Chemical Incident Report

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Editorial

Dr Virginia Murray, Director, Chemical Incident Response Service

The Chemical Incident Response Service (CIRS), in this Chemical Incident Report (CIR), targets the following for public health and staff working in accident and emergency departments:

- *land contamination* presents a problem for public health. As yet few Consultants in Communicable Disease Control (CsCDC) have had much experience in responding to land contamination incidents. However these incidents can present difficulties because of the lack in understanding of the impact on the public health. CIRS is grateful to the authors of two recent incident reports. Earthquakes in the last three months around the world have lead to fires and chemical releases. Even the UK is not immune with a recent earthquake in Wales A review of the land incidents reported to CIRS has resulted in the development of a checklist for health authorities by Emma Woodey (CIRS Research Engineer–Land)
- *chemical terrorism* worries medical professionals. Worldwide, many have been involved in trying to understand the effects of two incidents that occurred in Japan and learning the lessons from these events. A review of some of the relevant Internet sites is provided. A draft information sheet for those exposed to sarin, but triaged as not being at immediate risk of developing health effects is offered for comment. Please do so!
- *other issues:* includes the effects of bleach in milk continuing our series of food related incidents; to remind those treating tuberculosis of the toxicity of isoniazid in overdose, a recent case report from the National Poisons Information Service, London, is summarised; and requests for a trawling questionnaire have resulted in the development of the enclosed draft.

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The implications of an accidental leak of aviation fuel

Gerard Madden, Environmental Health Officer, South Gloucestershire Local Authority

The incident

On Tuesday 19 May 1998, adjacent to the A38 north of Bristol an underground fuel pipeline was damaged by maintenance workers and approximately 27000 litres of aviation fuel escaped. Significantly, the line was not under pumping pressure at the time of the incident, however, fuel was released due to hydrostatic head in the line. The spill appeared to be localised and the Company responsible for the pipeline began recovery of the fuel and removal of the most heavily contaminated soil. The fuel spread over an area of 40 x 20m on old depot land and onto an adjoining residential property (hereafter House A) spreading over parts of the garden lawn, a paved patio and a garage.

The Police and Fire Brigade attended but stood down at approximately 2000 hours, the latter being satisfied that all surface liquids had been removed.

The incident then moved from potentially explosive to a physical clean-up operation.

During the course of Wednesday 20 May the residents of a property 16 houses away from the spill site (hereafter House B) reported a strong smell of kerosene in their property and a 'pool' of fuel under the floorboards towards the front of the property was found. An Environmental Health Officer (EHO) from the South Gloucestershire Local Authority (SGLA) re-visited the site and House B and met with the Company. Health based advice was sought from Avon Health Authority who in turn have access to the Chemical Incident Response Service (CIRS).

Photograph 1: fuel supply pipe line exposed (G Madden)

The occupiers of Houses A and B were evacuated and housed in a hotel overnight while the company tried to secure ventilation equipment and the clean up continued. The pathway from the spill to House B was also investigated.

On Friday 22 May, a further site meeting was held and a Second Phase Strategy was agreed based on the available information including results from Scientific Services (of Bristol City Council contracted by SGLA) on indoor fume levels within the houses.

EHOs, public health and the company agreed the following course of action:-

- All residents were to be briefed by public health
- If health problems occur contact GPs
- If odours - call the company and the EHOs
- If odours/symptoms do occur the company to re-house as a precaution
- Occupants of the two most affected properties (Houses A & B) to be re-housed.
- The company to continue with remediation.

The action plan was used through the first few weeks and was confirmed in writing to all the residents affected with a series of contact telephone numbers.

Health information and advice

Aviation fuel is similar to kerosene. Toxicological literature revealed an occupational exposure level of 100mg m^{3-} TWA. Kerosene is also a suspected carcinogen, a severe skin irritant and can cause somnolence, hallucinations and distorted perceptions. CIRS revealed the need to be very cautious as people can inhale the vapour and be unaware that they are affected, which could, for example, lead to a driving accident. It was clearly a health risk.

The risk assessment methodology for air was accepted and airborne levels of kerosene of 10mg m^{-3} in the short term and 1mg m^{-3} in the long term were determined. Soil targets were also agreed.

Remediation strategy:

The objective of the strategy was to reduce the contamination present to 'risk based clean up levels' and also to achieve the qualitative objective of minimising odours. A combination of vacuum extraction and bioremediation were used.

A number of old land drains running parallel to Gloucester Road through the gardens and under the properties were discovered. One in particular had provided easy conduit for the fuel to House B, where it had backed up due to a blockage in the drain

Remediation/monitoring:

House B was gutted and a network of porous pipes were then sunk across the front living room and front bedroom and attached to a vacuum extraction system. The fuel va-

pour extracted was collected through a system of centrifuges - to remove water vapour - and then absorbed onto carbon filters, extraction continued until the quantity of product recovered became negligible. A similar system was also installed at House A

Photograph 2: remediation in action inside a property showing boreholes connected to vacuum extraction system (floor boards and joist removed) (G Madden)

Closing strategy

A Closing Strategy was agreed covering the targets to be achieved and a monitoring protocol extending to 1 year post reoccupation and a further year whereby the Company would investigate any unforeseen problems reasonably attributable to the original leak.

Lessons learned

- The lack of clear health guidance for aviation fuel, even though measurable, was frustrating. Often in chemical incidents, the chemical is unknown or there is no analytical method readily available for detection.
- Conflicting advice from two Environmental Consultants caused concern amongst the residents and ourselves. At one stage, there were two sets of remedial equipment on site. If this had continued identifying the person responsible, should the remediation fail, could have been serious problem.
- The on-site meeting with public health physicians from Avon Health Authority was extremely useful and led to the adoption of a pragmatic approach in the early stages. However a lack of communication between SGLA., Avon Health and CIRS meant that the offer from CIRS to attend the site was not taken up.
- Monitoring undertaken independently by Scientific Services (Bristol City Council) was very useful to reassure residents, especially at the beginning of the incident prior to the arrival of the Environmental Consultants. Advice would be to monitor early and establish why later, as invariably it will be useful.
- The use of unaffected property in the vicinity as a background site to establish levels to work towards, helped in the understanding that 'kerosene-free' may not be practicable.

Given the opportunity to start at the beginning again it would be recommended to try and set out what needs to be achieved early on, and if there are no answers then how systems need to be implemented to find them. For example:

- if it can't be established that houses are safe, then temporarily re-house the occupants
- have in place a procedure for people to report further problems and actions to then be taken
- establish that steps will need to be taken to determine the safety of properties and clarify responsibilities.

This case has already been utilised in training for EHOs both in-house and in the region. The lessons learned have also been incorporated in SGLA's Inland Pollution Hazards Plan. Roles of relevant organisations, access to health based advice and lines of communication have been clarified. The company concerned who have been co-operative throughout have been advised to revisit their preparedness for future incidents in light of the lessons learned.

Photograph 3: evidence to damage to trees resulting in an autumn-like reaction in July, 1998 (G Madden)

Finally we have recently been notified of a disagreement with the health based targets set by the consultants acting for the residents and so we are currently reviewing these levels with the help of CIRS.

<u>Please Note</u> ; The contents of this paper reflect the views of the author and are not necessarily those of South Gloucestershire LA/ Council. In addition, the incident is ongoing and subsequent findings may alter conclusions.

Pollution of an inland watercourse

Dr Ken Allen, CCDC, Doncaster Health Authority
Emma Woodey, Research Engineer – Land, CIRS

Summary

Askern tip, on the site of an abandoned colliery and Coalite plant are situated to the north of the village of Askern near Doncaster. In 1997, following a meeting of local representatives, Went Inland Drainage Board contacted the Environment Agency and later the Local Authority and Health Authority to raise concerns about the possibility of drainage from Askern Tip polluting the inland watercourses, in particular Swan Syke Drain. There were two primary concerns expressed.

1. Occasionally, drainage board employees work in the dyke usually using machinery to clear weed and sediment but sometimes by hand particularly in culverts. They wear standard protective clothing;
2. In dry summers farmers with land adjacent may, under an abstraction license, use the water for irrigation.

A site visit and meeting was held in order to establish whether there was a significant pollution problem in the drain. If so, what was the cause and was the problem likely to get better or worse?

Photograph 1: The drain downstream of the tip (Emma Woodey)

The drain is approximately 100m downstream of the tip and is ultimately pumped into the River Went. It is believed that the discharge to Swan Syke Drain might be from 4 old lagoons that are buried to the middle west of the tip site and were used to dispose of slurry when the colliery was in operation. A significant amount of liquid was discharged from these lagoons. The liquid or leachate could be continuing to flow for a number of reasons, for example, the lagoons may have been poorly capped thus allowing rainwater to infiltrate through the waste material and become contaminated.

Analyses and interpretation of results

The Environment Agency have analysed the water downstream of Askern Tip on a monthly basis for a number of years. Samples are analysed for biological oxygen demand (BOD), chemical oxygen demand (COD), ammonia, suspended solids, thiocyanate, oil and grease, free cyanide, monohydric phenols and total iron.

Raised levels of iron were detected in the drainage water. There was not believed to have been any iron in the slurry disposed of in the lagoons although it was highlighted that iron in the form of pyrites (FeS) is present in a lot of colliery waste. The ammonia in the drain water was considered to present the biggest problem but the levels measured were not dissimilar to those found in any watercourses near to sewage works. It was therefore concluded that as long as the drain water was not directly ingested there is no risk to human health although the tip presents a continuing hazard.

The nature of the crops planted should determine whether the water was suitable for irrigation. It was felt that MAFF should be contacted, advised of the analyses and asked to provide more detailed advice.

Continuing hazard and risk assessment

The scope of the current analysis by the Environment Agency was reviewed and its suitability questioned. This was primarily because there could be small amounts of potentially toxic chemicals e.g. dioxins, present in the drain water that are not looked for in the analyses currently undertaken. This could present a problem if the drain water were used for the irrigation of edible crops. However it was agreed that there was a need to continue providing the Health Authority with any analytical results that would be of value.

Earthquakes 1999

Rico Euripidou and Virginia Murray, CIRS

Severe earthquakes have been reported around the world with secondary chemical incidents from fires and chemical

Table 1: Earthquakes reported in 1999 (Information collated from the Guardian online search*: http://www.guardian.co.uk/)*

Date	Place	Scale	Numbers of reported deaths and injured	Numbers of homeless or evacuated
25 Oct 1999	Wales	3.5	0	0
17 Oct 1999	Los Angeles	7.0	0	0
1 Oct 1999	Mexico	7.5	5 dead	6000 unsafe buildings demolished
21 Sep 1999	Taiwan	7.6	2152 dead, 3500 injured, 1245 trapped	1000 homes destroyed
14 Sep 1999	Turkey	Aftershock	7 dead, 200 injured	
7 Sep 1999	Athens	5.9	143 dead	10 000 homeless
17 Aug 1999	Turkey	7.8	~15 000 dead, thousands injured	>50 000 homeless

releases (table 1). This following summary provides an example of the problems in the immediate aftermath

Immediate aftermath of the Great Hanshin-Awaji Earthquake, 1995

Kristin Hanson, Pre-medical school student working in Japan, assisting at the World Association of Disaster and Emergency Medicine Conference, Japan, 1999

On January 17, 1995 at 05.46 hours, an earthquake measuring 7.2 on the Richter Scale struck Kobe, Japan claiming over 6,000 lives. This active, international port city of 1.5 million inhabitants, sits directly above an intricate web of active fault lines—information that was not released to the general public until after the quake. Reputed as an area safe from the otherwise impending threat of earthquakes in Japan, the tremor sent shock waves not only through the land, but also through its unsuspecting citizens.

News of what reporters called The Hanshin Earthquake, immediately made international headlines. At 06.00 hours. Japan time, just 14 minutes after the earthquake had struck, Cable television (CNN) was reporting to some 150 million viewers in 142 countries worldwide that a major earthquake had struck Kobe. Within the first hour, there was a global response, various governmental agencies in Europe, Asia, and North America were all offering assistance through their embassies in Tokyo. In Japan, however, Prime Minister Murayama had not yet arrived at his Tokyo office, located three hours by Bullet Train away from the disaster site, and was apparently unaware that anything at all had happened.

Photograph 1: Example of collapsed buildings in Kobe (Kristin Hanson)

A state-of-the-art Emergency Satellite Information System did exist in Kobe. It was established for the purpose of disseminating current information in a crisis to and between key emergency response agencies in both Tokyo and the local prefecture. The system was installed in 1991 and was linked by satellite to 92 municipalities in the prefecture and 172 bureaus, including the Fire Defense Headquarters, National Land Agency, and Regional Maritime Safety Headquarters. This satellite system too, however, became a victim of the earthquake when a tremor destroyed the water coolant tank that was used to keep the backup generator running. The system was rendered powerless.

The situation with which residents of the stricken area were confronted immediately following the earthquake varied considerably depending on location: landslides, threat of tsunami, injury, people buried under the rubble of their collapsed homes and raging fires. With power, telephone, and transportation systems severely damaged, the usual modes of communication within the city were difficult, if at all functional. Consequently, most people were completely unaware of anything outside of their immediate area.

Photograph 2: Example of the damage after fire broke out following the earthquake (Kristin Hanson)

Immediately following the earthquake, an enormous number of fires simultaneously broke out. The Fire Bureau received 6,922 calls of which 2,765 had to go unanswered, the callers' voices could not be heard over the damaged phone lines. There was little hope anyway, by the time backup fire fighters could be contacted and were able to get through the heavy traffic jams to assist the 292 fire fighters on duty at the time of the quake, there was no water. Water tanks around the city had cracked and leaked, depleting even the reserves.

Water tanks were not the only containers to be spilling their contents. Not far from where the fires were burning out of control, gas tanks were also leaking The mammoth containers each held some 20,000 tons of liquid petroleum gas (LPG). An explosion feared, 80,000 people from the densely populated area surrounding the tanks took to the streets seeking refuge.

Personal experience

- I was in the shower when the earthquake happened—the walls appeared to move in and out on me
- my family in the US could see on television extensive fires resulting from the earthquake before I could find a telephone which worked so I could reassure them
- immediate response was by individuals—due to the scale of the disaster government based organisations were initially paralysed.

Land Contamination

Emma Woodey, Research Engineer - Land

Introduction

Land contamination, predominantly from past industrial activity, is a widespread problem in the UK. Many contaminated sites have been abandoned and have been derelict for many years. As part of the national need for land, for housing and for new industrial purposes, the re-use of such 'brownfield' sites is being promoted. This has the two-fold advantage of improving the quality of the local environment whilst at the same time protecting diminishing land resources.

Legislation

The Environment Act 1995 created a new legal framework for managing the investigation and remediation of contaminated sites (Part IIa). It was due to come into force in April of 1997 but has been held up for various reasons and will probably now be introduced in early 2000. A third consultative document was released by the DETR in October 1999. A copy of this can be obtained from the DETR web-site (www.detr.gov.uk).

The new regime places a statutory duty on local authorities to identify areas of contaminated land in their area. It is likely that they will then, in conjunction with the landowner or the original polluter, be required to investigate and, if necessary, clean up sites that are harmful or may potentially be harmful to human health or the environment. This is likely to raise a number of issues including liability and cost as well as social concerns, for example the impact on the value of adjacent property and perceived risk to human health.

Land Contamination and Health

The link between human health and the quality of the environment has been recognised for a considerable time [1], yet it is only in the past twenty years following incidents such as Love Canal in New York State [3] that soil has been identified as an important exposure route to potentially toxic substances [2,6] This may be for a number of reasons.

1. Soil is perceived as being 'dirty' so therefore contamination is much less obvious than contaminated water or air where there may be a strange taste or odour.

2. As human interaction with soil is much less frequent than with air or water, contaminants may have accumulated gradually over many weeks, months or even years without being detected. Direct exposure to toxic substances in soil may occur through eating vegetables that have been grown in contaminated soil, inhalation of soil vapour, dermal contact or through direct ingestion of the soil. For this reason, young children with geophagia (soil-pica) are most at risk.

3. Contaminants in the soil do not tend to migrate or disperse as far or as quickly in soil as they do in other environmental media. This means that health effects may be very localised and exposure can occur several years after the pollution incident making detection and management much more complex.

4. A direct link between exposure to contaminated soil and human health effects is often difficult to establish. This may be due in part to the difficulty in establishing soil as the exposure pathway between the source of contamination and the target (human, animal, plant building etc.). In some circumstances land is considered as an end-point for contaminants whereas in reality it is both a source of contamination and an exposure pathway between the source and target (Figure 1).

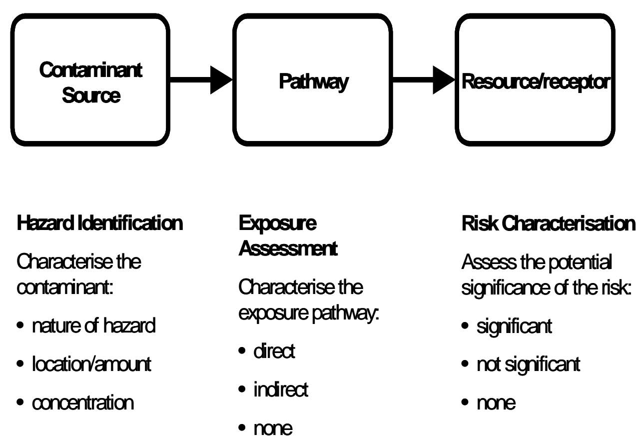


Figure 1: Source-Pathway-Receptor model for assessing risks posed by contaminated land (Richards et al, 1996)[5]

Soil can affect human health in several ways leading to specific diseases or to more general ill health. However, it is considered that some of the relations between soil and health are uncertain and the causes putative. [4]

A review of CIRS data

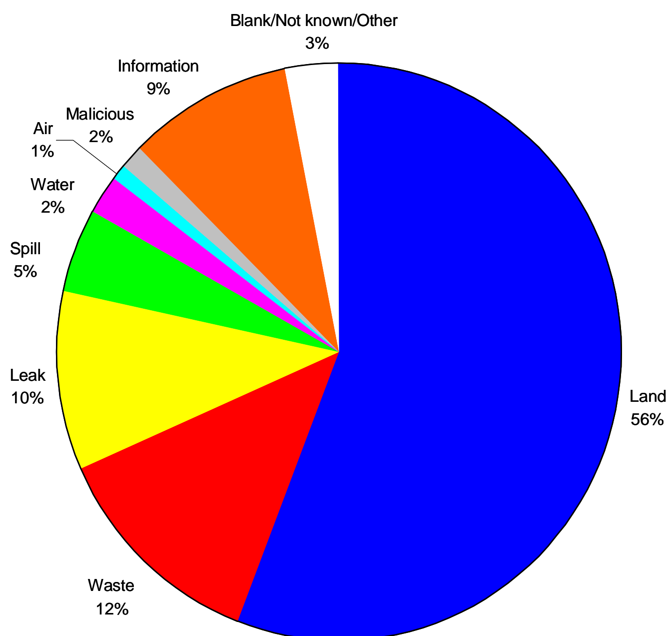
As part of on-going research into land chemical incidents a review of the incidents that have been reported to CIRS between February 1996 and August 1999 has been undertaken: a total of 129 land chemical incidents have been reported: 12 of these have been requests for information ranging from concerns for contractors digging up a graveyard to information about landfill sites.

Graph 1 shows all land incidents reported to CIRS by type of incident. Just over 50% of land incidents are explicitly categorised as 'land'. In general these are chronic land problems such as the redevelopment of an old industrial site. Land problems categorised under 'waste' are usually chronic problems also. For example, materials on a toxic dump or an old quarry infilled with waste, which may be redeveloped and the chemically contaminated soil exposed.

In contrast, acute land contamination incidents are most likely to result from leaks or spills, frequently of petrol/fuel

oil. Based on these assumptions it can be concluded that the majority of land chemical incidents reported to CIRS are chronic problems – 68%.

Graph 2 highlights the chemicals most frequently involved in land contamination incidents reported to CIRS. The bar labelled 'other' represents 46 different chemicals. As you probably realise, more often than not contaminated sites contain a mixture of two or more chemicals. Heavy metals such as lead, arsenic, zinc, copper, mercury and cadmium are frequently encountered at old industrial sites that have been abandoned and derelict for many years and these are generally chronic problems. Most acute incidents that result in land contamination involve leaks or spills of petrol or other fuel oils.



Graph 1: Land chemical incidents reported to CIRS by incident 'type' (February 1996—August 1999)

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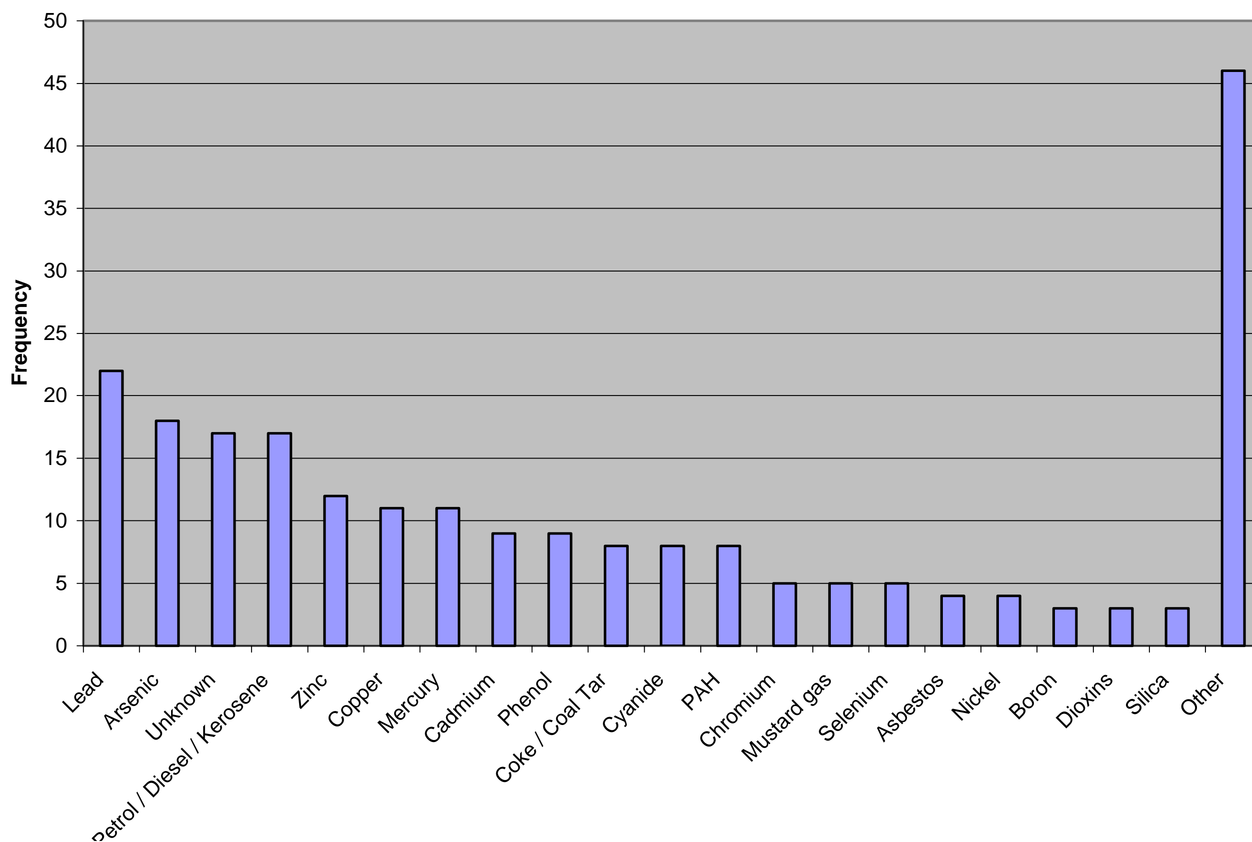


Graph 2: Chemicals involved in land chemical incidents reported to CIRS

Introduction to draft land contamination checklist for Health Authorities

Emma Woodey, Land Engineer & Virginia Murray, Director

Checklists provide a summary of the experiences CIRS has gained as a result of response to incidents. The concept of a checklist for public health response to land contamination has been tested at the Land Training Day, 14 October 1999. CIRS is grateful to those Consultants in Communicable Disease Control and others attending the Training Day for their comments.

Introduction

Chemical incidents arising from land contamination are not infrequent and may present acutely or over a period of time to Health Authorities. Sometimes the more slowly evolving incidents become urgent with the increasing concerns from local residents and/or media coverage. Either way it is essential that the Health Authority has a process in place to initiate a timely and prepared response.

Therefore this draft checklist is designed to aid in the response to acute and chronic events which can results from fires, explosions, spills, leaks or transport accidents. It should be used in conjunction with:

- Acute chemical incident checklist (published in Chemical Incident Report 10, October 1998)
- Chemical water incident checklist for health authorities (published in Chemical Incident Report 8, April 1998)
- Non-domestic fire incident checklist for health authorities (published in Chemical Incident Report 13, July 1999)

The draft checklist for land contamination addresses the following issues

- Action card summary overview
- Questions to be asked to the notifying organisation
- Recommendations for initial actions and risk assessment by health authority
- Site specific information
- Post site visit review

ACTION CARD SUMMARY OVERVIEW

- What are the casualties complaining of?
- What toxic hazards should I be thinking about?
- Do I need to warn/evacuate anybody?
- Can I get samples of soil, water, air or other material?
- Have I alerted key groups including CIRS?
- Do I need to organise a multidisciplinary incident control team?
- Should I visit the site?

DRAFT LAND CONTAMINATION INCIDENT CHECKLIST

Emma Woodey, Research Engineer—Land

QUESTIONS TO ASK TO THE NOTIFYING ORGANISATION

(General questions to ask with regard to incident identification)

- Have any health effects been reported?
- Have any toxic hazards been identified?
- Who has identified the contamination?
  - ⇒ Local Authority
  - ⇒ Emergency Services
  - ⇒ Environment Agency
  - ⇒ Local Residents
  - ⇒ Other
- How was the contamination discovered?
  - ⇒ Spill, leak, explosion etc. or other acute incident
  - ⇒ Routine testing (planned by the Environmental Health Department of the Local Authority)
  - ⇒ Planning application/change of land use
  - ⇒ Complaint (odour, health, disease cluster)
  - ⇒ Other
- How long has the contamination been present on the site?
- Who is currently involved in the incident investigation?
  - ⇒ Local Authority
  - ⇒ Environment Agency
  - ⇒ Water Company
  - ⇒ Environmental Consultants
  - ⇒ other

RECOMMENDATIONS FOR INITIAL ACTIONS AND RISK ASSESSMENT BY HEALTH AUTHORITY

- Alert CIRS as soon as aware of incident.
- Do the local authority, local water company, Environment Agency know about the incident? Should anyone else be informed? (Local GPs, local hospitals, emergency services etc.)
  - ⇒ Consider setting up and/or participating in a multidisciplinary incident control team
- What chemical hazards have been identified?
- Is there a pathway (e.g. water course or farming activity) between the source of the contamination and any potential targets (human, animal etc.)?
- Is further sampling, biological and/or environmental, required?
- Define affected or at risk population. Ascertain those with increased susceptibility to adverse health effects from exposure to the chemical(s) (include the young,

elderly, infirm).
- ⇒ Have there been any complaints of health problems that may be associated with exposure to the chemical(s)? (Consider contacting and/or visiting local GPs to discuss concerns and agree any case definitions that may be needed for immediate or ongoing assessment)
- ⇒ What are the potential health effects from exposure to the chemical(s)?
- ⇒ Is an environmental health questionnaire required to assess potential exposure of local residents to the chemical(s)?

- What steps need to be taken to prevent further contamination? (Short and long term considerations)
  - ⇒ What (if any) immediate action is required? (evacuation/shelter etc.)
  - ⇒ Can the chemical be controlled/contained immediately?

- How will local residents be informed of the incident? Who will take responsibility for this?
  - ⇒ Consider an information leaflet drop or setting up a helpline/information service
  - ⇒ Is a press statement to the local media required?

- Consider undertaking a site visit

SITE SPECIFIC INFORMATION

(Questions to ask during site visit)

- Where is the site? (Postcode or Grid reference if possible)
- How big is the site (acres/hectares)?
- Is the area predominantly rural or urban?
- What is known about the history of the site and the adjacent land?
- What is the site currently used for?
  - ⇒ Housing/domestic gardens
  - ⇒ Allotments
  - ⇒ Recreation
  - ⇒ 'Sensitive' use e.g. school
  - ⇒ Farming
  - ⇒ Light commercial (business use)
  - ⇒ Heavy industry
  - ⇒ Derelict & abandoned site
  - ⇒ Car park
  - ⇒ Other
- Are there any vulnerable populations in close proximity to the site?
  - ⇒ Nursing home
  - ⇒ hospital
  - ⇒ school or nursery
  - ⇒ Other

- Are any fruits/vegetables currently grown on the site or in adjacent gardens?
  If yes, what?

- What is the soil type?
  - ⇒ Sand
  - ⇒ Clay
  - ⇒ Silt
  - ⇒ Loam
  - ⇒ Mixed
  - ⇒ Other

- What is the underlying geology/hydrology? Consider consulting Odnance Survey maps, etc
  - ⇒ Is the site on/near an aquifer?
  - ⇒ Is there an abstraction point on or near to the site?
  - ⇒ Do any (plastic) water pipes run through the ground?

- Does a stream/river flow through or near to the site?
  - ⇒ Have any water samples been taken?

- What is the topography?
  - ⇒ What is the prevailing wind direction?

- How close is the nearest commercial or residential property to the site?
- What is known about the chemical(s) that has been detected in the soil?
  - ⇒ What chemical(s) is present?
  - ⇒ What form is the chemical(s) in?

- What levels of chemicals have been detected in the soil?
  - ⇒ How many samples have been taken?
  - ⇒ Who has taken the samples?
  - ⇒ How were the samples taken?
  - ⇒ Where have the samples been sent for analysis? (NAMAS accredited laboratory?)
  - ⇒ Is further sampling required?

- Have any remediation options have been considered? If yes, which process?

POST SITE VISIT REVIEW

- Consider longer term epidemiological surveillance and tagging heavily exposed individuals
- Is further monitoring of the site or exposed individuals required? Who will be responsible for this?
- Did local plans and communications work in practice in order to provide a timely response to the incident?

If you require further information or have any comments please contact Emma Woodey via e-mail at: emma.woodey@gstt.sthames.nhs.uk

Terrorism and the Millennium

Virginia Murray, CIRS

Since 1991 Dwyer collated data from British Transport Police Annual Reports and showed that reports are available of

- over 40 terrorist related explosive incidents
- approximately 6,500 telephone bomb threats
- over 10,000 reports of suspicious items

This type of information along with preparations for the Millenium and Y2K have resulted in concerns being raised by several Health Authorities. They have requested information about incidents that have occurred as a result of use of chemical weapons. Two such incidents occurred in Japan and are well documented and are summarised by Henrietta Wheeler below. Other Health Authorities have expressed interest in Internet based sources. Rico Euripidou has identified nine sites that you may wish to visit.

CIRS fax sheets are available on sarin (an organophosphate nerve agent), mustard gas, cyanides and other substances if required.

If a sarin incident occurs, CIRS has attempted to develop a patient information sheet which could be used for those exposed but on triage are found not to require immediate health care. Any comments to CIRS on this form of information and of its use to Health Authorities or Accident and Emergency Departments would be welcome.

If you have any comments please contact Virginia Murray via e-mail at virginia.murray@gstt.sthames.nhs.uk

Chemical Terrorism: The Japanese experience and lessons learnt.

Henrietta Wheeler, Research Fellow, CIRS

Chemical terrorist attacks occurred in Japan in 1994 and 1995, thus opening the eyes of the world to the chaos that could occur during a major chemical incident. These incidents were the first reported use of nerve agents on civilians by a terrorist group, and are therefore of great importance for the emergency services, emergency planners and the medical profession. In both incidents the nerve agent sarin was used and highly populated areas were targeted.

Matsumota, 27 June 1994

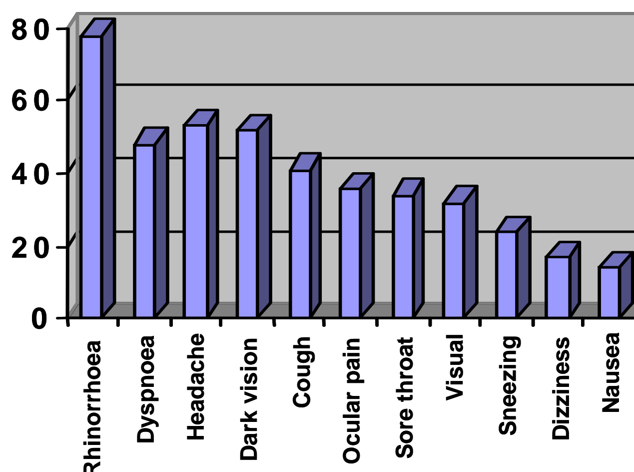
On 27 June 1994 an airborne release of sarin occurred in Matsumoto. Approximately 600 residents and rescue staff were affected, seven people died in the attack; 264 casualties suffered symptoms of typical organophosphate poisoning and sought medical treatment. In the space of 5 hours 37 residents were transferred to hospital by ambulance, 3 were found dead in their homes, 4 died shortly after transfer, 253 were seen by doctors and 58 were admitted. The most common symptom at the time of the incident was marked constricted pupils. Pupil size was measured in 219 patients, of the 51 who were referred to ophthalmologists, the ages ranged from 15 to 76 (mean 37 years) with the most common effects being dimmed and blurred vision, and red and painful eyes.

Table 1 Case details of one casualty of the Matsumoto sarin attack[1]

- Apartment 50 m from release on the 3rd floor; male resident suffered blurred vision at about 23.00 hours
- 01.00 rescue team found him unconscious and transferred to hospital
- On arrival: pulse 120 bpm, BP 158/80 mm Hg, temperature 37.5^{0}C, respiration 15 rpm and shallow
- Patient was unconscious with copious salivation, rhinorrhoea and bilateral miosis
- Developed generalised convulsions and fasciculation of tongue, facial muscles and extremities; intubated and ventilated, given IV diazepam
- Ventilation discontinued at 02.50, extubated at 03.50
- Initial tachycadia replaced by bradicadia within 8 hours; by 1200 on 29 June had multifocal premature ventricular contracture which lasts for 11 months
- Analysis on admission E-AChE was 0.1 IU/L (normal 1.2-2.0), serum ChE 21 IU/L (normal 109-249)
- ChE and E-AChE reached normal 17 and 90 days after exposure, respectively
- Discharged well on day 18

After the incident Morita et al collected patient data on 84.9% of the patients seen in all the medical institutions involved. The age of the patients ranged from 3-86 years with a mean of 33[1]. All those affected recovered without abnormal findings at 6 months, apart from one female who suffered severe anoxic encephalopathy, due to respiratory arrest prior to arrival at hospital. The clinical effects of the severely effected patients were similar; Table 1 describes the case of one of the most seriously affected. The cholinesterase (ChE) was decreased in 45 of 105 people (42.9%) and erythrocyte cholinesterase (AchE) activity was decreased in 20 casualties; all returned to normal values within 6 months[1].

Figure 1 Symptoms suffered by affected Matsumoto residents who did not seek medical attention



Three months after the incident retrospective information was gathered from the residents who did not seek medical advice at the time of incident. Symptoms that were suffered at the time are shown in Figure 1.

Secondary contamination: Of the 49 rescue personnel involved with the incident, 18 (37%) became symptomatic during the incident.

Tokyo, 20 March 1995

Sarin was released in the Tokyo underground during rush hour from 5 devices placed on 3 subway lines. 5,510 sought medical attention in 278 hospitals and clinics. 688 victims were transported to hospitals by ambulance and >4,000 casualties reached hospitals either on foot or by private transport[2]. About 25% who reached medical facilities required hospitalisation. Table 2 indicates the overall numbers of casualties that sought medical attention following the incident.

Table 2 Overall numbers of casualties who sought medical attention in Tokyo

No. of casualties	Severity
5,510	Casualties
(4,073)	(seen but not admitted)
8	Deaths on first day
4	Deaths in following month
17	Critically ill, ITU care
37	Severe symptoms
948	Moderate symptoms

Due to its location, St Luke's Hospital received the largest number of casualties. They dealt with 500 patients in the first hour (3 in cardio-pulmonary arrest) and in total saw 640 patients in 3.5 hours. The mean age was 35 years (range 8-65). Of these 528 (82.5%) only had affected eyes and were discharged within 12 hours; 107 (16.7%) had moderate symptoms (weakness, difficulty breathing, fasciculation, convulsions not requiring ventilation); 5 (0.78%) required intubation and ventilation. One casualty died in A&E and 111 cases in the severe and moderate category were admitted. The most prominent clinical effects reported in the moderate and severe group are shown in Figure 2. 107 (96.4%) of those admitted received atropine. All moderate and severe patients received pralidoxime and 8 patients received diazepam. The mean length of admission was 2.4 days in the moderate category and 8.4 in severe. On discharge 70 (63.1%) patients still complained of eye symptoms and 28 (25.2%) of headaches.

Secondary contamination: Nozaki et al investigated the difficulties for Keio University Hospital A&E which received 113 patients, 85 arrived by ambulance, one in cardiopulmonary arrest; 15 were admitted and the others were treated in out-patient clinics. The majority of the emergency medical staff suffered symptoms while treating patients; dim vision (73%), rhinorrhoea (53%), tight chest (27%), cough (13%), salivation (7%) and sore throat (7%)[4]. Of 1,364 emergency personnel who were at the incident 135 (9.9%) showed acute symptoms and received medical treatment[2].

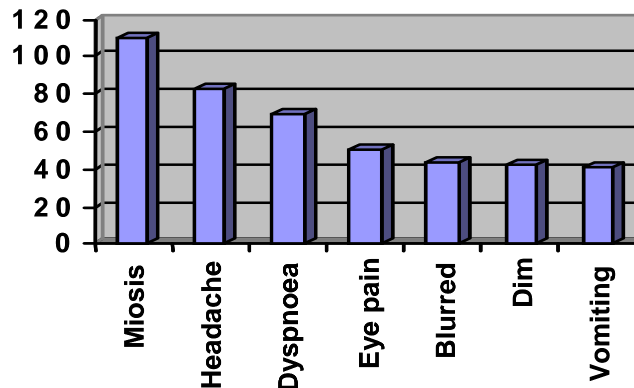


Figure 2: Main clinical effects experienced in Tokyo

Post incident survey: Shirakarwa et al investigated 210 hos pitals/clinics that were involved in the incident; the following are some of the main problems involved in this incident. At 11.00 hours. (3 hours after the incident) the Police made a television announcement that the chemical involved was sarin. This was the first information that 145 (73%) of the hospitals/clinics had about the chemical. Pralidoxime was out of stock in 156 (74%) of the hospitals. 157 hospitals received sarin information from the Japanese Poisons Centre. 73 (35%) requested advice from the Poisons Centre on the day but the lines were engaged[3].

Discussion

The above brief descriptions show the enormity of a chemical incident. It is essential that from such disasters others should heed the lessons learnt and be involved in emergency planning. Both of the incidents described were unprecedented and unexpected, and as a consequence the hospitals and emergency services had access to very little relevant information in the first few hours. The following points are various issues that have been made and highlighted following on from the Japanese experience.

- Need for specific and effective information systems for medical facilities in a chemical incident
- Integration and co-operation of concerned organisations to be established through disaster drills
- Chemical Provider Units or Poison Information Centres should act as regional mediators of all toxicological information[2]
- Planning for large scale patient decontamination and ability to decontaminate at the incident site
- Ensure adequate supply of antidotes
- Providing proper protective clothing for health professionals

Conclusion

There are many different organisations involved in chemical incidents, only with adequate preparation will an increase in the magnitude of the disaster be prevented. In Tokyo many of the suggestions made with regards to emergency planning had been previously stated and discussed following a mas-

sive earthquake in early 1995. However, many of the suggestions had not been implemented and procedures not put in place[3]. It is vital that we in the UK learn from the experiences in Japan and ensure that we are prepared as much as possible.

CIRS has prepared information sheets on various chemicals that may be involved in an incident and has also prepared patient information sheets. A copy of a sarin information for patients sheet is given on page 13. It is currently in the developmental stage and we would value any suggestions on further development.

One of the most valuable lessons learnt is the essential need for integrated planning with all those potentially involved and the development of well established communications chains, thus ensuring communication, co-operation and co-ordination.

References

1. Morita H et al, 1995. Sarin poisoning in Matsumoto, Japan. Lancet 346:290-293
2. Okumura T et al, 1998. The Tokyo Subway Sarin Attack: Disaster Management, Part 1: Community Emergency Response. Academic Emerg Med 5(6):613-617
3. Shirakarwa Y et al, 1997. Information disorder in hospitals during the Tokyo sarin attack in 1995. Prehospital & Disaster Med 12 (suppl3): S24/92
4. Nozake H et al, 1995. Secondary exposure of medical staff to sarin vapour in the emergency room. Intens Care Med 21:1032-1035

A review of chemical terrorism information available on the internet.

Rico Euripidou-CIRS

A literature search strategy using only the English language with the subject headings "Chemical + Terrorism" was undertaken by CIRS using the "Lycos" search engine on the Internet. This search strategy resulted in 4,347 hits matching the search phrase. As expected US sites dominated this topic with most government agencies having some information on their sites:

- I found the most useful information relating to Public Health on an ATSDR (Agency for Toxic Substances and Disease Registry) site in an article titled 'Industrial Chemicals and Terrorism: Human Health Threat Analysis, Mitigation and Prevention.' The article covers a basic ten-step procedure to 'analyse, mitigate, and prevent public health hazards resulting from terrorism involving industrial chemicals' that may be found locally within one's district. It mentioned procedure which cover issues such as identifying potential local threats, local sources of chemicals, exposure pathways and prevention methods including how to incorporate these in emergency response plans and training exercises. This information is available at *http://www.atsdr.cdc.gov/ofp/terrorism/indterr.html.*

- 1995 Patterns of Global Terrorism – US Department of State Office of the Coordinator for Counter-terrorism available at *http://nsi.org/Library/Terrorism/terror95.html.*

- The US Centre for Disease Control (CDC) maintains a web page titled BioTerrorism – Preparedness and Response which is an up to date topical site available at *http://*www.bt.cdc.gov/, also available from CDC is: *http://www.cdc.gov/nceh/programs/demil/factsheets/brochures/demilbro.htm,* detailing further information on chemical weapons.

- The US Environmental Protection Agency's (EPA) web site outlines the counter-terrorism efforts of the EPA Offices involved include:
  - ⇒ Chemical Emergency Preparedness and Prevention Office (CEPPO)
  - ⇒ Office of Emergency and Remedial Response (OERR),
  - ⇒ Office of Radiation and Indoor Air (ORIA)
  - ⇒ National Enforcement Investigations Centre (NEIC). (http://www.epa.gov/swercepp/cntr-ter.html).

- The Advantages of Using Chemical and Biological Weapons for Terrorism documents the ease and availability of using chemical and biological weapons in terrorism available at: http://www.calpoly.edu/~drjones/advantages.html

- An extensive periodical articles review of chemical, biological, and nuclear Terrorism/Warfare is available from the US Navy at *htt*p://vislab-www.nps.navy.mil/%

- The Monterey Institute of International Studies Centre for non-proliferation studies also holds some useful information on chemical and biological weapons available at http://cns.miis.edu/research/cbw/index.htm

- A no nonsense site is run by the Royal Canadian Mounted Police titled Criminal / Terrorist use of Chemical / Biological weapons available at *http://www.rcmp-learning.org/docs/ecdd1022.htm*

- For the latest news on chemical terrorism activities the US news online: Special report on terrorism's next wave available at: http://www.usnews.com/usnews/news/chemhigh.htm, is quite useful

Draft information sheet for members of the public exposed to sarin but not identified on initial triage to require immediate medical care

Henrietta Wheeler, Research Fellow, CIRS

Comments would be gratefully received about the information provided on page 13.

S A R I N

This leaflet has been given to you as you might have been exposed to Sarin.

You will have been assessed by a member of the medical profession and treated if necessary.

This leaflet explains about the substance, the possible effects from exposure to sarin and what you should do.

If you do not understand anything on this information sheet, ask a doctor to explain

What is sarin and how can it affect me?

Sarin is a man-made chemical that belongs to a group called organophosphates. Organophosphates are normally used as insecticides. It can be absorbed through breathing in the vapours, through the skin (including from contaminated clothing) and eyes. Once in the body sarin interferes with the normal nerve 'message' system. The variety and severity of symptoms depends upon extent of sarin exposure. Depending on the severity, symptoms may be both immediate, and occasionally, delayed.

What are the immediate health effects?

Mild: These should disappear with time and require no medical intervention

- Headache & nausea
- Small pupils, visual difficulties & painful eyes
- Running nose, eyes & excess salivation
- Mild muscle weakness & agitation

Moderate: If these symptoms persist or get worse medical advice should be sought

- Dizziness, disorientation & confusion
- Sneezing, coughing & wheezing
- Marked drooling & excess phlegm production
- Vomiting & diarrhoea
- Marked muscle weakness, numb fingers & toes, & difficulty in breathing

Severe: Individuals with severe symptoms will have been assessed and admitted to hospital. Any other symptoms not mentioned above may require advice from a GP or A&E.

Are there any possible long-term effects?

The following symptoms may be delayed and if they become distressing consult your doctor.

- Nightmares, anxiety & headaches
- Loss of short-term memory & insomnia (inability to sleep)

Are there any potential complications if I am pregnant?

There is no evidence that exposure to sarin is a risk to unborn babies but a check up

Precautions

If you have been exposed to Sarin you may be asked to:

- Remove all contaminated clothing including watches and jewellery
- Keep all contaminated clothing aside in a sealed, air-tight bag which may be retained until they have been decontaminated

Shower as soon as possible for at least 15 minutes

CONTACTS

☎ If you feel unwell do not hesitate to call your GP or 999

☎ If something has not been explained on this leaflet you should contact a public health doctor on:

____

☎ This leaflet should be carried at all times for 7 days and then given to you GP to keep in your medical notes

Isoniazid toxicity - potentially on the increase

Dr Craig Wallace, Toxicology Registrar, Medical Toxicology Unit, London.

Case report

A 15 year old girl presents to Accident and Emergency after consuming up to 56 Rifinah tablets. She developed a severe metabolic acidosis (pH = 6.8) and generalised seizures. Initial management consisted of intravenous sodium bicarbonate and her seizures were controlled with intravenous diazepam. She was intubated, ventilated, and transferred to an intensive care unit where she received 5g intravenous pyridoxime over 1 -2 hours. Her recovery was unremarkable and she was discharged home after psychiatric evaluation.

Mechanism of action

This patient was taking Rifinah tablets for prophylaxis due to exposure to open TB at school. The components of Rifinah are rifampacin (150-300mg) and isoniazid (100-150mg). The acute toxicity of rifampacin is relatively benign with main effects including facial oedema, vomiting, diarrhoea and discolouration of bodily fluids.

Isoniazid, on the other hand, is capable of severe, life-threatening toxicity [1]. It competes with pyridoxime in the CNS and liver causing enzyme inhibition. In the CNS decreased production of inhibitory neurotransmitters (GABA) results in generalised seizures, and in the liver, inhibition of lactate conversion to pyruvate results in lactic acidosis. Pyridoxime is a useful antidote in the treatment of isoniazid toxicity by overcoming this enzyme inhibition by direct competitive mechanisms. High dose diazepam is also useful in controlling seizures and may in fact have some synergy with pyridoxime.

Comment

The resurgence in tuberculosis morbidity and mortality is well documented [2]. Potential causes include:

- HIV related disease;
- decreased resources and sites for detection and monitoring;
- importation of disease via migration.

The emergence of multi- resistant strains has also become a problem but the mainstay of treatment chemoprophylaxis remains rifampacin and isoniazid.

Increased treatment of tuberculosis will lead to increased availability of isoniazid and may subsequently lead to an increased frequency of isoniazid overdoses. Physicians treating poisoned patients should be familiar with the treatment of isoniazid poisoning since it is severe and there is an effective antidote (pyridoxime +/- diazepam) available.

References

1. Isoniazid, pp195-6, Poisoning and Drug Overdose, ed. KR Olsen, Appleton and Lange, 1999.
2. Glynn JR, Resurgence of tuberculosis and the impact of HIV infection, *British Medical Bulletin,* 54(3):579-93, 1998.

Bleach in milk

Dr Dianna Cannon, Senior House Officer, Public Health Medicine, and Dr Joyshri Sarangi, Consultant in Communicable Disease Control, Somerset Health Authority.

The incident

At 12.30 hours on 25 August 1998 a shop owner reported to the CCDC that she thought the milk supplied by a local dairy was contaminated with bleach. The shop had taken delivery of nine 2-pint plastic containers of semi-skimmed milk. After consuming the milk the shop owner experienced burning in her mouth and pharynx followed by dyspepsia. The shop owner retrieved 8 of the 9 milk containers, alerted the local general practitioners and telephoned the Health Authority and the local council.

Immediate Public Health Actions

1. CIRS contacted for advice
2. Environmental health officer (EHO) visited the dairy to investigate and establish distribution of the milk for product recall.
3. EHO visited the informant. The milk was sent for analysis to Somerset Scientific Services.
4. The Director of Communications at the Health Authority co-ordinated informing the media.
5. All general practitioners and hospitals in Somerset were notified.

Investigation

Epidemiology: Five people reported symptoms after consuming milk from the same batch. All reported burning sensations in the mouth and pharynx and in three this was followed by dyspepsia.

Environmental Health: The dairy owner revealed that 1 gallon of dilute sodium hypochlorite could have been left in the filling machine after cleaning. The filling machine holds 30 gallons of milk and fills 120 two-pint containers. Calculations suggested that the concentration of free chlorine in the milk was approximately 10 parts per million.

511 similar containers from the dairy had the same use by date but there was no means of identifying the first 120 containers filled.

Toxicology: Organoleptic testing identified a smell and taste described as 'musty' or 'woody'. The milk caused no oral or pharyngeal irritation to members of the taste panel. Chemical analysis detected no contaminant.

Control Measures

Product recall involved telephoning 30 retail outlets the same afternoon, a press release to local media and a television interview for the local evening news at 18.30 hours.
174 of 511 containers were not accounted for.
Incident Meeting called for the following day.

Ongoing Action

Legal action by the district council against the dairy.

Discussion
Sodium hypochlorite ingestion can cause gastrointestinal irritation but severe damage is associated with large ingestion. The estimated free chlorine concentration was not deemed to be a health risk. This concentration assumed that the chemical was diluted properly and mixed uniformly in the milk. This could not be determined. Whilst contamination of the milk was not scientifically proved there was enough evidence to institute product recall. 66% of the product was recovered prior to sale.

Lessons Learnt:
This chemical incident illustrates the importance of the public health response in terms of co-ordinated concurrent investigations and control measures within an appropriate time frame. Within 6 hours of notification product recall had been accomplished as outlined above. An incident meeting was held 24 hours after the notification by when acute issues had been resolved and plans were made for ongoing action by the district council.

Conclusion
Clinical governance places a statutory duty on health authorities to provide appropriate public health response to chemical incidents. NHS guidance on the management of major incidents provides a useful framework for any chemical incident. The importance of identifying the lessons learnt and making the information available for those involved in similar incidents in the future will encourage evolution of best practice guidelines. Locally a Consultant in Public health Medicine in the South West Region has proposed useful standards for auditing performance and the NHS guidance lists essential actions that can also be used for audit purposes.

Corrections
Chemical Incident Report, January 1999, number 11, page 20. In table 11: summary of chemical incidents responded to by the CIRS in 1998, the total number of hospital enquiries to NPIS(L) between July to December 1998 for other areas outside of England was reported to be 13912 . Review of this figure shows that this included calls from several sources such as general practitioners, nurse practitioners and military hospitals. The corrected figure after review was found to be 1969 (Scottish hospitals 520, Welsh 1044, Northern Ireland 30, Channel Islands 296, Isle of man 39 and Military 40). We apologise for any confusion caused.

Chemical Incident Report, July 1999, number 13, page 12 In the article on 'Chemical incident in an aircraft hangar in Wiltshire' by Dr Bernadette Purcell, Specialist Registrar in Public Health and Dr John Simpson, CCDC, Wiltshire Health Authority, they reported that the incident had resulted in closure of the Accident and Emergency Department of Princess Margaret Hospital, Swindon to walking and blue light casualties for approximately 12 hours.
Mr I Kendall, Consultant in Accident and Emergency Department of Princess Margaret Hospital, Swindon, wrote to request that the Chemical Incident Report corrects this statement by saying that the Department, in view of the large number of casualties, tried to make arrangements for urgent GP referrals to go to neighbouring hospitals wherever possible and remained open to walking and blue light casualties throughout the incident and thereafter.

Draft 'Trawling Questionnaires' for the Investigation of Acute Chemical Incidents
Rico Euripidou, Environmental Epidemiologist, CIRS

Introduction
Recent conversations with Consultants in Communicable Disease Control have consistently brought up the topic for questionnaires that can be easily drafted and adapted for 'quick and dirty' epidemiological investigations of chemical incidents prior to a methodological follow-up. The following comments are intended to provide the background to the development of a draft trawling questionnaire. This is designed as a draft model on which a user can develop an appropriate version for a specific chemical incident that may need further epidemiological investigation.

When to use a trawling questionnaire
The following examples offer chemical incident scenarios where a trawling questionnaire could provide the basis for a public health survey. They include:

- after a release of a hazardous chemical(s) which may potentially be harmful to human health.
- in the event of a rare chemical exposure with little known toxicological effects.
- in the event of combination of chemical release (e.g. during a fire).

Questionnaire design issues
As always some of the fundamentals to the process of the design are included for consideration:

- always begin by giving each questionnaire a unique identity number and a confidentiality statement header for each page
- collect demographical data first (name, address, age, sex)
- collect data on exposure, route and dose
  - ⇒ time, date, *duration*
  - ⇒ possible routes of exposure
  - ⇒ dose by e.g. amount of water consumed
- collect data on other potential risk factors which may confound exposure data (smoking, alcohol, hobbies, occupation etc.)
- collect data on symptoms suffered during the chemical incident (it is important to compile a tick list of symptoms that includes distinct categories of relevant symptoms, probable symptoms and irrelevant or dummy symptoms)
- collect data on health status of respondent (health status, chronic health complaints, pregnancy/breast feeding status)
- collect data on biological sampling or environmental sampling (date, time, type) so that this data may be correlated with environmental exposure.

Please comment on the following questionnaire and copy if helpful. If you would like an e-mail version of this draft questionnaire please contact rico.euripidou@gstt.sthames.nhs.uk

CIRS ADAPTABLE DRAFT 'TRAWLING QUESTIONNAIRE'"
CONFIDENTIAL

Name of Health Authority
Follow up Questionnaire (3 Pages)
Address:
Telephone No. Fax No.

Please answer all questions

QUESTIONNAIRE REF. NO: ________________
DATE COMPLETING QUESTIONNAIRE : _____/______/______

Forename... Surname..

Address..

....

Postcode.. Telephone...

Sex: Male Female
Age in years Date of birth

GP Name: ____

GP Address):
(In some instances it may be useful to request consent to consult GP records)

Q1. Please state the names of the people currently living at this address:
Name: 1) ………………………………………………………….. 2) …………………………….…………………………...
3) …………………………………………………………. 4)……………………………………………………………….
We request one person to complete each questionnaire and to please return to the Health Authority in the pre-paid S.A.E. enclosed.

Q2. Please state your whereabouts on __________ 1999 between __.__ hours and __.__ hours
....………………………………...

Q3 Please list your actions following (the incident)
…………………………………………………………...
....……………..……………………………………………………………………………....……

Q4 Did you spend any time at ……... (time/place) on ..….. (the incident time/day?)
Yes No Don't Know

Q5 If **YES** to Q4 how much time did you spend in the ………… (during this period ?) (*Please tick appropriately*)
Less than one hour One hour Two hours Three hours More than three hours Other time period

Q6 Did you or your family notice any unusual substances ……… on ………?
Yes No Don't know

Q7 If **YES** to question Q6, please describe this substance(s)..................………………………...
…………………………………………………………………………………………………….………………………

Q8 Did you seek further advice from the Local Authority, GP, A&E, other: Yes No (*Please specify*)

CONFIDENTIAL

Q9 Did you suffer **any** symptoms on **any** of the following time/dates *(Please tick each day appropriately)*	Yes	No	Don't Know	Onset Time	Please list Symptom experienced
TIME/DATES					
Other [Please specify]					
Q10 If possible please provide a short summary of the circumstances of symptoms (where, when, what?) :					

Q11 Do you suffer from any long term health problems (e.g. diabetes, asthma, bronchitis)
Yes No Don't Know

Q12 If **YES** to Q11 please list which health problems you suffer from and any medication you take for this:
………..
Q13 Do you or any family or home residents smoke cigarettes ? Yes No Don't Know

Q14 If **YES** to Q13 how many cigarettes on average are smoked in your household *(Please tick appropriately*)
Less than 5 per day 5-10 per day 10 -15 per day 15-20 per day More than 20 per day

Q15 Please describe your current state of health *(Please tick appropriately*)
Good Fair Poor

Q16. Did you suffer from any of these symptoms over the period	***Please tick each box appropriately for each symptom***	***Please complete***	***Please complete***	***Please complete***	***Please complete***
SYMPTOMS (examples given below of signs and symptoms to include likely, less likely & non likely effects)	Yes	Don't know	No	Time of onset	Date of onset
Asthma					
Blurred vision					
Eczema					
Eye discharge					
Hair falling out					
Hay Fever					
Muscle aches					
Vomiting					
Others :*Please list*:					

Thank you for taking the time to complete this questionnaire. If any of the questions were unclear or indirect, please use the enclosed space for making appropriate comments.

Thank you for your co-operation in completing this form

Name person completing the questionnaire (please print)**:** ____

A pre-paid envelope for your reply is enclosed (optional).

If a chemical incident requires further study it is important to bear in mind that assistance requested from CIRS must be at the earliest stage of this process within a reasonable time scale. Please refer to Chemical Incident Report No. 12, April 1999 page 12 for a more detailed checklist of factors affecting questionnaire design.

Air pollution episode warning system in Barking and Havering Health Authority

Dr. A. Kessel , Hon. clinical lecturer in Public Health, Epidemiology Unit, London School of Hygiene & Tropical Medicine, and Dr. K. Padki, Consultant in Public Health Medicine, Barking and Havering Health Authority

In 1997 Sir Kenneth Calman stated that improvements to the environment and health require co-ordinated efforts bringing together local government, voluntary, community, health and other sectors whose activities 'often deliver health benefits as well as environmental ones, and involvement in the partnerships and planning stimulates the development of a healthier community'.

This message - of the importance of collaborative strategies - is key to efforts to improve the impact of air pollution on health, and has been repeated in the 1997 White Paper *The new NHS* , the 1998 Green Paper *Our healthier nation*, and in the 1998 *Chief Medical Officer's project to strengthen the public health function in England*.

In Barking and Havering Health Authority (BHHA) an 'Air Quality and Health Group' was set up in June 1997, with the aim of developing local initiatives to a) improve air quality, b) reduce the health effects of air pollution and c) improve awareness and understanding of air pollution.

The group meets bimonthly and regular members currently include environmental health officers from London Borough of Havering (LBH) and London Borough of Barking and Dagenham (LBBD), and public health doctors from BHHA.

Barking and Havering Health Authority - Department of Public Health
London Borough of Barking & Dagenham - Environmental Services
London Borough of Havering - Environmental Services

To: **All General Practitioners / A & E Departments**
Date:
Time:

Air Pollution Warning

Forecasting information supplied today by the South East Institute of Public Health has indicated that an 'air pollution episode' is likely to involve the Barking & Havering Health Authority area *during the next 24 hours*. The following pollutant(s) which have been ticked will be likely to reach either 'high' or 'very high' levels as defined by the Department of Environment, Transport, & the Regions (DETR) banding system:

- ❑ Carbon Monoxide
- ❑ Nitrogen Dioxide
- ❑ Ozone
- ❑ Particulate Matter (PM_{10})
- ❑ Sulphur Dioxide

Implications for Medical Practitioners

1. During an air pollution episode individuals with existing chronic cardiovascular or respiratory disease, especially the elderly, may experience worsening of their symptoms. The effects of an air pollution episode *may last for up to a few days.*
2. Air pollution episodes are associated with small increases in GP consultation, A&E attendance, and also hospital admission of those with existing chronic cardiovascular or chronic respiratory disease e.g. chronic obstructive lung disease or asthma.
3. Advance warning of an air pollution episode may be useful in diagnosing exacerbations of chronic respiratory or cardiovascular problems.
4. Those affected by an air pollution episode may need to: a) modify their treatment AND/OR b) avoid strenuous activity, especially outdoors.
5. Children with asthma should be able to play games as usual, although they may need to increase bronchodilator use before participating; there is no need to stay away from school.

GPs and health professionals are requested to contact the following for further information:

1) *Graham Jarvis, Specialist Environmental Health Officer at the London Borough of Havering (01708 772553) or*
2) *Pollution Team of Environmental Services (01708 772777) or*
3) *Dr A. Kessel / Dr. K. Padki / Dr. E. Kangesu of the Public Health Department at Barking & Havering Health Authority (0181 532 6363).*

Air pollution telephone hotline

The London Borough of Havering (LBH) is part of the London Air Quality Network (LAQN), which is co-ordinated by the South East Institute of Public Health (SEIPH). As part of this network, the borough receives a daily forecast of the major air pollutants, with the Friday forecast covering the weekend. A local freephone telephone hotline has been set up in LBH and provides a daily pollution forecast covering the whole of BHHA, as well as health implications when the forecast is "poor" or "very poor" according to the banding system of the Department of Environment, Transport and the Regions (DETR). The freephone number is being advertised, and its use will be evaluated.

Air pollution episode warning system

As well as informing the public, another group for whom knowledge of an air pollution episode may be important is healthcare workers caring for patients likely to be affected by poor air quality - those with chronic respiratory or cardiovascular disease. Such information could be useful in two ways:

1. *diagnostically:* the differential diagnoses of an acute event such as an exacerbation of chronic obstructive airways disease reflect the underlying cause, which may be infective or pollution-related
2. *health promotion:* as a basis for discussing air quality and health with patients, and providing further information such as air pollution information sheets presently being developed in BHHA.

An air pollution episode warning system has therefore recently been set up in BHHA - using the daily forecast from SEIPH - and works as follows. On any day when the level of one or more pollutants is 'poor' or 'very poor' (DETR banding system) LBH faxes the public health directorate at BHHA. This information, along with health advice, is then immediately passed on by 'Fast-fax' to all general practitioners (GPs) in the Health Authority, as well as the local Accident & Emergency Departments and respiratory clinics. The form used is shown.

At the developmental stage the warning system was discussed informally with local GPs, respiratory clinicians and specialist nurses, and was also presented to the Local Medical Committee. The initiative - which represents a pilot in the UK - will be evaluated by the public health directorate at the end of one year.

References

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Life as an EHO in a Health Authority

Sarah Webb, Environmental Health Officer, Lincolnshire Health Authority

I have been employed by Lincolnshire Health Authority since November 1998. Prior to that I had worked as an Environmental Health Officer (EHO) in local government for 14 years. Much of my experience was in the field of Food Safety although I have also worked in housing, general nuisance and noise. Despite being part of the public sector, health authorities are culturally very different to local authorities. Although I am employed as an EHO, I no longer have the framework of legislation that defines so much of what our profession does and of course there are no elected members. The pace of change within the health authority has also been much quicker mainly due to the setting up of Primary Care Groups.

A major part of my remit is communicable disease control particularly working with the seven district councils in Lincolnshire. A joint project is underway to refine the notification system improving consistency, surveillance and communication links between reporting laboratories, local authorities and the CCDC.

Health Improvement Programmes are expanding the Public Health function of health authority with an emphasis on inequalities at the core. There is a real interest within the health authority in environmental and community issues and their role in health in its widest sense. Environmental Health has much to contribute and I have found my role is developing to provide facilitation and liaison between the local authorities and the health authority on a broad range of environmental health issues.

The connections between the work of district councils and health are not always obvious but require collaborative work. For example:

- ⇒ many people on low incomes particularly the elderly live in poorly insulated homes
- ⇒ cold weather exacerbates many medical conditions and puts the acute services in the NHS under severe pressure every winter
- ⇒ therefore work to improve home insulation standards and reduce fuel poverty should eventually result in fewer admissions to hospital

Pollution and its effects on health are a focus of increasing public concern. It is also an important part of our remit whether it is

- contamination of land from past industrial use
- redevelopment of contaminated land
- the management of chemical incidents

Therefore partnerships working between EHOs and the health authority staff as well as the many other agencies involved such as the CIRS, have become vital for the protection of public health

Land Training Day report

Thursday 14th October 1999

Emma Woodey, Research Engineer - Land

The first CIRS specialist land chemical incidents training day held at St Thomas' Hospital was attended by nine consultants in communicable disease control, eight public health specialist registrars, one medical toxicology registrar and two environmental health officers.

The aim of the day was to provide delegates with the tools and information required to provide a prepared and timely response to chemical incidents that result in land contamination.

The day consisted of a series of presentations provided by CIRS staff and external speakers, interactive group exercises and discussions. These aimed to highlight some of the issues related to land contamination that public health and environmental health might be involved in and hence need to be aware of.

90% of the delegates who completed evaluation forms considered the meeting to be 'highly relevant' with considerable interest in the presentation on landfill and health by Dr Hilary Fielder of University of Wales College of Medicine. 86% of delegates found the quality of education offered by the meeting to be excellent and 88% rated the usefulness of the course as 'very useful'.

TRAINING DAYS

1999 – 2000 Programme

Following the success of previous training days, CIRS has reviewed its 1999 – 2000 Training Programme and announces the following courses:

Water Contamination Incidents

Thursday 11th November 1999

for CsCDC, CsPHM and Specialist Registrars, and Local Authority Environmental Health Officers, 10 spaces left only—please book as quickly as possible

The aim of this specialised CIRS training day is to provide the knowledge and skills necessary to deal with water contamination incidents specifically. One of the aims of the day will be to further develop the water incident checklist, published in the April 1998 issue of the Chemical Incident Report. As with all CIRS training days, interactive exercises will be included, along with case studies of actual water contamination incidents.

Topics to be discussed include:

- how the water industry works;
- water sampling;
- a review of CIRS water incidents & significant overseas incidents;
- susceptible populations, renal dialysis and biological sampling;
- a case study of diesel contamination of drinking water
- health surveillance and questionnaire design

The course will be held at St Thomas' Hospital, London in Block 9, West Wing Committee Room, For booking information on this course and further details, please contact Rico Euripidou on 0171 771 5381

How to Respond to Chemical Incidents – basic course *Wednesday 24th November*

for CsPHM and Specialist Registrars on call

LAST 'how to respond' basic training day of the Financial Year. So far 30 have applied to come on the day. A total of 35 places are available. Please book soon.

The course will be held at St Thomas' Hospital, London, in Block 9, West Wing Committee Room. For booking information on this course and further details, please contact Rico Euripidou on 0171 771 5381

CIRS Update for CsCDC

Thursday January 27 2000 for CsCDC

LAST one of the Financial Year— eight CsCCD have booked in and numbers are limited to 25—please book soon.

The course will be held at St Thomas' Hospital, London, in Block 9, West Wing Committee Room. For booking information on this course and further details, please contact Rico Euripidou on 0171 771 5381

For Accident and Emergency Professionals

Management of Chemical Incidents in Accident & Emergency Departments

Tuesday 14th December 1999

(for A&E Consultants, Senior Medical Professionals and Senior Nurses).

The course will be held at St Thomas' Hospital, London, in Block 9, West Wing Committee Room. Contact Heather Wiseman: 0171 771 5295 for further information

Chemical Incident Report

Edited by Dr Virginia Murray, prepared and distributed in collaboration with Rico Euripidou, Joan Bennett, Ivan House, Emma Woodey and the staff of the Chemical Incident Response Service.

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