

Chemical Hazards and Poisons Report

From the Chemical Hazards and Poisons Division
September 2005 Issue 5



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Editorial

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Editor Chemical Hazards and Poisons Report

These last three months have proved to be a very difficult time for us all with response to terrorist events in London. The Chemical Hazards and Poisons Division of the Health Protection Agency has worked closely with all agencies requiring toxicological, chemical and environmental advice on public health protection. We will continue to provide support.

In this Chemical Hazards and Poisons Report we report a series of recent incidents:

- The problems with mercury in barometers in the home are exemplified by this incident report from East of England Region. It considers the potential implications of the European Community Strategy concerning mercury.
- Two incident reports about unspecified illnesses related to schoolchildren and man-made fibres used in building works, one in London and the other in the South West. Both provide lessons to be learned for the management of child-related events.
- Two fires: one is probably the largest fire in London for the last ten years. This occurred on 14th July one week after the London Bombings and demonstrates the resilience of the city to respond to very difficult events. The other occurred in an unused chemical factory set in Common land with allotments and housing in the South East; this led to a complex investigation assisted by information from the Met Office.
- Contamination of Accident and Emergency Departments always presents concerns and in this incident 'white powder' resulted in the temporary closure of an A&E department in the North West.
- The management of chemical waste is challenging and a report from Wales considers the issues.

Emergency preparedness issues are again identified as important. Articles cover a wide range of topics including personal protective equipment and the levels of protection offered, lessons from COMAH exercises in the North East Region, the report from the Environment

Agency on the 2004 flooding Exercise Triton, the use of scenarios for training, and the US Toxic Exposure Surveillance System.

Strategic environmental assessment (SEA) offers a very exciting tool for the HPA. SEA allows easier integration with the environmental decision making process and may be a tool to improve the health of the UK population.

As always, education and training remain high on the agenda of CHaPD and developments are reported. Two exciting conferences are advertised and the back page of this Chemical Hazards and Poisons Report provides a summary of some of the courses we are running in 2005. Let us know if you would like us to consider other topics and in other areas outside London.

The next issue of the Chemical Hazards and Poisons Report is planned for December 2005. The deadline for submissions for this issue is November 1st, 2005. Please do not hesitate to contact me about any papers you may wish to submit or if you have any comments on those in this issue, by e-mail on Virginia.Murray@gstt.nhs.uk [Virginia.Murray@hpa.org.uk] or call on 0207 771 5383.

I am very grateful to Professor Gary Coleman for his support in preparing this issue. I thank Dr James Wilson and Amber Groves, at CHaPD (London), for all their help in preparing this issue.

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Recent Chemical Incidents

Should mercury barometers be banned?

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Introduction

We present a chemical incident reported to the Chemical Hazards and Poisons Division illustrating an uncommon source of elemental mercury in the home, and the potential implications of the European Community Strategy concerning mercury.

Incident

In May 2005, CHaPD (London) was contacted with a request for advice on the management of a case of household exposure to elemental mercury following an incident involving a mercury barometer.

A 58 year old woman (case A) attended her local Accident and Emergency Department complaining of headache and chest tightness, and was very anxious about having been exposed to mercury. She had been moving an antique barometer, a family heirloom, and had laid it on its side. A small quantity of mercury, estimated as being about a teaspoonful, leaked out of the instrument contaminating the upholstery and carpet.

The barometer was placed in a plastic bag and removed to the garden shed. As the husband was a builder and he was aware of the status of mercury-containing materials as contaminated waste, he disposed of the carpet and upholstery at an appropriate waste disposal site. The barometer was to be sent for repair.

The case (A) and her 18 year old daughter (case B), who was also exposed, had blood and urine mercury levels measured following

the exposure. The results for case A were elevated above the level considered normal but did not exceed the level interpreted as hazardous. The levels for the daughter, whose exposure was of shorter duration, were below the level considered to be normal. The results are given in the table.

If the appropriate precautions concerning disposal had not been taken, this incident could have resulted in a prolonged exposure to elemental mercury vapour.

Mercury barometers – moving and handling

A barometer is an instrument used to measure air pressure. Observed changes in the barometric pressure can be used to predict changes in the weather. There are two main types of barometers, mercury and aneroid. The mercury barometer, invented by Evangelista Torricelli in 1643, is made by first filling a dish with mercury¹. Mercury is then poured into a glass tube which needs to be at least 760 mm in length. The tube is completely filled with mercury, a finger is placed over the end, and the tube is then inverted and placed into the dish below the level of the mercury. When the finger is removed, the level of the mercury inside the tube drops until the pressure at the bottom of the column of mercury is equal to the pressure exerted by the surrounding air. The height of the mercury column is used to measure the air pressure and the units used are mmHg, or torr, named after Torricelli. Since no air can enter the tube, the empty space above the mercury column is a vacuum² (figure 1).

A variety of designs exist for the glass tubes containing the mercury column. An example of the cistern type is shown in the photograph. A barometer of this design can contain as much as 500 grams of mercury³. Mercury barometers should be handled with care, and guidance on this is given in the box.

Mercury toxicity and disposal

Elemental mercury is slightly volatile at room temperature and is toxic both acutely and chronically by inhalation. Chronic exposure to elemental mercury can result in damage to the central nervous system and kidneys.

Table: Results of biological monitoring following mercury exposure

Case	Urine (nmol/L)	Normal (nmol/L)	Hazardous (nmol/L)
A	87	<50	>500
B	32		
Case	Blood (nmol/L)	Normal (nmol/L)	Hazardous (nmol/L)
A	59	<50	>250
B	30		

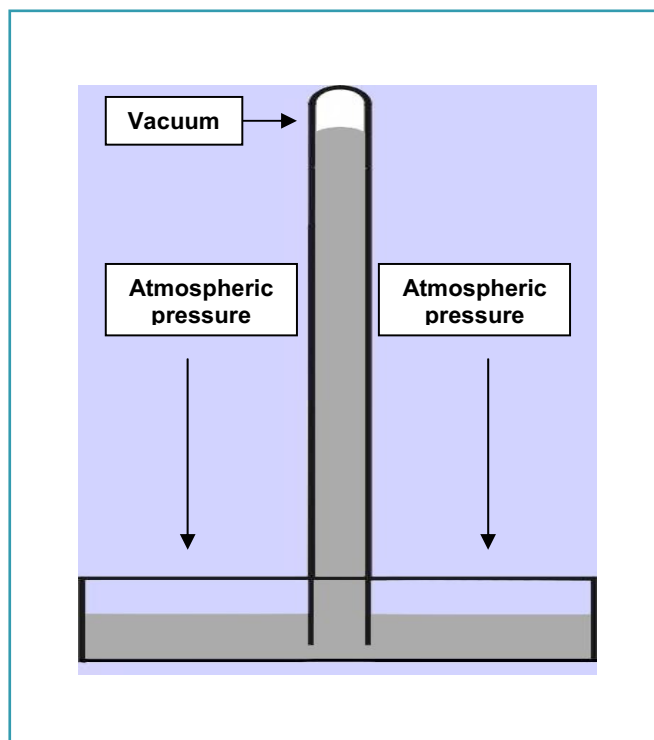


Figure 1: The Torricelli barometer (based on diagrams in Encarta)

In the event of spillages of mercury from barometers, thermometers or other sources, members of the public should seek advice on clean up from their local Environmental Health Officer, insurance company or local Health Protection Unit. In summary, they should be advised:

- not to vacuum, as contaminated vacuum cleaners will be a persistent source of mercury vapour and may require disposal as contaminated waste,
- not to wash potentially contaminated clothes in their clothes washer as this will be a persistent source of vapour and may require disposal as contaminated waste,
- that kitchen gloves should be worn as mercury can be absorbed through the skin and may form amalgams with gold rings,
- that affected areas of carpet and soft furnishings are likely to require professional removal,
- that all contaminated materials should be placed in plastic bags and sealed,
- that specialist waste disposal contractors should be contacted to arrange for safe disposal.

Box: Mercury barometers should be handled very carefully.

If a mercury barometer needs to be moved, it should be tilted slowly to about 45 degrees to get the mercury to fill to the top of the tube. This will create a tapping sound, or may be felt as a knock on the barometer case. The barometer can now be moved safely.

The barometer must never be laid flat³.



Photograph: Mercury 'cistern' type tube for a mercury barometer (Note that with the cork bung in place, this barometer would not read accurately, but would reduce the amount of mercury vapour produced) (Source: Medford Clock Shop³)

Extent of the problem

From April 2004 to June 2005, 28 incidents involving mercury were reported to CHaPD (London). Of these, 19 have involved clinical instruments and materials (thermometers, sphygmomanometers or dental amalgam). This incident involving a barometer illustrates a potential domestic source of elemental mercury. Other similar sources of elemental mercury in the home include mercury thermometers, thermostats and silent wall switches.

In the countries of the European Union in 2003, the demand for mercury was approximately 300 tonnes. The uses included dental amalgam, measuring and control equipment (such as thermometers) and fluorescent lamps (in which the use of mercury increases energy efficiency). Mercury is also used in the manufacture of chlorine and caustic soda, but this is in the process of being phased out⁴. Figure 2 illustrates EU mercury consumption in 2003 by use. At a level of 26 tonnes for measuring instruments, the proportion of mercury consumption in the EU for this purpose in 2003 was 9%⁴.

Apart from barometers, mercury has traditionally been used in a variety of measuring instruments and control equipment. The most commonly encountered instruments are thermometers, sphygmomanometers and manometers. From a risk management perspective it is appropriate to distinguish between measuring instruments for consumer and professional uses. While the mercury content of professional instruments can be quite high, the numbers are limited and the equipment is typically used in systems with well-established control procedures on safety in the workplace and management of dangerous waste. In contrast it has proved extremely difficult to keep used measuring instruments from consumer uses out of the waste stream, and some EU states (Netherlands and France) have reported that mercury from domestic products is the main source of mercury in surface waters⁵.

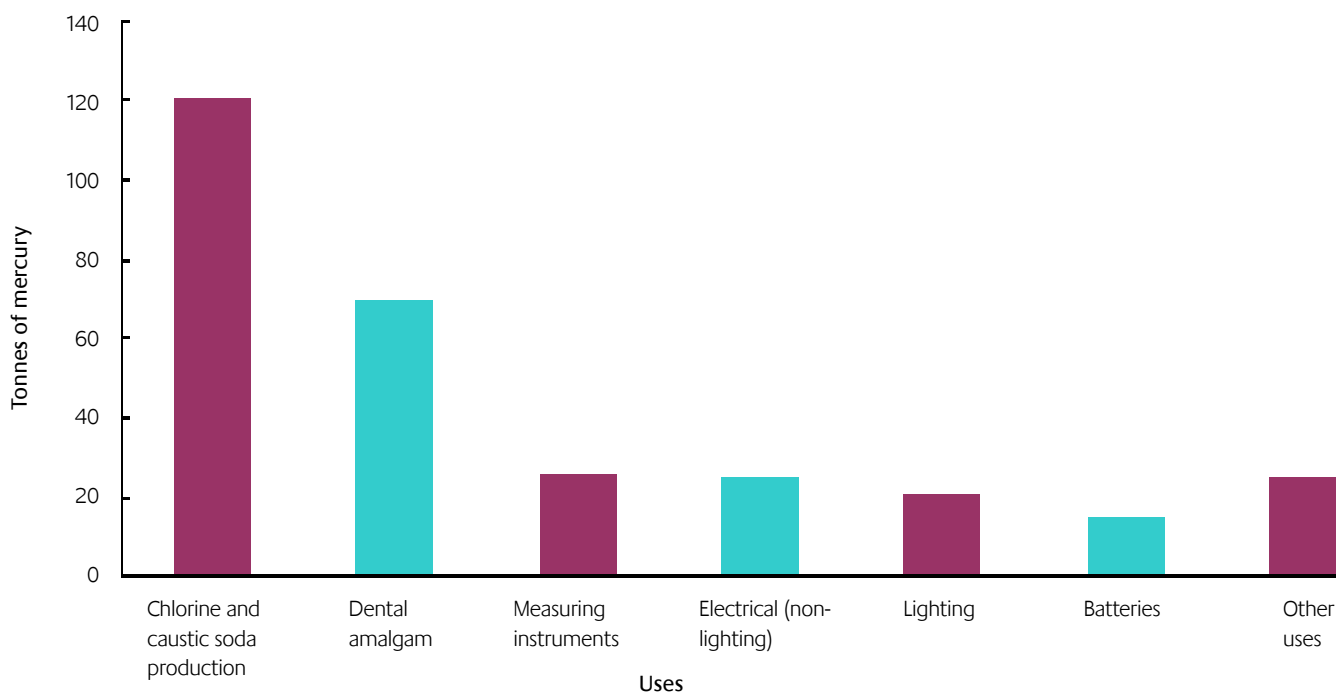


Figure 2: EU mercury consumption in 2003

European mercury strategy

The Commission of the European Communities produced a mercury strategy in January 2005⁶. This has the following objectives, which we have highlighted for the purpose of this paper illustrating the parts of particular relevance to public health in *italics*:

- reducing mercury emissions,
- reducing the entry into circulation of mercury in society by cutting supply and demand,
- resolving the long-term fate of mercury surpluses and *societal reservoirs (in products still in use or in storage)*,
- *protecting against mercury exposure*,
- improving understanding of the mercury problem and its solutions,
- supporting and promoting international action on mercury.

In relation to protection against mercury exposure, the European Parliament Directive on the restrictions of the use of certain hazardous substances in electrical and electronic equipment (RoHS) (2002/95/EC) does not cover the use of mercury in thermometers, sphygmomanometers or barometers, which use substantial quantities of mercury, since they are not designated as electrical or electronic equipment⁶. However, action 7 of the European Community Strategy concerning mercury is '*...to propose in 2005 an amendment to Directive 76/769/EEC to restrict the marketing for consumer use and healthcare of non-electrical or electronic measuring and control equipment containing mercury*'⁷.

Conclusion

Even if there were to be an outright ban on the sale of all types of mercury barometers, there will still remain some antiques and family heirlooms in people's homes acting as a potential source of exposure to the toxic effects of elemental mercury. Removing the mercury from these instruments should not alter the value of these antique instruments. At the very least, advice on the appropriate moving and handling of mercury barometers should be publicised to reduce the risk of similar incidents.

CHaPD (London) considers that a reduction in the use of mercury-containing instruments in households will lead to a reduction in the risk of mercury spills in such environments. Therefore the authors support the proposed European mercury strategy to improve public health protection, and indicate a need to emphasise the uncommon but dangerous sources of mercury intoxication in the home.

References

- 1 http://en.wikipedia.org/wiki/Evangelista_Torricelli (accessed 28/07/05)
- 2 <http://images.encarta.msn.com/xrefmedia/aencmed/targets/illus/ist> (accessed 28/07/05)
- 3 <http://www.medfordclock.com/bfaq.html#7> (accessed 05/07/05)
- 4 http://europa.eu.int/comm/environment/chemicals/mercury/pdf/q_a_mercury.pdf (accessed 29/07/05)
- 5 Commission of the European Communities: Memo 05/30, 31 January 2005 Questions and Answers on the Mercury Strategy <http://www.europa.eu.int/comm/environment/chemicals/mercury/index.htm> (accessed 06/07/05)
- 6 Commission of the European Communities. Communication from the Commission to the Council and the European Parliament: Community Strategy Concerning Mercury {SEC(2005) 101}
- 7 Commission of the European Communities. Commission Staff Working Paper: Annex to the Communication from the Commission to the Council and the European Parliament on Community Strategy Concerning Mercury Extended Impact Assessment, Section 7 {COM(2005)20 final} http://europa.eu.int/comm/environment/chemicals/mercury/pdf/extended_impact_assessment.pdf (accessed 06/07/05)

Investigation into an unspecified illness in school children

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Introduction

On Monday 18th April 2005, a pupil presented to her classroom teacher with a rash. It had occurred since coming to school, it was burning and red and affected her arms. No one else reported the same. However, on Wednesday 20th April a further 17 new rashes were identified, of which 3 were in members of staff. By 5th May, 33 staff and pupils had reported symptoms of the rash. The figure details the onset of cases against date.

The rash was not accompanied by fever or any systemic symptoms, it was self-limiting and occurrence seemed coincident with time at school. The pattern of symptoms reported was of burning, sore skin with small itchy 'blisters', usually on the arms and legs. One child had two episodes

of the rash, with remission coinciding with absence from school over a bank holiday weekend. Only one child had a rash on her face.

The classroom distribution of the rash identified that one form had the most affected children, and that, apart from the nursery, all seven forms had had a case (table 1).

No other schools in the area were affected.

Table 1: Class distribution of affected pupils

Class	Number of pupils
Nursery	0
Reception	1
Form 1	4
Form 2	1
Form 3	5
Form 4	3
Form 5	9
Form 6	1

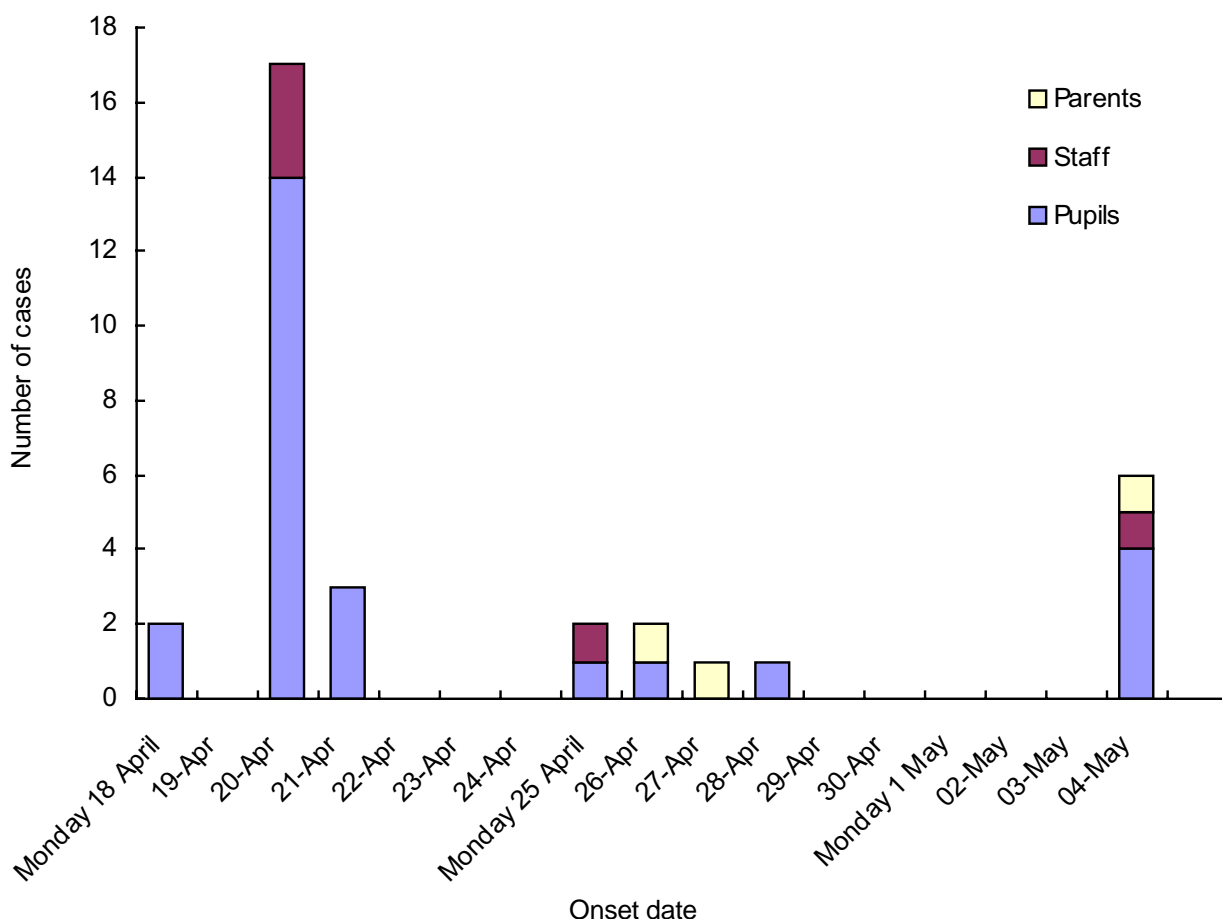


Figure: Occurrence of the rash against date of occurrence

Table 2: Possible causative factors considered on the site visit on 22nd April 2005

Caterpillars	None found
New plants	None
Cleaning products	No new products, contract cleaner service used that also serves other local schools
Laundry on site	Only in the nursery – no cases connected with the nursery
Food and drink	No change
Animals	One gerbil, located in the nursery
Location within the school	Children affected played in different parts of the playground Classrooms at opposite ends of the school
Additional activities	No recent school trips
Other	No complaints about water quality, reports of 'pickled onion' smell from the kitchen on Wednesday 20th April, none since
Building work	Involved partition walls. Water-based paint was used, no solvents. Isowool was used as a sound attenuator

Clinical diagnosis

Several GP consultations were reported, each diagnosis describing different aspects of the rash. Two children presented to St George's Hospital, although only one had clinical signs. It was felt that due to the transient nature of the rash and the lack of prodromal and systemic features, it was unlikely that this rash had an infectious origin. The Health Protection Unit sought a medical opinion from a local consultant dermatologist, who suggested that it was consistent with an airborne contact dermatitis, possibly following exposure to caterpillars or plant antigens. One child had reported seeing caterpillars at the school. The consensus was that an environmental antigen was responsible.

Health protection investigation

The local HPU team visited the school on Friday 22nd April and Wednesday 3rd May. The CCDC described the rash as consistent with a history of exposure to an allergen, but not due to infection or bites. Possible causes of the rash were sought, with the key factor being any change, or new occurrence, that would have coincided with the onset of the rash. A search was carried out and covered the areas given in table 2.

Involvement of CHaPD

The HPU asked CHaPD (London) to undertake a joint site visit to the primary school. The site visit principally followed up on the environmental investigation that the HPU had initially undertaken (see table 3). The primary school is in an urban area, surrounded by houses. The school playground is mainly hard tarmac with a small area consisting of grass and trees. A tour of the school and its grounds was undertaken with both the headteacher and the school caretaker. After careful review it was concluded that the likely cause was the material used during the building works (see photograph and box).

Discussion

Rashes are common occurrences in children, and are often transitory; illness outbreaks are common in schools and the source is not always identified. Despite the evidence that sociogenic illness outbreaks are a feature of school outbreaks, occurrences of the type of rash that appears related to attendance at school require early



Photograph: Isowool
© Chemical Hazards and Poisons Division, London

Box: Isowool

Isowool is a glass mineral wool used for thermal and acoustic insulation. It is manufactured primarily from silica sand which is heated to melting point at 1100°C and is then spun into woolly filaments in a process similar to spinning candy floss from molten sugar. Isowool is available in a number of forms, including rigid pre-formed slabs and rolls which are cut to size on site.

Work on the site described here was carried out using rolls of Isowool which were cut to size. It is thought that this may have generated Isowool dust which then travelled around the school premises, significantly increasing the potential for contact with children and staff.

In common with other mineral and glass wools, Isowool is classified as a mechanical irritant (European Directives 67/548/EEC and 97/69/EC). It is known to cause eye irritation and contact dermatitis in sensitised individuals (Jolanki et al, 2002).

Table 3: Findings of the joint site visit on 3rd May

Caterpillars	Previous infestation five years ago	No evidence of recent infestation No leaf damage on trees
School cleaning	A list of all cleaning products was taken and checked for irritant effects	No reports of ill-health from the cleaners All products used across several schools in the area No complaints from any other school
Plant antigens and irritants	Of the plants found, four were possible irritants: Daffodils (<i>Amaryllidaceae</i>) – contain calcium oxalate in leaves, stems and bulbs Euphosbia sp (<i>Euphorbiaceae</i>) – some species contain phorbol esters/latex Common ivy (<i>Hedera helix</i>) – Tritpenoid saponins and polyacetylene in sap can cause itchiness, redness and blisters Stinging nettles (<i>Urticaria dioica</i>)	Plants undamaged In an area not used by the children, plants not damaged Plants not damaged Only two plants seen. Not in an area used by the children
School classrooms: physical education, art and craft, computer room	Normal products, no new ones being used Computer room air-conditioned, and equipment recently serviced	Nothing as obvious irritant Limited time spent by pupils in communal areas
Building works	Commenced 11th April and continuing Use of Isowool started one week prior to onset of itching, work using Isowool now finished Isowool is a known irritant	Occurring in the main entrance of the school so all staff, pupils and visitors potentially exposed Potentially tracked throughout the premises
General comments	The school was very dusty throughout	

public health intervention and a site visit. The presence of the HPU at the onset, the good relationship that the team built up with the headteacher, and the subsequent joint visit by the HPU and CHaPD (London) ensured that the staff and therefore the pupils and parents felt supported and, importantly, taken seriously. Consequently, the remediation action recommended by the teams was taken seriously by the headteacher.

Conclusion

Site visits are essential for the elucidation of the likely role that environmental factors have in outbreaks, especially within school populations. In this incident the site visit enabled the identification of the most likely source of the rash as exposure to the Isowool during the building works that was tracked through the school from the main entrance. Trimming of the wool sheets on site is considered to have resulted in the release of airborne fibres. It was recommended that no further building works using Isowool be undertaken in term time and that a thorough deep clean of the school be undertaken to ensure removal of all the fibres. No further outbreaks of rashes were reported by the school to the HPU.

Early site visits are essential to establish facts, possibly remove the source of the exposure and to prevent further morbidity, therefore forming an essential part of public health protection.

Reference

Jolanki R, Makinen I, Suuronen K, Alanko K and Estlander T (2002). Occupational irritant contact dermatitis from synthetic mineral fibres according to Finnish statistics. *Contact Dermatitis* 47(6):329-33

Rashes at a school – incident or outbreak?

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The Incident

A GP phoned the CCDC at Surrey Health Protection Unit at midday on 20th March 2005 to report that four children from the same class, at the same primary school, had attended her surgery that morning with rashes. The GP had learnt that there were other children at the school with similar rashes. She wished to report the outbreak and to discuss diagnosis and management.

The school had not reported any outbreaks to the Health Protection Unit, but cases of both measles and Parvovirus were current in the area at that time. The CCDC said that it was an epidemic year for Parvovirus, but that she would first ascertain the facts from the school before advising on management. The GP said that the rash had the appearance of slapped cheeks and that she would take photos of the children. She had already taken throat swabs from the four children as she was intrigued by this apparent 'outbreak'. The Consultant Microbiologist at the local Trust was phoned and informed of the 'outbreak'. It was agreed that although there were other possible causes, she would carry out viral studies.

The CCDC was unable to contact the school at first, as the telephone was constantly engaged, but eventually managed to speak with the deputy headmistress who informed her that 20 out of 24 children from the same class, who had all been well when they arrived at the school in the morning, had developed rashes and become unwell. The first child had become unwell at 9.30 am, shortly after Assembly and the others become ill soon afterwards. A second wave of children, from three other classes, and one member of staff had developed rashes between 10.15 and 10.30 am. These children had all been well on arrival at school that morning. The CCDC arranged to visit the school as soon as possible.

When the CCDC arrived at the primary school, it was learnt that other children from assorted classes had developed rashes at around midday. All the children with rashes had reported feeling unwell. The majority complained of having headaches and nausea and some had vomited. The rashes were behind the ears, and on the cheeks, chin and neck. The rashes were itchy and the children's ears stung. Those who had first developed the rash on their faces had later developed rashes on the tops of the arms and backs.

Most of the first wave of children were recovering by midday and were cheerful and alert, despite a strong smell of vomitus which permeated the corridors. Their rashes were fading, but consisted of erythematous macules with a tendency to confluence, mainly on the faces but also on other exposed skin, such as the arms and the knees. One child, whose rash had been severe, still had red, sore eyes. There were approximately 50 children, from several classes, affected by the end of the lunch break, but there were no cases of illness or rashes at the adjoining infants' school where there were many siblings of children attending the primary school.

After the lunch break, the CCDC toured the school and playground and took a detailed history from the headmistress and the construction workers who were engaged on building an extension which was on the edge of the school playground and immediately adjacent to the class that formed part of the second wave of rashes, which was in turn adjacent to the first class to be affected. She learnt that the construction workers were installing glass fibre wool in the roof of the extension. The extension formed a tunnel which was open to the elements at both ends. The workers swept through at the end of each day, in the direction of the playground. There had been rain each day with the exception of the day before the outbreak of rashes, when it had been a fine day. The CCDC also spoke to people in the houses surrounding the school, but there were no reports of illness or rashes. The Health and Safety Executive (HSE) was contacted and asked to take samples at the school.

Incident meeting

An incident meeting was held at the school on the second day after the incident by the CCDC and was attended by representatives of the school, CHaPD (London), the HSE, the local Trust's Department of Microbiology, and the County Department of Education. The school had been closed temporarily to allow thorough cleaning of the premises as it was thought likely that the rashes had an environmental cause rather than an infectious one.

It transpired that there had been further cases on the day of the incident meeting near the extension, and that the windows had been open, because of the fine weather. These children had been away on a school outing on the day of the outbreak and had all been well when they were dropped at the school car park that evening. However, a few had developed rashes that night which became worse when they reached school. There were still no cases at the infants' school or in the surrounding houses. In one family who lived next door to the school, the only one of three who had developed a rash was the one who attended the primary school.

There had been no spraying of the land around the school and the playing field. The extension had been painted with an exterior paint on the day of the outbreak and there had been a chemical smell in the class which had caused windows to be closed. The grass had also been mowed on that day but had not been treated with anything.

Preliminary results from the air and classroom dust samples were already available and showed no traces of glass fibre. Final results and results of water samples would not be available for a few days. No samples had been taken from the playground. A roll call of the 230 pupils, 4 part-time and 10 full-time teachers and 25 dinner ladies and helpers had been taken. Two cleaners and the caretaker, 96% of year 4, 70% of year 6, 30% of year 5 and both teachers in year 4 had developed rashes. The cleaners and the caretaker developed rashes on the day after the main outbreak. One of the cleaners had a faint rash on her stomach. The headmistress informed the incident committee that years 3 and 4, and 5 and 6, play together in rotas during school breaks. One classroom was empty on the day of the outbreak and children in this class were only affected the following day. There had only been five new cases on the day of the incident meeting. No parents or siblings who did not

attend the school had developed rashes. The rash reportedly felt hot and burning and was made worse by cold water. The three classes most affected were all down the side of the building near the extension, but one class was at the other side of the building. However, some children move between classes.

The grass had been mown on the day of the outbreak and subsequent day for the first time in three months and a column of dust had been produced at the temporary road by the extension, so that cutting had to be stopped. This road was made of crushed concrete.

Temporary huts had been removed two or three weeks before and there had been some asbestos, type unknown, in the huts. The builders had also produced a great deal of dust when working on pipes surrounding the extension. The dust had been swept up and put in a skip, but this had been removed before the incident. The glass fibre wool had last been used in the extension three days before the outbreak and the floor of the extension swept on the night before the outbreak and two subsequent nights.

The Education Department representative said there had been a similar occurrence in another school a couple of years previously, but no cause had been found. Although the water tanks had been condemned three years before, it was thought that some substance in the dust, most likely the glass fibre wool, or else the crushed concrete, might have caused the irritating rash. It was decided to test samples from the wet vacuum cleaner and the playground and to check if there was a contaminated batch of glass fibre wool. Throat swabs taken by the GP were cultured.

Results of investigation

Samples from the playground included a grey powder like sand which contained glass wool fibres. Samples from the skirting board in one room where people had been affected also contained glass wool fibres. No pathogens were identified in the throat swab.

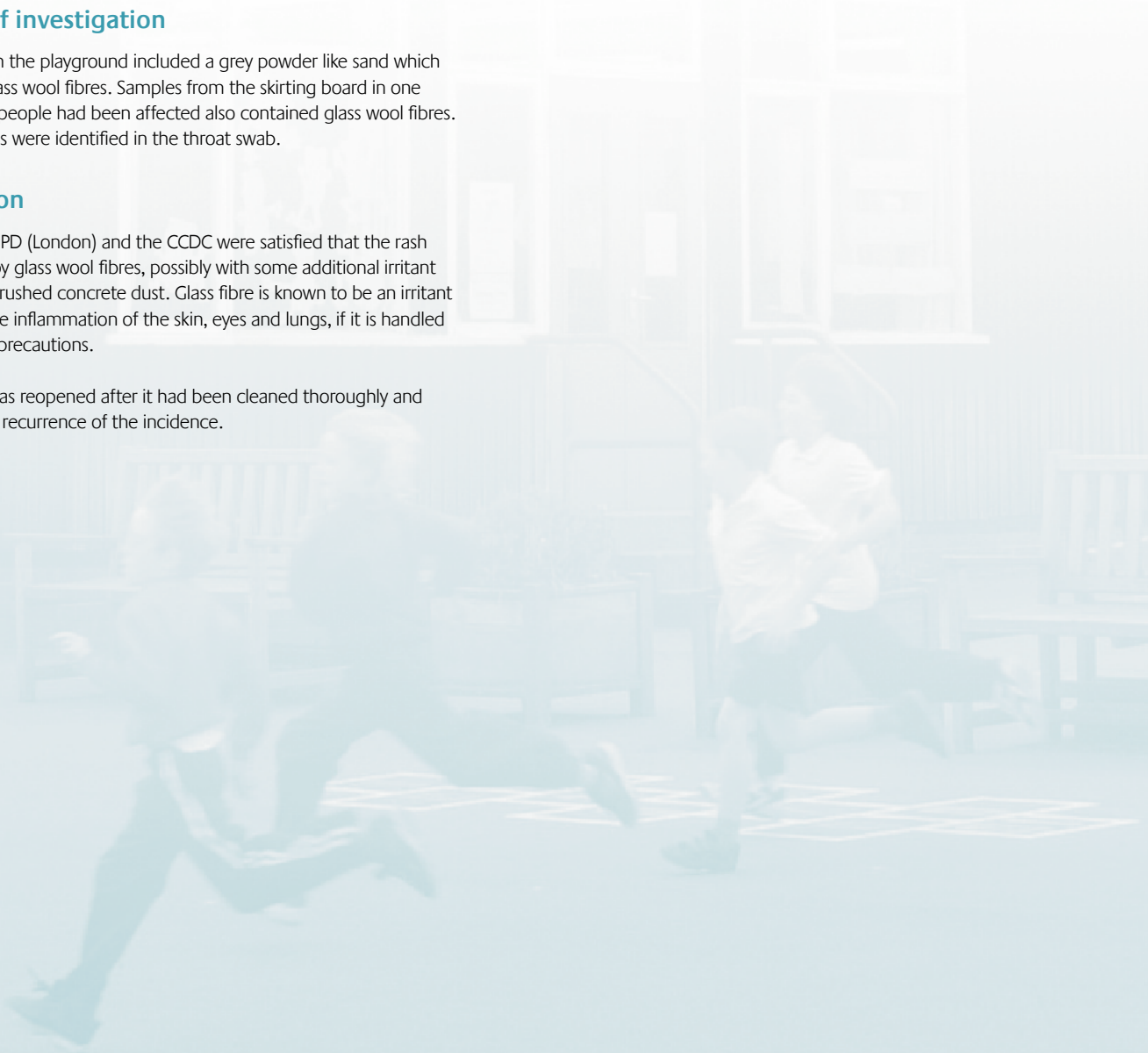
Conclusion

The HSE, CHaPD (London) and the CCDC were satisfied that the rash was caused by glass wool fibres, possibly with some additional irritant effect from crushed concrete dust. Glass fibre is known to be an irritant and can cause inflammation of the skin, eyes and lungs, if it is handled without due precautions.

The school was reopened after it had been cleaned thoroughly and there was no recurrence of the incidence.

Lessons learned or reinforced

- 1 An 'outbreak' may on investigation be a chemical 'incident' – a good differential diagnostic approach is vital in effective public health protection.
- 2 A site visit is essential and a map or diagram of the site is helpful.
- 3 A detailed history from people with different roles within the incident site and surroundings is important.
- 4 An incident meeting attended by all the key players, as soon as is practicable, ensures optimal collaboration.
- 5 Clarification and delegation of responsibilities needs to be established at an early stage.
- 6 Communications with parents need to be frequent and a contact address or phone number ensures that the Unit is kept informed of all new information and rumours.



Another ‘Great Fire of London’, 14th July 2005

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North West London Health Protection Unit

Incident summary

On **Thursday 14th July, at 12.45**, a large fire was reported at or near the Wembley Stadium complex. The London Ambulance Service (LAS) stated that the fire was at an industrial site in South Way, Wembley, and the Senior LAS Officer at the scene was requesting technical information from the Health Protection Agency (HPA). The LAS Officer confirmed the location of the incident and that the fire was now graded as a 20 appliance fire, the system used by the fire service to categorise the size of fire and to request the increase of resources. On each appliance there are 6 fire professionals, therefore at least 120 were on scene.

At the scene there was concern as to the contents of the industrial site. It was reported to be a company that produced video tapes and compact discs, therefore many plastics were likely to be involved in the fire. Within this building there were reported to be containers of nickel sulphamide and issues were raised as to the possible effects of this being involved in the fire. The LAS Officer requested the presence of an HPA representative at the scene to take part in the Silver Co-ordinating Meetings, the next of which was at 14.00.

At **13.00** the large plume of smoke was visible across London (photograph 1). The North West London Health Protection Unit (HPU), which is situated a few streets away from the fire (photograph 2), was alerted and as the on-call HEPA was some distance away, sent a CCDCC to the 14.00 Silver Co-ordinating Meeting. Support was also requested from the Chemical Hazards and Poisons Division, London (CHaPD, London) to alert them of the incident and for advice regarding the fire, specifically the likely products of combustion associated with a fire involving plastics and nickel sulphamide.



Photograph 1: Plume of smoke from the fire © Carl Davey

At the 14.00 Silver Co-ordinating Meeting the CCDC and the LAS Officer were concerned as to the effect that the large thick plume of smoke could have on the health of the general public.

By 14.30 the fire service increased its resources on the scene, with up to 40 fire appliances in attendance.

Following the 14.00 meeting, information was received from the National Poisons Information Service, London, via CHaPD (London), that two patients had presented to St Mary's Hospital A&E with smoke inhalation, having passed through the plume on an underground train travelling on the overground part of its route.

At 15.30 the next Silver Co-ordinating Meeting was convened with the fire service, police, ambulance service, the HPU, the HEPA representing HPA London Region, the local authority, transport agencies and the Environment Agency. The fire service confirmed the attendance of 35 fire appliances and that the nickel sulphamide had not been involved and that the fire was being contained. However, the fact that two patients had presented with smoke inhalation from the passing railway line resulted in HPA London Region recommending that train services be suspended on the railway line in the vicinity of the plume. The main line trains had already been stopped due to the possibility of a wall collapsing adjacent to the line. It was reported that the Environment Agency would provide bowsers to remove run off water from the surface drains as there was concern over the potential for the run off to contaminate the wider environment.

Immediately following the 15.30 meeting, the fire service CCTV system was used to provide a closer view of the scene. The smoke plume was still thick at this time and was now close to the ground. Although the majority of downwind land was made up of commercial properties, some evacuation had already been commenced. As these properties were non-residential, no rest centre was required.

At 16.05 CHaPD (London) reported that a consultant from a local hospital had received a fire-fighter from the site of the Wembley fire earlier in the day suffering from heat exhaustion and that the A&E had received information that the fire-fighter might have inhaled fumes from a fire involving nickel sulphamide. The Fire Brigade Commander stated that nickel sulphamide had not been involved and this information was passed directly to the consultant at the scene.

At 16.35 the LAS Officer reported to the HPA team at the scene that they had received a call in the local area from a woman complaining of her skin burning. Having examined a map it was discovered that the woman was upwind of the incident, and in discussion with CHaPD (London) it was considered that her symptoms were not likely to have been caused by the Wembley fire.

At 16.51 the Police called an extraordinary Silver Co-ordinating Meeting to gain advice from the HPA with regards to a large number of people now standing at the underground station awaiting the next train following the lift of the suspension. The concern was that some 40 people were now standing directly in the path of the plume. Discussion took place regarding the safety of these people and the need to move them out of the area quickly but neither the police nor the transport agencies had sufficient resources immediately available to remove the people from the hazard. With this in mind, it was decided to reinstate the Metropolitan line to move these people out of danger.

As the weather cooled, the plume sank lower over the local area. Through dialogue with CHaPD (London), there was a discussion at the Silver Co-ordinating Meeting as to the fact that as the fire began to subside it would burn at a lower temperature and therefore may generate more toxic products. The evacuation area and exclusion



Photograph 2: Fire seen from the window of the Health Protection Unit © North West London HPU

zone was re-examined and the decisions made were considered to be appropriate in light of this information.

At 17.15 reports came in that a chemical smell had been noticed where the Environment Agency bowsers were pumping water from the drains. Both the Environment Agency and the HPA went to the location and could not detect anything other than the normal smell of drains. However, to minimise any risk, an exclusion area was established round the open manhole.

At 17.30 the next Silver Co-ordinating Meeting took place where the fire service reported that the fire was under control, that the water supply good and that they were reducing their attendance to ten fire appliances. By this time the plume had reduced considerably and was no longer clinging to the ground.

At 18.30 the risk to the health of the population was considered to have been reduced considerably and further HPA advice could be given over the phone if required.

From reviewing data over the last ten years, this was one of the biggest fires that has occurred in London in that time.

Lessons learned

By participating in the Silver Co-ordinating Meeting, the HPA presence provided effective, immediate advice to the emergency responders as the situation changed. It was evident that HPA attendance at the scene proved to be invaluable to all the emergency services, local authority and other services.

Continuous information sharing and generation of advice to minimise harm to the health of the population had taken place. Collaboration between the Health Protection Agency (including CHaPD (London), the North West London Health Protection Unit, Health Emergency Planning Advisers, HPA Communications Manager and HPA Regional Office) and Brent Primary Care Trust, ensured that an effective and cohesive response was given to the incident.

Report of a fire in a disused chemical factory

Dr Corry van den Bosch, Surrey Health Protection Unit

Tim Pashen, Principal Environmental Health Officer (now Head of Environmental Services), Surrey Heath Borough Council

Incident summary

On 19th August 2003 at 22.32 hours, Surrey Heath Borough Council Duty Environmental Health Officer (EHO) was called out to a fire by Surrey Fire and Rescue, who had contacted him through the Borough Call Centre. The fire was in a disused double storey chemical factory, 40 by 48 metres on the edge of Chobham Common and was surrounded by the Common, allotments and some residences set in heathland. The EHO arrived at the scene at 00.10 hours, by which time an incident control unit had been established. The EHO met police at the access road and, after showing his identification, was escorted to the incident control unit vehicle which was parked on the leeward side of the fire.

The fire was intense and the whole of the double storey building was ablaze. There was a heavy plume of grey smoke which was ascending almost straight up, as the night was still, and then drifting towards Chobham Common, away from the houses. The EHO inspected the fire and then contributed to an incident meeting. A CHEMET had been requested from the Met Office and was available for inspection (see the figure and box).

The incident meeting considered the necessity of evacuation and decided that it was not warranted as the plume was drifting away from the houses but residents were advised to close their windows. Then the HazMat Officer from the fire service came from the fire and advised the EHO that a transformer might have exploded and that there could be polychlorinated biphenyls (PCBs) in the plume and that there was definite asbestos contamination. He also said that oil coolants had been used in the factory. The Environment Agency had already been called as there was concern about the effect of the large volumes of water used to control the fire on the water course. Inspection of the fire was carried out at intervals by fire-fighters with breathing apparatus. A decision was made to contain the fire, i.e. to douse the fire and let it burn itself out, rather than enter the building and extinguish the fire.

The EHO left the fire at 01.10 hours and soon afterwards had calls from the Food Standards Agency who wanted to know if there was any agriculture in the area. The EHO mentioned that there were only

Box: CHEMET Area At Risk Plume

The CHEMET Area at Risk Plume is produced on a GIS mapping system. This uses a simple atmospheric dispersion model which takes mainly just wind speed and direction into account. The hatched area in the centre of the plume is where up to 70% of the dispersant is most likely to go. The outer envelope is where up to 95% is most likely. Therefore, there remains a risk of dispersant outside the plume including, particularly in light winds, areas upwind of the site. Fire, police and emergency planning officers are encouraged to request a CHEMET. Emarc, the Environment Monitoring and Response Centre, part of the Met Office, is manned 24 hours every day of the year.

allotments in the vicinity of the fire, but that asbestos, PCBs and products of oil combustion would be in the plume. The EHO was then called by the public health doctor on call who asked for information about the fire. The public health doctor on call had been alerted by the Chemical Hazards and Poisons Division (London) who had been informed of the fire (CHaPD had received a copy of the CHEMET).

The public health doctor on call informed the CCDC about the fire the next day and phoned the EHO at 11.10 hours. The CCDC asked whether the fire plume could have contaminated the allotments or residences and what sampling would be done. The CCDC obtained the incident numbers from both the police and the fire service and established that the police were the lead authority as there was the possibility of arson. In addition, there was concern that there could be bodies inside the building which was used by vagrants on occasion. The police secured the site for several days until their investigations had been completed.

The CCDC met with an EHO team at the site. It was difficult to identify who was the owner of the building, as it was in the process of changing hands, but eventually the owners were identified and visited the site. The EHOs were able to establish from the Council's records that the building had not been used as a factory for ten years. However, it was not known whether it was empty. The owners of the building said that the building was thought to have been cleared of asbestos. At one stage it had since been used as an office. However, there was still a tank of diesel on the site which had originally been used for metal-plating so that there could have been traces of metals on the shop floor. Building Control Officers from the local authority had visited to assess the stability of the structure. It was decided that parts of the building needed to be cleared with bulldozers while the fire service kept the building doused so that asbestos dispersal was minimised.

The environs of the fire were inspected. It was not possible to inspect the site itself while the fire was still smouldering. The Council instructed consultants to collect samples of dust and debris (including insulation and thermoplastic products) for asbestos identification from the allotments, window sills, gutters and gardens which had been identified as being at risk from the CHEMET and also at sites about 200 metres from the fire which were not thought to be at risk. Ash from the fire was found in one of the allotments and on some window sills. The EHOs collected soil and vegetation samples from the allotments for the presence of PCBs. The consultants carried out the asbestos identification but could not test for PCBs. This was carried out at another specialist laboratory in Slough. The new owners of the building instructed their own asbestos consultants to deal with asbestos contamination within the building. The samples were tested for asbestos immediately and, on a less urgent basis, for PCBs. It was hoped that the results of the asbestos tests would be ready before the weekend (August bank holiday).

The following day a report was received of a piece of debris in a swimming pool in an area which did not lie under the path of the original CHEMET, suggesting that the direction of the wind had changed slightly during the course of the fire. This piece of debris was found to contain asbestos. It had a smooth irregular edge, suggesting that it was a piece of asbestos remaining after the clearance. As a precaution, further samples were taken from this house and other houses in the area for asbestos and PCBs.

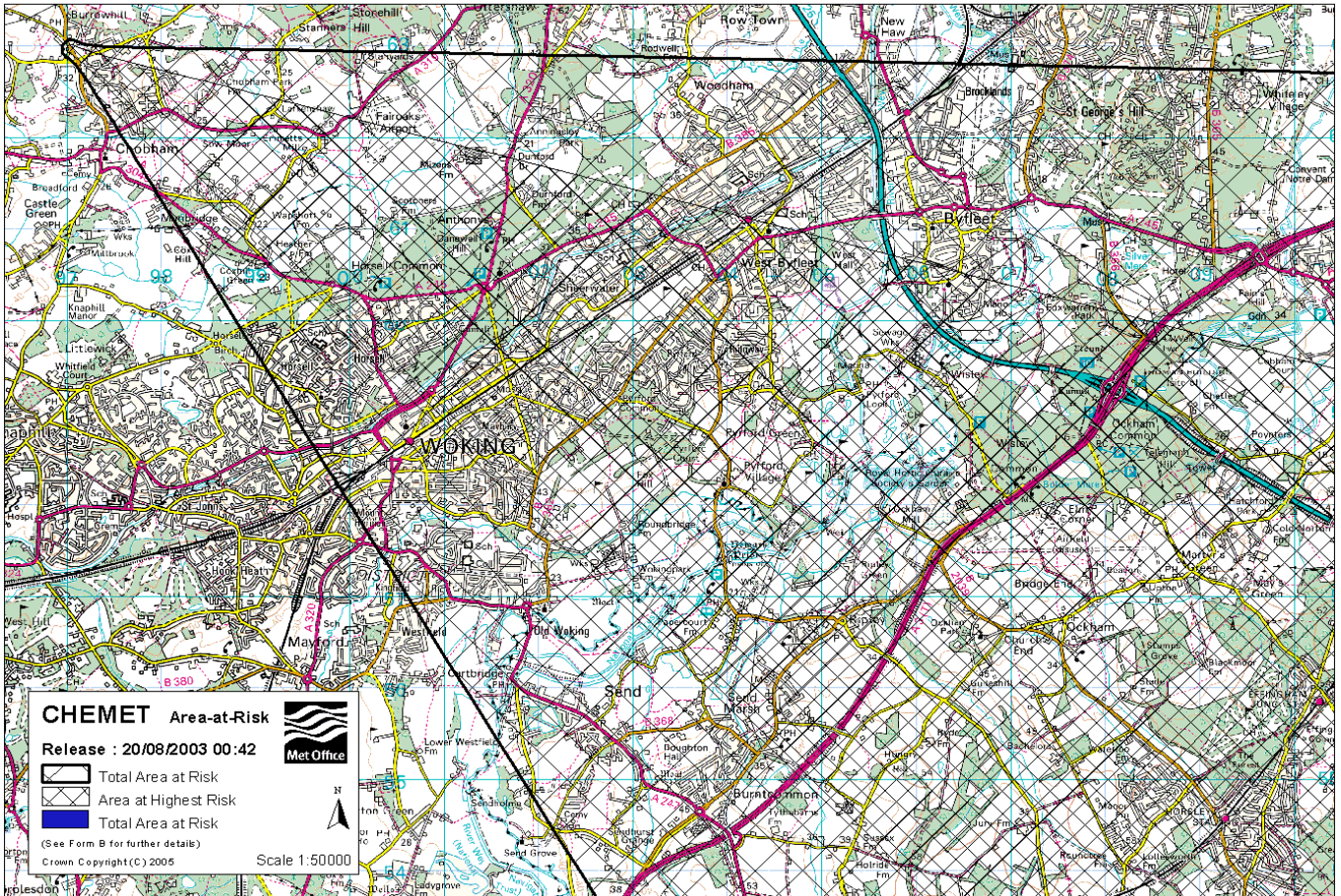


Figure: CHEMET plume of fire on 19th August 2003 at 22.32 hours © Crown Copyright 2005

The test results were all negative for asbestos with the exception of chrysotile asbestos in one piece of insulation material found in a back garden. PCBs were within acceptable limits in all samples.

A letter for nearby residents, containing public health advice, was drafted by the CCDC in conjunction with the EHOs, after consultation with CHaPD (London). The CHaPD non-domestic fire checklist was consulted to confirm that all aspects of the fire had been dealt with. The letter advised residents not to eat any produce from gardens or allotments, not to cut the lawns and not to allow pets or small children into the gardens, until further notice as the results of some tests were still pending. The letter contained a number to phone if any debris was found and also the number of the Surrey Health Protection Unit and NHS Direct in case further information was required. These letters were delivered by hand by the EHOs before the onset of the holiday. Notices were also sent to the Surrey Wildlife Trust to post on Chobham Common warning the public not to eat any fruits, nuts or mushrooms found there. A question and answer information sheet was drawn up by the CCDC and issued to NHS Direct who were asked to refer any queries not covered by the information sheet to the Surrey HPU. A draft press release was agreed between the Local Authority (LA) and the Surrey HPU with the LA to be the lead for any queries about the fire, directing any health matters to the HPU.

A second letter was sent to all residents on 27th August updating them of the results of test so far and advising them that it was still important to wash all vegetables and not to cut the lawns.

On 8th September, the surveyor of the building was finally contacted and was able to confirm that the offices, workshop and storage areas were all empty at the time of the survey. An incident meeting was held on 12th September 2003. The evidence was reviewed, in particular, the matter of asbestos contamination, the CHEMETs and the sampling distribution were examined. It was decided that the piece of debris was

an isolated piece remaining after the clearance which had been carried into the garden by the transformer exploding.

A letter lifting all restrictions was sent out to all residents on 12th September after the incident meeting had decided that all necessary actions had been carried out, that there was no danger to health and that the incident could be closed.

Lessons learned

- 1 The importance of an efficient out-of-hours service.
- 2 A copy of CHaPD non-domestic fire checklist (<http://www.hpa.org.uk/chemicals/checklists/fire.pdf>) to be kept in Duty EHO's bag. This list is very useful for focusing the mind when called from sleep to immediately assess advisability of evacuation of local residents. This was the second night fire in six months where evacuation had to be considered. All EHOs were given a copy of this checklist.
- 3 The importance of local knowledge. In this case it was known at an early stage that there was no need to consult the Council records and/or call an emergency Council meeting which would have caused some delay.
- 4 If it had been possible to identify the owners of the building with certainty, the Council would have requested them to carry out an assessment of the existence of hazardous materials on the site, rather than arranging for the sampling itself. Had been large amounts of asbestos on the site it would have been the legal responsibility of the factory owners to clear all the asbestos and the Council could have required them to do this wherever it could be shown that asbestos fallout was associated with the fire. A notice would then be served on the owners and if they had failed to do this, the Council would carry out the clean-up and reclaim the money from the owner afterwards.
- 5 The necessity of knowing the incident numbers of the different services so that regular updates can be obtained.

'White' powder: is it a cause for alarm?

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Dr Anita Roche,
SPR in Public Health, on secondment to CHaPD (London)

Incident summary

A patient presented to the Accident and Emergency Department of Fairfield Hospital in Greater Manchester at 01.00 hours in July 2005. He was complaining of vague symptoms of numbness in his legs and headache, but no other information was provided by the patient.

Having been in the A&E department for approximately 45 minutes, the patient gave a history of spending the evening clearing the house of his girlfriend, who had been found dead at home the week before. Whilst there, he found a tin containing an unknown white powder, which he opened and tasted. His symptoms of numbness and headache developed a few hours after this and he became concerned and attended A&E. He claimed not to know what the substance was and at that point produced the container of white powder to show a member of the nursing staff.

The nurse inspected the container and became contaminated with powder on both her fingers and her face (after inadvertently touching her nose). The nurse then developed symptoms of numbness in her hand and felt generally unwell. At this point there was concern about the presence of the unknown substance in the A&E department, the symptomatic patient and the contamination of staff with subsequent development of symptoms. Senior staff members were alerted and the police and fire service were called.

Initial police inspection was unable to identify the white powder. Shortly after 03.00 hours the hospital decided to instigate its major incident procedure. The A&E department was closed and designated a contaminated area, with all staff and patients to remain there. A&E staff liaised with the Health Protection Unit locally and the Chemical Hazards and Poisons Division on call via the National Poisons Information Service.

In total, three staff members had been in contact with the patient, one had been in contact with the powder and two had become symptomatic, although the symptoms resolved spontaneously. Decontamination equipment was set up and the process of decontamination commenced with the index case, who was then examined. In the meantime, the Fire Service Technical Support Team was called to help identify the substance. Further discussion between the fire service and the patient suggested that the substance may be a mixture of illicit drugs.

The Technical Support Team arrived at 05.30 hours and analysed the powder before confirming it to be a mixture of cocaine, heroin, speed and cannabis. Further decontamination of staff was not deemed to be required. By 06.00 hours A&E was declared safe and re-opened.

Lessons learned

This incident resulted in the closure of an A&E department for three hours, with obvious implications for the health of the local population. It also highlights a number of issues relating to the management of exposures to unknown powder presenting to A&E departments, including the need for:

- early identification of potentially contaminated individuals in order to minimise exposures of other patients and staff,
- early and robust decontamination procedures to avoid unnecessary closure of the department.

Another potential problem raised by staff in this incident was the management of those who might decline to be decontaminated. No clear solution to this has been identified, except to keep staff and patients who are potentially contaminated away from those who are not contaminated until environmental assessment is complete. After this point, if the contaminant is a risk then staff and patients should be informed and decontamination reconsidered.

A patient presenting with powders in A&E is not an uncommon event and such events are usually well managed without risk to staff and other patients. The circumstances of this incident are different in that there had been a recent death, an unknown powder and reported illness. Whilst recognising the difficulties for triage, staff may have been over-enthusiastic in their investigation of the powder. It is important for all responders to protect their health first and not put themselves at unnecessary risk.

All A&E staff and other emergency responders should be aware of guidance relating to dealing with suspect material and establishing whether the threat is 'credible' or 'non credible'. This guidance is available on the HPA website: http://www.hpa.org.uk/infections/topics_az/deliberate_release/pdf/packages_materials.pdf. The police are charged with assessing the threat as credible or not. However, whilst waiting for this risk assessment it is important that people are advised to:

- avoid touching or clearing up suspect materials,
- avoid touching other parts of the body and wash hands in soapy water (if facilities are available),
- remove people to another contained area away from the suspect material,
- keep those who have been exposed separate from others who have not,
- contain the contaminated location by closing doors and windows and switching off air conditioning.

Information on incidents similar to the one described here should be shared with the local Health Protection Unit and, if necessary, the National Poisons Information Service (NPIS) for immediate toxicological advice. The NPIS can be contacted on 0870 600 6266, and staff are always happy to help on a 24 hour basis.

Strychnine

O E Huckle, Chemical Hazards and Poisons Division (Cardiff)

D Russell, Chemical Hazards and Poisons Division (Cardiff)

N Brooke, National Poisons Information Service (Cardiff)

Incident summary

The Chemical Hazards and Poisons Division (Cardiff) was contacted by the National Poisons Information Service (Cardiff) reporting a query received from a pollution control officer at Pembrokeshire County Council (PCC) regarding the potential hazards of strychnine.

PCC had been contacted by an individual who had stored two containers of strychnine in his shed, one in powdered form, and the other in liquid solution. Neither container appeared to be compromised. The local fire brigade placed both containers into oversized drums awaiting collection, transportation and disposal by PCC, who sought advice and support regarding the potential toxicity and public health impact. PCC also sought information as to the suitable personal protective clothing required and the potential environmental impacts from strychnine. An integrated view was provided by NPIS (Cardiff) and CHaPD (Cardiff) as to the characteristics, health hazards and environmental issues regarding strychnine.

Strychnine is an odourless, bitter tasting white crystalline alkaloid, available as a powder derived from the seeds of the tree *Strychnos nuxvomica*¹. It is highly toxic to both human health through inhalation and ingestion and the wider environment, with similar effects in aquatic and terrestrial wildlife.

Even small doses of strychnine can be fatal, especially in children². Exposure can result in repeated convulsions within minutes of ingestion or inhalation, leading to death from respiratory failure and cardiac arrest¹.

There are a number of reports of poisoning with strychnine, an example being provided by Oberpaur et al³ who reported an accidental ingestion by a six year old boy in the USA. In this case the child's father had prepared a strychnine-based solution in an attempt to curtail the local dog population but had apparently not stored the solution safely. This led to accidental ingestion by the child that resulted in hospitalisation and intensive care before the child recovered.

With regards to risks to public health, strychnine has been detected as an adulterant/contaminant in drugs of abuse (e.g. cocaine, heroin and amphetamine)^{4,5}. It has also been used in Asian herbal preparations such as Maqianzi and some homeopathic preparations⁶. Starretz-Hacham et al⁷ report an example of strychnine use being a risk to public health in Israel. The case report identifies the dangers of using strychnine as a rodenticide, with tablets being distributed around the streets by exterminators to eliminate stray dogs and cats. Unfortunately, this can lead to accidental ingestion by children, thought to be attracted by the bright colour (pink) of the tablets. In this case report a six year old child (male) suffered severe convulsions requiring intensive care treatment before recovery.

Regarding the case in Pembrokeshire, the major public health issue arising from the strychnine containers is likely to be due to members of the public being unaware of the toxicity of strychnine. This could result in a number of possible scenarios such as children playing with the powder or drinking the solution. Another potential threat to public health could arise if it was stored in unsuitable containers or disposed of incorrectly, resulting in leaks to groundwater and subsequent contamination of water supplies. In addition, containers of strychnine placed outside may pose a public health risk via inhalation should the powder become airborne.

In view of this, it was advised that both over-drummed containers should be kept in a well-ventilated area prior to transportation and appropriate personal protection needed to be worn during handling. Although PCC has procedures in place for dealing with hazardous waste, liaison with the Environment Agency over suitable disposal was advised. It was also advised that the shed be kept well ventilated should there be any remaining small residues. As the containers were over-drummed, and upon the fire brigade's satisfaction with the integrity of these, it was deemed unlikely that there would be any public health or environmental risk in this instance, subject to suitable transportation and disposal. The incident was subsequently closed and no further action was deemed necessary.

Lessons learned

This incident highlights the potential dangers of antiquated stored chemicals. Many such incidents have been reported to the CHaPD over the years. These incidents are often difficult to manage as there is a need to assess the hazards and risks to the local population over time. These data are not often available and safe, planned and controlled disposal may be the only solution.

Public health practitioners should be aware that there are many forgotten stores of chemicals that can cause concern on identification. These can be located in attics in homes or in offices, garden sheds, hospital outhouses and old chemical laboratories. Formal records of these chemicals stores are not available.

References

- 1 Flood R G. Strychnine poisoning. *Pediatr Emerg Care* 1999; **15**:286–287
- 2 Palatnick W, Meatherall R and Sitar D. Toxicokinetics of acute strychnine poisoning. *Clin Toxicol* 1997; **35**(6):617–620
- 3 Oberpaur M D et al. Strychnine poisoning: an uncommon intoxication in children. *Pediatr Emerg Care* 1999; **15**(4):264–265
- 4 Boyd R E, Brennan P T and Deng J. Strychnine poisoning. *Am J Med* 1983; **74**:507–512
- 5 O'Callaghan W G et al. Unusual strychnine poisoning and its treatment: report of eight cases. *BMJ* 1982; **285**:478
- 6 Chan T Y. (Abstract): Herbal medicine causing likely strychnine poisoning. *Hum Exp Toxicol* 2002; **21**:467–468
- 7 Starretz-Hacham O, Sofer S and Lifshitz M. Strychnine intoxication in a child. *Israel Med Assoc J* 2003; **5**:531–532

Emergency Response

Personal protective equipment for use following the release of toxic chemicals

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Chemical incidents may take the form of accidental or deliberate releases of agents that are identified by the event, the development of adverse health effects, or appropriate and timely environmental sampling. Although early identification is usually possible in accidental releases, this may not be the case for deliberate releases involving chemical warfare (CW) agents. Fire and emergency medical personnel responding to such incidents must therefore take appropriate steps to wear suitable personal protective equipment (PPE) to avoid becoming casualties themselves. Incidents involving toxic releases are controlled by cordoning the surrounding area into hot, warm and cold (uncontaminated) zones (see the figure). The hot zone, nearest the site of the release of the chemical, is where rescue operations to remove casualties are performed, usually by the fire services. Casualties are then taken to the warm zone where decontamination is performed if necessary before they can be transported onwards to the cold zone and ongoing medical care. The essential difference between the hot and warm zones is determined by the ambient concentration of the released toxic agent, with the greatest concentration being at the point of release.

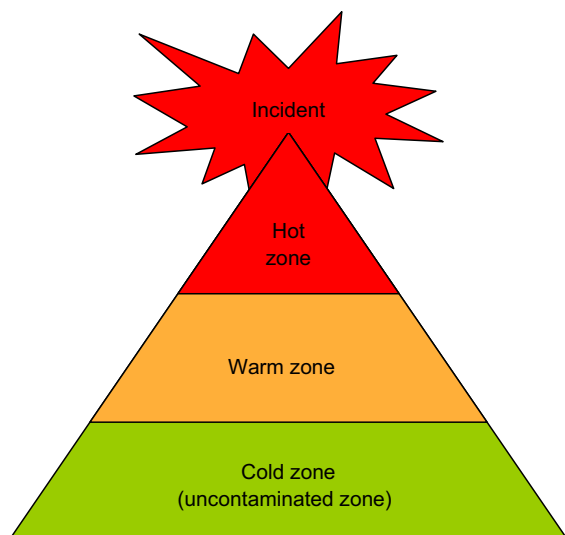


Figure: Representation of the incident – hot, warm and cold (uncontaminated) zones

Hot zone working has always been regarded as the job of the fire services who are equipped to face the toxicity and corrosiveness presented by the released chemical. Fire-fighters are used to wearing self-contained breathing apparatus (SCBA) supplied with air from bottles or airlines since they are exposed to carbon monoxide and smoke products of combustion as a regular hazard from fire fighting. Carbon monoxide is not absorbed by filtration respirators. In contrast to the civilian situation, the military, whose personnel for many years have been required to work potentially in battle zones contaminated by highly toxic CW agents, has taken a different approach to PPE since

carbon monoxide is not usually a battlefield hazard and SCBA is not easily deployed in the field. The military approach to PPE has been to use relatively lightweight suits with filtration respirators where ambient air is filtered through a cartridge containing activated charcoal mixed with silver salts to remove cyanide.

The levels of PPE and the type of equipment required are summarised in the box.

Box: Classification of PPE

Level A	Positive pressure self-contained breathing apparatus or a pressure-demand supplied respirator (air hose) Fully encapsulating chemical-resistant suit (one piece) Double layer chemical-resistant gloves Chemical-resistant boots Airtight seal between the suit, gloves and boots
Level B	Positive pressure self-contained breathing apparatus Chemical-resistant long sleeve suit (two piece) Double layer of chemical-resistant gloves Chemical-resistant boots
Level C	Full face filtration respirator Chemical-resistant suit Chemical-resistant outer gloves Chemical-resistant boots
Level D	No specific respiratory or skin protection Usually normal working clothes



Photograph 1: Tokyo Fire Department HazMat teams wearing level A suits during the 1995 Tokyo sarin release

Level A PPE (photograph 1) provides maximum protection against vapours and liquids which are toxic and corrosive.

Level B PPE is used when full respiratory protection is required but the danger to the skin from liquid contact is less. It differs from level A in that it uses a non-encapsulating, splash protective, chemical-resistant suit ('splash suit') that provides level A protection against liquids but is not airtight.

Level C PPE (photographs 2 and 3) uses a lighter splash suit than level B and provides respiratory protection by filtering the ambient atmosphere.



Photograph 2: GIAT level C protection used by the Paris Emergency Medical Service (Acknowledgment: SAMU de Paris)



Photograph 3: Decontamination exercise by personnel wearing a Swedish level C suit. The filtration canisters for the respirator are belt mounted

The essential difference between the fire service and military approach to working in PPE has been highlighted by the current perceived threat of deliberate toxic and biological release by terrorists in an urban setting. The traditional use of heavy suits and SCBA by fire services for toxic releases had been applied uncritically for all civil chemical and biological releases, particularly in the USA. While this approach leans heavily on the side of safety, the use of such equipment in the warm zone, where ambient concentrations of toxic agents are less than in the hot zone, is counterproductive (a) because of the limited time a wearer can remain safely inside the suit and (b) because of the severe limitations placed on manoeuvrability. There has been a growing realisation that early medical care in the form of advanced life support is required for some casualties who are delayed in the warm zone while awaiting decontamination. Since many CW and other toxic agents have their life-threatening effects on the respiratory system, early airway and ventilation management is a vital adjunct to antidote therapy (Department of Health, 2003). This has led to consideration of what PPE medical responders should wear.

Military PPE is essentially level C equipment (photograph 3). However, it should be noted that protective suits, respirators and filtration cartridges have been developed under conditions of considerable secrecy over the years working in response to intelligence information about what CW agents are likely to be faced. Data about penetration of agents through the suits and canisters are not openly published. Military PPE developed in the UK has adopted a 'breathing' approach to try to reduce the heat stress load by using layers of material impregnated with activated charcoal. These are designed to allow soldiers to remain operational in persistently contaminated battle zones for considerable

periods. In the civilian area manufacturers have adopted the use of lightweight impermeable suits and data for their chemical resistance are openly available. Similarly data are available for the type and duration of protection offered by the respirator canisters.

Level C suits are regarded by many emergency medical services in Europe as being suitable for operation by emergency medical services personnel working in the warm zone to provide essential care to patients awaiting and during decontamination (photographs 2 and 4). The weight of the suits and thickness of the gloves allow manoeuvrability and dexterity which permit essential medical operations such as inserting a pharyngeal airway or intubation and ventilation. While level A and B suits allow only about 20 to 30 minutes of breathing from a self-contained air supply, filtration respirators can be used for considerably longer and the cartridges can be changed inside a contaminated zone using established procedures. Heat stress, which is a serious disadvantage of level A and B PPE, is reduced in level C PPE and this can be improved further by the use of ventilated suits.



Photograph 4: British Army soldier wearing level C NBC protective suit. The respirator is a military type S 10 with a CW filtration canister

Photograph 5 shows such a suit provided for use by the NHS. In the UK there is still debate about the deployment of emergency medical services personnel in the warm zone. In France, however, plans and equipment and training have been provided to allow the emergency medical service (SAMU) to work in the warm zone. The approach has been to use specially procured level C suits and a filtration respirator which allows good visual contact and speech transmission (photograph 2). SAMU emergency teams are medically led and the doctor in charge is allowed clinical freedom in his choice of treatment options rather than following set protocols as in paramedical systems. This improves flexibility of clinical response in the difficult operating circumstances of the hot/warm zone. SAMU personnel have received extensive training in wearing level C PPE and stocks of equipment are held and maintained in ambulance dispatching centres ready for immediate use by normal, on-call emergency medical response teams. These personnel are able to perform all the usual advanced life support actions while wearing PPE such as endotracheal intubation, artificial ventilation and peripheral intravenous vascular access.

In the UK PPE developments are in train for emergency medical response teams to be able to perform all the usual advanced life support actions while wearing PPE, such as triage, endotracheal intubation, artificial ventilation and peripheral intravenous vascular access, and provide critical health effect information to the wider health community. It is considered that when the UK adopts this approach, warm/hot zone working will improve the ability of the whole of the NHS to respond to a significant hazardous materials and CW incident. However, the protection provided will depend on the toxic compound released and its

concentration, and the duration of time spent in a contaminated zone. More work is needed, in conjunction with designers of PPE, to assess the suitability of the variety of PPE available on the commercial market for use in urban HazMat and CW releases.

Reference

Department of Health. Expert Group on Management of Chemical Casualties Caused by Terrorist Activity. Treatment of poisoning by selected chemical compounds. October 2003. http://www.dh.gov.uk/PublicationsAndStatistics/Publications/PublicationsPolicyAndGuidance/PublicationsPolicyAndGuidanceArticle/fs/en?CONTENT_ID=4073328&chk=EvrEE6



Photograph 5: Personal protective equipment provided by the Department of Health

Exercises Double Strife and Impact

Lessons learned from Northumberland Tyne and Wear's off-site Control of Major Accident Hazard (COMAH) planning exercises

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Introduction

Northumberland Tyne and Wear has six top tier COMAH sites whose operators have a statutory responsibility to prepare and to test off-site emergency response plans. The Health Protection Agency's North East Regional Environmental Public Health and Emergency Planning Unit regularly plans for and participates in off-site COMAH exercises. This report outlines how exercises for three of these sites were prepared and conducted and identifies some lessons learned.

Preparation of the exercises

Tyne and Wear Emergency Planning Unit chairs a Joint Services Exercise Working Group which includes the North East Ambulance Service, Northumbria Police, Tyne and Wear Fire and Rescue Service, and the Health Protection Agency. The role of the working group is to develop plausible scenarios that would generate significant off-site impact and use these scenarios to develop exercises that fully test off-site emergency plans and all of the different organisations involved in them. Traditionally such exercises have focused on the very early stages of an event (i.e. the first two hours) and exercises have focused on the immediate response activities of blue-lights organisations. However, recognising the huge public health impact of a major incident at a COMAH site, whether through direct effects or public perception, the Health Protection Agency has been proactive in promoting the involvement of primary care organisations, ensuring that they are represented at all exercises and that public health questions are an integral part of all exercises.



Photograph: Exercise Impact – tactical table in foreground, operational table in background

During the exercises participants were divided into two multi-agency syndicates, Operational and Tactical, working separately. This separation allowed different sets of questions to be asked of the same scenario and allowed the two syndicates to feed information to each other as would be the case in the event of a real incident.

Exercise summary

Exercise Double Strife addressed two top tier COMAH sites that lie within 200 m of one another. The scenario involved an alcohol spillage around a fuel tanker at a chemical storage facility at one site and a simultaneous dust explosion at the other. Both incidents resulted in substantial fires with smoke plumes travelling well beyond the site boundaries. There were on-site casualties and reports of people having respiratory problems and complaining of sore eyes downwind of the fires.

Exercise Impact was based at a site under the flight path of Newcastle International Airport. Whilst the probability of an accident involving an aeroplane is low, the impact would be significant and an exercise scenario was developed whereby 3.5 tonnes of bromine was released after part of the port cowling of the engine of a Boeing 757 aircraft detached and landed on the bromine storage area of this site whilst a bromine tanker was offloading. The scenario generated casualties on-site and a brown cloud of bromine gas which drifted past the boundary of the site into a nearby housing estate.

Lessons learned

Exercises Double Strife and Impact were well attended by the police service, the fire and rescue service, the ambulance service, the Environment Agency, the primary care trust, the Health Protection Agency and the local authority. Both exercises were successful in

addressing the interaction and inter-relationship between the major incident plans of the emergency services and the site operators and also facilitated a better understanding of roles of the participants. However, the exercises also generated a number of generic and site-specific lessons that will now be incorporated into the planning process.

For example, fire alarms require staff to leave buildings and muster outside, whereas chemical release alarms require staff go inside to designated sheltering points. These alarms are not always co-located and it was not clear what would happen if the wrong alarm was pressed or there was a fire and a chemical release simultaneously.

An unexpected problem with the aeroplane scenario was that this would have led to the precautionary call out of the fire service. Twelve appliances would have been sent to the airport. Thus, in this situation the fire and rescue service's response would have been delayed as appliances were called in from more distant stations.

CHEMET plume modelling provided by the Met Office gives a good indication of the direction that a chemical plume will travel. However, whilst this model can be run quickly it cannot be adjusted to account for different substances and quantities. None of the organisations present at the exercise would have been able to provide real-time modelling and only the Met Office itself would have been able to provide qualified personnel to conduct off-site monitoring to identify the true spread of the plume.

Both scenarios ended before three hours had elapsed. Whilst this does provide time for the primary care organisation, to be contacted it does not allow its staff time to explore the actions they would take in such an incident. Primary care organisations may need to consider communication links with site operators and blue-lights services to ensure adequate information flow, in both directions, to allow effective action to protect public health.



Report on Exercise Triton 04: working together for a better flood response?

Professor Virginia Murray, Chemical Hazards and Poisons Division (London)

The Health Protection Agency took part in the Department for Environment, Food and Rural Affairs (Defra) and the Environment Agency Exercise Triton 04 on 16th and 17th June 2004. This multi-agency exercise provided an excellent opportunity to work with agencies in responding to flooding. The excellent report on the exercise has now been published at http://www.environment-agency.gov.uk/commondata/acrobat/geho0305birqep_1106396.pdf. The summary of the exercise, its planning and lessons learned are very valuable.

Brief overview

Exercise Triton 04 depicted a scenario with an East Coast tidal flood from south of the Humber to Southampton Water and a West Coast tidal flood affecting the coasts of north and south Wales. The combination of high spring tides, storm surge, winds and wave action caused many flood defences to be overtopped and/or breached. The result was devastating. Many people were killed or injured and thousands of homes and several coastal towns and city centres were flooded. There was widespread disruption and damage to transport, power, water and communications networks, along with major damage to industry and commerce and drowned livestock.

The South East and Eastern Region Health Protection Units led the HPA response and they requested support from the Chemical Hazards and Poisons Division (London) on chemical consequences. They were one of the 60 organisations and agencies taking part nationally, regionally and locally.

The strategic management teams from many organisations, based at 35 locations, were presented with this emergency scenario and asked to respond as they would if the event were real. Each team had to make decisions that included how to evacuate hundreds of thousands of people; inform and warn the public via the media; what resource they needed and what their priorities were; if they needed military aid; how to communicate up and down the chain of command; and whether they needed emergency powers.

Day one focused on handling the emergency. Day two was about developing recovery plans. These plans looked at what was needed to get local communities, regions and the nation back to normal within a year of the flood.

Some of the lessons learned

The exercise report summarises a series of lessons learned from the exercise. Many of these are those we would expect from HPA exercises. Therefore sharing them is helpful.

- With a number of organisations working together, roles and responsibilities were not always clear. A recommendation from Exercise Triton is that, in future exercises, some more appropriate training should form part of the scenario.
- The concept of systems to support operations and to encourage organisations and agencies to work together better and help keep

them informed at all times is made. In particular, the suggestion of the development of a 'decision-support' programme (or secure website) that could be made available on the internet to help organisations gather information quickly and efficiently would be beneficial to all emergency responders including the HPA.

- The concept of separate plans for the incident itself and the recovery phase is interesting. Guidance should also be provided to recognise differences between incident and recovery phases.
- In the view of the organisers of Exercise Triton, it showed that responders needed more training to better understand emergency plans. All organisations involved in such an emergency situation should include this as a target in their business plans to ensure better effective working in an emergency. This approach should be very helpful to the HPA.
- Issues about evacuation were raised. It was considered that the Environment Agency should improve its ability to advise on evacuation, i.e. when and where people might need to evacuate and in what scale of event. Sharing this approach with the HPA would be valuable.
- Communications were an issue. One point raised by Exercise Triton highlighted the need that everyone involved in the emergency should look again at how they deal with the media to make sure that information is relayed sensitively and appropriately. Partners should also agree a joint media strategy for use during flood incidents to avoid delays in releasing important information to the public. I believe that the HPA will find these concerns appropriate.
- Exercise Triton pointed to the need for a national review to see if there is enough dedicated emergency support equipment such as pumps, generators and mobile radios. Organisations from different sectors could look at how they might work together to share resources. In addition, there is a need for Gold control room facilities to be compatible with the equipment needs of all users. Using new communications methods, such as tele/video-conferencing, could mean fewer people are needed to staff control centres.

The decision about when to seek military aid resulted in the recommendation that the Ministry of Defence (MoD) should produce guidance on how and what military aid is available. I believe that this would be helpful to the HPA.

In the view of Defra and the EA, Exercise Triton 04 tested the ability to work together to effectively deal with a major flooding incident. Defra, the EA and WAG (the Welsh Assembly Government) consider that more valuable lessons have been identified from this exercise that will be carried forward to further strengthen the nation's capability to deal with a major incident of this kind. Key partners have endorsed the recommendations in this report. It is now proposed that the partners take the implementation of these lessons forward, monitored by Defra and WAG.

I commend all interested in emergency response to read this report and I consider that the approach to implementing the lessons learned by each partner is most important.

Use of scenarios for emergency training

Professor David Alexander, Scientific Director, Region of Lombardy Advanced School of Civil Protection, Milan

Introduction

The idea that crisis situations are unique and unpredictable is a misleading truism. In fact, emergencies are made up of both foreseeable and unexpected elements. The way to manage them is to anticipate the former in order to minimise the latter. This can be achieved by building predictive models, or scenarios, of what is likely to happen in the future.

The models are a vital ingredient of both planning and training. In an emergency plan the reference scenarios can be taken from significant events that have occurred in the past, which must be updated to take account of modern conditions. The scenario can be elaborated in terms of hazard, vulnerability, impact and emergency response. A systems methodology should be used for this (see the figure) and the conditions tailored to a variety of situations, for example with respect to disasters that strike at night or during the day, the outcomes of which are, of course, related to aggregate patterns of human behaviour. As the essence of emergency planning is to anticipate pressing needs in order to supply them effectively at the critical moment, a well-constructed set of crisis or disaster scenarios is an essential aid. Coupled with an audit of emergency resources (vehicles, equipment, supplies, manpower, procedures and protocols) the scenario can help identify potential shortages and deficiencies so that these can be corrected before the next disaster strikes.

The other main use of scenarios is in training. As the field of emergency management becomes steadily more professional, course leaders must consider the problem of how to make training lively, realistic and relevant to actual crises. Scenarios can be used to provide a means of getting students to think their way into emergency situations. The scenarios should be chosen carefully, or synthesised from the most relevant events, and should be used with care in order to teach essential principles.

Training scenario example

By way of example, the following scenario, given in abbreviated form in the box, was originally posted to an internet search and rescue discussion group on 18th March 1996. The story has been modified to make it brief, generic and illustrative of the dilemmas that face the emergency manager in the field. Students or trainees are asked to consider how the emergency is developing, devise a strategy for co-ordinating the relief effort as it gets underway and consider the limitations to what can be achieved.

Classroom strategies

Experience in the classroom with a wide diversity of student and trainee groups suggests that the discussants usually fall into two categories: those who are practical by nature and those who have yet to grasp the difference between what can be done and what cannot. To manage the emergency well, they must divest themselves of the purely academic

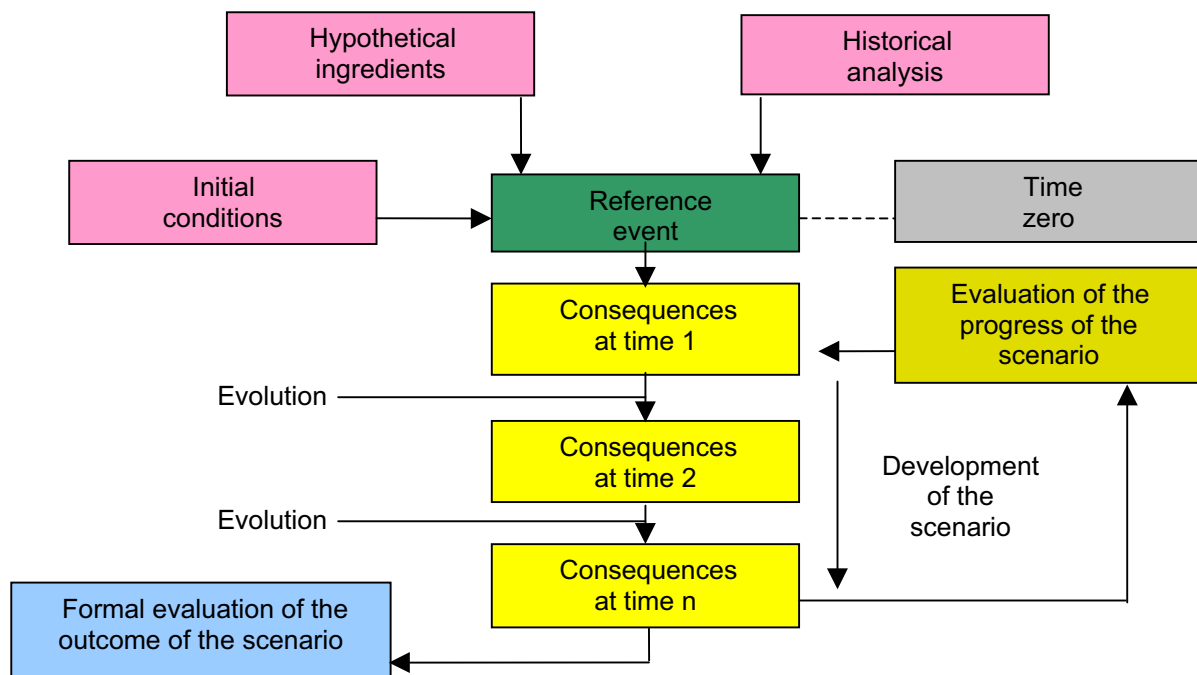


Figure: Scenario methodology for emergency planning

Box: Training scenario

On the periphery of a large industrial city, a factory that once produced vehicle batteries is about to be rebuilt into a wholesale warehouse. Inside it there are some large, rusting tanks that contain residues contaminated with arsenic and cyanide which are leaking slowly into the ground beneath. The roof of the factory, which workmen have begun to dismantle, contains asbestos.

Wood and aluminium scaffolding has been erected up to roof level and polyethylene sheeting has been rolled out to contain the asbestos dust. As it is winter, space heaters powered by bottled liquid propane gas are being used inside the building. Electrical power is obtained exclusively from a connection point at the perimeter of the site which is next to a storage area containing a large number of LPG canisters.

During the lunch break there is a violent storm with heavy gusts of wind. Part of the scaffolding collapses and the polyethylene sheeting catches fire when it comes into contact with one of the space heaters. A large explosion leads to a fierce fire that generates temperatures of more than 1000°C. The building is rapidly consumed by flames, which burn out the site office and then move toward the LPG storage area. The site office and electricity point are destroyed.

The flames reach the gas canisters and the resulting explosion seriously damages the water supply hydrant and the drains, such that the toxic materials stored on site start to leak copiously into the sewerage system. Above the burning factory a cloud forms, rich in the combustion products of the toxic substances present at the site. The wind is blowing it gently towards a school, which is occupied, and an area of housing.

Within minutes you arrive at the site, the first incident commander to reach it. How are you going to manage the situation? What resources will you need and what can you count upon obtaining quickly?

approach. For example, there is no time to analyse the toxicity of the smoke, to measure wind speed or even to evacuate the school and the residential area. A warning can only be given if there is a safe way of delivering it, and the best strategy is probably to use a police car with loudspeaker and a series of telephone calls advising people to stay indoors with windows and doors closed. The first priority should be to warn the school.

With a little gentle persuasion, students can be encouraged to think realistically in operational terms, listing firstly the problems to be solved, secondly the needs that they generate and thirdly how to manage them by applying some simple rules.

The problems can be summarised as follows:

- a high-temperature fire
- explosion damage and a continuing hazard
- the toxic cloud
- potentially severe pollution of the storm drainage system
- toxic substances at the site (asbestos, cyanide, arsenic, etc)

The principal needs generated by the emergency are:

- evacuate the factory site and protect people against fire and explosion hazard
- protect residents and people in the school from the effects of the toxic cloud

- contain the fire and abatement of the explosion hazard
- protect the sewerage system and limit toxic contamination

These are the possible operational strategies for devising solutions:

- distinguish, list and prioritise tasks (it should become second nature to do this)
- where appropriate, delegate responsibility
- do not tackle problems that lack an immediate solution
- where it can be done, apply a workable solution

For example, five questions come to mind regarding the toxic cloud:

- can a rapid estimate be made of where it is going and roughly how fast?
- where will it get to and approximately when?
- how much time is there in which to do something?
- what emergency resources are likely to be available in that time interval?
- under the circumstances, what would be the most appropriate strategy to limit the cloud's effects?

Operability

As it is not so much the seriousness of the problem that counts but the efficacy of the solution, what is needed is a form of mental triage. The 'golden rules' for applying this are three. Firstly, all solutions must function in the very short term. Secondly, it pays to limit one's span of control, where appropriate by delegating responsibility for specific tasks (calling the HazMat team, for example, and explaining the situation to its leader). Thirdly, problems should be judged by the likelihood of achieving a solution quickly with the available means. If this cannot be accomplished a problem should be delegated or deferred in favour of more solvable matters.

For many students who are new to the field of emergency management, a classroom scenario such as the one described may be their introduction to the concept of operability. They need to accustom themselves to working in an environment of great uncertainty, and hence one of the greatest challenges for the teacher is to reduce the role of hindsight and encourage the trainees to think themselves into the emergency situation, dealing with information as it arrives, when it is in short supply relative to what needs to be known and has yet to be verified.

The scenario given above is an extremely basic one which has been cast in a generic form – i.e. without reference to any specific system of command and control or particular set of operating rules. These can, of course, be added in order to lend realism, but a balance must be struck between adding operational detail and obscuring the general picture.

In synthesis, scenarios are both a fundamental input to emergency plans and a vital teaching resource. With a little thought and the distillation of field experience, what would otherwise be a mere anecdote can be turned into a useful tool for illustrating the basic principles of emergency management.

Further reading

- 1 Alexander D E. Scenario methodology for teaching principles of emergency management. *Disaster Prevention and Management* 2000; **9**(2):89–97
- 2 Janing J. Assessment of a scenario-based approach to facilitating critical thinking among paramedic students. *Prehospital and Disaster Medicine* 1997; **12**:215–221
- 3 Ringland G. *Scenario Planning: Managing for the Future*. Wiley, New York, 1998.
- 4 Walker W E. *The Use of Scenarios and Gaming in Crisis Management Planning and Training*. Rand Corporation, Santa Monica, California, 1995

TESS – Toxic Exposure Surveillance System

Nick Edwards, Manager, National Poisons Information Service (London)

The Toxic Exposure Surveillance System (TESS) in the US comprises data collected by US poison centres and sent to the American Association of Poison Control Centers (in Washington DC, www.aapcc.org). This represents a large body of data on potentially poisoned humans – some 2,000,000 ‘cases’ a year (the figure shows the TESS Annual Report for 2003).

Centres in the US have to provide data to the AAPCC to maintain their accreditation (which in turn has a big influence on the each poison centre’s ability to attract local, city, state and federal funds). The data collected are in TESS format, but are trapped and stored locally (in the centres’ own databases using a variety of commercial systems). In total, 61 poison centres contribute to the system which covers 100% of the US population.

The data from centres include codified patient demographical information, reported clinical features and the agents (that is, the drug, chemical, natural toxin, etc) implicated in the possible poisoning. The system uses the agent coding from Poisindex® (see www.mdx.com) and not text reports.

In January and April this year I visited the poison centre in New York City, New Jersey and Washington DC. I was able to observe the recording of

the data first hand. All these (and the majority of all centres) report cases to TESS in near real time. This enables AAPCC to monitor the occurrence of events by reports of agents *and* clinical features across the US.

At the time of my visit to AAPCC, I met Dr Watson who monitors the data and runs routine reports to try and signal unusual or significant events. If a signal is identified the data are reported back to the host centre for further investigation. The monitoring is partially automatic and the searches that generate the reports look at rolling averages of enquiries and compare the daily result with the picture from a year ago (although it looks at two weeks either side) and flags anything that sits three standard deviations either side. This produces many false positives. As a result it requires review and assessment to determine the significance of any signal. With this system there remain concerns that the syndromic reporting component is not sophisticated and therefore not yet useful enough. Even with these limitations, on the plasma screen in the AAPCC offices there is a real-time map of the US and one day in 2004 a ‘stripe’ (following an interstate highway) of county-based cases of diarrhoea and vomiting led investigators to a truck-stop milk shake machine which was poisoning drivers.

I consider that the power of TESS is significant and valuable as it is national, timely and harmonised. TESS needs to prove it can produce more than ‘fancy-that’ data; indeed there are some interesting examples where it may well be very useful. More work is being undertaken on TESS and it may well be helpful for the Health Protection Agency to consider developing a similar system here.

Toxicology

A special contribution from the American Association of Poison Control Centers.



2003 Annual Report of the American Association of Poison Control Centers Toxic Exposure Surveillance System

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Figure: TESS Annual Report 2003

<http://www.aapcc.org/Annual%20Reports/03report/Annual%20Report%202003.pdf>

Is arson a public health problem?

Dawn O’Neill, Department of Health and Life Sciences, King’s College London, on attachment to CHaPD (London)

Introduction

Deliberately started fires are the largest single cause of major fires in the UK: figure 1 shows a comparison of total accidental fires and total deliberate fires recorded by the fire services for 1993 to 2003¹. In addition, some statistics that are worrying can perhaps be most simply summarised by stating that in the average week in the UK there are:

- 2343 deliberately started fires,
- 1896 accidental fires,
- 20 schools are damaged or destroyed,
- 4 places of worship are damaged or destroyed,
- 57 non-fatal injuries occur,
- 2 deaths occur,
- these fires cost approximately £40 million to society².

Figure 2 shows the non-fatal casualties from fires (excluding fire brigade casualties) by nature of injury in 2002. Therefore there is concern that fires and arson are a public health issue.

Cost of fire

It is difficult to calculate the cost of arson to society as it covers not only the financial cost, which can be calculated, but also the emotional and psychological cost which is more difficult to put a price on. The financial cost of arson, which in 2000 was estimated at £2.2 billion, can be divided into three categories:

- 1 Cost of anticipation** These are protection and prevention measures undertaken to reduce the impact on the potential victims. In recent years the government and insurance companies have recognised the magnitude of the problem.
- 2 Cost of response** These are the costs of extinguishing and cleaning up after a fire. In the London Fire Brigade budget agreed on March 2004, £11,310,040 was allocated for operational responses. This allocation is used to fight both accidental and non-accidental fires and to respond to false alarms. The estimate of the total cost of responding to arson attacks in 2000 in the UK was £230 million.
- 3 Cost of consequence** The resultant costs of a fire, including replacing lost property, income or business and the cost of treating injured victims, are difficult to gauge. It is estimated that arson costs society £40 million each week – this includes the most obvious cost of repairing and replacing damaged property, loss of business and the cost of rehousing schools and community activities.

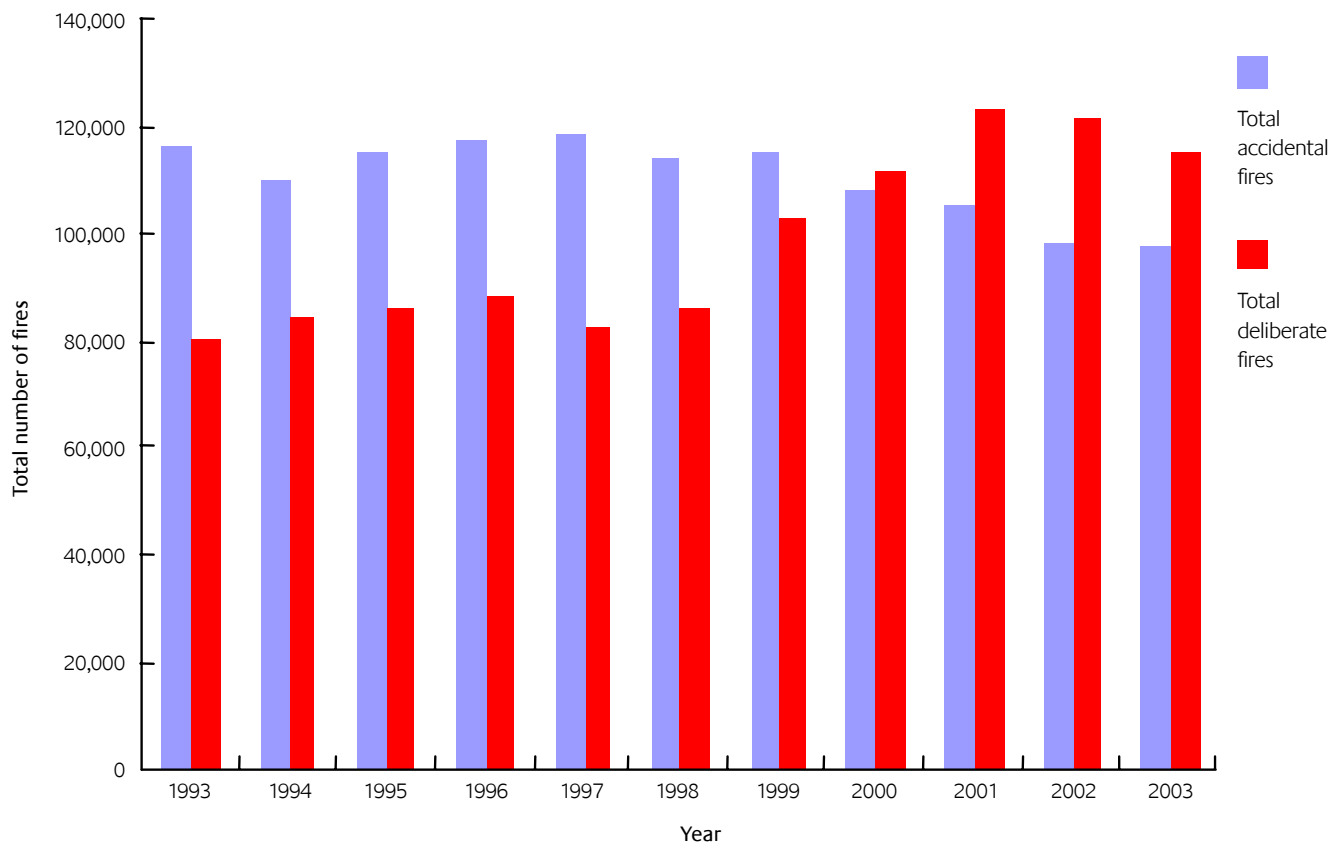


Figure 1: Comparison of total accidental fires and total deliberate fires recorded by the fire services 1993–2003¹

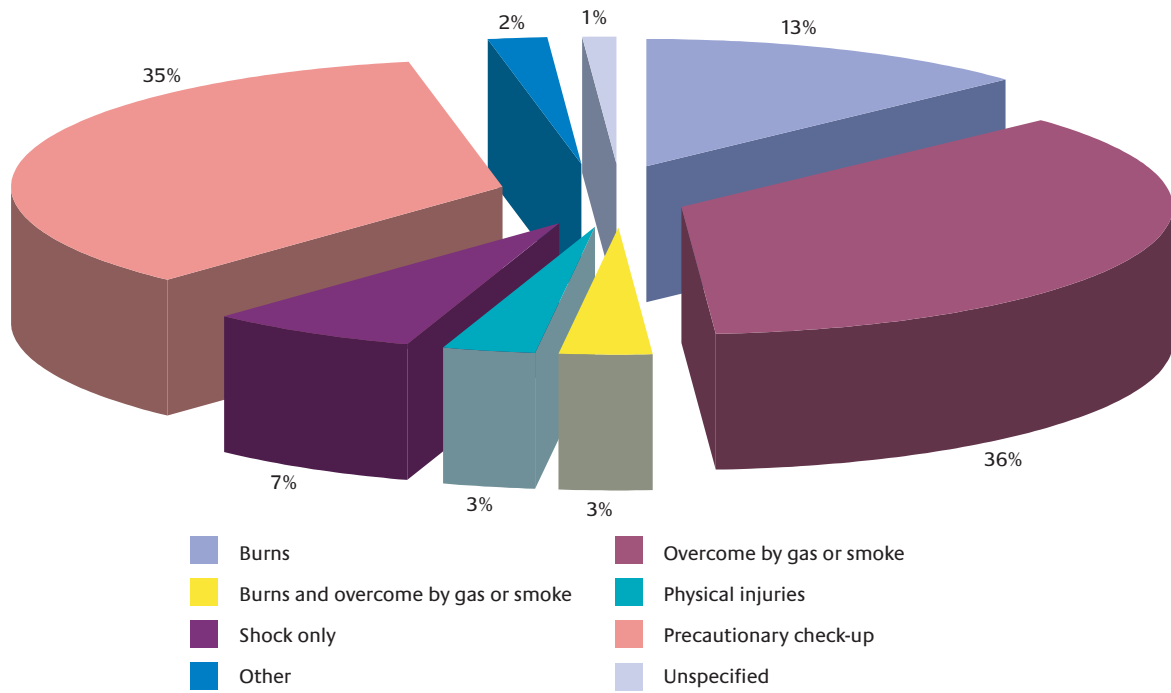


Figure 2: Non-fatal casualties from fires (excluding fire brigade casualties) by nature of injury in 2002¹

Discussion

Arson is expensive, in terms of fire services time and police hours, money in property and jobs lost, and finally health which is difficult to place a price on. While the cost of arson has grown over the last five years there has not been a visible increase in the money allocated for arson reduction strategies. The police define arson using the Criminal Damage Act 1971, which requires a higher standard of proof than the deliberate fire definition used by the fire services. This leads to problems in comparing statistics. Forensic science plays an important role in the determination of arson. Research on detection, identification and quantification methods needs to happen, therefore maximising the information obtainable from evidence.

Although the fire services and police have the principal roles in arson reduction, there is also a definite role for public health by addressing the underlying socio-economic problems which may lead to fire setting.

References

- Office of the Deputy Prime Minister, Fire Statistics – United Kingdom 2003. http://www.odpm.gov.uk/stellent/groups/odpm_fire/documents/page/odpm_fire_035909.pdf (accessed 08/08/05)
- Arson Prevention Bureau, 51 Gresham Street, London, EC2V 7HQ, Key facts. <http://www.arsonpreventionbureau.org.uk/Documents/Default.aspx?Did=2> (accessed 08/08/05)

Environmental Contamination and CHaPD Developments

Strategic environmental assessment and its implications for the Health Protection Agency

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Introduction

Strategic environmental assessment (SEA) has been defined as: ‘the formalised, systematic and comprehensive process of evaluating the environmental impacts of a policy, plan or programme and alternatives, preparing a written report on the findings, and using the findings in publicly accountable decision-making’¹.

Environmental impact assessments (EIAs) are routinely carried out on projects in the UK and usually involve the production of an environmental impact statement (EIS). The EIS provides information to planners, enabling appropriate decisions about development applications to be made. Building on the success of this process, the EC Strategic Environmental Assessment (SEA) Directive (2001/41/EC) now requires a similar level of assessment for certain plans and programmes². The table provides a list of national, regional and local examples for plans and programmes.

SEAs are therefore the latest weapon in the environmental armoury available to planners. Building on the success of the EIA, integrated pollution prevention and control (IPPC), and sustainability appraisal (SA) processes, SEA aims to integrate environmental and sustainability considerations in strategic decision-making.

As they are carried out earlier in the planning process, SEAs can cover a wider range of issues than EIA. Put simply, the project-level EIA process focuses on the ‘how’ question (e.g. how is the landfill going to be constructed?), whilst the high-level SEA process focuses on the whether, where, when and what form of development is environmentally appropriate (e.g. landfill versus incineration, urban versus rural sites and policies for taxing waste).

SEA in the UK will allow for the early identification of impacts and can consider the cumulative, synergistic and large-scale impacts (e.g. global warming and biodiversity). An environmental report is also produced which suggests ways to minimise negative and maximise positive impacts of the proposal. Furthermore, SEA allows easier integration into the decision-making process and will focus on identifying possible alternatives (EIAs are often undertaken once the main decisions have been made). Finally, SEA has a greater focus on public participation, as it includes the need to open the process to consultation before, after and during the publication of the environmental report.

Figure 1 illustrates how SEA fits into the planning process.

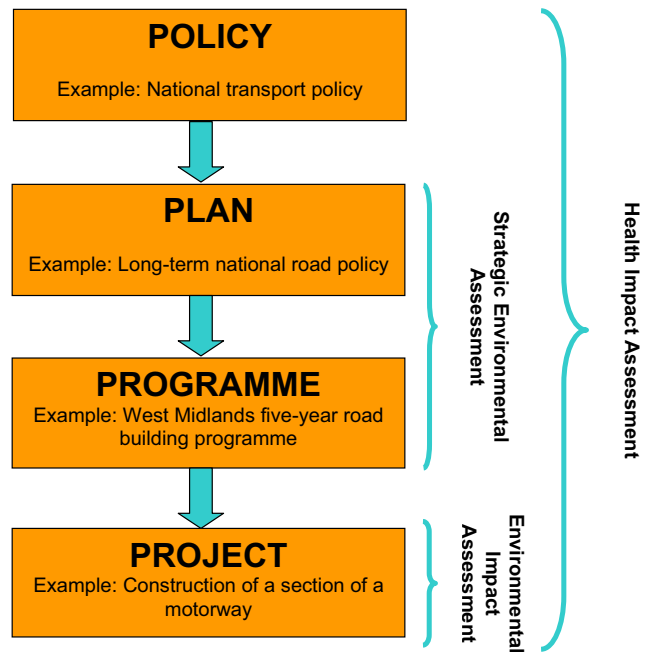


Figure 1: Relationship between planning levels and assessment tools

Table: Examples of actions requiring strategic environmental assessments

	National	Regional	Local
Plan	Salmon action plans Water company resource plans	Regional spatial strategies Regional economic strategies Regional transport strategies	Minerals local plan Local development documents Local air quality action plans Primary care trusts local delivery plans
Programme	Offshore windfarm licensing rounds	River basin management programmes of measures	

SEA legislation

The two main pieces of legislation regulating SEA in Europe are the SEA Directive² (Commission of the European Communities, 2001) and the United Nations Economic Commission for Europe's SEA protocol³.

The SEA Directive does not cover policies; it applies only to certain plans and programmes, as well as modifications to them, whose formal preparation began after 21st July 2004. The environmental report produced is required to identify, describe and evaluate the likely effects on the environment of implementing plans or programmes, and provide a reasonable range of alternatives. 'Environment' is defined as including: 'biodiversity, population, human health, fauna, flora, soil, water, air, climatic factors, material assets, cultural heritage, landscape and their inter-relationships' All potential impacts should be considered including secondary, cumulative, synergistic, short-, medium- and long-term, permanent and temporary, and positive and negative ones.

The SEA protocol has been signed by over 30 states (including the UK) and requests that health be considered at the different stages of the SEA process, and that 'health authorities' are consulted at those stages (in many respects it requires the same as the SEA Directive). This protocol will come into force once it has been ratified by 16 states – to date only Finland has done so.

SEA stages

The main stages of SEA are described in Figure 2.

SEA and health

SEA has the potential to be either an administrative burden or a tool to improve the health of the UK population. Environmentalists are fearful a specific health focus could detract from ecological issues, whilst some health professionals worry that a link with an environmental assessment tool will limit the health assessment to quantification of environmental contamination⁴.

Despite such concerns, SEA offers a number of potential benefits. These include:

- protecting human health and reducing the burden of ill-health,
- identifying ways to improve health and productivity throughout life,
- co-ordination of action to improve health across various sectors,
- greater equity in health,
- institutionalisation of health policies via SEA so that policies continue even when political power or governments change,
- elimination of costs (hidden in the health-care sector) of treating the health consequences of non-health policies that have been overlooked during planning and development,
- potential for reallocation of resources freed by the use of an integrated approach to policy development.

Experience with EIA and early SEAs suggests that when health aspects are addressed, assessments tend to estimate only the negative effects resulting from expected changes in the physical environmental media, neglecting the effects of modifications on other health determinants, such as socio-economic ones, and the possibility of promoting health benefits¹. Furthermore, the human health component of an EIA or SEA is not generally undertaken by a health professional, but rather by an

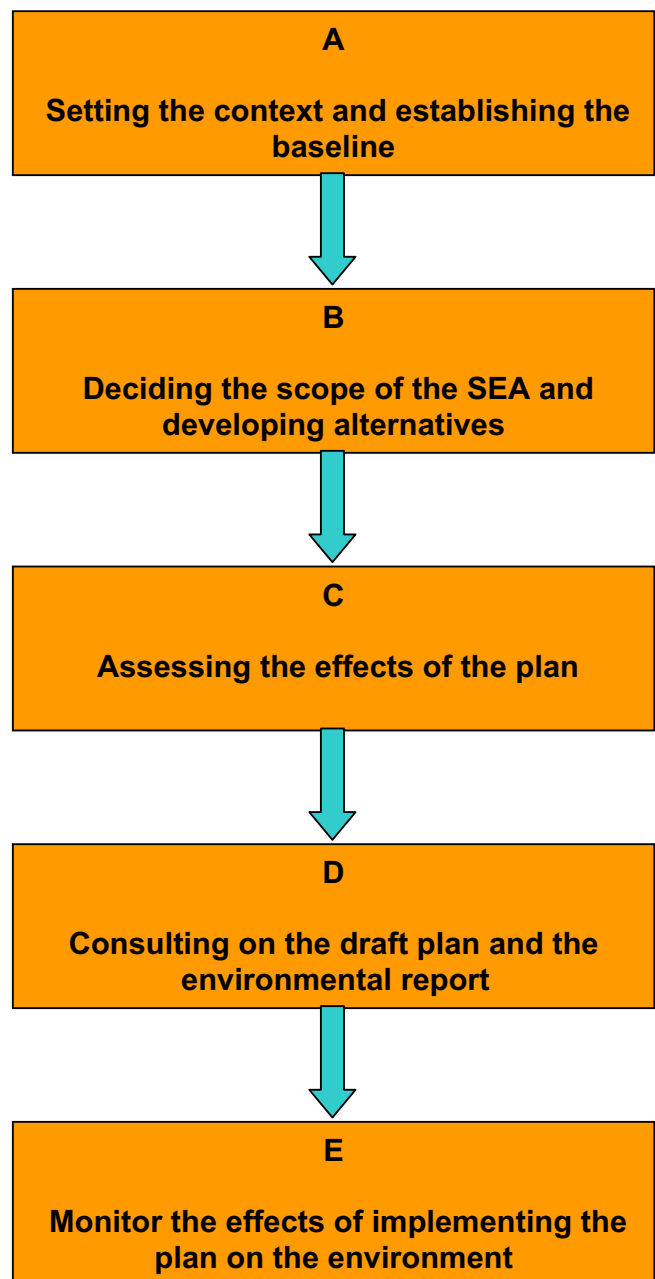


Figure 2: Stages of strategic environmental assessment

environmental or social scientist, further diminishing the consideration of health.

An International Workshop on Public Participation and Health Aspects in Strategic Environmental Assessment (23rd and 24th November 2000, Szentendre, Hungary) concluded that health should be more broadly addressed in SEAs than at present. As a minimum, 'exposure' (i.e. health effects arising from pollutants) should be considered. Other issues that might be addressed include:

- health determinants and effects (with a need to specify which determinants and priority risk factors are to be addressed),
- positive and negative health effects (using appropriate indicators),
- effects on particularly vulnerable groups, use of a broad range of health determinants,
- enhance positive as well as eliminating/mitigating negatives,
- cost-effective monitoring of actual impacts on health.

SEA and the HPA

Clearly SEAs will require a health input and it is likely that both the NHS and the HPA may be approached by statutory consultees to the SEA process for advice on the health impacts of various plans and policies. In England and Wales, the Environment Agency (EA) is one of the designated authorities that must be consulted during the process of SEA and the EA has recently commissioned an assessment of the likely demand of SEA nationally. Its statutory consultee role will include commenting on the health aspects of SEA and a dialogue has been started with the HPA about supporting the EA with this part of its consultee role.

As the demand for such advice could be great, the HPA is looking to produce a short guide on SEA to help inform the process. It is also working with the EA on a scoping exercise to determine which types of SEA may require a significant health input in order to prioritise resources and ensure that any health response is appropriately focused. The HPA will also work with health impact assessment (HIA) experts to determine the most appropriate response to SEA. Finally, CHaPD is considering providing training to EA staff on dealing with health aspects of SEA, particularly when and where to get appropriate advice.

SEA example West Midlands Local Transport Plan

This plan was written in 2003 and focused on whether a quality bus network should be promoted in the West Midlands. Regarding human health, this plan detailed the predicted impacts on noise, water, local air quality, greenhouse gases, physical fitness and accidents. Consultation led to:

- identification of key areas of importance (e.g. air pollution),
- setting of absolute constraints (e.g. pollutant concentrations),
- identification of unacceptable alternatives,
- support of alternatives that promoted sustainable development.

Although it was quite easy to describe the baseline environment and to identify a range of alternatives, planners had difficulty in predicting and evaluating the impacts of these choices and the associated mitigation measures. Uncertainty was due to three main factors:

- what the actual changes in traffic levels would be,
- the actual level of central government funding,
- whether the networks will be implemented exactly as predicted.

Incorrect assumptions made during the process would influence all subsequent decision, highlighting the need for post-implementation monitoring and an iterative approach to SEA (this plan will be revised later in 2005). An understanding of the difficulties involved can be gained when one looks at an example of the predictions made. For accidents, a switch from car to bus journeys would seem to have a positive impact as travelling by bus is twice as safe as travelling by car. However, walking to the bus stop carries a risk five times that of driving a similar distance so the net impact is uncertain and dependent on the distance walked (which, in turn, is inversely proportional to the likelihood of people switching!).

Although a large number of positive and negative impacts were identified, by far the most important impact was that of chemicals (for example, oxides of nitrogen) emitted into the environment. Again, making predictions was problematic, although a range of around

two orders of magnitude was achieved for the ten-year forecasts of total emissions for the different transport options. The SEA approach allowed for easy comparison of the pollution potential of each transport option, demonstrating the importance of the quantitative nature of SEAs over earlier plans (with a simple statement that air pollution will get worse/better).

Overall, the plan followed good practice (for example, the precautionary principle was used when there was not enough information to support a robust decision) and underlined the advantages of a more robust environmental assessment at the plan/programme stage.

The full report on the transport plan is available at http://www.dft.gov.uk/stellent/groups/dft_econappr/documents/page/dft_econappr_033911.pdf.

Future work

The health sector needs to:

- increase awareness of how strategic environmental assessment can improve policy-making and integrate action to promote health across all sectors,
- develop tools and learn from experience,
- increase the capacity for undertaking the health assessment of SEAs.

References

- 1 Therivel R. *Strategic Environmental Assessment in Action*. London: Earthscan, 2004. ISBN 2003021890
- 2 Commission of the European Communities (CEC). *Directive 2001/42/EC on the assessment of the effects of certain plans and programmes on the environment, 2001*. <http://europa.eu.int/comm/environment/eia>
- 3 United Nations Economic Commission for Europe (UNECE). *Protocol on Strategic Environmental Assessment to the Convention on Environmental Impact Assessment in a Transboundary Context, 2003*. www.unece.org/env/eia/sea_protocol.htm
- 4 Kemm J, Parry J and Palmer S, Eds. *Health Impact Assessment*. Oxford: University Press, 2004

Useful SEA Websites

Office of the Deputy Prime Minister

http://www.odpm.gov.uk/stellent/groups/odpm_control/documents/contentservertemplate/odpm_index.hcst?n=4136&l=2

United Nations

<http://www.unece.org/env/eia/health.html>

Environment Agency

http://www.environment-agency.gov.uk/aboutus/512398/830672/832860/?version=1&lang=_e

European Union

<http://europa.eu.int/comm/environment/eia/sea-support.htm>

General

<http://www.sea-info.net>

Impact of outdoor air pollution on the health of London's children

A quantitative risk assessment

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Dr Giovanni Leonardi, Consultant in Environmental Epidemiology, HPA Chemical Hazards and Poisons Division (Head Office, Chilton)

Dr Jackie Spiby, Consultant in Public Health, North East London Strategic Health Authority

Background

For biological and behavioural reasons, children are particularly susceptible to environmental hazards. A variety of international initiatives aim to raise awareness of the impact of specific hazards on children's health¹. These emphasise the need for regional health impact assessments of those hazards most relevant to the health of children living in the area.

London has higher levels of many outdoor air pollutants than any other city in the UK². Although the impact of this pollution on adult health has been extensively researched, its effects on children have received much less attention. One of the strategic roles of the Health Protection Agency is to "identify and develop appropriate responses to childhood diseases associated with chemical hazards"³. In light of these factors, we decided to assess the health impact of outdoor air pollution on children living in London.

Methods

Since no direct data on the number of children affected by air pollution in London exist, we estimated this figure using an approach called quantitative risk assessment (QRA), which comprises the following steps⁴.

Step 1: Select appropriate health outcomes

The literature was reviewed to identify health outcomes attributable to outdoor air pollutants in children, and to obtain reliable effect estimates for these outcomes.

Step 2: Determine valid effect estimates

An effect estimate describes the impact of a unit change in the concentration of an environmental hazard on the relative risk of developing a specific health outcome. Those for air pollutants are derived from studies examining the impact of changes in ambient air pollutant levels on health outcomes. For this work, published effect estimates were identified and their quality appraised by reviewing the primary research from which they were derived. Expert advice was sought to improve the objectivity of selections made.

Step 3: Estimate exposure to air pollution

Concentrations of ambient air pollutants can be directly measured using special monitors. However, these can only provide information about air in their vicinity and modelling has been used to estimate

average exposures over wider areas⁵. The most recent (1999) modelled estimates of average particulate matter with a aerodynamic diameter of 10 micrometres or less (PM₁₀) exposure in metropolitan London were obtained from Cambridge Environmental Research Consultants (CERC)⁶.

Step 4: Quantify health impacts attributable to environmental exposure

The formulae used to estimate health impacts are well described in the previously mentioned WHO guidance on QRA⁴. Three further pieces of information were required to perform these:

- 1 number of children – this was obtained from recent Census data,
- 2 existing prevalences of the selected health outcomes – ideally, London data were used but these were not always available,
- 3 background environmental level of the air pollutant studied – necessary if the analysis assumes that it is not worth measuring health impacts below this level because it is impossible to reduce concentrations below this.

Step 5: Quantify uncertainty of attributable number of cases

The impact of imprecision was investigated with respect to the effect estimates and baseline prevalences of illness used, and the choice of minimum effects level of PM₁₀.

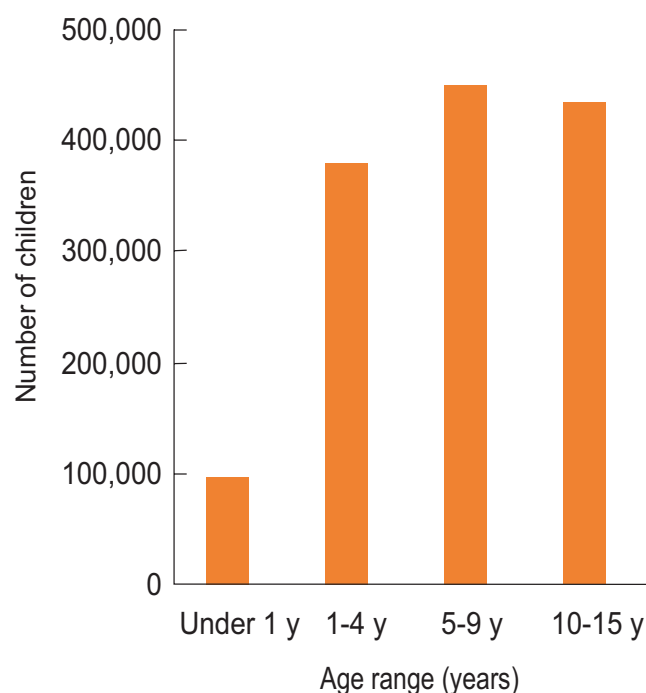


Figure: Age breakdown of children in London

Table 1: Effect estimates and baseline prevalences for health outcomes studied (all PM₁₀)

Health outcome	Effect estimate (95% confidence interval)	Source of baseline prevalence	Baseline prevalence
Respiratory deaths (0–5 years)	1.01 (0.99–1.03) ⁷	ONS data on numbers of children dying from respiratory diseases (ICD codes J00–J99) in England and Wales (E&W) in 2001 divided by numbers of children under 5 years in E&W ¹¹	0.071/1000
Asthma admissions (0–15 years)	1.012 (1.002–1.023) ⁸	Age-specific hospital episode statistics (HES) data on children's hospital admissions for asthma (ICD codes J45 and J46) in E&W during 2000–2001 divided by numbers of children in respective age groups in E&W ⁹	5.2/1000
Asthma exacerbations (0–15 years)	1.051 (1.047–1.057) ^{9,10}	UK incidence rates from the International Study of Asthma and Allergy in Children (ISAAC) ¹²	330/1000
Acute bronchitis episodes (0–15 years)	1.306 (1.135–1.502) ^{9,10}	Incidence rate from a synthesis of national surveys in three European countries ⁹	106/1000

Results

Literature review

The most consistently reported associations were for greater rates of health services usage, asthma exacerbations, and episodes of bronchitis with higher levels of external air pollution. In addition, several studies have noted a small but significant effect on infant and childhood respiratory mortality. Air pollution does not appear to cause asthma and there was limited evidence that it led to chronic respiratory damage. Health impacts have been most consistently associated with particulates (usually measured as PM₁₀). On the basis of these findings, the impact of PM₁₀ in London was examined for four health outcomes: asthma exacerbations, asthma admissions, and episodes of acute bronchitis (children 0–15 years); and respiratory deaths (children 0–5 years).

Quantitative risk assessment

The demographic profile of children in London is shown in the figure. The proportion of the London population who are children (20.1%) is similar to the average for England and Wales.

Table 1 summarises effect estimates and baseline prevalences for the health outcomes studied.

Using these data, our analysis suggested that 43,185 asthma exacerbations, 63,942 cases of acute bronchitis, 92 asthma hospital admissions, but less than 1 death were attributable to PM₁₀ exposures of children in London in 1999 (Table 2).

Table 2: Attributable cases of disease in London children (1999)

Health outcome	Numbers of attributable cases
Asthma exacerbations	43,185
Asthma admissions	92
Acute bronchitis	63,942

Discussion

The existing literature on air pollution and children consists largely of studies evaluating the effects of acute exposures. These shed no light on the impact of chronic exposures, which may be far more important in terms of overall public health.

Our use of modelled estimates did not replicate the methods used in studies from which effect estimates were derived, where pollutant

concentrations were measured at background monitoring sites.

We did so because we felt that the best method of estimating the personal exposure of London's children to PM₁₀ was to assume an average exposure across London in 1999, and modelling provides the most accurate representation of this⁵. Although our assumption of an 'average' exposure was clearly untrue, other methods were impractical to use or subject to more uncertainties. For instance, it was difficult or impossible to relate measured concentrations of PM₁₀ from different background monitoring sites to local populations in London. If a borough's monitoring site was located on a very busy road, this would clearly have overestimated exposure amongst children living a mile away in leafy suburbia. In addition, work involving personal exposure monitoring is extremely limited and could not be used in this study. These problems highlight the need for more research which relates personal exposure to air pollutants to health effects.

QRA assumes that PM₁₀ is causally linked to the health outcomes studied. This has not been proven, although the weight of evidence linking particulates to a wide spectrum of adverse respiratory health outcomes provides support. QRA also assumes that air pollution is linearly related to illness at all levels of PM₁₀. Again, it is not clear if health effects diminish at low concentrations, or whether a threshold concentration exists. Recent studies suggest that very low levels of particulates may be associated with illness. Nevertheless, we did not assume adverse effects below a PM₁₀ of 7.5 µg/m³ as this level is thought to represent natural background levels⁴ and no studies have examined populations exposed to concentrations below 5–10 µg/m³. Our analysis ignored the impact of pollutants other than PM₁₀, and did not consider potential long-term health impacts. Thus it is likely that the overall health impact of external air pollution on children in London is greater than for those associations quantified.

Although prevalence data were obtained from well-established datasets, there are inherent uncertainties in frequency measures of morbidity and use of health-care systems. For instance, European prevalence data were used to obtain the baseline prevalence of acute bronchitis in children, but definitions of this illness vary significantly between countries. Perhaps the greatest source of uncertainty was produced by the effect estimates used. Although those used were drawn from authoritative analyses, and had been used in WHO-sponsored impact assessments, other effect estimates would have led to much lower estimates of health impact. Nevertheless, particulates have been consistently associated with respiratory admissions and mortality in children, and it is unlikely that air pollution will increase rates of hospital admission but not exacerbations. In general, the frequency of a health outcome is inversely related to its severity, and assessing impact solely in terms of the most severe but less common outcomes will underestimate the total health impact.

Table 3: Sensitivity calculations for asthma exacerbations

Asthma exacerbations	Attributable number of cases	Sensitivity (alternate estimate as % of the main point estimate)
Point estimate of this study	43,185	100%
Effect estimate (1.051)		
Lower 95% CI value (1.047)	39,980	93%
Upper 95% CI value (1.057)	46,361	107%
Impact if $PM_{10} > 0$	60,185	139%
Only impact if $PM_{10} > 15 \mu\text{g}/\text{m}^3$	26,055	60%
Low prevalence rate	39,259	91%
High prevalence rate	47,111	109%
All variables at minimum	14,615	34%
All variables at maximum	70,465	163%

Table 3 illustrates the effect of uncertainties in the above factors (effect estimate, baseline prevalence and threshold level for PM_{10}) on the estimated numbers of children with one health outcome – asthma exacerbations. It is clear that there is a wide range of possible results, ranging from 14,615 to 70,465 cases per year.

Conclusions

Quantitative risk analysis relies on numerous assumptions, making exact estimates of attributable cases of ill-health unreliable. Although there is much uncertainty in the results presented, this may have resulted in overestimation as well as underestimation of overall health impacts. Our results suggest that substantial morbidity, but very little mortality, is attributable to PM_{10} exposures of children in London, and that outdoor air pollution is an important cause of illness in children in London. Recommendations for improving regional air quality have been fed into a variety of regional NHS and government fora where policy is formulated. Our results were presented at the 3rd International Conference on Children and the Environment last year.

References

- World Health Organization. Children in the New Millennium: Environmental Impact on Health. Geneva, WHO, 2002
- London Air Quality Network. Air Quality in London 2001. London, King's College and Health Protection Agency, 2002
- HPA Corporate Plan. London, Health Protection Agency 2003
- Quantification of the Health Effects of Exposure to Air Pollution: Report of a WHO Working Group at Bilthoven, Netherlands. Copenhagen, World Health Organization and European Centre for Environment and Health 2000
- Harrison R M. Measurement of concentrations of air pollutants. In Holgate S, Samet J, Koren H, Maynard R, Eds, *Air Pollution and Health*, pp 63–81. London, Academic Press, 1999
- Cambridge Environmental Research Consultants. <http://www.cerc.co.uk> (accessed 31/10/2004)
- Cohen A J, Anderson H R, Ostro B, Pandey K D, Krzyzanowski M, Kuenzli N et al. Mortality impacts of urban air pollution. In Ezzati M, Lopez A D, Murray C J L, Eds, *Comparative Quantification of Health Risks: Global and Regional Burden of Disease Attributable to Selected Major Risk Factors*. Geneva, World Health Organization, 2003
- Atkinson R W, Anderson H R, Sunyer J, Ayres J, Baccini M, Vonk J M et al. Acute effects of particulate air pollution on respiratory admissions: results from APHEA 2 project. *Air Pollution and Health: a European Approach. Am J Respir Crit Care Med* 2001;**164**:1860–66.
- Kunzli N, Kaiser R, Medina S, Studnicka M, Chanel O, Filliger P et al. Public-health impact of outdoor and traffic-related air pollution: a European assessment. *Lancet* 2000;**356**:795–801
- Dockery D and Pope C A I. Outdoor air: particulates. In Steenland K and Savitz D A, Eds, *Topics in Environmental Epidemiology*, pp 119–66. New York, Oxford University Press, 1997
- Department of Health. Hospital Episode Statistics 2001–2002. Available at: <http://www.doh.gov.uk/hes/index.html> (accessed 10/08/2003)
- Kaur B, Anderson H R, Austin J, Burr M, Harkins L S, Strachan D P et al. Prevalence of asthma symptoms, diagnosis, and treatment in 12–14 year old children across Great Britain (international study of asthma and allergies in childhood, ISAAC UK). *BMJ* 1998;**316**:118–24

Analysis of professional roles and collaboration during local management of chronic land contamination cases

**Dr Michael Ogunlokun, MSc in Public Health,
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The Environmental Protection Act 1990 has made contaminated land a key public health issue requiring effective collaboration between professionals from relevant services and organisations at all levels.

A London-based MSc study was undertaken to examine the roles and the collaboration between primary care trust (PCT) public health practitioners, and local authority environmental health officers, planners, and building control officers in managing land contamination.

A literature review showed that factors promoting and/or hindering links at NHS and local authority interface are grouped as three broad themes – organisational issues, cultural and professional issues, and contextual issues¹. The box lists some of the professional dealing with contaminated land. Poor links between health protection units (HPUs) and local authority environmental health officers (LAEHOs), in quantifying and communicating risks from land contamination, have been described by Crook².

Box: Some of the professionals dealing with contaminated land

- Environmental Health Officers
- Planners
- Building Control Officers
- Public Health Practitioners

Research questions were generated using case study research design³ and are summarised below:

- What are the views of the participants on levels of collaboration/hindrances on managing contaminated land incidents?
- Do PCTs give any advice/have direct contact with local authority officers dealing with contaminated land incidents?

This study was done as a holistic multiple case study with two sources of evidence. London was divided into five strategic health authority areas, each area being defined as a case. Replication logic was used to guide production of evidence, selection of cases and preservation of external validity. The choice of five cases was to ensure a high degree of certainty about literal replication. A stated proposition was tested and alternative ones were developed using theoretical replication. Data analysis was carried out using three cases only. Cross-case synthesis was the analytical tool of choice.

Results

- There were three cases where budgetary constraints and lack of staffing to respond to chronic contaminated land incidents were considered as hindrances by at least two professionals.
- There were two cases where there was no collaboration between local authorities and primary care trusts in London sectors during chronic contaminated land incidents.

The lack of resources as a factor hindering collaborative work in this study and by previous research⁴ highlights its importance as a barrier to collaborative work. Contaminated land will continue to remain a key public health challenge at all levels in the UK. The debate about additional resources (ring-fenced or not), linked to organisational performance in public sector organisations, will continue.

References

- 1 Cameron A, Lart R, Harrison L, MacDonald G and Smith R. Factors Promoting and Obstacles Hindering Joint Working: A Systematic Review of the Research Evidence. South and West NHS Executive, Final report, 2000
- 2 Crook P. Enhancing Local and Regional Capacity to respond. London, HPA, Report for HPA London Management Team, 2004
- 3 Yin R K. Case Study Research Design and Methods. Sage Publications, USA, 2003
- 4 Sarjeant J. An Examination of the Relationship between Local Authority Environmental Health Services and Local NHS Bodies (BSc Thesis), King's College, London, 2002

Health and social impacts of chemical incidents

Joint study between the Institute of Psychiatry and Chemical Hazards and Poisons Division

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Introduction

For several years our research group at the Institute of Psychiatry has been interested in collaborating with the Chemical Hazards and Poisons Division (CHaPD) on research looking into the psychosocial outcome of chemical, biological and radiological incidents. Gradually, a joint protocol was developed for a study to assess psychosocial outcome following a chemical incident and we have recently secured funding for this study to proceed. The purpose of this article is to give an overview of the planned study and to publicise our work to the wider readership of the Chemical Hazards and Poisons Report.

Background

In recent years, the public in the United Kingdom and other developed countries have become increasingly concerned about environmental incidents¹. A number of high profile incidents, coupled with a general increase in environmental concerns, have led to media discourse and public worry about many types of potential and actual toxicological hazards². Much is now known about the toxicology of chemical incidents and the ongoing work of CHaPD means that emergency responders can now access swift and comprehensive toxicological advice when managing such incidents. However, there is a lack of good quality research on the emotional and psychological effects of environmental incidents, as most studies in this area are retrospective and/or cross-sectional. Furthermore, most studies have not sampled random incidents but have concentrated on those with a high local (and often national) profile, the best known example in the UK being Camelford³.

The aim of our study is to examine the factors (beyond the toxicological exposure) that modulate the health and social impact of chemical incidents. We also hope to explore the community and social factors that may lead to increased symptom burden in a proportion of individuals. Chemical incidents are ideal episodes in which to study the perception of risk, as they usually invoke many of the 'fright factors' that are felt to trigger alarm⁴. Therefore the study has been designed to enable us to examine factors known to be important in the perception of risk.

Details of the study

The study is entitled 'A cohort study to investigate the determinants of high health and social impact following chemical incident' and it will use a novel study design whereby the incident itself will be the unit of study rather than the exposed individuals. Over 350 new, acute chemical incidents that are reported to CHaPD will be 'recruited' into the study and followed up over a period of six months. The plan is to assess each chemical incident using a newly developed measure of health and social impact, which will enable us to identify incidents that have led to unusually high impact. We will also be gathering other information including toxicological, socio-economic and risk perception data. Ultimately we aim to stratify incidents by their score on the outcome measure (i.e. their health and social impact). The 10% of incidents with the greatest impact will then be compared to the remaining 90%. We hypothesise that, in addition to the toxicity of the incident, there are likely to be several factors that influence the impact of an incident. Specifically we hypothesise that the higher the socio-economic status of an affected area, the greater the impact of the chemical incident.

An important part of the study will be to further develop and validate the measure of health and social impact, which has been devised specifically for this study and needs further refinement and piloting. This measure will attempt to capture the extent to which a chemical incident impacts on the health and social functioning of a local community. The measure will assess health impact at the initial emergency response phase and in the few weeks after the incident. The 'social' impact of the incident will be monitored by the local political and media response and this will be incorporated into a composite overall measure of impact.

Much of the information that is needed for the measure of impact is already routinely collected by CHaPD. However, we are aware that, for a minority of incidents, we will need to contact the source of the initial report in order to ask more questions. For example, we may need to re-contact a health protection representative (who has responded to an incident with CHaPD) in order to gather more detailed information about the initial emergency response. We will also be surveying Accident and Emergency Consultants whose units have received casualties from the incidents; and asking them some brief questions to gain an idea as to the number of casualties and impact on their departments. In addition, we will also be surveying a small sample of GPs who may have seen patients in the aftermath of a chemical incident. Clearly health professionals who work in emergency settings and general practice are busy people and we wish to minimise the disruption that participation in our research may cause. For this reason, prior to the start of the study, we will be inviting interested parties to advise us on how we can best elicit the information we need in the simplest possible way.

Timescale and research team

We expect to begin pilot work on the study towards the end of 2005, but the main data collection will commence in summer 2006. The main research team will be Dr Lisa Page and a research assistant who will be supervised by Professor Simon Wessely (Institute of Psychiatry, King's College London). Further epidemiological and toxicological supervision will come from Dr Giovanni Leonardi and Professor Virginia Murray of CHaPD (London).

References

- 1 Masterton-Allen S and Brown P. Public reaction to toxic waste contamination: analysis of a social movement. *International Journal of Health Services* 1990; **20**(3): 485–500
- 2 Petrie K, Sivertsen B, Hysing M et al. Thoroughly modern worries: the relationship of worries about modernity to reported symptoms, health and medical care utilization. *Journal of Psychosomatic Research* 2001; **51**: 395–401
- 3 Altmann P, Cunningham J, Dhanesha U et al. Disturbance of cerebral function in people exposed to drinking water contaminated with aluminium sulphate: retrospective study of the Camelford water incident. *BMJ* 1999; **319**: 807–811
- 4 Bennett P. Understanding responses to risk: some basic findings. In Bennett P and Calman K, Eds, *Risk Communication and Public Health*, pp 3–19. Oxford: University Press, 1999

CHaPD, HPA gets closer to water

Martin Furness, Chair of Water Industry Public Health Network, Severn Trent Water

The UK Water Industry has now formally re-established its Public Health Network and is actively engaging health professional agencies to:

- continue to improve communication channels and liaison,
- proactively address any water quality and public health risks,
- promote collective preparedness for any incidents or emergencies.

The figure shows the current arrangements between the UK Water Industry and the Chemical Hazards and Poisons Division (CHaPD) of the HPA.

Members of the Public Health Network are drawn from all water companies and are typically the senior water quality manager with specific responsibility for the health professional interface. The group has identified a need to engage with health professionals at two levels, beyond that already in place for the regulatory notifications. Engagement with environmental health officers in local authorities is yet to be progressed.

For CHaPD and possibly the wider HPA these are:

- at the strategic and policy level,
- at the technical and procedural level,
- training in procedural levels.

One of the first initiatives picked up by the Public Health Network and a primary topic of development has been emergency management training for Consultants in Communicable Disease Control, Consultants in Public Health Protection and EHOs. The group has identified the value of a CD-ROM training tool to guide health professionals through the risk assessment and protection advice process and the role of an incident management team or outbreak control team in a water emergency.

A meeting took place with Professor Virginia Murray and her team at the Chemical Hazards and Poisons Division (London) on 2nd August 2005 to review current training initiatives. They were shown a working training template produced three years ago by Severn Trent Water which needs updating and specific CHaPD input on responsibilities and scenarios. The team was very supportive of the initiative. The aim is to provide a self-learn tool particularly for new health professionals to gain experience of the key decisions and experience 'role play' in the health aspects of managing a water emergency. A number of different and challenging scenarios are being considered to add to the two already available.

Commitment to the project is now being sought with CHaPD in September 2005 along with an exploratory discussion on the more strategic interface between the HPA and the Water Industry. Some of the areas that could be considered are collaboration on research and development, a gap analysis, sharing of best practice, development of training programmes and exercises.

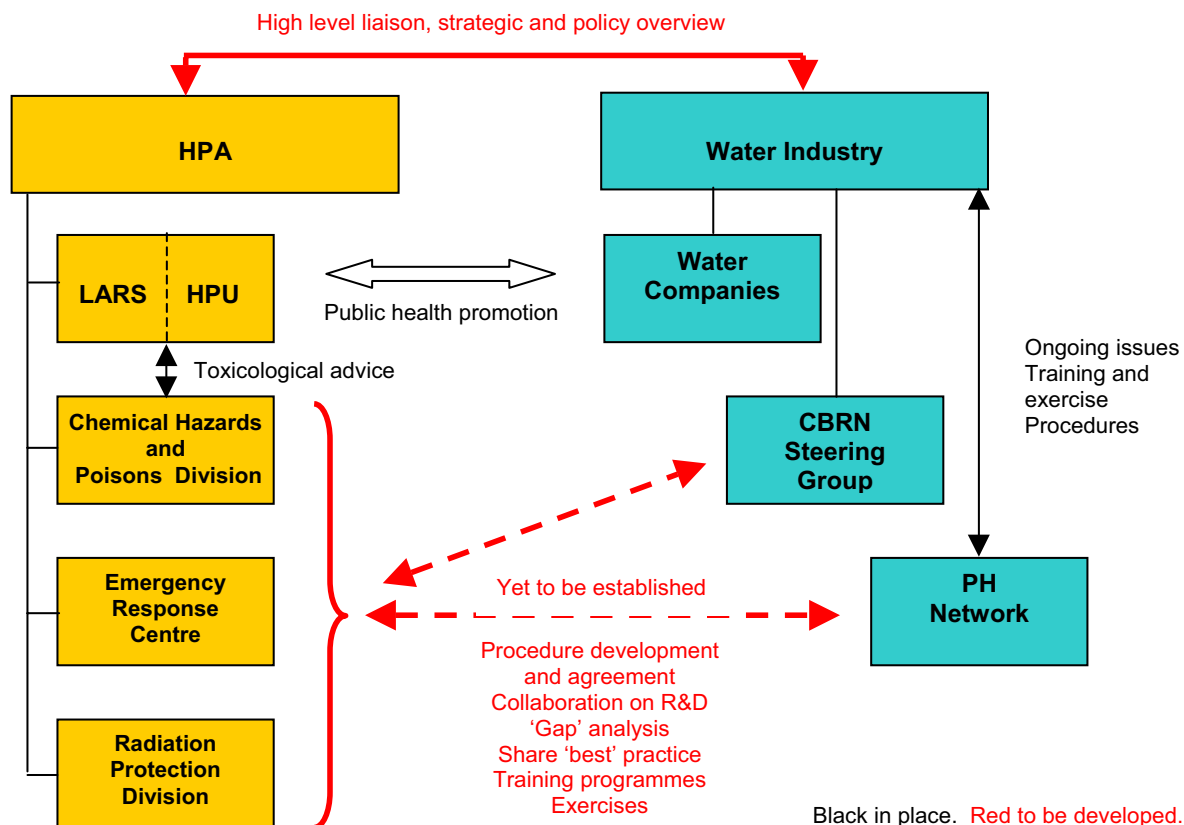


Figure: Current arrangements between the UK Water Industry and the Chemical Hazards and Poisons Division (CHaPD), HPA

Meeting Reports

Environmental and biomedical sampling following the release of chemical warfare agents

**Dr D J Baker M Phil DM FRCA, Consultant Medical Toxicologist,
Chemical Hazards and Poisons Division (London)**

The International Medical Chemical Defense Conference was held at the Bundeswehr Sanitaetsakademie in Munich on 27th and 28th April of this year. The conference is held annually at the main medical training and research facility of the German Army. Many of the international speakers work at the academy, which has an internationally recognised reputation for its research work, particularly in the use of oximes following pesticide poisoning.

The main themes of the conference this year were the problems and pitfalls of the verification of the release of chemical warfare (CW) agents and the importance of environmental sampling and environmental monitoring. Special emphasis was given to clinical analysis following exposure to nerve or blistering agents. The conference was attended by about 200 delegates, mainly from Germany but with representatives from France, the United Kingdom, the Czech Republic and Israel. The UK contingent included representatives from Dstl, Porton Down, who have made a major contribution to retrospective verification of the alleged use of CW agents.

The meeting opened with consideration of the problems faced by the verification teams with emphasis on the work in Iraq and the use of chemical agents against the Kurds at Hallabjah during the infamous al Anfal campaign of 1987–88. The work of the Organisation for the Prohibition of the Use of Chemical Weapons (OPCW), based in the Hague, was presented. This highlighted the difficulties of gathering samples and the dangers of working in areas that still retained unexploded and unstable munitions. Both environmental and biomedical sampling should be used to analyse any alleged use of CW agents but the two approaches are not equivalent. Real-time detection of possible chemical releases is important but there are inherent difficulties in gathering environmental samples and human samples are affected by metabolism. Quality control of analytical techniques is very important. The OPCW has a network of 18 approved laboratories around the world and has a central control laboratory at Riswijk in the Netherlands. Both on- and off-site analysis are used in verification operations and control of analysis conforms to an international standard (ISO17025).

The attack at Hallabjah in 1988 provided a vivid illustration of the consequences of the release of chemical weapons against an unprotected civilian population with few or no medical resources. Both nerve and blistering agents were released from artillery shells, confirmation being provided by analysis of samples taken to Porton Down. The positions of the dead, seen in a videotape taken some days after the attack, indicate that the agent causing death had a very short latency of action. Overall there were at least 5,000 fatalities as a result of the attack and there have been considerable long term health problems among the Kurds, including an apparent increased incidence of neoplasms. Building an accurate picture of what had happened at Hallabjah highlights the importance of combined environmental and biomedical sampling following alleged CW agent release. For the verification teams, eyewitness accounts and identification of toxidromes are of utmost importance. The information may, however,

be manipulated by a structured presentation of evidence in the form of a 'guided tour' for investigators. In one African country, for example, signs and symptoms of endemic illness had been presented as being the result of exposure to chemical agents for purely political reasons.

Environmental monitoring is possible on a real-time basis using a variety of field detection techniques. Armies around the world have adopted this approach since the end of the Second World War to detect the release of CW agents from a pre-identified list of threats. Since many of the agents, such as hydrogen cyanide, are non-persistent or may be hydrolysed in the environment, as in the case of the nerve agent sarin, post-hoc detection of a release may be difficult. With other highly persistent agents, such as the nerve agent VX, the problem is not so marked. On the biomedical side, human metabolism may change agents to which victims had been exposed to a number of metabolites which are excreted in the urine. Biomonitoring is beset with a number of difficulties. Sometimes assays for marker metabolites may be normal after a genuine exposure. Toxidromes and individual symptoms may be unspecific and patients may also present with a preconceived diagnosis based upon fears of exposure to a suspected CW agent release (for example, following a terrorist release in an urban setting). In addition, genetic variations among human populations may affect metabolism of specific chemical agents.

The meeting heard a number of presentations about the details of biomonitoring techniques used following nerve or blister agent exposure. One important difference between detection of the use of a specific anticholinesterase nerve agent and accidental exposure to pesticide is that the identity of the latter is usually known and thus only the degree of acetyl cholinesterase inhibition is necessary to confirm the patient's pathophysiological status. In the case of the use of nerve agents (which are banned by international treaty) identification of the agent itself through specific metabolites is necessary to confirm exposure. Standard protocols and details of analytical techniques have been put together by the US Army in an open memorandum TM Med 296. This is a key reference containing detailed techniques for the detection of exposure to GB (sarin), GD (soman), GF (cyclosarin) and cyanide. There are also details of techniques which are transportable to the field such as the micro Ellman technique for the determination of concentrations of red cell acetylcholinesterase. There have been problems in the past with the analysis of acetyl and butaryl cholinesterase using different methods. The new modification overcomes the problems of transportability of the original Ellman method.

Following exposure to specific organophosphate nerve agents, hydrolysis is the main metabolic pathway and the resulting alkyl methyl phosphonic acids can be analysed. Phosphonic acid metabolites are excreted in the urine for about two or three days. The nerve agents sarin and soman can bind to plasma albumin and be released later. VX has a useful characteristic marker due to the metabolism of its sulphur-containing side chain.

There has been a considerable amount of new work on detection following the release of blister agents, particularly sulphur mustard ('mustard gas'). Although the toxidrome from exposure to this agent is well described, clinically specific confirmation comes from environmental analysis and bioanalysis. S-mustard is a non-discriminating alkylating

agent which is metabolised via a complex hydrolysis reaction with glutathione. Verification of exposure has depended in the past on the analysis of urinary metabolites including thiodiglycol sulphoxide. Currently work is in progress using an immunochemical approach by raising monoclonal antibodies to S-mustard.

The Munich meeting highlighted the difficulties of environmental and biomedical monitoring following exposure to CW agents whose

stockpiling and use is banned by international treaty. There are major differences between releases of such agents and accidental exposure to industrial chemicals whose identity is known and the production and transport of which is under careful control through the HazMat system. Experiences in CW verification in remote parts of the world are useful lessons for the Health Protection Agency, which has a leading role in the management of both accidental and deliberate release of toxic agents, particularly if a CW agent is used by terrorists in an urban attack.



Environmental and occupational epidemiology

Professor Virginia Murray,
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The full breadth and scope of research in environmental and occupational epidemiology is not readily appreciated, as there has not been, up to now, a forum for in the UK for presenting and sharing research work in this area. The first such meeting took place this spring and the Health Protection Agency was delighted to be able to provide facilities and host this meeting at the Sherman Postgraduate Centre, Guys and St Thomas' Hospital, on 28th April 2005. The meetings were conceived as providing an opportunity for researchers in these two complementary areas to meet and share ideas, and also to improve dissemination: for example to provide HPA staff with an update on the skills and knowledge available in the academic community that might help them to solve difficult problems in public health protection.

The meeting was organised by CHaPD (London) in collaboration with the International Society for Environmental Epidemiology and the International Commission of Occupational Health. Sponsorship for the meeting included support from the Department of Health, the Health and Safety Executive, the British Occupational Health Research Foundation and the Colt Foundation.

The organising committee decided to limit this meeting to UK work, and aim for a balanced programme. It was decided to leave plenty of time for discussion and settle on a format with some invited plenary talks and open submission of posters, which facilitated review and discussion of the posters. The morning had the focus on occupational epidemiology and the afternoon environmental epidemiology. The evaluations suggested that a good balance was indeed achieved. The organisers were very happy with the response to the call for posters. A total of 29 were accepted, broken down as 13 with a primary focus in occupational epidemiology and 16 in environmental epidemiology.

The four formal presentations were very well received.

- Professor Paolo Vineis, Imperial College, reviewed gene–environment interactions using many examples. He discussed the relationships between risk factors for cancer and the molecular mechanisms by which they exert their action (molecular epidemiology). In particular, he considered research on genetic susceptibility related to DNA repair and the metabolism of carcinogenic substances, and on intermediate markers such as DNA adducts.
- Dr Anna Hansell, London School of Hygiene and Tropical Medicine, presented the developments in the BioBank programme. More details of this important programme can be found at <http://www.ukbiobank.ac.uk/>.
- Professor Stephen Palmer, Health Protection Agency, considered the value of environmental public health tracking and shared his experience of a meeting in the USA reporting on the exciting developments in this area.

- Professor Matthew Hotopf, King's College, summarised the extensive work undertaken on environmental epidemiology and military health. He discussed the overlap between psychiatry and medicine; medically unexplained symptoms and their relationship with psychiatric disorder and psychological factors; the relationship between physical disease and psychiatric disorders in relation to issues such as the Gulf War syndrome.

Occupational epidemiology poster topics ranged from acute symptoms following pesticide exposure to needle stick injuries among nurses and midwives in sub-Saharan Africa and inflammatory responses, to the inhalation of metal fume and risk of pneumonia. The quality was excellent but after much debate by the facilitators the prize for the best poster in the morning session was awarded to Keith Palmer, Mike Calnan, Jason Poole and David Coggon of the MRC Environmental Epidemiology Unit, University of Southampton, for their work on 'Somatisation and arm pain: a prospective cohort study'.

Environmental epidemiology abstract titles ranged from assessment of exposure to nephrotoxic agents from industrial emissions, to the use of atmospheric dispersion modelling to estimate human exposure to chemicals around a landfill site and environmental burden of disease assessment for the Republic of Ireland. Again the quality was excellent and the facilitators had great difficulty in choosing to award the prize to Stephen Bremner, Department of Community Health Sciences, St George's Hospital Medical School, who worked with Richard Atkinson, Roy Harrison and Ross Anderson on 'Particle species and daily mortality and hospital admissions in the West Midlands, 1995–2001'.

Over 80 delegates attended, mostly from the United Kingdom, but delegates from the Republic of Ireland, Bulgaria, Poland and Australia were also present. Evaluations indicated that such a meeting was welcomed as a useful contribution to the quality of work in this field, and the organisers intend to develop it into a regular event on the calendar.

Training and Conferences

VIIIth International Conference,
Cardiff, Wales UK



Chemical Hazards, Poisons and Sustainable Communities

The Macdonald Holland House Hotel, Cardiff, Wales, UK 5-7 December 2005

Chemicals are an essential part of modern life but they can cause harm. Indeed the public is increasingly anxious about the long term effects of exposure to chemical as well as the acute threat from chemical terrorism. In the drive for sustainable communities, the undoubted benefits to society of chemicals in manufacturing, industry, agriculture, food presentation, housing, products etc have to be tempered by the potential for harm.



This conference will focus on national and international developments in identifying the key threats to the health of the public, covering "Alert and Response" systems, environmental public health tracking of hazards, exposures and health effects, engaging with the public, assessing risk and giving advice.

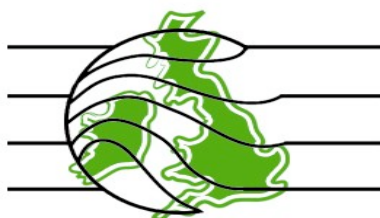
The conference will highlight current knowledge and gaps and will make challenging proposals for research and for developing interventions and strategies for sustainable communities, including what the public health workforce should look like in the 21st century.

The conference will be of interest to policy makers, environmental health and public health professionals, toxicologists as well as those professionals in allied agencies and organisations.

For further information about the conference and poster submission, please contact:

Tel: 029 2041 6388
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www.hpachemicalconference.org.uk



Advisory Committee for Natural Disaster Reduction

PRESENTS

A Conference of European National Platforms for Disaster Risk Reduction

COMMUNICATING RESILIENCE

15th and 16th December 2005

The Thames Barrier Installation, London



Conference Aims

- To share best practice in natural disaster reduction communication
- Help to implement the Hyogo Framework 2005 for natural disaster reduction
- To consider what support the European National Platforms seek from the EU Commission

Supported by

Environment Agency
Civil Contingencies Secretariat
Health Protection Agency
Society for Earthquake and Civil Engineering Dynamics
University of Portsmouth
Commonwealth Disaster Management Agency Limited

Conference Objectives

- To encourage European collaboration in disaster risk reduction via the UN International Strategy for Disaster reduction (ISDR) National Platform framework
- To invite all National Platforms of the 25 EU member states to endorse the London Declaration (2005) on promoting resilience to natural disasters

For further information please contact:
Chemicals.training@hpa.org.uk



Training Days for 2005

The Chemical Hazards and Poisons Division considers training in chemical incident response and environmental contamination for public health protection a priority. The 2005 programme offers basic and more detailed training, along with the flexibility to support Local and Regional Services initiatives as requested.

Introduction to Environmental Epidemiology Short Course 19th–23rd September, London School of Hygiene and Tropical Medicine, London

(for those working in public health, health protection or environmental health and who have an interest in or experience of environmental epidemiology and would like to improve their skills)

The aims of this short course are to summarise the key concepts in environmental epidemiology, to explore the key concepts in exposure assessment and cluster investigation, to examine the scope and uses of environmental epidemiology in local agency response to public health, and health protection issues. Also it will show how to explore study design and practical consequences of choices made when planning and undertaking an environmental epidemiological study. This will include an appreciation of the influence of finance, politics and time constraints on the choice of study, to review the advantages and difficulties of multidisciplinary and multi-agency working in environmental epidemiology and to use strategies for communicating risks concerning investigation of environmental hazards. The fee for this course is £500. A maximum of 20 places are available. For further information see: <http://www.lshtm.ac.uk/prospectus/short/seep.html>

How to Respond to Chemical Incidents

22nd September 2005, Queen's Campus, University of Durham, Stockton on Tees

25th October 2005, London

(for all on the on-call rota including directors of public health and their staff at primary care, other generic public health practitioners, accident and emergency professionals, paramedics, fire and police professionals and environmental health practitioners)

The general aims of these basic training days are to provide an understanding of the role of public health in the management of chemical incidents, to be made aware of the appropriate and timely response to incidents and to understand the interaction with other agencies involved in incident management. These training days also have specific educational objectives which include to be aware of the process for health response to chemical incidents, the type of information available from CHaPD (L) to help the health response, the resources available for understanding the principles of public health response and the training needs of all staff required to respond to chemical incidents. A maximum of 40 places are available for each course.

Contaminated Land Training Day

27th September 2005, London

(for consultants in health protection, CsCDC, CsPHM, and specialist registrars in public health medicine and local authority environmental health officers)

Land incidents are of considerable concern and present extremely interesting and important issues for public health protection. Occasionally land contamination may arise from acute events (such as spills and leaks) but

most public concern now concentrates on chronic long-term contamination issues (waste disposal including landfills, an abandoned factory site, or other brownfield sites). These have resulted in chemical contamination of the soil and present, or have the potential to present, a risk to human health. It is anticipated that this training should provide delegates with the tools and information required to provide an appropriate and timely response to chemical incidents that result in land contamination.

Environmental and Public Health Training – Advanced Update to Include Integrated Pollution Prevention and Control (IPPC) 13th October 2005, London (postponed from June)

(for the HPA environmental network, consultants in health protection with a special interest in environmental contamination and local authority environmental health practitioners)

The general aim of this training day is to raise awareness of some recent developments in environmental science. The specific educational objectives include familiarising participants with current issues relating to environmental sciences including modelling, monitoring, risk assessment and relevant research topics. Using the IPPC regime as an example, the course will describe many of the key risk assessment tools and sampling methodologies used by industry and regulators. Case studies will include the Environmental Agency's H1 assessment tool and the use of air dispersion modelling in IPPC and local authority air quality review and assessment reports. A maximum of 40 places are available.

Acute Chemical Incident Response for Emergency Departments 24th November 2005, London

(for emergency physicians and nurses but will also be of interest to hospital managers and clinicians from other specialities – general physicians, anaesthetists and intensivists – who may be involved in a hospital's response to a chemical incident)

Topics to be covered include recognising a chemical incident, containing the incident, principles and practice of decontamination, antidotes and supportive treatments, the role of the Health Protection Agency, planning and preparation, and medico-legal and forensic issues. Presentations on each topic will include small group sessions with case scenarios facilitated by members of the teaching team.

Those attending CHaPD (L) courses will receive a certificate of attendance and CPD/CME accreditation points.

The costs of the training days are £25 for those working within the Health Protection Agency and £100 for those working in organisations outside the Health Protection Agency. Places will be confirmed as reserved upon receipt of the fees. These charges are to cover lunch, training packs and administration costs.

For booking information on these courses and further details, please contact Karen Hogan, our training administrator, on 0207 771 5384.

CHaPD (L) staff are happy to participate in local training programmes. Please call Virginia Murray or Karen Hogan to discuss on 0207 771 5383.