Chemical Incidents in England and Wales 2005
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Editors

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We are grateful to our colleagues Rebecca Gay, Lorraine Stewart, Graham Urquhart and John Dyer for help in producing this report.
This report summarises the programme of chemical incident surveillance for 2005 in England and Wales undertaken by the Chemical Hazards and Poisons Division (CHaPD) of the Health Protection Agency (HPA). National surveillance of chemical incidents is a corporate objective and a key component of the HPA environmental public health tracking system; it is essential if the HPA is to respond effectively to chemical and environmental hazards. Surveillance provides information for action and this system underpins the development of appropriate interventions, including planning and preparedness, public and professional communication, and research. This report provides a summary of the distribution, characteristics and public health impact of chemical incidents that occurred during 2005 in England and Wales and highlights the response of the HPA as a result of this analysis.

Over 1000 incidents were recorded in 2005, ranging from the largest explosion in post-war Europe at the Buncefield oil depot to domestic spillages of mercury. Optimal responses to this spectrum of hazard require a wide range of skills and expertise from a number of agencies. Incidents occur in every region of England and Wales, and surveillance demonstrates that effective management and response minimise their public health impact. However, the HPA is not complacent and is working with other key agencies to improve its preparedness, planning and response. In particular, the HPA is examining the specific impact on children and deprived communities and – for the first time in England and Wales – it is examining the causes of chemical incidents not investigated by the regulatory agencies to ensure interventions are most effective and have the greatest impact on health inequalities.

I would like to thank all HPA staff and stakeholders whose work has contributed to the effectiveness of the chemical incident surveillance system.

I hope that you find this report interesting and informative and invite you to send any comments to chemicals@hpa.org.uk.

Roger Cox
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The Chemical Incident Surveillance System in England and Wales is managed by the Chemical Hazards and Poisons Division (CHaPD) of the Health Protection Agency (HPA). Surveillance data are used to describe the distribution, characteristics and public health impact of chemical incidents. This underpins the development of HPA interventions, including planning and preparedness, public and professional communication, and research.

Major improvements to the surveillance system have been implemented during 2005, as recommended by the HPA in its Burden of Disease Report, and these are reflected in the improved dataset.

In 2005, 1040 chemical incidents were recorded in England and Wales. Up to around 27,000 people were estimated as being exposed during these incidents with up to around 3,000 people exhibiting symptoms of exposure. In addition, 14% of incidents resulted in evacuation of local populations.

Enhancements to the surveillance system during the year have resulted in significant improvements to data ascertainment and completion. For the period from July to December 2005, 152 uncontained chemical incidents were examined. It is estimated that over 85,000 people lived within 250 m of these incidents and an estimated 1.3 million, including 340,000 children, within 1 km.

Incidents were reported in every region. Most occurred in London (25%), followed by South East England (16%), South West England (13%), the West Midlands (10%), the North West (9%), the East of England (8%), the East Midlands (7%), Yorkshire and the Humber (4%), Wales (3%) and, lastly, the North East (2%).

The most frequently reported chemical group released was products of combustion (27%). Of the 7% of incidents involving metals, one in six was a domestic spillage of mercury. The year also saw an increase in acid releases from industrial settings.

HPA Health Protection Units were the source of 27% of the reports on chemical incidents. The other main sources of reports were the National Poisons Information Service (10%), the fire services and media sources (9%, each), the National Chemical Emergency Centre (7%), hospitals (4%), and the ambulance services and local authorities (3%, each).
A multi-agency environmental public health surveillance system was established in Wales in 1993\(^1\). The system developed into an effective mechanism for identifying chemical hazards with potential public health implications and for informing policy development. In England, a similar system was established in the West Midlands by the Chemical Hazard Management and Research Centre at the University of Birmingham\(^2,3\). This surveillance system also supported health service emergency planning and response through the real-time notification of serious incidents.

The success of the Welsh and West Midlands surveillance systems informed a national surveillance programme managed by the National Focus for Chemical Incidents based at the University of Wales Institute in Cardiff\(^4\). Data were provided by regional chemical incident response units based in Cardiff, London, Newcastle and Birmingham, the Scottish Centre for Infection and Environmental Health, the Department of Health, Social Services and Public Safety (Northern Ireland), the Ambulance Service Association, the Police (Hazchem scheme), the National Chemical Emergency Centre, and the Maritime and Coastguard Agency. The National Focus programme contributed to the World Health Organisation International Programme on Chemical Safety and the establishment of a WHO Collaborating Centre for an International Clearing House for Major Chemical Incidents at the University of Wales Institute in Cardiff\(^5\).

These systems consistently reported hundreds of incidents each year affecting every government office region, with enormous potential for exposure and public health impact. Analysis of data for the period 1999–2004 is available in the HPA Burden of Disease Report\(^6\). This and previous reports have also identified shortcomings in data ascertainment and completion as well as outputs\(^2,3,6\).

The Environmental Health and Risk Assessment (EHRA) Unit of the HPA Chemical Hazards and Poisons Division became responsible for the national surveillance of chemical incidents programme in 2005. The EHRA Unit implemented a number of initiatives during 2005/06 to address these concerns, including:

\(\text{a} \) Agreement on the definition of a chemical incident (see Box 1, p6)

\(\text{b} \) Establishment of an audit group to assess the quality of surveillance data and ensure compliance with the definition

\(\text{c} \) A chemical incident management database established by CHaPD West Midlands\(^2\) has been developed nationally to improve data collection and incident classification

\(\text{d} \) The database is available online on a 24-hour basis enabling remote access by on-call staff and contemporaneous recording of incident logs

\(\text{e} \) Establishment of a ‘duty desk’ to act as a single point of contact to which requests for general toxicological and environmental advice can be made by other HPA centres, the public and other government organisations

\(\text{f} \) Systematic retrospective analysis of incident management records to improve completion of key data fields

\(\text{g} \) Introduction of a geographical information system (GIS) to enhance the mapping and analysis of data

\(\text{h} \) Memorandum of understanding agreed with the Environment Agency on data exchange

\(\text{i} \) Incorporation of data from the incident database of HPA Local and Regional Services Division (LaRS)

\(\text{j} \) Publication of quarterly reports on the HPA website\(^7\)
The Chemical Incident Surveillance System (CISS) for England and Wales and the closely linked Scottish Environmental Incident Surveillance System are the only national population-based surveillance systems in the world. In the USA, the Hazardous Substances Emergency Events Surveillance System operated by the Agency for Toxic Substances and Disease Registry, while covering a small number of states, publishes good quality data and analysis which have provided useful comparisons (see the discussion). The HPA South West Local and Regional Services Unit, in collaboration with other agencies, is also piloting a multi-agency environmental public health surveillance system to improve access to information on acute events and chronic exposures to environmental hazards of public health significance.

Chemical incident surveillance has informed the development of HPA interventions, including planning and preparedness, public and professional communication, and research. Work in this area includes the production of briefing notes on key chemicals for public health responders, the development of personal protective equipment, and the planning and delivery of training for HPA and other staff, e.g. participating in annual national conferences and contributing to the Chemical Hazards and Poisons Reports that are available on the HPA website.

This report produced by the EHRA Unit summarises the results of the chemical incident surveillance programme in England and Wales for 2005. It includes an analysis of the distribution, characteristics and consequences of chemical incidents. In addition, the report discusses the response of the HPA and makes recommendations to facilitate more effective response to chemical incidents as well as addressing issues such as health inequalities.
2 Methods

Data collation

The definition of a chemical incident for the Chemical Incident Surveillance System (CISS) (see Box 1) is based on the experiences of the National Focus system and the WHO International Programme on Chemical Safety14. Data are principally sourced from the real-time online management system used by CHaPD for responding to incidents and supplemented by data from the single point of contact ‘duty desk’, HPA Health Protection Units, a number of fire services, and specific requests from the emergency services, local authorities and members of the public. Incidents are screened to remove those for ‘information’ (e.g. general enquiries for factual material, advice or data not relating to a specific chemical incident) and exercises.

Data completeness and quality have been improved by the introduction of an audit group in July 2005 to review incident data, the national real-time online management system for chemical incidents, and by comprehensive retrospective completion of incident logs by EHRA scientists. Data on numbers exposed and casualties involved were either provided by HPA staff managing the incidents or from the organisations supplying incident information. Data on incidents were extracted from the contributing organisations’ databases and entered into a Microsoft Excel™ spreadsheet for analysis. Duplicates and incidents not meeting the definition were removed.

Box 1 Definition of a chemical 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.
Data analyses

Mapping of incidents and the description of a potentially affected population requires a geographical reference, such as post code or grid reference. Prior to the introduction of the national online incident management system in July 2005, data were reported to the CISS on a regional basis and a geographical reference was unavailable for approximately 85% of the incidents. The introduction of the national database has greatly improved the completion of this field and, accordingly, mapping has used data for the period July–December 2005.

Where a geographical reference was available – for 267 (or 52%) of those incidents logged for the period July–December 2005 – the incident was mapped using the ArcGIS® 9.1 geographical information system. Proximity analysis was applied to uncontained incident locations – 152 (or around 30%) of those incidents logged for the period July–December 2005 – and populations within 250 m and 1 km of an incident captured and characterised using population data from the 2001 national census.

Some under-reporting for 2004 is likely given that the CISS went through a period of transition during 2004 and there was an improvement in ascertainment during 2005. However, there is no evidence of differential reporting and, accordingly, analysis has focused on 2005 data and on relative differences from 2004.
After screening for duplicates (68 incidents) and those not meeting the definition (26 incidents), 1040 chemical incidents were recorded for the period 1 January through 31 December 2005 in England and Wales. The results of the analyses of the characteristics of the chemical incidents are outlined below.

Exposure and health effects associated with chemical incidents

Between 2,800 and 27,000 individuals were estimated to have been exposed during chemical incidents in 2005. This compares to 1,700–13,000 in 2004. Figure 1 shows that 284 incidents (27% of the total) resulted in the exposure of between 1 and 10 people and 27 incidents involved the exposure of 11 to 25 people. In 178 incidents no one was reported to be exposed.

In 2005 between 600 and 3,400 people were estimated to have experienced symptoms, which is similar to the range for 2004 (600–3,900). Figure 1 shows that in 324 incidents (31% of the total) for 2005 no people were reported to have experienced symptoms. The number of people exposed was unknown in 49% of chemical incidents and the number symptomatic was unknown in 52% of incidents.

A total of 145 incidents (14%) led to evacuation of local populations. There were eight fatalities in five incidents (although only two deaths were directly related to a chemical exposure) in 2005 compared to nine fatalities in six incidents in 2004.

Figure 1 Estimated number of people exposed to chemical incidents and number symptomatic for 2005 (1040 incidents)
Nearby populations

Figure 2 shows the distribution of chemical incidents that were recorded since the national online database was established in July 2005 through December 2005 with sufficient information recorded in the logs to enable the post code to be determined (267 cases).

It is estimated that 1.3 million people, including 340,000 children (aged 0–19 years), lived within 1 km of the 152 uncontained chemical incidents recorded. On average, 8,800 people – of which 2,200 were children – lived within 1 km of each incident. This suggests that, on average, one in every four people living in the proximity of an incident is a child.
The table below shows that the average number of residents in close proximity to uncontained chemical incidents was highest in London (approximately 25,500 people per incident within 1 km). This was followed by the North West (9,000 people per incident within 1 km) and the West Midlands (8,900 people per incident within 1 km); the lowest numbers were in the East of England and Wales (both 2,700 people per incident within 1 km).

<table>
<thead>
<tr>
<th>Region</th>
<th>Number of incidents</th>
<th>Average population within 250 m</th>
<th>Average population within 1 km</th>
</tr>
</thead>
<tbody>
<tr>
<td>North East</td>
<td>5</td>
<td>100</td>
<td>3,100</td>
</tr>
<tr>
<td>North West</td>
<td>11</td>
<td>600</td>
<td>9,000</td>
</tr>
<tr>
<td>Yorkshire and the Humber</td>
<td>8</td>
<td>600</td>
<td>8,200</td>
</tr>
<tr>
<td>East Midlands</td>
<td>18</td>
<td>300</td>
<td>4,800</td>
</tr>
<tr>
<td>West Midlands</td>
<td>19</td>
<td>500</td>
<td>8,900</td>
</tr>
<tr>
<td>East of England</td>
<td>15</td>
<td>200</td>
<td>2,700</td>
</tr>
<tr>
<td>London</td>
<td>22</td>
<td>1,600</td>
<td>25,500</td>
</tr>
<tr>
<td>South East</td>
<td>21</td>
<td>400</td>
<td>6,300</td>
</tr>
<tr>
<td>South West</td>
<td>25</td>
<td>400</td>
<td>6,300</td>
</tr>
<tr>
<td>Wales</td>
<td>8</td>
<td>100</td>
<td>2,700</td>
</tr>
</tbody>
</table>
Temporal trend

Figure 3 shows the monthly distribution of chemical incidents reported for 2005 compared to those for 2004 (1040 and 871 incidents in total, respectively). In 2005 significantly larger proportions of incidents occurred in April and May compared to 2004. The fewest incidents in 2005 occurred in January.

Figure 3  Comparison of monthly distribution of chemical incidents for 2004 and 2005
Source of chemical incident reports

Figure 4 shows the proportion of incidents by reporting organisation. HPA Health Protection Units (HPUs) reported 27% of incidents, the National Poisons and Information Service (NPIS) 10%, the fire services and media 9% each, and the National Chemical Emergency Centre (NCEC) and the Multi-Agency Initial Assessment Team (MAIAT, operating in London) 7% each. The notifying organisation was reported in around 90% of incidents for 2005, a significant improvement over 2004 for which the corresponding proportion was around 65%.

Figure 4 Notifying organisation of chemical incidents for 2005
**Type of chemical incident**

Figure 5 shows the most common types of incident which resulted in the release of chemical(s) (see Box 2 for definitions). Fires were involved in 279 incidents (27%) reported during 2005. Chemical releases and leaks were involved in 157 and 121 incidents, respectively. In 127 cases the type of incident was unknown and the information could not be obtained by retrospective analysis.

![Figure 5: Chemical incidents by type of incident for 2005](image)

**Box 2 Definitions of types of chemical incident**

- **Explosion**: Violent release of energy resulting from a rapid chemical reaction
- **Fire**: Combustion of a material with the production of heat, light, smoke, etc
- **Leak**: Gaseous, liquid or solid release arising from a fault in a container or pipe
- **Spill**: Unintentional gaseous, liquid or solid release from an intact container or pipe
- **Release**: Inappropriate release from an identified source which cannot be attributed to the other types of incident (excluding unknown and other)
- **Land**: Release associated with substances in, on, or emanating from, the surface or subsurface of previously contaminated land which cannot be attributed to a leak or spill
- **Deposit**: Inappropriate deposit of chemical substances in a non-designated location which cannot be attributed to a fire, explosion, leak or spill
- **Other**: A release of chemical substances attributed to a specific event which cannot be described as deposit, explosion, fire, land, spill, leak or release
- **Unknown**: A release of chemical substances which cannot be attributed to a specific event
Figure 6 shows that the proportion of incidents involving fires in 2005 was significantly higher than in 2004, while the proportion of unknown type declined. Improvements in data collection have significantly increased completion of the ‘incident type’ field.
Chemicals involved

Chemicals have been grouped into 16 classes (see Box 3) with either similar chemical or physical properties based on the WHO IPCS\textsuperscript{14} and HSEES classifications\textsuperscript{15}. In 191 cases (18\%) in 2005 the chemical involved was unknown (Figure 7), which is a significant improvement on the figure for 2004 (239 cases or 27\%) and is largely attributable to an improvement in data quality managed by EHRA staff.

The chemical group most frequently reported was products of combustion (272 incidents or 27\%) – matching the reported number of fires – followed by other organic (124 incidents), other inorganic (100), metals (76) and asbestos (54).

Box 3 Chemical groups

<table>
<thead>
<tr>
<th>Acids</th>
<th>Halogens</th>
<th>Pesticides</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ammonia</td>
<td>Metals</td>
<td>Petroleum/oils</td>
</tr>
<tr>
<td>Asbestos</td>
<td>Natural gas</td>
<td>Products of combustion</td>
</tr>
<tr>
<td>Carbon monoxide</td>
<td>Other inorganic</td>
<td>Unknown</td>
</tr>
<tr>
<td>CS gas</td>
<td>Other organic</td>
<td>(in alphabetical order)</td>
</tr>
<tr>
<td>Cyanides</td>
<td>Particles</td>
<td></td>
</tr>
</tbody>
</table>
Metals were the largest release in residential properties. One in six incidents involved the leak/spill of mercury (Box 4). Thirty-nine incidents (around 50%) involving metals in 2005 were reported as occurring in residential locations, compared to 34% in 2004. Although only six incidents involving metals occurred in health care locations, half of these were attributed to breakage of thermometers and sphygmomanometers containing mercury.

One in three incidents involving petroleum or oils was a spill or leak of kerosene or petrol in residential properties during 2005. There was a large increase in the proportion of incidents involving acids at industrial locations (20% to 40% from 2004 to 2005). Although only 41 incidents (4%) involved the release of halogens, it was noted that 30% of these involved the release of chlorine when mixing chemicals to sterilise swimming pools. This proportion is similar to that observed in 2004.

Box 4

One in six chemical incidents involving the release of a metal is the breakage of a thermometer in a residential property for which clean-up advice is sought.
Regional distribution of chemical incidents

Incidents were reported most frequently in London (25%) followed by the South East (16%) (Figure 8). The lowest numbers were in Wales (3%) and the North East (2%). There was a significant improvement in the proportion of events for which the geographical location was determined between 2004 and 2005 (Figure 9).

Figure 8 Regional distribution of the number of chemical incidents and the rate per 1,000,000 population for 2005
Increased reporting was observed in London, the South East and the South West. A decrease was observed in the West Midlands, while the proportion of incidents in the East of England and in Yorkshire and the Humber remained unchanged over the two years (see Figure 9).

Completion of the ‘incident type’ field ranged from 99% in the West Midlands to 77% in London. This relatively low field completion in London is likely to be due to the difficulty in applying the existing designations to the high number of white powder incidents and other potential security-related incidents.
Figure 10 shows the location type of chemical incidents. Incidents at industrial locations (222 cases or 21% of the total) were the most commonly reported, followed by residential (194) and commercial locations (158). Only four chemical incidents occurred at Control of Major Accident Hazards (COMAH) sites, although this category included the Buncefield oil depot explosion and fire of Sunday 11 December 2005. Figure 11 shows that the location types in 2005 follow a similar pattern to that observed in 2004.
This report describes the distribution, characteristics and public health impact of chemical incidents recorded in England and Wales during 2005 and assesses the impact of improvements to the system on data completion and ascertainment. A total of 1040 incidents were recorded in 2005 compared to 871 in 2004. A series of improvements to the surveillance system were introduced during 2005 including:

a. Agreement on the definition of a chemical incident
b. Establishment of an audit group to assess the quality of surveillance data and ensure compliance with the definition
c. Development of a national real-time online chemical incident management database
d. Establishment of a ‘duty desk’ to act as a single point of contact for general toxicological and environmental advice
e. Systematic retrospective analysis of incident management records to improve completion of key data fields
f. Introduction of a geographical information system to enhance the mapping and analysis of data
g. Recruitment of additional data sources to the system

These measures have resulted in major improvements in data ascertainment and completeness, e.g. reduction in the number of unknown chemicals, and completion of geographical location, chemical incident type and notifying organisation fields. The surveillance system underwent a period of transition during 2004 and some under-reporting is likely for that period. However, there is no evidence of differential under-reporting and, accordingly, analysis has focused on 2005 data and on relative differences from 2004.

Up to around 27,000 people were estimated to have been exposed following incidents in 2005 with up to around 3,000 reporting symptoms. These figures are estimates with a wide range and further work is needed to improve these data. While the number of fatalities is low (eight fatalities in five incidents, although only two deaths were directly related to a chemical exposure), it is clear that the potential for exposure is real and substantial. In addition, 14% of incidents led to an evacuation of local populations.

It is estimated that over 85,000 people lived within 250 m of an uncontained incident in the second half of 2005 and 1.3 million, including 340,000 children, within 1 km. However, it is evident that data on actual exposure following incidents are incomplete. Existing estimates use residential proximity as a surrogate for exposure which introduces major potential for exposure misclassification. In addition, there is inadequate exposure measurement/modelling following incidents (in most cases none at all) and inadequate long-term follow-up of incidents; for example, the Chemical
Incident Surveillance System may not identify sub-acute health effects associated with an incident that are reported after the acute management phase. CHaPD is now conducting a major retrospective review of a sample of incidents to more accurately quantify exposure and health impact and is working with the HPA Radiation Protection Division in the development of a joint exposure modelling capacity.

Previous work has demonstrated health inequalities in terms of disproportionately large deprived and minority ethnic community populations living in the vicinity of industrial processes and future work will also specifically examine the impact of incidents on health inequalities. Children are particularly vulnerable to the effects of hazardous chemicals and residential settings are the second most common site of a chemical incident. Further work is necessary to characterise the nature of chemical injuries in children.

Epidemiological follow-up of chemical incidents can be complex and challenging, especially the appropriate assessment of the psychological impacts of incidents – a neglected area in England and Wales. The HPA conducted a major study of the psychological impact of the Buncefield oil depot fire and a systematic review of the psychological effects of incidents will be published in 2007. In addition to the health costs, for many incidents there will be an economic cost imposed by emergency service response, clean up, monitoring and regulatory responses, loss of work, interruption of economic activity, etc.

While the frequency of incidents generally follows the population density distribution, incidents occur in every region of England and Wales. Incidents were most commonly reported in London and the South East, significantly more so than in 2004. The increased reporting in the London region can be predominantly attributed to the implementation of the London ‘early alerting system’ in 2004. The implementation of this alerting system has involved developing new, and strengthening existing, communication pathways between CHaPD, the emergency services and other agencies that deal with chemical incidents. Early alerting has resulted in an increase in the total number of incidents reported and an improvement in the speed of notification. A significant decrease in reported incidents between 2004 and 2005 was seen in the West Midlands. The reasons for this decline are not known, but as the surveillance of incidents within the West Midlands is well established, it is unlikely that changes in ascertainment could account for this decline. It is possible that these data may reflect a real decrease in incidents within this region over this period.

While the Chemical Incident Surveillance System has improved ascertainment, all passive systems will experience under-reporting. The fire services, for example, record many thousands of fires and while only a small proportion would be classed as chemical incidents, it is surprising that only 0.1% of fires recorded in 2005 were identified as chemical incidents. This is most probably due to most fire services not being active partners in the CISS, especially in terms of potential incidents. In addition, the South West surveillance system pilot has identified some under-reporting to the national system at a regional level. The use of the capture–recapture technique to compare passive and active systems has suggested considerable under-reporting.

Chemical incidents vary considerably in terms of potential impacts, ranging from the largest explosion in post-war Europe to domestic spillages of mercury. However, all have the potential to lead to exposure to a hazardous chemical. Mercury spillages as a result of broken thermometers and barometers were reported to be the most common cause of incidents involving metals in residential properties. While it is simple to ensure effective clean-up of a small mercury spillage, advice clearly needs to be more effectively available to, and accessible by, the public. CHaPD is publishing simple, straightforward advice on this type of issue on the HPA website. There were also a number of incidents involving mercury releases at health care locations due to broken sphygmomanometers and thermometers, and mercury used for dental amalgam. While the number of these types of incidents is comparatively small, the impact on the health service is potentially significant if incidents result in the closure of GP surgeries or clinics. The HPA is further coordinating its work on hazardous waste handling advice to the NHS with its incident response activities.
Industrial incidents involving acids with a potential public health impact increased in 2005. These were reported from a range of different industrial processes such as waste recycling, manufacturing, textiles, forging, and chemical processing. It is important to learn any lessons from these trends. In addition, the categorisation of chemicals needs revision as some chemical groups are too broad to enable meaningful analysis and some are no longer relevant given the changes to the definition of a chemical incident.

In the USA, the Hazardous Substances Emergency Events Surveillance System examines the primary and secondary causes of incidents\textsuperscript{22,23}. In 2003 equipment failure accounted for 51\% of incidents, human error for 32\%, intentional or illegal acts for 14\%, and 2\% were caused by adverse weather conditions or natural disasters. This information is crucial for identifying the most effective prevention of incidents. In the UK, the regulatory agencies thoroughly investigate major chemical incidents and make recommendations accordingly. However, many incidents occur in residential settings and incidents at major industrial processes are relatively uncommon; only 1\% of incidents between 1999 and 2004 in England and Wales involved major industrial sites\textsuperscript{6}, such as those regulated by the Control of Major Accident Hazards (COMAH) Regulations. A thorough assessment of the principal causes of those incidents which are not investigated by the regulatory agencies is required.
5 Programme of Actions

The Health Protection Agency has developed a programme of actions as a result of this review and proposes to:

a. Conduct a detailed retrospective review of incidents to identify the causes and make recommendations on interventions accordingly

b. Conduct a detailed retrospective review of incidents and use improved statistical techniques to more accurately assess the level of exposure to local populations and the associated health impact

c. Develop appropriate modelling capacity for use in chemical incidents

d. Assess the impact of incidents on vulnerable groups including children and deprived communities

e. Investigate all significant changes in the patterns of chemical incidents to identify interventions and to learn from the impact of good or changing practices

f. Produce briefing notes for professionals and the public as appropriate, e.g. clean up of domestic mercury spillages

g. Collaborate with the devolved administrations and agencies in Scotland and Northern Ireland on an assessment of chemical incidents for the whole of the UK

h. Widen participation in the Chemical Incident Surveillance System, including the South West surveillance system pilot and the recruitment of additional agencies, such as the emergency services and local authorities, to improve ascertainment

i. Discuss closer working with key agencies including the Environment Agency and the Health and Safety Executive

j. Widen access to the national online database and improve data sharing

k. Improve the classification of chemical groups – review the methods used by the Hazardous Substances Emergency Events Surveillance System in the USA and the International Union of Pure and Applied Chemistry* to apply an appropriate chemical nomenclature to the surveillance system

l. Integrate data from the Chemical Incident Surveillance System into the HPA environmental public health tracking system

* IUPAC is responsible for maintaining and developing internationally recognised standard systems for designating chemical nomenclature
6 References


12. The National Focus for Chemical Incidents. 2001 Decontamination and chemical personal protective equipment in the National Health Service: current provision, consensus opinion, specification and training implications. A report on progress. The University of Wales Institute, Cardiff.


