidents 2005. This data set requires comparison with CHaPD data to enable removal of duplicate incidents and ensure compliance with the inclusion and exclusion criteria (see annex I). CHaPD and the Environment Agency (EA) have exchanged a memorandum of understanding and service level agreement. These agreements establish an exchange of data on national pollution incidents reported to the EA between organisations. Data provided by the EA reports approximately 6000 pollution incidents between 2001 and 2005. Further work is underway to identify those incidents with a potential impact on human health. Data provided by LaRS and the EA will be presented in the HPA Chemical Incident Surveillance Annual report for 2005 to be published in July 2006.

**Source of chemical incident reports**

5. 20 % (n=44) of chemical incidents were reported by local HPU, 11 % of incidents were reported via the Fire Service (n=24), 10 % via the National Poisons Information Service (n=21) and 9 % from the Ambulance Service (n=19). The improved data cleaning considerably increased the completion of this field (from 70% to 94% see figure 1).

**Chemicals involved in incidents during reporting period**

6. Prior to follow up the type of chemical involved in each incident was unknown in 48 % (n=108) of cases, which was reduced to 19 % (n=42) after follow up (figure 2).

7. During the reporting period products of combustion (20 %, n=44) were the most commonly reported chemical release followed by organic chemicals (15 %, n=34), metals (10 %, n=21), petroleum/oils (6 %, n=13) and asbestos (5 %, n=12).

**Regional distribution of chemical incidents**

8. During the reporting period 27 % (n=58) of incidents were in London (figures 3), 15 % (n=32) in the South East, 12% (n=26) in the East of England, 11 % (n=25) in the West Midlands and 10 % (n=23) of incidents in the South West (figure 3).
Chemical incident location type

9. The completion of the location field has been improved from 68% to 90% (figure 4).

10. The most frequently reported location types were residential (21 %, n=46), commercial (21 %, n=46) and industrial (16 %, n=36). Educational premises were involved in 9 % (n=19) of chemical incidents.

Number of casualties and fatalities from chemical incidents

11. The information in the incident log did not allow a better estimate of the number of people exposed and showing symptoms and therefore the data did not alter after follow up.

12. Figure 5 shows that, of 221 chemical incidents, 16 % (n=35) reported 1-10 people exposed to the chemical hazard i.e. from between 35 and 350 people exposed. In 72 % (n=160) of chemical incidents it was not reported how many people were exposed. No one was reported to having been exposed to a chemical agent in 7 % (n=16) of incidents.

13. The number of people with symptoms ranges from 1-10 in 6 % incidents (n=14, i.e. between 14 and 140 people symptomatic), no-one showed symptoms in 10 % (n=22) incidents (figure 5). In 82 % (n=181) of chemical incidents it was not known how many people showed symptoms of exposure to a chemical hazard.

Recent developments

14. In addition to the next quarterly report an annual review of chemical incident surveillance reported in 2005 will be produced for July 2006. The incidents logged in quarters two and three 2005 will be followed up in May before producing the annual summary. The next quarterly report will cover the period 1st January to 31st March 2006.

15. CHaPD is responding to feedback by acknowledging that an improvement in the chemical classification is required. A programme of work is being developed to classify chemicals involved in incidents according to internationally recognised standards established by organisations such as the International Union of Pure and Applied Chemistry (http://www.iupac.org/dhtml_home.html).

16. CHaPD has recruited a Surveillance Scientist with responsibility to undertake:

   i) Retrospective completion of data fields (ref. paragraph 2).
   ii) Retrospective analysis of a 10% sample of incidents in order to more accurately quantify exposure, morbidity and mortality.
   iii) Investigations into the primary and secondary causes of acute incidents.
   iv) Mapping of incidents using GIS to identify potentially exposed populations for future tracking.

17. The Environmental Health and Risk Assessment (EHRA) Unit at Chilton is now able to provide Geographical Information System (GIS) support to CHaPD HQ and Regional Units and to HPA Local and Regional Services. We are able to offer descriptive mapping (example is provided in Annex II) including:
Ordnance survey 1:10,000 raster data (UK coverage)

Geopolitical boundaries including
* PCTs
* Government Office Regions
* Local Authorities
* Strategic Health Authority regions

* Point data including:
  * UK COMAH sites (lower and upper tier)
  * IPPC A1 sites
  * UK town centres

* Network data including the UK road network
* Emissions data from the National Atmospheric Emissions
* Air quality management areas declared in 2005

18. We can also provide some basic analytical mapping such as creating buffer zones, data interpolation and describing population characteristics (census and other datasets) within prescribed areas.

19. The unit currently operates ArcGIS 9.1 and is moving towards the installation of a dedicated server to support ArcGIS SDE.

20. The EHRA unit is working closely with RPD and the GIS team in the Centre for Emergency Preparedness and Response at Porton Down to strengthen the Division’s GIS capability (including adding a GIS functionality to the chemical incident management database) and we have agreed to act as the gateway to Porton for GIS support (including access to resources of the Pan-Government Agreement). Please direct any such requests to the EHRA team as there may be internal resources that can be utilised.
Figure 1 Notifying organisation of chemical incidents reported between 1st October and 31st December 2005 (n=221), before and after follow up. Abbreviations: Chemical Hazards and Poisons Division (CHaPD), Multi Agency Initial Assessment Team (MAIAT), National Poisons Information Service (NPIS), Other includes Environment Agency and General Practitioner.
Figure 2 Chemicals involved in incidents reported between 1st October and 31st December 2005 (n=221), before and after follow up.
Regional distribution of chemical incidents

London 27%
South East 15%
East of England 12%
West Midlands 11%
South West 10%
East Midlands 6%
Yorkshire and Humber 5%
North East 4%
Scotland 1%
Wales 2%
Other 1%

Figure 3 Regional distribution of chemical incidents reported in England, Wales and Ireland between 1st October and 31st December 2005 (n=221).
Figure 4 Chemical incident location type for chemical incidents reported in England, Wales and Ireland between 1st October and 31st December 2005 (n=221), before and after follow up.
Figure 5 Number of people exposed and experiencing symptoms from a chemical incident reported between 1st October and 31st December 2005 (n=221).

Number of people exposed and number experiencing symptoms

Number of incidents

Number of people exposed

Number of people experiencing symptoms
Annex I

Chemical Hazards and Poisons Division

Definition of a Chemical Incident

National Database of Chemical Incidents

REVISED DATA SPECIFICATION AUGUST 2005

Definition of incident

All incidents representing “an acute event in which there is, or could be, exposure of the public to chemical substances which cause, or have the potential to cause ill health” should be included in the National Database. All incidents with an off-site impact are to be included, as well as on-site incidents where members of the public are affected. (For the purposes of the definition, hospital staff and emergency services personnel should be regarded as members of the public).

Examples of incidents to be excluded from national surveillance include:

- Occupational exposure with no potential for public exposure, e.g. a small spill at a factory in which only employees are exposed.
- Food contamination incidents with no potential for public exposure.
- Incidents involving non-ionising radiation.
- Accidental childhood poisoning, e.g. the ingestion of bleach.
- Incidents involving drugs and other substances of abuse.
- Suicide attempts not involving chemicals

By way of contrast, the following incidents should be included:

- Cases of non-intentional gas poisoning.
- All workplace incidents with an off-site impact, as well as on-site incidents where members of the public are affected. (For the purposes of the definition, hospital staff and emergency services personnel should be regarded as members of the public).
- Spills of chemicals in a school laboratory, resulting in the admission of pupils to hospital or exposure of staff or pupils.
- Potential chemical terrorism events
- Deliberate contamination of food or water supplies

Those incidents, for which there is uncertainty over whether they should be included in the National Database, should be included, and any difficulties associated with the definition drawn to the attention of the Database Audit Group. By doing so, an informed review of the definition can occur, and incidents can be subsequently deleted from the database if necessary.
Annex II

Location of environmental sampling points following Buncefield Oil Depot fire, over OS 1:10 000 scale mapping

Legend
- Buncefield Oil Depot
- Sample Sites

Map produced by the Environmental Health Risk Assessment Unit, CHAPD Chilton

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Concentration of nickel in grass samples, collected following Buncefield Oil Depot fire, over OS 1:10000 scale mapping

LEGEND

- Buncefield Oil Depot
- Nickel grass conc. (mg/kg)
  - < 10
  - 10 - 50
  - 51 - 100

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Concentration of polycyclic aromatic hydrocarbons (PAH) in soil samples, collected following Buncefield Oil Depot fire, over OS 1:10000 scale mapping.