Chemical Hazards and Poisons Division

Public Health Surveillance of Chemical Incidents

Surveillance report 1st July – 31st December 2006

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Summary

The Chemical Incidents Surveillance System (CISS) for England and Wales is maintained by the Chemical Hazards and Poisons Division (CHaPD) of the Health Protection Agency (HPA). The web-based element of the system has now been in operation since July 2005 and all incidents for the reporting period 1st July – 31st December 2006 have been extracted from the database. An annual report on data from all contributors to the CISS for 2006 will be published in due course.

The Division has a programme of continuous improvement of surveillance and introduced specific measures in May 2006 to improve data ascertainment, completeness and analysis *e.g.* the source of chemical incidents improved from 82% to 98% from the second half of 2005 to this reporting period. The key findings for the second half of 2006 include:

- **An estimated 2.2 million people lived within 1km of reported uncontained chemical incidents in England and Wales including over an estimated 540,000 children (0-19 years).**
- **456 chemical incidents were managed and recorded on the database. Fifty-six (56) incidents were excluded as duplicates, exercises or as not meeting the CHaPD definition of a chemical incident and fifteen (15) were not located in England or Wales.**
- **Of the 456 reported incidents included in the analyses in this report, 373 were designated 'actual', 57 'potential' and 26 for 'information'.**
- **There were eleven fatalities resulting from eight separate acute chemical incidents reported in this period. 148 reported acute incidents resulted in an estimated 1088 - 6345 people being exposed and in a reported 113 incidents an estimated 298 - 1420 people showed symptoms. During one further incident in excess of 1000 people were estimated to have been exposed. The estimation of population exposure was 56% (n=254), an improvement from the same period in 2005 when it was 28% (n=123). Evacuation was reported in 18% (n=83) of incidents.**
- **The chemical group most frequently identified was products of combustion (39%, n=172) with 98% (n=168) being designated as fires and the remaining 2% were explosions. This is followed by other organic chemicals (13%, n=61) and other inorganic chemicals (9%, n=42).**
- **For the reporting period, chemical incidents were most frequently reported in London (33%, n=153), followed by the South East (15%, n=67) and then by the South West (13%, n=59).**

- **The most common sources of reports for chemical incidents (notifying organisation) were National Poisons Information Service (24%, n=110) followed by Health Protection Units (16%, n=74) and the Fire Service and Environment Agency (12%, n=56 and 53 respectively).**

Introduction

1. This report summarises the distribution and characteristics of chemical incidents recorded in the on-line database[1] between the 1st July and 31st December 2006.

2. Incidents are 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** (an event which could result in the exposure of the public to chemical substances and endanger public health), for **information** (general enquiries for factual material, advice or data not relating to a specific chemical incident) and **exercises**.

Box 1: 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).

Results

3. After screening for duplicates (n=7), exercises (n=12), incidents outside the geographical region of England and Wales (n=15) and incidents not meeting the definition (n=37) given in Box 1, 456 acute chemical incidents were recorded for the period 1st July through to 31st December 2006 in England and Wales. The results of the analyses of the characteristics of the chemical incidents for the period are outlined in the sections below.

Exposure, morbidity and mortality associated with chemical incidents

4. An estimated 1088-6345 people were exposed as a result of 148 reported chemical incidents. One event in the London involved the estimated exposure of more than 1000 people to a chemical in the water supply. Figure 1 shows that 1-10 people were reported as being exposed to a chemical hazard in 27% (n=122) of the incidents, that is, between 122 and 1220 people. No one was reported to have been exposed to a chemical agent in 23% (n=105) of incidents. In 44% (n=202) of chemical incidents it was not reported and impossible to impute the number of people who were exposed, an improvement on the 72% (n=317) recorded for the corresponding period in 2005 (refer to Figure 1).

5. The number of people exposed and exhibiting symptoms as a result of 113 reported chemical incidents was estimated to be 298-1420. In 39% (n=178) of reported incidents no symptoms were reported and in 36% (n=165) the number of symptomatic cases was not known (refer to Figure 2). There was an improvement in the reporting of morbidity status of individuals during chemical incidents for the reporting period in 2006 (64%) in comparison to same period in 2005 (17%). Figure 2 shows the comparison between the morbidity data for July - December 2005 and 2006.

6. Figure 3 shows the geographical distribution of 354 (78%) of the 456 reported chemical incidents which occurred during the reporting period, where the postcode of the incident was reported or subsequently ascertained. 211 of the 354 (60%) chemical incidents were uncontained and resulted in potential population exposure.

[1] http://chapd.fs-server.com/

More than 2.2 million people are estimated to live within 1km of the uncontained incidents in England and Wales.

7. Table 1 shows that more than 540,000 children (0-19 years) are estimated to be living within 1km of uncontained incidents which occurred in England and Wales during this period. This suggests that one in every four person potentially exposed during a chemical incident is a child which is similar to that for the previous two quarters for 2006. The regional population within a 250m, 500m, 750m and 1km radius of each incident is also shown in Table 1. On average 10,300 people (within a 1km radius) was exposed to a chemical incident in this reporting period.

Table 1: Population within 250m, 500m, 750m and 1km of uncontained chemical incidents in Government Office Regions (GOR) of England and Wales.

	0-250m	250-500m	500-750m	750-1000m	Total within 1km
North East (GOR) – 1 incidents					
Population	0	0	120	1,360	1,480
0-19 years	0	0	34	350	380
North West (GOR) – 15 incidents					
Population	9,130	21,360	25,480	26,840	82,810
0-19 years	2,220	5,850	6,920	7,060	22,050
Yorkshire & Humber (GOR) – 11 incidents					
Population	3,420	8,770	20,400	60,090	92,680
0-19 years	860	2,090	5,480	17,570	26,000
East Midlands (GOR) – 9 incidents					
Population	3,460	8,730	11,450	11,870	35,510
0-19 years	780	2,340	3,100	3,250	9,470
West Midlands (GOR) – 22 incidents					
Population	10,880	34,950	59,580	87,600	193,010
0-19 years	3,020	10,160	17,620	25,260	56,060
East of England (GOR) – 9 incidents					
Population	1,220	3,510	8,220	13,160	26,110
0-19 years	280	800	1,960	2,920	5,960
London(GOR) – 69 incidents					
Population	86,790	254,560	425,800	579,680	1,346,800
0-19 years	20,880	60,750	102,450	139,840	323,920
South East (GOR) – 29 incidents					
Population	9,910	27,205	40,050	58,290	135,450
0-19 years	2,760	7,060	10,050	15,360	33,640
South West (GOR) – 39 incidents					
Population	17,440	48,960	70,200	81,530	218,120
0-19 years	411	11,850	15,990	18,520	50,460
Wales – 7 incidents					
Population	2,660	5,230	13,480	15,810	37,170
0-19 years	640	960	2,620	3,510	7,730

Total Incidents = 211; Total population within 1km = 2.2 million; Total 0-19 years within 1km = 540,000

8. There were eleven (11) fatalities during eight (8) chemical incidents for this reporting period.

Source of chemical incident reports

9. 24% (n=110) of chemical incidents were reported by the National Poisons Information Service, and 16% (n=74) by local Health Protection Units, 12% each by the Fire Service (n=56) and the Environment Agency (n=53). Figure 4 gives the statistics for all reporting organisations.

10. Retrospective analyses of the database have improved completion of this field from 82% during 1st July – 31st December 2005 to 98% for this reporting period.

Chemicals involved in incidents during reporting period

11. Figure 5 demonstrates that during the reporting period the most frequently reported primary chemicals which were released during chemical incidents were products of combustion (39%, n=172) followed by other organic chemicals (13%, n=61), other inorganic chemicals (9%, n=42), metals (6%, n=29), and acids (5%, n=23). The chemical was unknown in 11% (n=51) of reported chemical incidents, down from 21% (n=90) in the corresponding reporting period in 2005.

12. Figure 6 illustrates that during the corresponding period for 2005 the most frequently reported chemical that was released was also products of combustion but the proportion of incidents involving its release was less (24%). Although the proportions for the other chemical groups released during quarters three and four of 2006 and 2005 were marginally different this difference was not statistically significant.

Regional distribution of chemical incidents

13. Figures 7a and b show that 33% (n=153) of incidents occurred in London, 15% (n=67) in the South East and 13% (n=59) in the South West. In the case of the South East and South West these proportions are similar to that for the same period in 2005 (2005 percentages are shown in red font on the map in Figure 7b). Table 2 shows the total number of incidents occurring in each region for the third and fourth quarters of 2005 and 2006.

Table 2: Number of incidents occurring in the 9 regions of England and Wales during 1st July – 31st December 2006 and 2005.

Geographical Region	Number of Chemical Incidents	
	2006	**2005**
North East	14	13
North West	32	32
Yorkshire & The Humber	18	16
East Midlands	18	34
West Midlands	50	46
East of England	27	44
London	153	103
South East	67	70
South West	59	58
Wales	18	18

14. The regional geographical location for *all* incidents has been described for the reporting period.

15. Figure 8 illustrates the monthly distribution of acute chemical incidents for the reporting period. Wales appears to be slightly unique in that just over 50% of chemical incidents occurred in October.

Chemical incident location type

16. Chemical incidents were primarily reported in residential locations (26%, n=121) followed by industrial (20%, n=90). There was no single dominating type of incident

in residential locations, however, 54% (n=49) of incidents occurring on industrial premises were fires. Figure 9 shows that in 5% (n=22) of the incidents the location was unknown. Transportation accounts for 6% (n=26) of the chemical incidents of which 46% (n=12) were classed as spills and leaks.

17. There were no significant differences between the types of locations of chemical incidents for the reporting period of 2006 and 2005 (Figure 10). The proportion of incidents in which the location type was unknown was reduced from 14% for the reporting period in 2005 to 5% in 2006.

Types of chemical incidents

18. Figure 11 demonstrates that the most common type of chemical incident is fire (37%, n=168), followed by release, spills and leaks (12% each, n=56, 55, 55 respectively). This trend is similar to that observed previously for both annual and quarterly periods. The incident type was undefined for 8% (n=35) of acute chemical incidents of which 40% (n=14) occurred in London.

Discussion/Recommendations

19. The annual review for 2006 is currently been prepared.

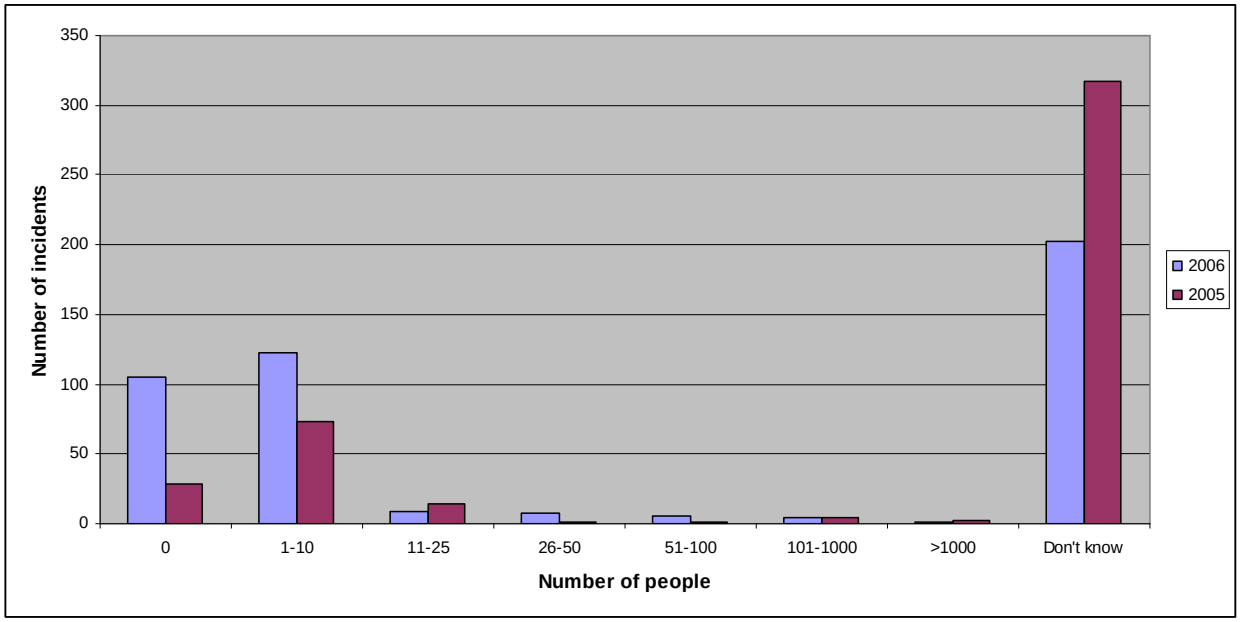

Figure 1: Number of people exposed during chemical incidents reported between 1st July and 31st December for 2006 (n=456) and 2005 (n=434).

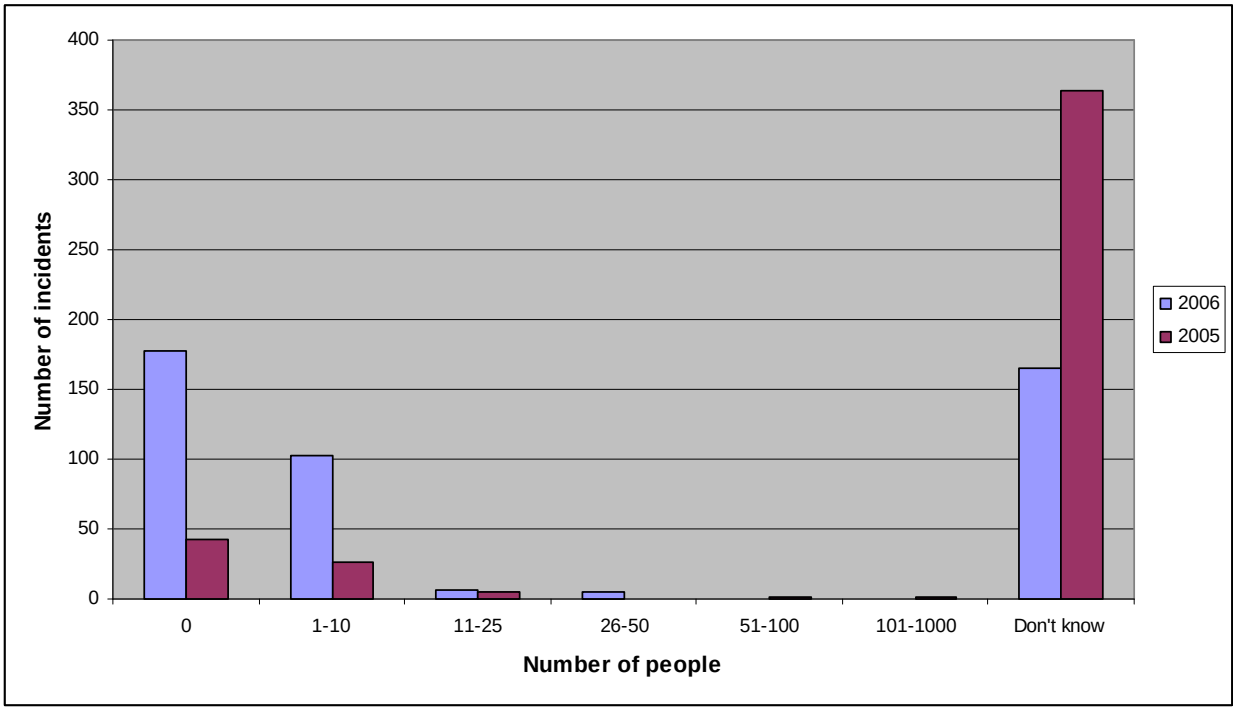

Figure 2: Number of people exposed and experiencing symptoms during chemical incidents reported between 1st July and 31st December for 2006 (n=456) and 2005 (n=434).

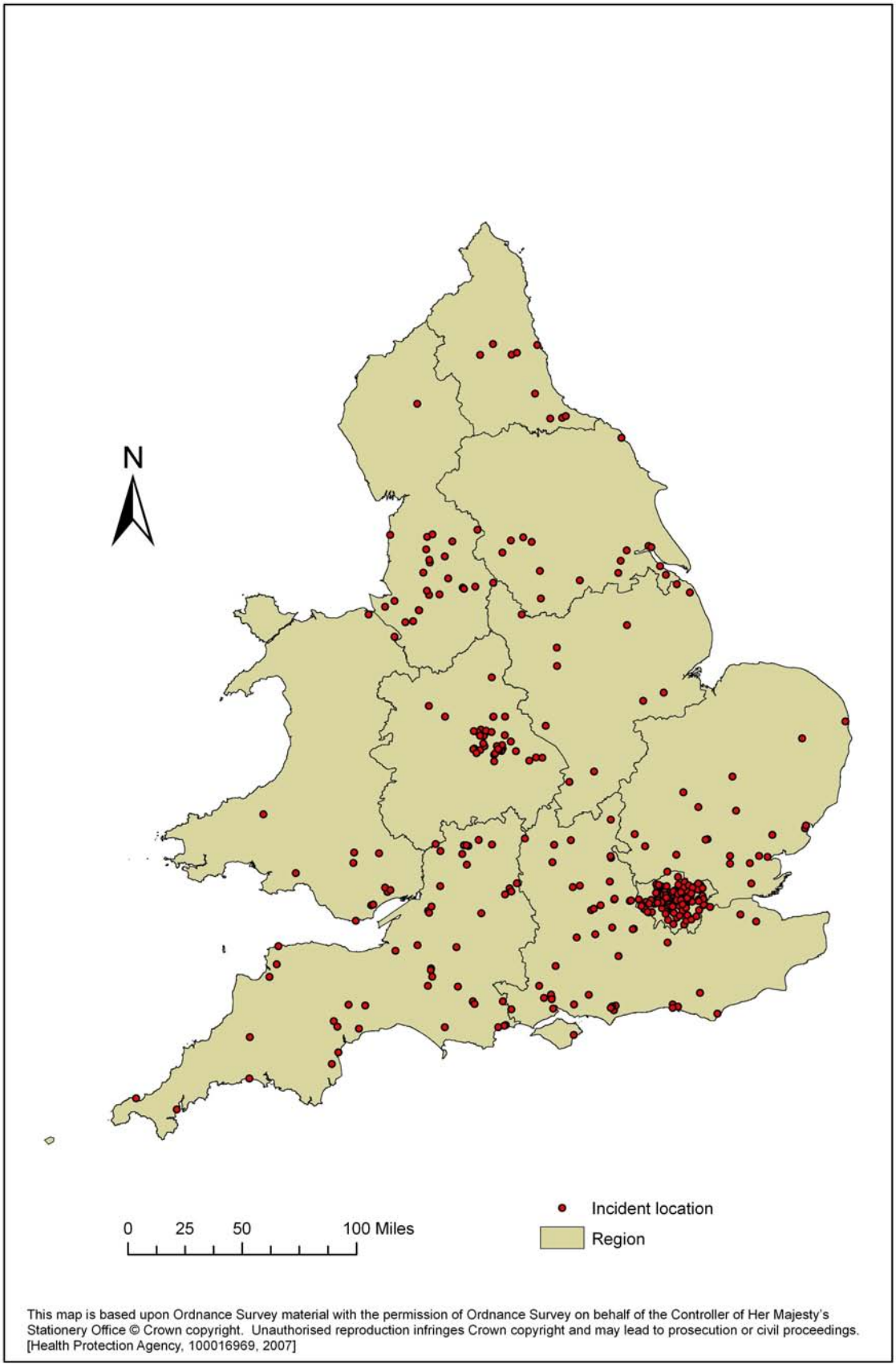

Figure 3: Illustration of the location of 354 incidents with geographical reference which occurred between 1st July and 31st December 2006.

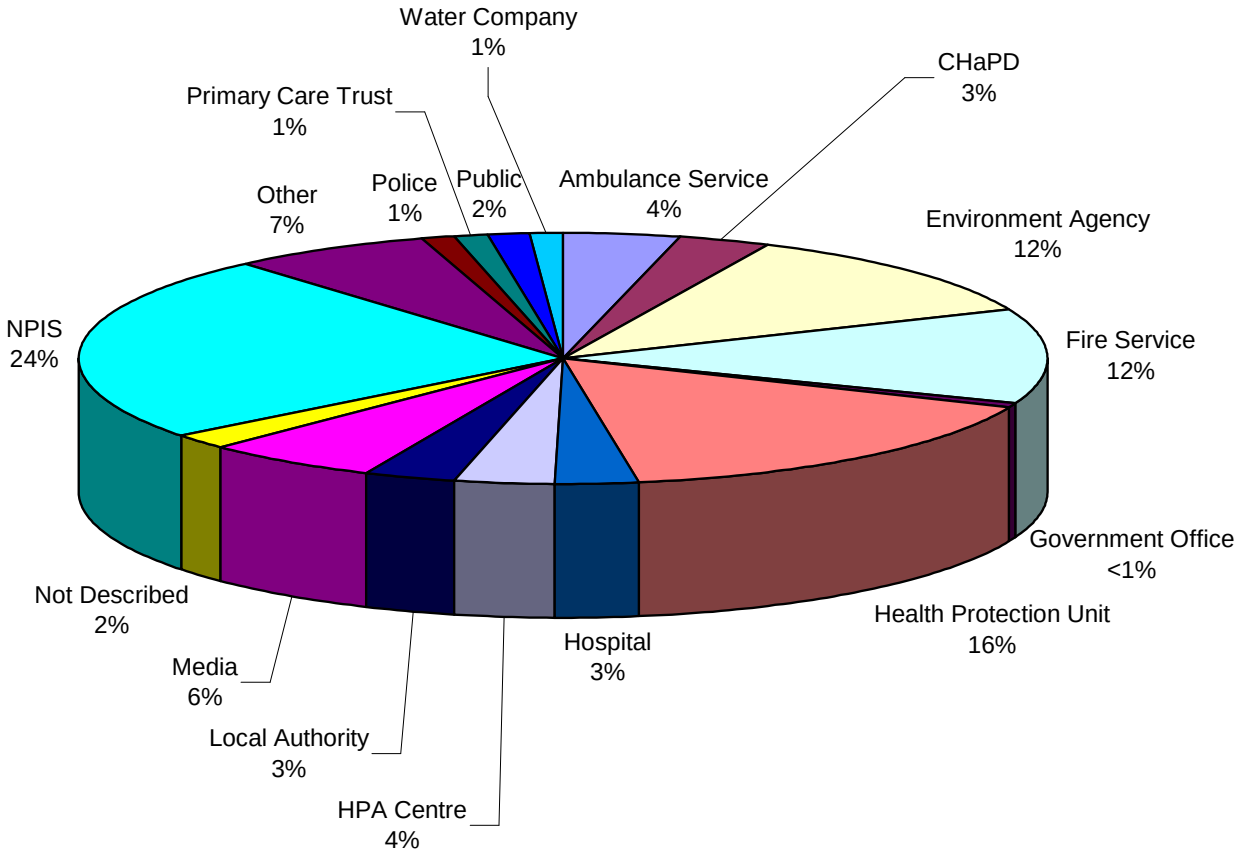

Figure 4: Notifying organisation of chemical incidents reported between 1st July and 31st December 2006 (n=456). Abbreviations: Chemical Hazards and Poisons Division (CHaPD), National Poisons Information Service (NPIS), Health Protection Agency Centre (HPA Centre). Other includes groups such as General Practitioner and Nurse practitioner.

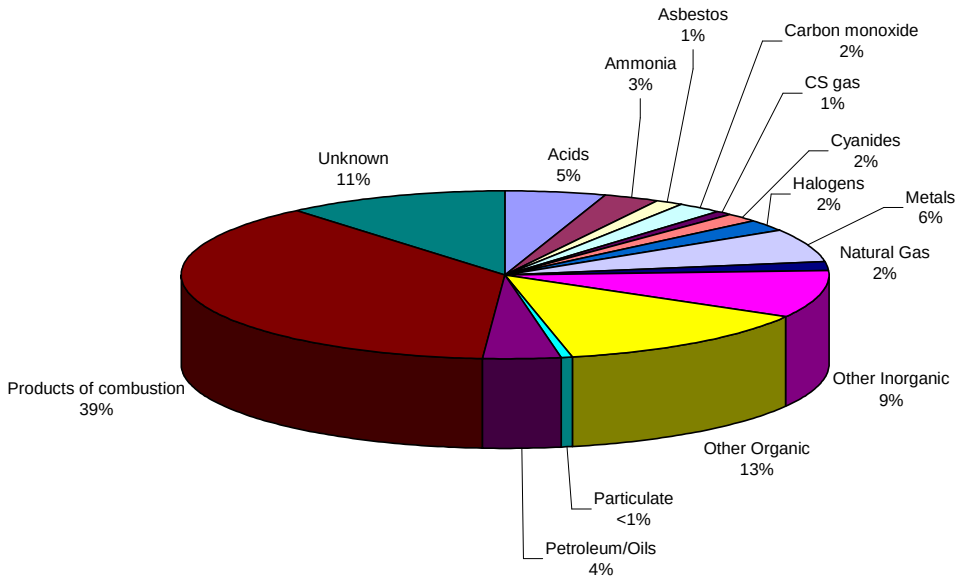

Figure 5: Chemicals involved in incidents reported between 1st July and 31st December 2006 (n=456).

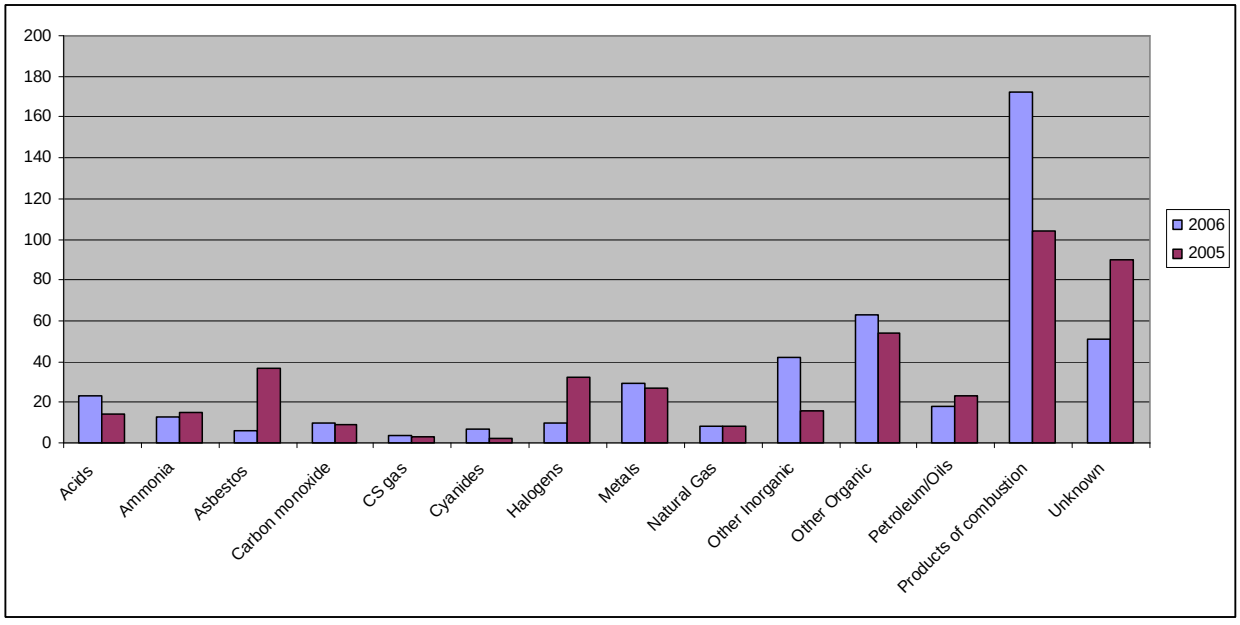

Figure 6: Chemicals involved in incidents reported between 1st April and 31st December for 2006 (n=456) and 2005 (n=434).

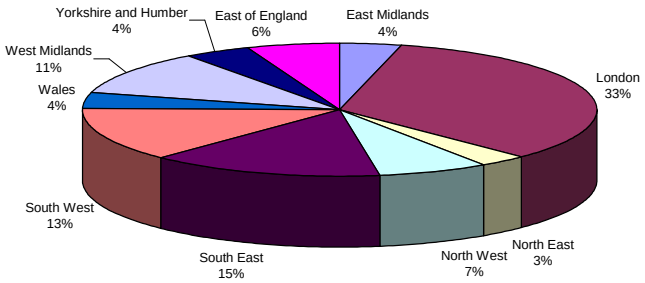

Figure 7a: Regional distribution of chemical incidents reported to CHaPD between 1st July and 31st December 2006 (n=456).

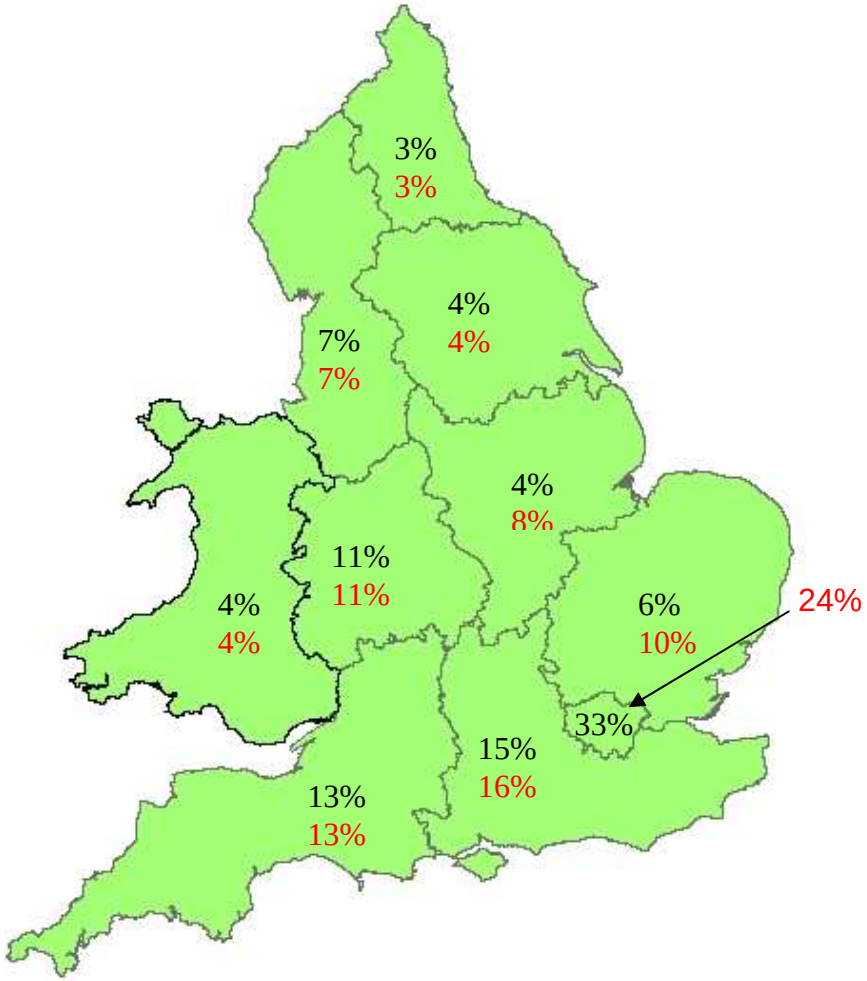

Figure 7b: Regional distribution of chemical incidents reported in England & Wales between 1st July and 31st Dec. 2006 (black font) and 2005 (red font).

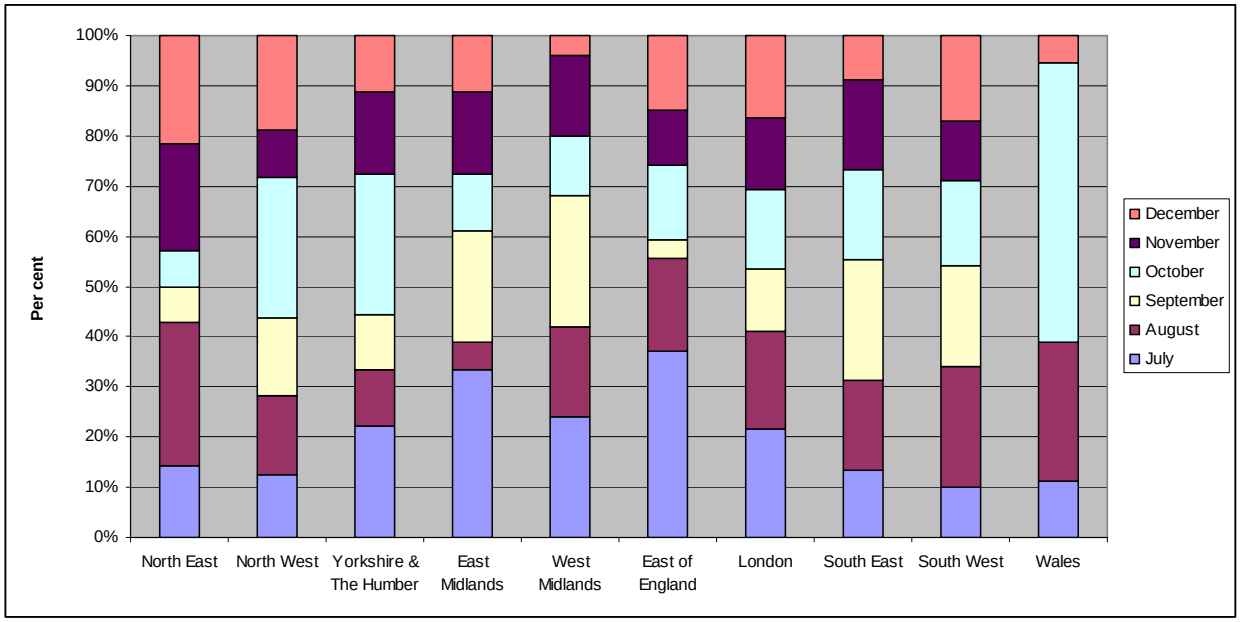

Figure 8: Temporal distribution of chemical incidents reported in England and Wales between 1st July and 31st December 2006 (n=456).

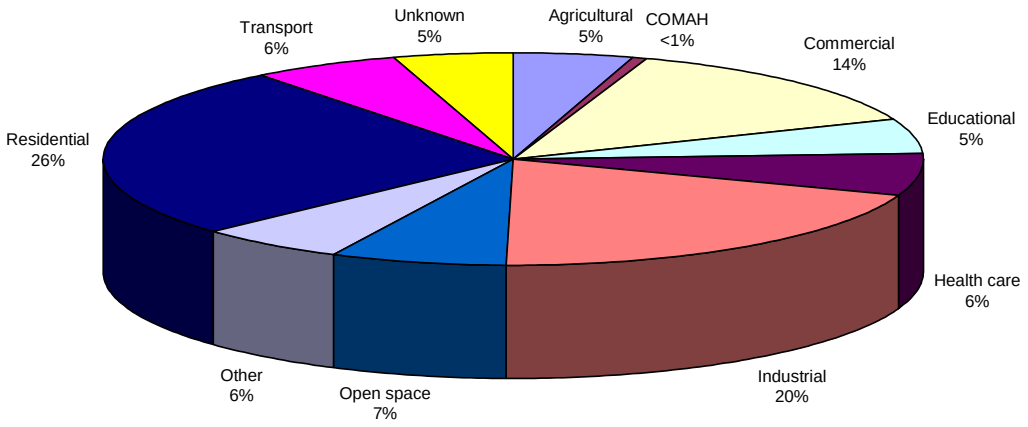

Figure 9: Chemical incident location type for chemical incidents reported in England and Wales between 1st July and 31st December 2006 (n=456).

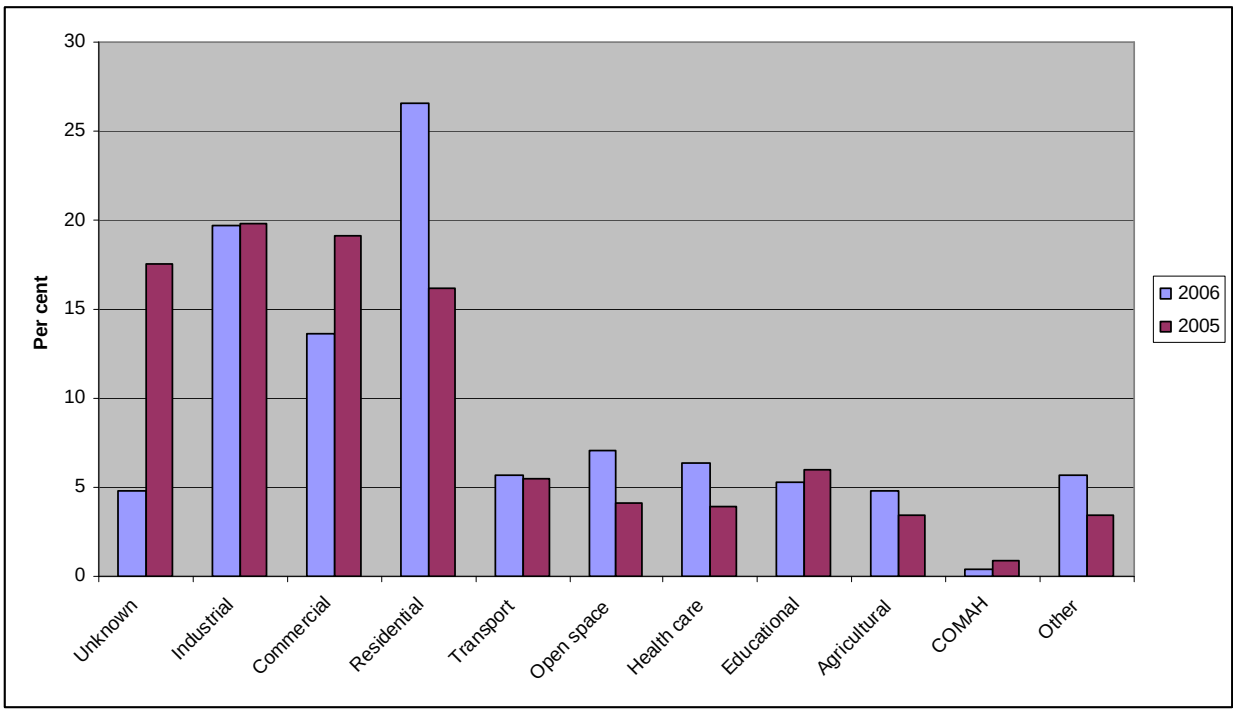

Figure 10: Chemical incident location type for chemical incidents reported in England and Wales between 1st July and 31st December for 2006 (n=456) and 2005 (n=434).

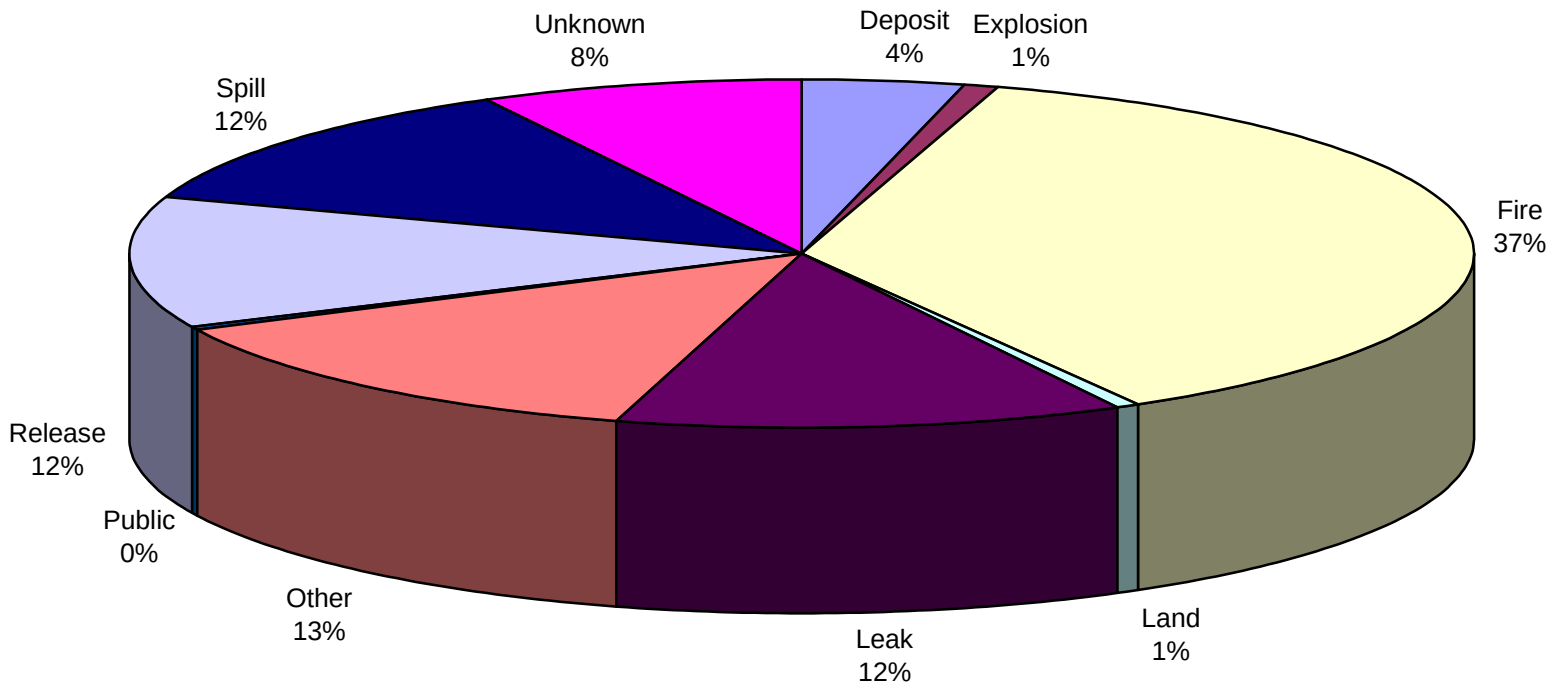

Figure 11: Chemical incident type for chemical incidents reported in England and Wales between 1st July and 31st December 2006 (n=456).