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Chemical Incident Report

Produced by the Chemical Incident Response Service of the Medical Toxicology Unit, Guy's and St Thomas Hospital Trust

Number 16
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Editorial

Dr Virginia Murray, Director, Chemical Incident Response Service

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

- Schools and educational establishments appear to the CIRS team to have been a frequent location of chemical incidents. We suspect that these types of incidents present difficulties to public health partly because they may not be informed early enough to provide a speedy response. Therefore we commend Dr David Black's checklist for you to consider using as a basis of discussion locally.
- Faith Goodfellow, the CIRS Research Engineer-water, has been working on trying to develop tools to facilitate response to water incidents for public health, Although the checklist has been piloted further comment would be welcome.
- Health surveillance has been an issue in several recent incidents where complex clinical responses have been required. We feel that the enclosed draft guidance may be a start to developing a simpler and clearer understanding of the purpose and value of this type of surveillance as opposed to long term epidemiological or mortality follow-up.
- Other issues included in this report are include the Environment Agency's comments on the new Contamination Land legislation introduced on April 1st 2000. Public health need to be aware of the process as their Local Authorities may contact them for advice. Why not come to our training day on land contamination on May 18? Reviews of what SpRs need to be skilled at have been developed. Dr Bernadette Purcell and CIRS are particularly grateful to SpRs and Consultants in public health in the training regions of Trent, North Thames and South West for their help with the survey. We also include an audit of activity on training already undertaken—we thank all Regions for their enthusiasm in attending our courses. We hope to make them even more useful in the future. Finally a survey of Environmental Health Departments and Local Authorities shows that communication with public health could be further improved.
- Information on CIRS **Training Days** between March and July 2000 is provided with a list of the other courses planned for 2000. A Training Flyer is also included for Health Authorities. If you would like one please contact us.

Contents

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Schools and educational institutions related incidents

Introduction

Dr Virginia Murray, CIRS

Incidents in schools and educational establishments have caused CIRS concern. They present particular difficulties in their management since they have potential to expose many young children to harmful substances causing anxiety to parents, staff, local education departments, environmental health departments and other agencies and organisations. Frequently these events attract extensive local media coverage.

Some of these incidents have been deliberate malicious acts within schools. Others are incidents where concern has existed because secondary contamination may have placed children at risk. Examples of these two types of events are provided by incident reports given below.

Dr David Black, Specialist Registrar in Public Health Medicine from Trent, has been involved with a school based incident which has proved difficult to resolve. Using his experience whilst on secondment. he has reviewed all school and education related incidents reported to CIRS. He includes in his commentary some points that public health may find helpful in similar situations.

A Comprehensive School and a CS Gas Incident Investigation

Dr. Samuel Ghebrehewet, Specialist Registrar in Public Health Medicine & Dr. Martyn Regan, Consultant in Communicable Disease Control, Liverpool Health Authority

Introduction

On the morning of 30 September 1999 the Consultant in Communicable Disease Control (CCDC) for Liverpool Health Authority (LHA) was informed by staff from Ambulance Control about a possible chemical incident at a local Comprehensive School. Information was collected on the cases from the health professionals reporting the incident and it was found that the symptoms were consistent with inappropriate use of a crowd control agents. Detailed information on crowd control agents was obtained from Chemical Incident Response Service (CIRS), London. This was circulated to all relevant agencies and professionals involved in the investigation.

Further information from the school later that day revealed that the incident occurred as a result of CS gas sprayed in the school corridor near the girls' gymnasium by a former pupil. This report describes the details of the incident investigation and focuses on the acute adverse health effects.

Aims and Objectives

Aim

- to assess the health impact of the incident
- To document lessons learnt

Objectives

- to determine the number of pupils affected by the incident
- to describe the demographic characteristics of the pupils affected by the incident
- to describe the symptoms experienced by the pupils
- to determine the extent of the effects of the sprayed CS gas on health

Methods

A self-completed questionnaire was drafted in consultation with CIRS and the Comprehensive School. The questionnaires were completed on 6 October 1999 by the pupils who were in the school corridor where the incident took place on the morning of 30 September. A summary of the questions covered in the questionnaire is provided below.

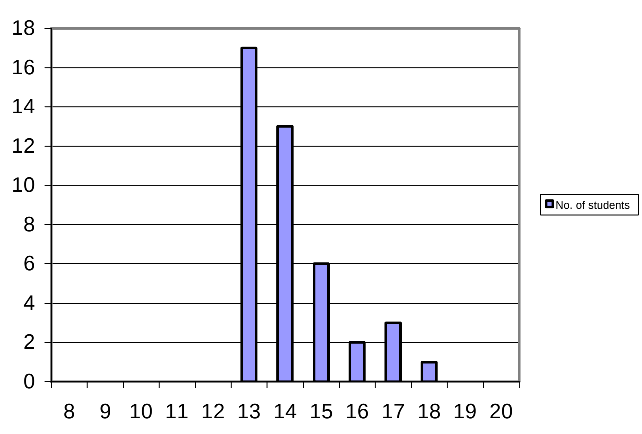
- name
- date of birth
- sex
- school form
- experience of anything unusual such as the smell of fumes, or seeing others develop symptoms
- experience and description of symptoms
- description of symptoms that affected students most
- significant past medical history of asthma, hay fever, eczema or others illnesses
- details of medical advice/care received after incident
- any other comments

Results

Age and sex breakdown

Overall, 42 pupils from the Comprehensive School were exposed to CS gas on the morning of 30 September. The age, school year group and sex distribution of pupils exposed to CS gas are shown in figures 1, 2 and 3.

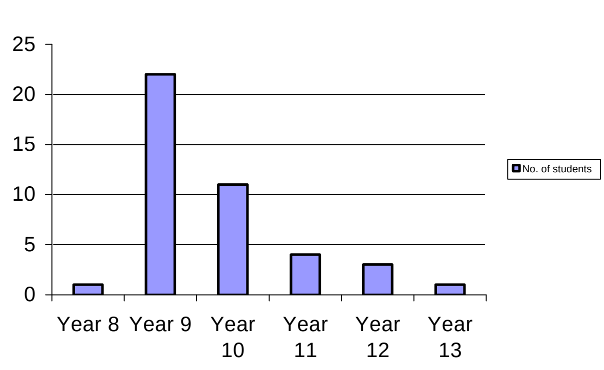
Figure 1: Number of students affected by age



Time of incident

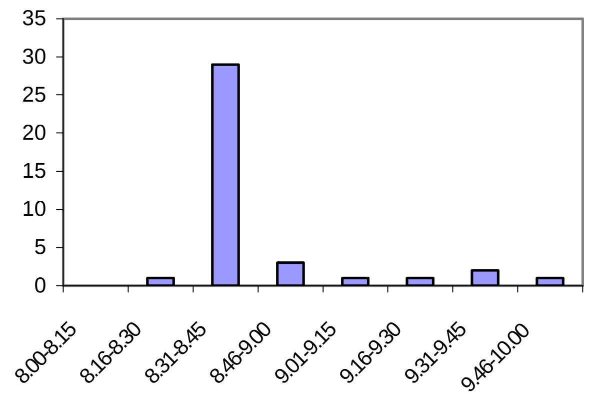
Figure 4 shows the time of the incident as reported by the students. Of the 38 students who responded to this ques-

Figure 2: Number of students affected by year group



tion, 29 (76%) reported that the incident occurred between 08.31 and 08.45 hours.

Figure 4: Time of incident as reported by students



Symptoms experienced

The most common symptoms experienced by the students were irritation/watering of eyes, irritation of nose/throat, cough and headache accounting for 39 (93%), 33 (79%), 30 (71%), and 28 (66%) of the 42 exposed students respectively (Figure 5).

Figure 5: Symptoms experienced by students

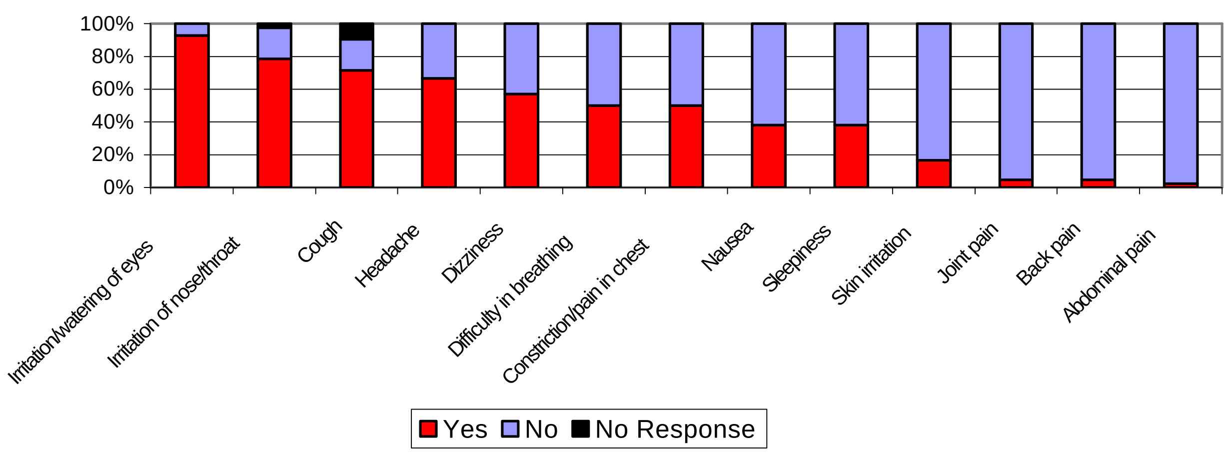
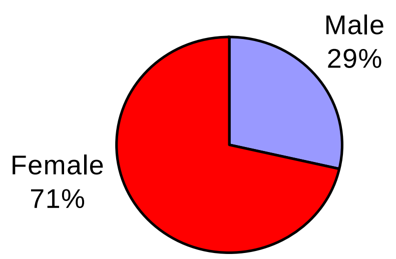


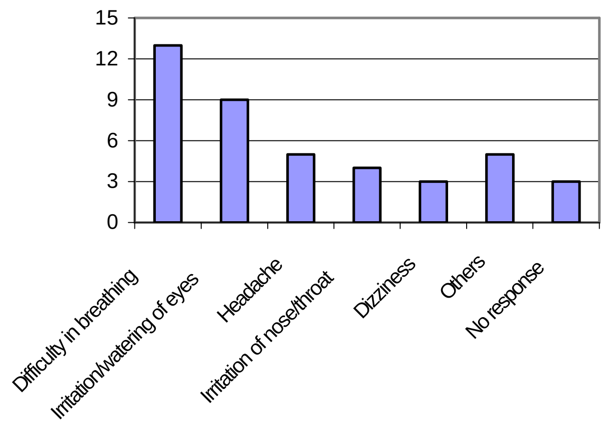
Figure 3: Sex of students affected by incident



Symptom(s) that affected students most

The symptom(s) that affected students most are presented below in figure 6. Difficulty in breathing was the most commonest symptom reported by 13 (31%) of the students. This reflects the toxicological expectation.

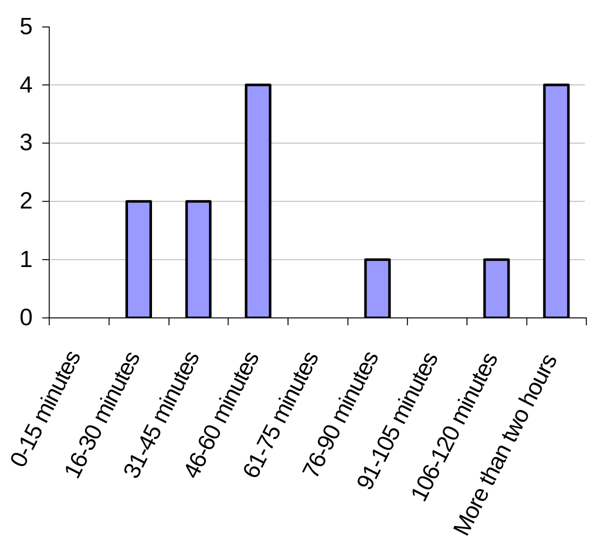
Figure 6: Symptom(s) affecting most students



Duration of symptoms

The duration of symptoms varied with irritation of the nose and throat ceasing within one hour for 13 of the 23 pupils, whereas watering of the eyes was still present at two hours in 11 out of 28 pupils. The other persistent symptoms of difficulty in breathing (figure 7) and headache were also present a two hours in 4 and 3 pupils respectively.

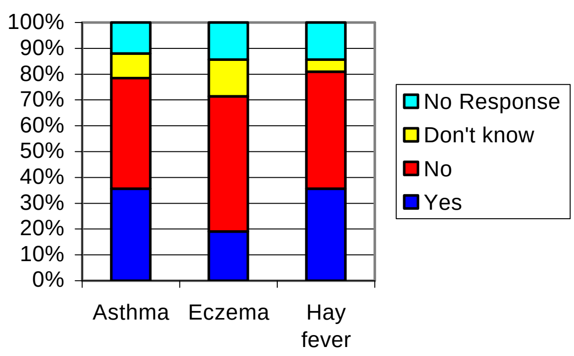
Figure 7: Duration of difficulty in breathing as reported by respondends (n=14)



Past medical history

Past medical history including asthma, eczema and hay fever as reported by students is presented in figure 8. 15 (35%) of the students were reported to be suffering from asthma and hay fever. 5 (11%) and 2 (5%) of the students reported to be suffering from both asthma and hay fever,

Figure 8: Past medical history (n=42)

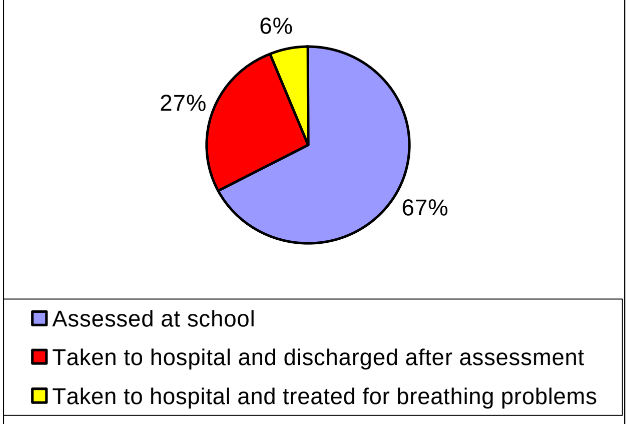


and asthma and eczema respectively.

Medical advice/care received

49 students were assessed at school by Mersey Regional Ambulance Service (MRAS) and a team from the Department of Community Paediatrics, Alder Hey Hospital.
16 of the 42 exposed students (38%) were taken to hospital (Figure 12). Of the 16 students taken to hospital, three

Figure 9: Advice/care reported by MRAS and Alder Hey A&E Dept. (n=49)



children (one asthmatic and two hay fever sufferers) were treated for minor breathing problems. All students were subsequently discharged from hospital.

Discussion

The management and investigation of chemical incidents depends on rapid assessment of the toxic risk to the local population by undertaking appropriate investigations, and developing and monitoring surveillance programmes. Therefore incidents leading to acute exposure of the public to toxic substances are an important concern for public health physicians. The role of the public health physician in the local response to chemical incidents has been summarised by Gunnell, 1993 as follows:

- assessing the local public health impact of the incident, and as appropriate, advising emergency services,
- liaising with a chemical incident response service,
- informing local health professionals such as GPs and casualty departments of an incident, and requesting collection of appropriate specimens from those affected,
- liaising with the media and public, in collaboration with other local emergency services, and
- arranging long-term follow-up procedures to elicit both immediate and delayed effects of the exposure.

It should be noted that the above conceptual sequence may well come into play at once, or in a different sequence. In the CS gas incident the CCDC was notified by the Ambulance Control and CIRS (London) at the same time. The CCDC took the co-ordinator role, and in collaboration with CIRS, the school, and the emergency services commenced public health interventions of liaison with GPs and other relevant organisations and professionals, and also public relations on behalf of the health authority regarding the health risks of the incident. In addition a retrospective study of the acute adverse health effects was initiated.

According to the information obtained from CIRS, most crowd control agents cause mild short-term self-limiting effects which resolve spontaneously within 15-30 minutes after cessation of exposure, and treatment in hospital is often not required. The common symptoms include irritation of eyes, upper respiratory tract, and skin.

Of the exposed students from the Comprehensive School more than 70% experienced irritation/watering of the eyes and irritation of upper respiratory tract which was consistent with information obtained from CIRS. However, a substantial number of students reported that the symptoms lasted more than two hours. This may be due to the nature of exposure, i.e. the students may have been exposed to high concentrations in confined spaces, or due to recall bias. The exposure to high concentrations of CS gas seems an unlikely explanation as only three (7%) who had previous medical problems needed hospital care, and the corridor where the incident happened was wide and open at both ends (personal observation).

Difficulty in breathing was the symptom that affected students most. This is important, as patients with pre-existing respiratory disease (e.g. asthma) may be more at risk of severe effects and need medical attention sooner .

Conclusion

This incident resulted in a large number of children being exposed to CS gas unexpectedly. Early communication and co-ordination between the Health Authority, local health services and CIRS proved valuable in managing cases and minimising harm. Although a retrospective study may offer little to the management of an incident in its acute phase its contribution to understanding the impact on public health and the specific health effects of any chemical incident, and to reassuring the public should not be underestimated.

Reference

Gunnell, D.J. The public health physician's role in chemical incidents. *Journal of Public Health Medicine*, 1993; 15 (4): 352-357.

Potential secondary asbestos contamination to school children

Dr Diana McInnes, Lambeth, Southwark and Lewisham Health Authority (LSLHA)

Incident summary

On Wednesday March 15 at midday a call from CIRS was taken by the duty CCDC at LSLHA informing us that they had been notified by the environmental health department (EHD) in one of our local boroughs of a possible asbestos incident near a local primary school. The duty public health SpR immediately contacted the EHD to obtain more information.

A concerned member of the public whose house overlooked a building site had contacted the EHD. He had witnessed, over the preceding few days, the demolition of some garages with asbestos roofing with no attempt at containment. The roofs were apparently broken up by a mechanical digger and the debris buried on site. The local resident's major concern was the proximity of the site to a local primary school.

Site visit

In discussion with the EHD and CIRS it was agreed that an urgent site visit was needed to examine the site, and take appropriate samples. This was arranged for 14.30 that afternoon. In attendance at the site were the local CCDC, SpR, CCDC on attachment to CIRS, principal EHO from borough and technician from analytical laboratory to carry out asbestos testing. The site was noted to be adjacent to a primary school. There was evidence of asbestos debris. Foundations had been dug on the site of old garages and there was evidence of recent movement of earth over much of this site. The only workman present denied any knowledge of burying any type of building rubble. The builder in charge did not appear during the visit although the workman expected him. Wind direction at the time of the visit was towards the school.

Environmental sampling

Air, soil and debris sampling was carried out on both the building site and at the school in an area adjacent to the building site. Results of the air sampling were available within thirty minutes and other results the following morning. They are summarised below. It was reassuring that the tests in the school grounds were negative. Whilst we were not notified until several days after the incident had started, the wipe test would have indicated any significant contamination.

The Health and Safety Executive (HSE) were notified by the EHD as soon as the incident came to light. They visited separately on March 16. Enforcement powers concerning building sites whatever their size now lies with HSE. The EHD had no powers to order clearance or closure of the site on the day.

Comment

Fortunately this proved to be minor incident. However, it does show that no matter how vigilant EHDs are in relation to environmental hazards it is often only by the action of an astute, informed member of the public that such incidents are brought to the attention of public health.

Sampling type	***Building site***	***School***
Debris samples	2 samples, 2 positive*	No samples
Wipe test samples	3 samples, 1 positive*	3 samples, all negative
Air samples	2 samples, negative	1 sample, negative
Soil samples	2 samples, negative	No samples
Key: *: The positive results were all at a level of 15% for chrysotile asbestos		

Summary of CIRS chemical incidents at educational establishments

Dr. David Black, Specialist Registrar in Public Health Medicine on secondment to Chemical Incident Response Service

Introduction

Incidents at schools and other educational establishments have the potential to affect a large number of people, especially children. Levels of anxiety may quickly become raised both in children and in their parents. The health resources consumed following an incident may be significant.

The Chemical Incident Response Services (CIRS) receives information about incidents at educational establishments via the National Poisons Information Service (NPIS) (London) and from Health Authorities and Local Authorities holding a contract with CIRS. Currently, 73 English Health Authorities hold such a contract. An incidents is defined as ''an unforeseen event leading to acute exposure of two or more individuals to any non-radioactive chemical substance resulting in illness or a potentially toxic threat to health, or two or more individuals suffering from a similar illness which might be due to such an event"[1]. In addition all NPIS CS incidents are reported to CIRS as part of its CS surveillance programme.

All incidents reported to CIRS are entered onto a computerised database and the exact location of the incident is recorded when this is known. Paper records, often containing more detail, are stored.

Aim

- To summarise all reported incidents at educational establishments in the two years 1998 and 1999.
- To draw any lessons learned from the incidents
- To present a brief public health response checklist for dealing with incidents at educational establishments.

Method

The CIRS database was used to identify all incidents known to have occurred at educational establishments. Paper records were obtained and incidents were broadly classified according to their nature: CS gas, water, swimming pool and chemistry lesson related, incidents in or near school grounds, contaminated land (chronic), incidents occurring in university and adult education, and other. A difficulty is that some incidents were reported by NPIS to CIRS, but required no further action other than provision of information. NPIS staff, because of the high volume of calls, record brief details making some incidents difficult to classify. However some incidents potentially affecting large numbers or causing significant health effects were found to require a public health response.

Results

Only 72 out of the 2,559 (2,8%) incidents reported to CIRS in the two year period were recorded as occurring at an Educational Establishment. 70 out of the 72 paper records were available for inspection. Three of the 70 incidents contained insufficient detail to confirm the location as being within an educational institution. Details of 67 incidents are thus presented.

CS gas: Seven CS gas incidents were reported, two following malicious releases within schools. The largest incident (malicious) led to the evacuation of a secondary school with over 1000 pupils. More than 50 children were exposed, 15 were taken to hospital and health care professionals attended the school to give advice and first aid. Two of the other seven incidents involved less than 10 individuals with the remaining four involving reported exposure only to individual children.

Water: Two incidents of potentially contaminated water were reported. One involved fibreglass contamination of a school water tank. The other related to the school's private water supply with naturally occurring fluoride at levels above the drinking water standard. Dental mottling is thought to occur at the levels recorded. The solution was to blend mains water with the private supply.

Swimming pools: Three incidents related to swimming pool use were reported. One followed the release of chlorine at a school pool and resulted in over 50 children attending A&E. Epidemic hysteria appeared to magnify the problem. The second involved 20 children who became unwell after a swimming lesson. The cause was not determined although levels of trihalomethanes (mostly chloroform), which occur in swimming pools, were above standards for competitive swimming. The levels were however below the drinking water standard. In another swimming pool related incident children completed their 40 minute lesson even though the teacher was aware of the contamination, with several children being assessed at the local A&E and two kept in over night.

Chemistry lessons: Nine incidents were reported although none resulted in serious harm. Five were due to inhalation of fumes, two to ingestion of chemicals, and two to skin contamination by chemicals. This last category included a combined chemical and radioactive contamination.

School grounds and surroundings: Five incidents involving school grounds excluding contaminated land were reported. Four involved enquiries about: crop spraying, the planned construction of a sewage works, a methane leak and an unidentified blue substance found on the playing field. Chemical analysis of the latter substance at the Medical Toxicology Unit laboratory failed to identify it but no child was thought to have developed adverse health effects.

An incident more significant in terms of resources resulted from elemental mercury being stolen by children from a scrap dealer's yard. Many children from approximately 26 schools played with it, gave it to their friends and took it home. Mercury vapour detecting equipment was required to identify contamination and some children's homes were also screened. At least 25 personal items were contaminated, some of which had to be destroyed. 200 children were screened, with several found to have raised blood and urine mercury levels, some with significantly elevated levels requiring chelation therapy.

Contaminated land: Two incidents of possibly contaminated land were reported. One was a playing field found to be contaminated with asbestos fibres and cadmium from underlying rubble fill. No ill health was reported and remedial action using a capping layer and topsoil was carried out. The other incident was reported the day after a primary school was closed following reports of unpleasant smells and illness in pupils and staff. The school lies on old coalmine working, near to a landfill and over a major sewer draining an industrial estate. The public health led investigation involved several agencies and included thousands of pounds of environmental sampling and analysis in addition to epidemiological investigations. A cause was not identified but alterations thought likely to be effective, were carried out. Despite these actions part of the school remains closed over a year later.

University and adult education institutions: Five incidents were reported. Four were minor including one about worries over the fumes given off by cleaning fluid. One concerned the malicious delivery of unknown capsules concealed in a book received by a University Professor. Another followed the accidental discharge of a smoke canister that fell off a desk at a police training college. A leak of acrylamide fumes in a University chemistry laboratory was serious and caused significant acute effects in several students. A leak of butanol at a University chemistry laboratory exposed 5 people, one of whom became ataxic and hypotensive.

Other: An additional 39 incidents were reported for which details are scanty or which cannot be classified into one of the groupings above. The most notable incidents are described. A leaking mercury sphygmomanometer at a nursery potentially exposed 45 children and 5 teachers. Urinary mercury was measured in most and found to be normal. A report of fumes in a school corridor led to temporary closure of a school although no cause was found and epidemic hysteria suspected. A coach load of 30 children was exposed to carbon monoxide. Three incidents relating to fire extinguishers were reported. There are many incidents involving ingestion of substances and the unauthorised spraying of substances by children. Only one incident of ingestion of plant material was reported, possibly harmful fungi.

Conclusion

Despite the large number of children and adults spending considerable amounts of time in educational establishments the number of incidents reported is relatively small. Few of the events led to serious illness. However, incidents may go unreported because the health and safety of school children and teachers is primarily the responsibility of the Local Authority. People at school, like people at work are not, strictly speaking, the responsibility of the health authority. However, public health has skills and experience that prove very useful. CCDCs for instance are used to communicating with parents in their communicable disease control work. Schools are vulnerable to large scale incidents for several reasons:

- high density of people in relatively small spaces
- despite security measures, schools may suffer malicious attack
- chemical substances are used as part of the curriculum, particularly in chemistry
- children by their nature are curious and may not be aware of the potential danger of many substances
- children may risk exposure through the unauthorised acquisition of substances and through their propensity to mischief.
- groups of young people are thought to be at particular risk of epidemic hysteria

Reference

1. Hill, P. O'Sullivan, D. Survey of arrangements for identification and investigation of incidents of acute exposure to the public to toxic substances. *NHS Management Executive*, 1992.

Public Health checklist for incidents occurring at education establishments

In order to be informed of school incidents, public health may wish to consider:

- making contact with the local authority's department of education and explaining the role of public health and the help available should an incident arise
- ensuring other agencies and professional groups who may be involved with school incidents inform public health (e.g. first aiders, school nurses, ambulance service, A&Es, GPs, head teachers, staff, and parents)

In order to mount an appropriate response public health should consider:

- contacting CIRS for advice
- estimating the likely risk and if appropriate arranging for health care professionals to visit the school rather than sending large numbers to A&E
- early and clear communication with parents
- warning about the need for and advising on appropriate decontamination
- giving early thought to appropriate biological and environmental sampling in consultation with environmental health, CIRS and other agencies (e.g. Health and Safety Executive, Environment Agency)
- providing an appropriate response to media interest
- collecting clinical information from health services
- gathering the information needed to conduct an epidemiological investigation if this is necessary (e.g. names of those exposed, degree of exposure)
- using core public health skills in organisation and co-ordination to ensure all parties work together appropriately.
- assisting in declaring when an incident is over, when an institution is safe and communicating this with authority to parents, staff and pupils.
- ensuring lessons learned from incidents are recorded and shared

Chemical Water Contamination

Introduction

Dr Virginia Murray, CIRS

Many incidents of water contamination have occurred in the UK and elsewhere (Oliver *et al*, 1998a). Even small incidents arising from fuel oil leaks can present public health and other agencies with difficult and time consuming problems which may cause considerable anxiety amongst the exposed population.

Faith Goodfellow, CIRS Research Engineer (water), has already published a chemical incident water checklist for Health Authorities (Oliver *et al*, 1998b). However, experience from incidents reported to the Unit and study of the literature has shown the need for an expanded checklist including source specific questions. A flow chart accompanies this checklist to facilitate the path through the questions for the different water types.

This checklist was presented at the Water Training day on 11 November 1999 and at the CCDC Update training day, January 2000. Faith has taken on board the suggestions made but would be grateful for any further comments to help clarify the approach recommended. Please e-mail her on faith.goodfellow@gstt.sthames.nhs.uk

References

Oliver, F. and Holmes, E. (1998a). Identifying Chemical Water Incidents in the Published Literature. *Chemical Incident Report*. no.8 April. pp.2-9.

Oliver, F. and Holmes, E. (1998b). A Checklist for Water Related Chemical Incidents. *Chemical Incident Report*. no.8 April. pp.12-13.

Longstanding water and land contamination from a fuel oil leak

Faith Goodfellow, Research Engineer—Water, CIRS

The incident location is a small estate of several houses, recently re-developed from a former stable block. The houses are situated in large grounds with adjacent lakes and gardens. All the houses are supplied with heating oil from a central oil tank. At the time of construction, separate plastic water supply pipes were laid to each house from the iron public water main which runs past the perimeter of the estate. The incident has developed over several years and is still to be fully resolved.

Three main stages of the incident have been identified:

Stage one – a problem with oil contamination first arose in about 1996/97. This first event involved the estate lake being contaminated with oil and was not reported to the health authority. The source was traced back to surface drains from the housing development. It was found that the meters for the domestic heating oil supply to the houses had been designed for indoor siting, but had actually been located just outside each house. The meters had consequently corroded, and two meters were found to be leaking, with visible oil seen below ground level. The meters and the piping were replaced with those of suitable material. The old meters were removed, but the old piping was left in the ground, although it is believed that it was drained of any remaining oil and then sealed.

Stage two - in July 1998, following a complaint to the local water company regarding taste/odour problems in drinking water, the public health doctor contacted CIRS. A smell was only reported in three houses. In one house the smell from the water was described as 'horrific', however, no adverse health effects were reported. The most likely source of contamination was found to be oil contaminated soil, as a result of the previously leaking oil meters. This oil from the contaminated soil had permeated through plastic water supply pipes and led to drinking water contamination. Initially the mains supply was cut off and bowsers and a standpipe for drinking water were provided. An overland pipe directly from the main was installed by the water company. After connection to the overland supply the pipes were flushed through and no further oily smell in the water was observed.

A site visit was organised with the participation of the local health authority, local authority environmental health, representatives from the site owners and management agency, a residents' committee representative and CIRS. This led to some contaminated soil being removed with planned bioremediation of soil outside some properties. The plastic pipes were replaced with plastic coated copper piping from the mains water supply.

Stage three – in July 1999 renewed concerns of taste and odour in drinking water was reported. On investigation it was found that the connections from the water piping outside the house to the internal plumbing was still plastic and that continued contamination of the soil had resulted in permeation of oil through the plastic connectors, which were subsequently replaced. Extensive removal of contaminated soil beneath some houses is still underway.

Adverse health effects were reported at this point, and some residents were asking if health problems experienced over the previous year might be related to the contamination. A health questionnaire was sent to all residents in July 1999 with the objectives of documenting the residents' use of water, any changes they had noticed in their water and information on self perceived health status and recent changes. A report of the results of these questionnaires is being prepared.

Discussion

The main issue raised by this incident is the possibility of soil contamination with organic chemicals leading to drinking water contamination through permeation of plastic water supply pipes. This incident also highlights the need to replace all water pipe work with metal alternatives where organic chemical contamination is suspected.

This incident has also raised questions of health effects arising from these types of events. As a result the impact of the continuing involvement on the health authority in incident response can be prolonged.

CHEMICAL WATER INCIDENT CHECKLIST FOR HEALTH AUTHORITIES

Faith Goodfellow, Research Engineer—Water, Chemical Incident Response Service

The following checklist is to be used in the event of a chemical incident affecting any type of water, i.e. drinking, surface, ground, and marine or coastal water. The checklist consists of three parts:

1. a flowchart which allows the identification of the type of water affected by the incident and directs the user to the appropriate section of additional questions (see page 10);
2. the basic checklist for use in any water-related chemical incident (page 9); and
3. additional questions to be asked depending on the particular type of water affected: these are colour coded to match with the flowchart (see page 11)

BASIC CHECKLIST

Questions to Ask the Notifying Organisation

e.g. Water Utility or Environmental Health Officer

- What is known about the contaminating substance?
  - specific name(s)
  - composition
  - concentrations
- What is the source of contamination?
  - is it still continuing
  - has it been safely contained or removed
- How many households in what geographical area have actually and/or potentially been affected?
- How many people are known to have been exposed to contaminated water, and at what contaminant concentrations?
- Have any adverse health effects been reported following exposure, what are the symptoms?
- Are there hospital, drinking water, or food and drink manufacturer abstractions in the area that should be closed?
- Have samples been taken of affected water and potentially affected water
  - what is the sampling strategy, e.g. sampling frequency, priority analyses
  - if possible identify peaks and troughs in the analytical results

Recommendations for Initial Actions and Risk Assessment

- Define affected population, and monitor symptoms and disease levels
- Review potential health effects of the chemical and methods of control
- Compare any measured concentrations for the particular chemical with:
  - regulatory drinking water standards
  - any past sample results, e.g. from routine sampling
- Consider requesting analyses of biological samples on sentinel cases and others exposed where symptoms are reported
- Consider carrying out a questionnaire survey of all those exposed to identify any health effects
- Consider recommending duplicate environmental sample collection and analysis to assess exposure
- Take steps to ensure that further contamination is prevented

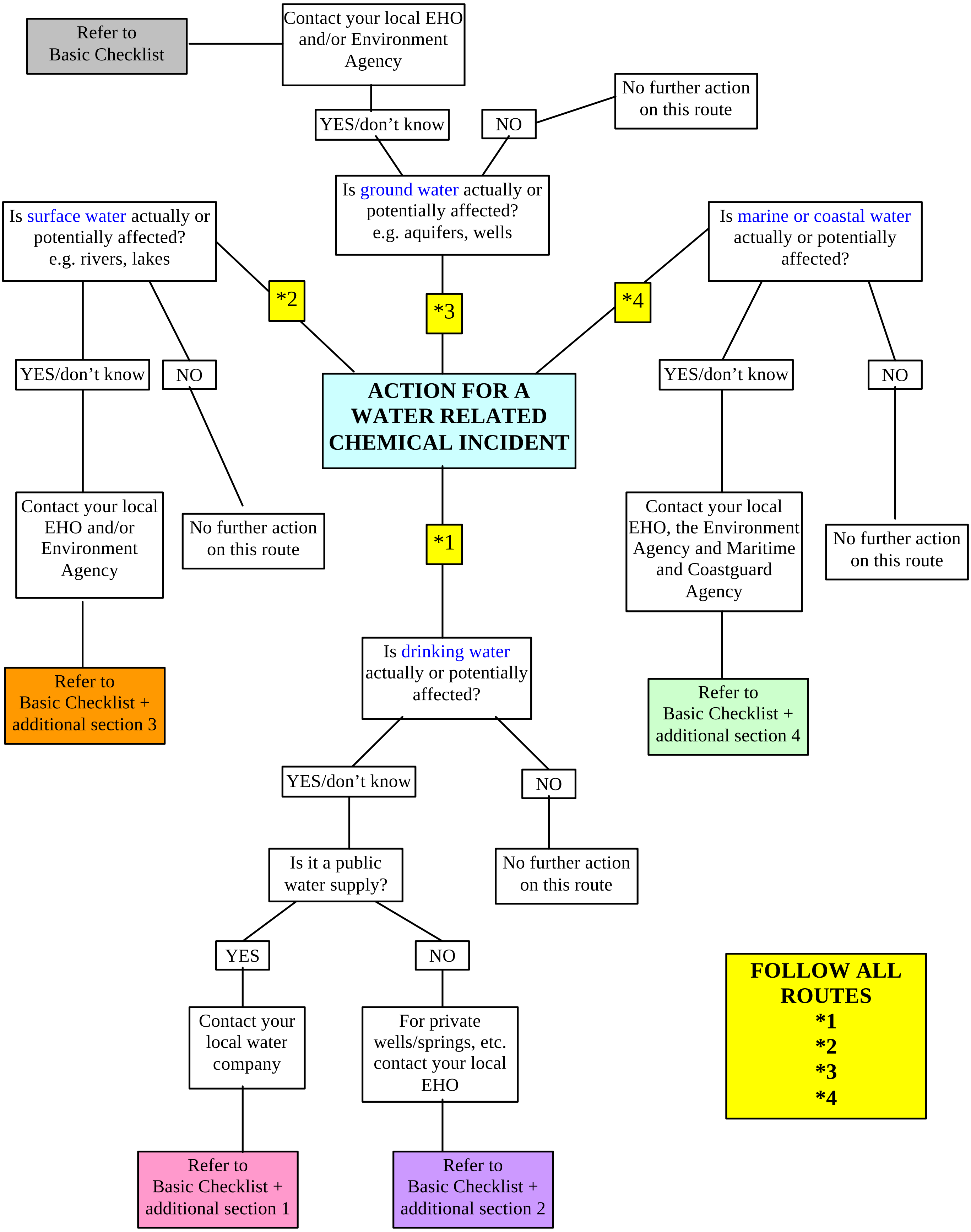
Who to Consider Alerting about the Incident

- Consider referring to health authority emergency plan and waterborne hazard plan if available
- Alert CIRS as soon as you are aware of the incident, and pass on as many details as possible
- Ensure relevant Water Company, Local Authority Environmental Health and Environment Agency personnel are informed and take 24 hour contact details
- Consider forming an incident team at an appropriate location.
- Ensure relevant members of the Health Authority are informed
- Consider alerting GPs, local hospitals, and neighbouring CCDCs, and ensure "at risk" groups are identified and alerted, particularly people using home and/or hospital renal dialysis
- Consider alerting emergency services to potential of casualties, and in the case of the fire service, possible contaminated water from fire hydrants and possible need for removal of the contaminant
- Check all affected drinking water consumers have been informed, including food and drink manufacturers who may be using potentially contaminated water. Also consider informing MAFF if there is a threat to food
- Consider issuing a press release to local press and media.

Post Incident Questions

- Has the incident been declared over for each organisation involved and are they standing down?
  - have those affected been informed of the end of the incident?
- Has the area been adequately decontaminated?
- Have all those with adverse health effects fully recovered?
- Do any patients need long term follow up?
- Are all records of the incident complete and up to date?
- Consider compiling a list of renal patients with routine updating for easy reference in event of future incidents

CHEMICAL WATER INCIDENT CHECKLIST FOR HEALTH AUTHORITIES



ADDITIONAL SPECIFIC QUESTIONS

SECTION 1 - CHEMICAL INCIDENTS AFFECTING PUBLIC DRINKING WATER SUPPLIES

Questions to Ask the Water Utility

- Have alternative drinking water supplies been arranged, are bowser water supplies safe to drink?
  - if yes, have consumers been notified not to drink, cook with or use tap water?
- Has the source of contamination been identified?
  - is the contamination contained?
- What samples are being taken?
  - who is taking the samples?
  - is there appropriate quality control?
  - are duplicate samples being taken by an independent organisation?
- Is the health authority being advised of all analytical results?
- Is advice from other organisations being sought by the water utility, e.g. environmental consultants, Water Research Centre (WRc)?
  - is this information/data available to the HA and CIRS?
- What action for remediation/decontamination is taking place?
  - for example, are water mains being flushed to remove contaminated water, if so, does this water need to be contained?
  - what is the expected time frame for remediation/decontamination?
- Have drinking water abstractions been closed?
  - when will they be re-opened?
  - how much water is in storage reservoirs?
- Have water treatment works been taken off line?
  - what impact will this have?
  - is disinfection still effective?
- Have sewage treatment works been taken off line?
  - what impact will this have?
- Could drinking water storage reservoirs have been affected?

Post Incident Questions

- Does the drinking water now meet UK standards for drinking water quality?
- Have water utility drinking water mains and domestic water pipes, tanks and plumbing fittings been adequately decontaminated?
- If permanent new water mains have been installed, have these been verified to be uncontaminated?
- Is a report to the Drinking Water Inspectorate required?

SECTION 2 - CHEMICAL INCIDENTS AFFECTING PRIVATE DRINKING WATER SUPPLIES

Questions to Ask the Environmental Health Officer

- Have alternative drinking water supplies been arranged, are bowser water supplies safe to drink?
- Are other drinking water abstractions in the area threatened with contamination?

Questions to Ask the Water Utility

- Inform water utility of the contamination, even if it is a private supply, may be a public water abstraction from the same aquifer.

Post Incident Questions

- Does the drinking water now meet UK standards for drinking water quality?
- Have drinking water supply pipes, tanks and plumbing fittings been adequately decontaminated?
- If permanent new water supply pipes have been installed, have these been verified to be uncontaminated?
- Is a report to the Drinking Water Inspectorate required?

SECTION 3 - CHEMICAL INCIDENTS AFFECTING SURFACE WATER

Questions to Ask the Environmental Health Officer

- Is the area used for water sports, swimming, etc. or for fishing?
- Are there any other uses of the water resource, e.g. drinking water abstraction or agricultural usage for irrigation or cattle watering?
- Consider advising the public of contamination and controlling access to the affected area?
- Will the area of contamination change over time, e.g. movement down a river?
- Could drinking water storage reservoirs have been affected?
- Is long term monitoring of the affected, or potentially affected area necessary?

SECTION 4 - CHEMICAL INCIDENTS AFFECTING MARINE OR COASTAL WATER

Questions to Ask the Environment Agency/Maritime Coastguard Agency

- Is the area used for water sports, swimming, etc.?
- Is there any recreational or commercial fishing, or collection of other marine animals for food in the area?
  - are aquatic organisms being sampled, for example by CEFAS?
- Consider advising the public of contamination and controlling access to the affected area?

Health Surveillance

Introduction
Dr Virginia Murray, CIRS

Casualties exposed to chemicals are often frightened and anxious that they may develop adverse effects immediately or in the future. Although strategies have been developed for early biological investigation and sampling (Irwin et al , 1999) patients may request a health check to confirm that they have been exposed and may wish for a medical examination to determine if they are likely to develop adverse health effects from that exposure. Dr Millership's incident summary illustrates the case history of a patient requesting a health check in the context of a complex incident investigation.

In the experience of CIRS a range of issues concerning health checks and health surveillance has been identified. These have been summarised by Dr Purcell and Dr Wilks below. Their draft 8 point checklist is designed to facilitate the decision making process required to determine the value of such health surveillance by public health. Comments on this checklist would be gratefully received. Please contact Dr Wilks with any comments by 1 June 2000 at martin.wilks@gstt.sthames.nhs.uk

The Fireman's tale

Dr Sally Millership, Consultant in Communicable Disease Control, North Essex Health Authority

Background
A fireman visited his general practitioner very concerned about an exposure to radiation, as he was planning to start a family. In summary his story was as follows:

On a cold wet night in December 1999 three weeks before, a cargo plane crashed into woods shortly after take off. He was a member of the first two fire crews on the scene. The plane was burning fiercely with a large plume of smoke and it took 2 1/2 hours to bring it under control. The fireman was wearing his ordinary protective clothing - helmet, suit and boots, which he would have worn for any fire. After about 3 hours he was advised to wear a dust mask, but no explanation was given for this advice. The fireman was on the site for about 5 hours. The aircraft and parts of the surrounding woods were still smouldering the next morning. He returned to assist and in all spent about 17 hours in the area.

The only casualties were the four crew members, who all died. No one else was injured. As far as the members of the fire crews were concerned the incident was over. However, in early January press reports of uranium in the plane began to circulate. The fireman remembered sitting with a group of colleagues when he was told about this by his union representative. He was very worried, especially as he felt no one seemed to know anything about the health hazards. He went to see his GP for advice about the possible dangers to the children he might have.

The Public Health problem
The local hospital accident department was cleared for a major incident but was stood down within 30 minutes as there were no survivors. The local health authority public health department had an agreement with the ambulance service to notify chemical and radiation incidents, but there was no requirement to do so for other major incidents.

Although the public health department was aware of the crash within 30 minutes via press and other reports, few details were available at the time. The full extent of the fire was not recognised until the following day when several public health concerns emerged

- there were press reports of benzene in the atmosphere as a consequence of spilled fuel.
- the contents of the cargo were unknown except that there were 13 litres of a "hazardous substance" thought to have been completely destroyed in the fire and press reports of detonator fuses on board. Neither police nor fire service would confirm the contents of the cargo manifest.
- no mention was made that the tail section of the plane had broken up distributing its ballast of 24 depleted uranium ingots in the woods and nearby lake.

Two days later the Millennium holiday period began, and public interest died away until mid January, when press reports of the scattered uranium appeared and the fireman presented to his general practitioner. This was followed by a request for radiation monitoring of the nearby population by another local general practice.

Public Health Investigation
Benzene is well known as a carcinogen on prolonged exposure. However it is likely that any present in the fuel was destroyed during the fire.

The Air Accident Investigation branch of the Department of the Environment, Transport and the Regions (DETR) supplied the cargo manifest, which is a public document. There were 125 consignment notes with between 1 and 20 separate items listed on each. These were principally clothing, machine parts and office equipment but included the following named chemicals

- calcium dichromate, n,n-dimethylacetamide 0.24L
- chlorosilanes 0.05 L
- 2,T-dipyridyl 2 kg
- benzyl chloroformate 2.5L
- paints 15 L
- 'paint related material' 13 L
- adhesives 4.6 L
- diagnostic kits with '1imited quantities of radioactive material'. The Air Accident Branch confirmed that these were medical kits with 25cl vials for immunoassay purposes.

All the above, except the diagnostic kits were likely to have been destroyed in the fire.

The Environment Agency monitored the crash site for radioactivity to locate the uranium ingots. So far 20 of the 24 rods have been recovered of which one was in two pieces and the rest intact. The ingots are depleted uranium (DU) which has a lower proportion of the more radioactive constituents of natural uranium. Typically DU is 0.2% ^{235}U . The alpha emissions can be stopped by intact skin, beta emissions by a few millimetres of plastic or metal and there is no significant external hazard from gamma radiation[1]. The ingots were encased in metal, and therefore not a health hazard unless broken or burnt with the production of dust. Once in a soluble form uranium is a highly toxic heavy metal as well as a radiation hazard from ingestion. There was no evidence that any ingot burnt; this requires 70°C for 4 hours. Only one was broken into two pieces, which fitted together. The remaining missing ingots are believed to be at the bottom of a lake near the crash site.

Extensive monitoring failed to show any other signs of radioactivity elsewhere apart from the radioactive material in the medical kits.

Discussion

The press identified two issues regarded as a public health concern, benzene in the fuel and uranium in the tail section of the aircraft. Further enquiry revealed a list of chemicals and the presence of radioactive material in the cargo. Fortunately further investigation showed that health fears were groundless (Clark). We were able to reassure the fireman and local doctors without undertaking health surveillance. However, we cannot assume that the matter will end now; it may be months or years before further public health concerns are raised. Once contacted other investigating agencies could not have been more helpful, and we believe that we have enough information to reassure the public without an expensive and difficult cluster investigation or health surveillance should allegations of health effects be made in the future.

It is a matter of concern that the potential public health hazards were not appreciated on the night of the accident. While the combination of an aircraft crash and a chemical or radiation hazard is rare it is not unknown. For instance in the Netherlands in 1994, organophosphates were believed to be present in the cargo of an aircraft which landed in the middle of a built up area. Furthermore materials which are quite safe when packaged can be dangerous in combination.

It is perhaps understandable that the police and fire services were reluctant to discuss the contents of the cargo manifest. This included nearly 200 pages, and while the chemicals and radioactive materials were clearly labelled as such it was difficult to pick them out from the other paperwork. Larger quantities spilled rather than destroyed might have presented a considerable hazard to emergency service personnel. There is a need for better liaison with public health departments at the earliest stage of an incident like this so that rescuers can be warned of potential dangers and the wider public appropriately advised before alarmist press reports circulate.

Reference

Clark MJ. National Radiological Protection Board. Personal communication

The role of Health Surveillance in Chemical Incident Management – a checklist for Health Authorities

Dr Bernadette Purcell, Specialist Registrar in Public Health Medicine, on secondment to Chemical Incident Response Service & Dr Martin Wilks, Consultant Medical Toxicologist, Medical Toxicology Unit

Introduction

This guidance is designed to aid public health practitioners in the decision whether to start local health surveillance on a group of people who have, or may have, been exposed to a chemical hazard in the community. The need to consider this usually arises under one of the following scenarios:

1. Agent-oriented: The exposure(s) is known and associated health effects are suspected e.g. aluminium contamination of a water supply.

2. Effect-oriented: There are apparent health effects in a locality and the cause is unknown but a chemical exposure is possible e.g. increases in congenital abnormalities near a hazardous chemical land fill site.

What do we mean by health surveillance?

This should be distinguished from health screening or conducting an epidemiological survey. Pre-employment, occupational risk and periodic medical examinations are all well recognised health surveillance procedures used in the workplace and designed to contribute to the prevention of work-related ill health.

Several terms that may be confused are used in the occupational health literature. The following definitions have been proposed [1]

Health surveillance:
A generic term. Any procedure undertaken in individuals or groups to review a person's health in order to detect and assess any significant deviation from normality. For example medical examination, biological monitoring*, biological effect monitoring**, inspection by a competent person, review of health records. It can be used to establish work related or non-work related effects.

Medical surveillance:
Health surveillance carried out by or under the direct supervision of a medical practitioner. Medical examinations are medical surveillance procedures.

Health screening:
Procedures carried out in the community which attempt to detect early signs of illness so that interventions can be made to reduce mortality and

morbidity e.g. screening for cervical or breast cancer

* Biological monitoring is the measurement of a chemical or its metabolites in the body fluids of exposed persons, and conversion to an equivalent absorbed dose of the chemical based on a knowledge of its human metabolism and pharmacokinetics.

** Biological effect monitoring is the use of biological markers as indicators of: *Susceptibility* e.g. genetic predisposition or pre-existing disease. *Exposure* indicating the action of the chemical at the cellular or molecular level with measurable alteration of biochemistry or molecular interaction. *Disease* the consequences of functional or structural change as a result of organ or system pathology

What to consider before starting health surveillance

Clarify objectives before starting any health surveillance programme. Any health surveillance programme potentially has high costs in terms of patient concerns, public health and other professional time and resources and financial costs. It is most important to clarify the purpose of surveillance and ensure that this is clear to all concerned from the outset. The draft checklist suggests key factors to consider before the decision whether or not to begin surveillance is taken.

How might the information be used?

Information from health surveillance will tend to be used for descriptive purposes and generating hypotheses rather than testing them. It is worth revisiting the Bradford Hill[2] criteria for assessing cause and effect However it is important to consider the implications for future epidemiological work and ensure records are kept with this potential use in mind (3)

How long might it last?

Whether the exposure is from a an acute or continuous point source may determine the duration of surveillance. Chronic exposures may warrant surveillance of health effects over a longer period of time, although acute exposure to certain chemical hazards may cause delayed health effects (e.g. asbestos).

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References

1. Bell J.G et al. A systematic approach to health surveillance in the workplace. *Occup Med* Vol 45, No 6 pp 305-310, 1995
2. Hill, A.B. The environment and disease. Association or causation? *Proc. R. Soc. Med.*, **58**, 295-300, 1965

Draft CIRS 8 point checklist for Health Surveillance

Dr Bernadette Purcell, Specialist Registrar in Public Health Medicine, on secondment to Chemical Incident Response Service & Dr Martin Wilks, Consultant Medical Toxicologist, Medical Toxicology Unit

1. Start with prevention!
   Have measures to avoid, remedy or reduce any significant adverse impacts on health been identified and put in place?

2. What is the stated purpose of health surveillance e.g. illness prevention, monitoring, medico-legal, and is this clearly understood by all involved?

3. Consider ethical issues:
   - Is ethical approval needed?
   - Are the objectives clear to all involved?
   - Are the procedures justifiable in terms of the objectives– including respect for individuals and avoiding unnecessary, trivial or degrading procedures?
   - Has informed consent been obtained?
   - Consider the effects of surveillance on people e.g. unexpected genetic findings.

4. Consider methodological issues:
   - Can you identify the population at risk? Specify the people to be surveyed and the frequency
   - Which health and/or disease indicators will be measured?
   - How will you analyse the results? Specify any statistical methods to be used in advance.

5. Anticipate the results:
   - What will you do with the results?
   - Can you act upon them? Are you prepared to?
   - How will results be communicated and to whom?

6. Set criteria for when to stop surveillance.
   Consider the need for ongoing monitoring

7. Record-keeping and sampling
   - Records should be kept in a way that allows you to go back and identify exposures, and people if necessary.
   - Consider whether samples will be stored or destroyed.

8. Consider the costs of surveillance
   - How much will it cost?
   - Who will pay?
   - Is the ‘polluter’ still around?

Update on contaminated land

Introduction

Emma Woodey, CIRS, Research Engineer-Land

The long-awaited contaminated land regulations, frequently referred to as Part IIA, came into force on 1 April 2000. The new legislation places a statutory duty on local authority officers to identify areas of contaminated land within their area. They will then have to determine whether the land is causing or could potentially cause significant harm to human health or the environment. This is likely to raise a number of issues and concerns and perhaps raise some new issues for Public Health.

In the summary below, Phil Crowcroft, Land Quality Manager from the Environment Agency discusses the implications of the new legislation in more detail and clarifies some of the points that those working in health authorities might need to be aware of. For those of you wanting more information, the second Land Training Day is to be held on Thursday 18th May at St. Thomas' Hospital and there are still a few places available. Please contact CIRS on 020 7771-5381 if you are interested in attending.

The new Contaminated Land Regime (Part IIA) and Health Authorities

Phil Crowcroft, Land Policy Manager, The Environment Agency

Part IIA of the Environmental Protection Act 1990 sets out a new contaminated land regime. This came into effect in England on April 1st 2000. Progress is also being made towards implementation via the National Assembly for Wales and the Scottish Executive, and the regime is likely to be fully operational across all three countries by the autumn of 2000. In England and Wales, the Environment Agency (the Agency) will regulate the regime with the local authorities. In Scotland, the Scottish Environment Protection Agency regulates alongside local authorities.

The purpose of the regime is to deal with the legacy of contaminated land that has arisen from a wide range of industrial, mining and waste disposal activities. It is intended to be complementary to the planning regime, with the expectation that most contaminated land will still be dealt with by use of planning conditions or legal agreements as part of the redevelopment process. Where other regulatory regimes apply, for example Waste Management Licensing or *Integrated Pollution Control* permits, and can be used to deal with contamination, Part IIA will not generally apply. However, Part IIA allows local authorities and the Agency to deal pro-actively with land which is posing unacceptable risks to humans, controlled waters or the wider environment, where that land is not being actively redeveloped or controlled by another permitting process. The new legislation is consistent with the 'polluter pays' principle and places the cost of dealing with contamination on the polluter where they can be found, or the landowner/occupier where the polluter no longer exists.

Local authorities are the lead regulator for Part IIA. However, the Environment Agency has specific duties, including provision of information, consultation on local authority inspection strategies, enforcement of remediation of 'special sites', provision of site-specific advice to local authorities on matters of water pollution and other matters where it has specific expertise and preparation of 'State of Contaminated Land' reports. The Agency is the enforcing authority for a particular group of sites known as Special Sites. Local authorities regulate the remainder of the sites identified as contaminated land.

Local authorities are required by the regime to inspect their areas and identify whether land can be considered to be contaminated land when judged by a particular set of criteria. Contaminated land is defined in the legislation as:

'Any land which appears to the local authority in whose area it is situated to be in such a condition, by reason of substances in, on or under the land, that:

a) significant harm is being caused or there is a significant possibility of such harm being caused; or
b) pollution of controlled waters is being, or is likely to be caused'

As a first step in the process of identifying contaminated land, the Statutory Guidance which supports the legislation requires that "significant pollutant linkages" must exist. A pollutant linkage has three components, a "contaminant", linked by a "pathway" to a defined "receptor". For such a linkage to be significant, it must pass the tests set out in Tables A and B of the Statutory Guidance. These tables deal with harm to a range of receptors including humans, crops, livestock and buildings. Health Authorities are going to be primarily concerned where the pollutant linkage relates to harm to human health.

There is a need to liase closely with Health Authorities where it is suspected that harm might occur in the short or long term, and a multi-disciplinary approach is likely to yield the best solutions to particular problems. In situations where it appears that harm may be imminent, the regime gives the regulatory authorities powers to take immediate action to control such risks. It is expected that in such situations, local authorities and their environmental health departments will work with health colleagues to ensure that any exposure of humans is properly assessed and medical treatment and monitoring provided.

The Department of the Environment, Transport and the Regions (DETR) and the Agency are producing guidance on a range of aspects of the new regime, and further information, including copies of the Statutory Guidance and Regulations can be obtained from the DETR website: http://www.detr.gov.uk

Chemical incident response by Environmental Health Officers – is there confusion?

Emma Waterworth, BSc Student in Environmental Health, Kings College

Introduction

Environmental Health Officers (EHO) have no specific statutory duty to deal with chemical incidents. Although there is some guidance on this matter, it appears that the role of the EHO remains unclear. Therefore, it was considered that a survey of the role of EHOs in chemical incidents would be a valuable exercise given the lack of clarity surrounding the protocol for dealing with chemical incidents. The aims of the survey were to examine the role of EHOs in chemical incident response, to evaluate their preparedness to carry out chemical incident work and to investigate the perception of EHOs regarding their role in chemical incidents. This report summarises only the aspects of the project that relate to EHO response and links to public health.

The Guidance

The Department of the Environment, Transport and the Regions (DETR) publication 'Environmental Sampling After a Chemical Accident' provides guidance on the sampling procedures essential to gauge the extent and nature of contamination resulting from a chemical incident (DETR, 1999). This report's intended users include EHOs. It suggests that EHOs may be ideally placed to play an initial investigative role following a chemical incident. The National Health Service (NHS) Guidance concerning planning for Major Incidents identifies the essential elements needed to ensure an effective response to a major incident (DoH, 1998). In the event of a major incident the role of local authorities often includes the co-ordination of an emergency planning liaison group. This role be performed by emergency planning officers and EHOs.

The Health and Safety/Local Authority Enforcement Liaison Committee (HELA) has produced a circular that gives advice to local authority enforcement officers about major incident response procedures (HELA, 2000).

Local authorities would be involved in the event of a major incident and they have their own emergency procedures and arrangements for dealing with major incidents through their role in emergency planning.

Method

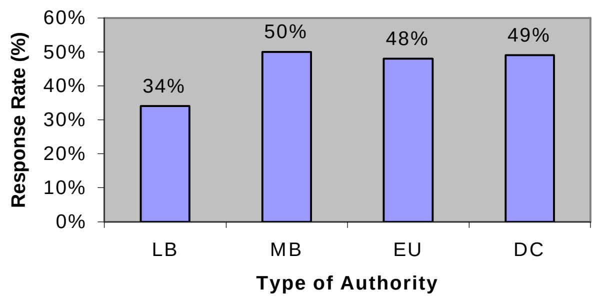
The purpose of the survey was to discover the preparedness, experience and attitudes of EHOs towards their role in response to chemical incidents. The study was undertaken at King's College, London. A pilot questionnaire was sent to twelve local authorities and members of the Chartered Institute of Environmental Health (CIEH) and the Medical Toxicology Unit (MTU) who were also invited to comment on the style and content. The suggestions were incorporated into the final questionnaire which were sent out in January 2000 to all local authorities within England, Wales and Northern Ireland. Respondents were asked to return the completed forms by the end of February 2000. Information on Wales and Northern Ireland will be published separately.

Results

Of the 418 local authorities sent a questionnaire 194 responded, giving a response rate of 46.4% which is a good for a postal survey (Oppenheim, 1992). The majority of the completed questionnaires were returned by Chief Environmental Health Officers or Principle Environmental Health Officers.

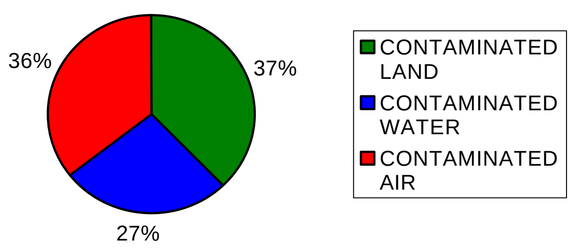
In England there was a 49% response rate from the District Councils (DC), 48% from Unitary Authorities (EU), 50% from Metropolitan Boroughs (MB) and 34% from London Boroughs (LB) (figure 1).

Figure 1 - Response Rate in England

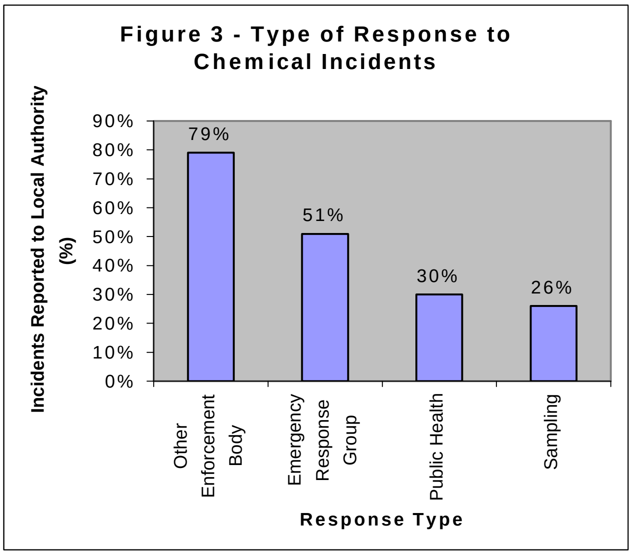


Respondents were asked whether they had any involvement in chemical incidents over the last 12 months and if so, how many and which environmental media were affected i.e. land, water or air. 92 (47%) of the respondents had participated in chemical incidents. The total number of incidents in these 92 authorities was reported to be 259, giving and average of 2.8 incidents per authority in those authorities in which incidents occurred and an average of 1.3 incidents per authority in all of the authorities which responded. Figure 2 shows the proportion of incidents affecting land (98 incidents, 37.8%), water (69, 26.6%) and air (92, 35.5%).

Figure 2 - Proportion of Incident Type



Respondents were also asked about the type of involvement they had in chemical incidents response. 79% of local authorities with chemical incidents said that they referred the case to another enforcement body for example the Ministry of Agriculture, Fisheries and Foods, the Environment Agency and the Health and Safety Executive. 51% said that they were part of an emergency response group, 30% said that they consulted public health and only 26% said that they carried out environmental sampling (figure 3).



Only 30% of respondents who had experienced chemical incidents stated that they had contacted public health. This may be because public health have already become involved. It may indicate a lack of collaboration or awareness of the role of public health or a reluctance to request any assistance.

A more detailed paper on the role of EHOs in response to chemical incidents is being submitted for publication and will point to the need for clarification of the role. This report is a summary of part of the project which forms part of the BSc in Environmental Health which is currently being reviewed for examination.

Acknowledgement
I would like to thank Robyn Fairman, King's College, for originally suggesting the subject of the project and for her assistance and guidance throughout. I would also like to thank the Chartered Institute of Environmental Health for their help with the project.

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What do Public Health trainees need to learn about non-infectious environmental hazards? A questionnaire survey of 3 regions in England.

Dr Bernadette Purcell, Specialist Registrar in Public Health on secondment to CIRS.

Background
The Chemical Incident Response Service (CIRS) provides training for public health practitioners in dealing with non-infectious environmental hazards (NIEH). At the request of CIRS this survey was conducted to review the training needs of public health trainees (including specialist registrars and non-medical public health specialists) who may have responsibilities for chemical incident management in the future. We wished to obtain the views of trainees and consultants in Public Health Medicine on priorities for training in relation to their own experience. The Faculty of Public Health Medicine working group reviewing training competencies and the National Focus for Chemical Incidents supported this exercise.

Method
Initially a review was conducted of sources relevant to training standards in this area. A short questionnaire was developed with the CIRS team and piloted at a North Thames training day in February this year. Comments from a regional epidemiologist, a regional training co-ordinator, a consultant in communicable disease control (CCDC) and the National Focus were incorporated into the final version. Respondents were asked to prioritise 16 learning objectives as 'essential', 'desirable' or 'low priority' (table 1). They were asked to comment on the amount of training time that should be allocated to this area. They were also invited to make general comments, although these are not reported here. The questionnaire was distributed in March to all consultants and trainees in North Thames, South West and Trent training regions.

Table 1: 16 learning objectives for public health training in non-infectious environmental hazards

- Participate in the response to a chemical incident
- Gain experience of emergency planning
- Understand the different agency roles in NIEH control/ containment and mitigation
- Understand the role of Occupational Health departments for NIEHs in the work place
- Understand the process of hazard and risk assessment
- Develop experience of communicating risk of NIEHs
- Learn the indications, scope and limitations of biological sampling
- Learn the indications, scope and limitations of environmental sampling
- Gain knowledge of the toxicology of a range of NIEHs
- Gain a working knowledge of the routine sources of data on NIEHs
- Learn methods of controlling NIEHs and preventing chemical incidents
- Gain an understanding of legislation as it applies to NIEHs
- Learn when and how to implement monitoring/surveillance of health effects of NIEHs
- Gain experience of responding to requests to investigate

chronic chemical exposures

- Perform a cluster analysis
- Understand the scope and limitations of environmental epidemiology

Results

Response

170 completed questionnaires were returned in total: 68 from trainees and 102 from consultants. Overall 57% of trainees and 50% of Consultants in these regions replied to the questionnaire. There was not a marked difference in response between regions. There are 33 health authorities in these regions out of a total of approximately 120 in the UK. CIRS has a total of service level agreements with 73 health authorities.

Of the trainees who responded 31 were from years 1 and 2; 28 from years 3 and above.

27 Consultants in Communicable Disease Control (CsCDC), 44 Consultants in Public Health Medicine (CsPHM), 21 Directors of Public Health (including a deputy director and regional director), 3 academics, and 7 other consultants (including a cancer intelligence unit director, a consultant epidemiologist, a director of development, a chief executive of a Primary Care Group, a director of medical education research, and consultant perinatal epidemiologist) responded.

Trainees' experience and views

Of the 68 trainees who replied 23 intended a career as a consultant in Public Health Medicine, 20 in academic public health, 8 in Communicable Disease Control and 16 were undecided.

Assessing experience:

- 13 had assisted in the response to at least one chemical incident and 2 had taken the lead
- 3 had been attached to a Chemical Incident Provider Unit
- 4 had responded to a chemical incident on call.
- 23 had experience that was limited to training days or a simulation exercise,

Figure 1: Trainees' views on the relative importance of learning objectives for public health training in non-infectious environmental hazards

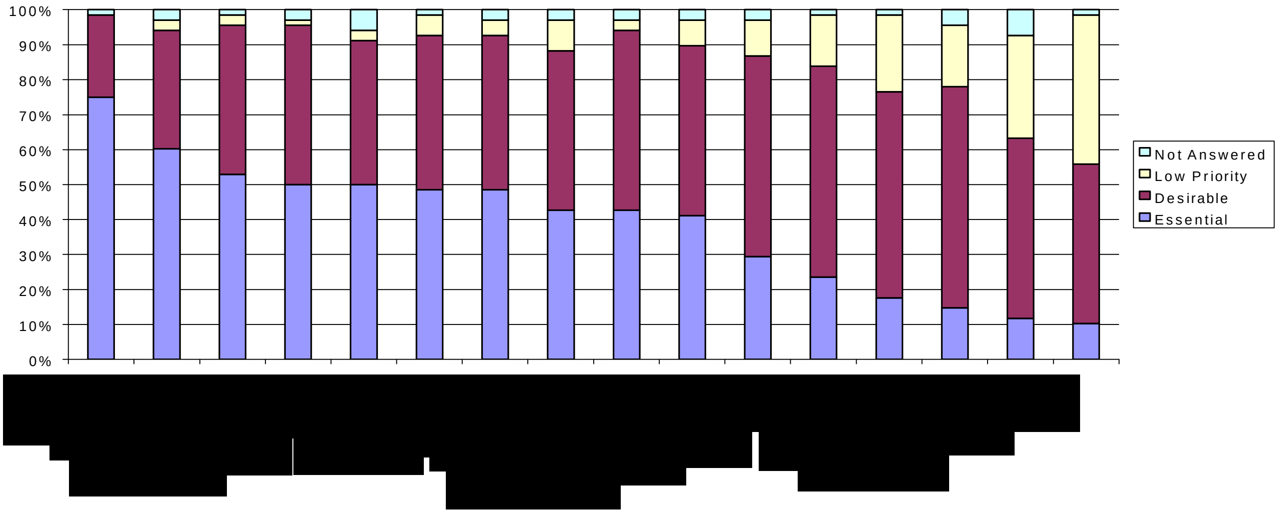

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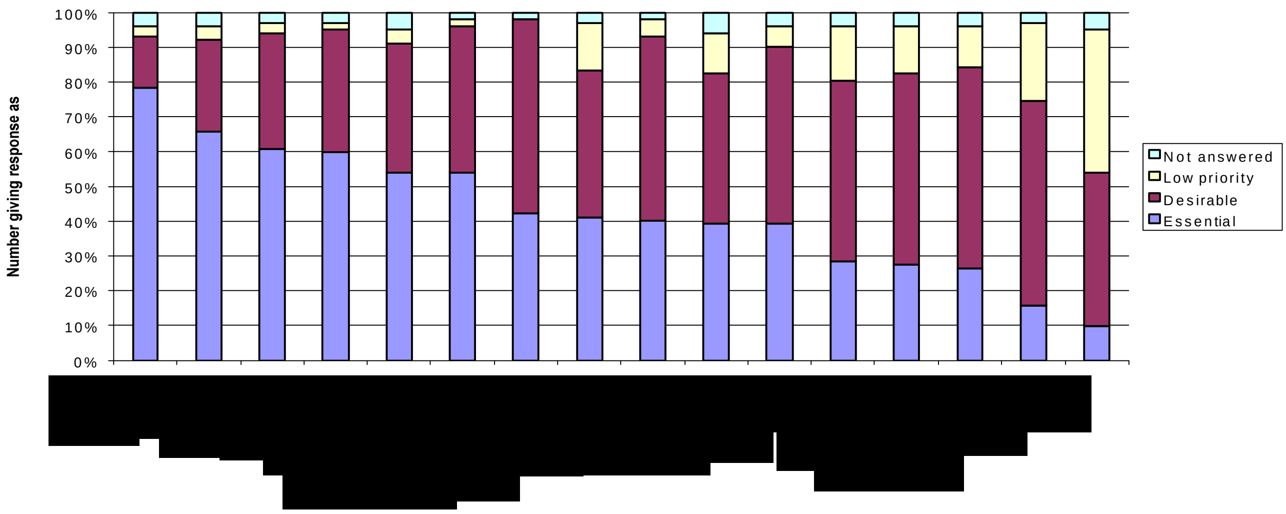
Figure 2: Consultants' views on the relative importance of learning objectives for public health training in non-infectious environmental hazards



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- 23 (about a third) had no experience. Most of these were in their first year of training.

33 out of the 68 were aware of NHS guidance on dealing with the health aspects of chemical incidents; most gave their major incident plans or on call pack as the source.

Figure 2 illustrates trainees' views on the relative importance of learning objectives in NIEH. A clear majority (51/68) considered 'gaining an understanding of different agency roles in NIEH control, containment and mitigation' to be essential.

28 thought a 'typical' PH trainee should spend 1 day each year on NIEH training, some of whom added this should be increased if the career preference was to be a CCDC. 26 thought that training should extend to 1 week each year. 10 respondents thought training time should be more than a week each year, up to 3 months in the total 5 years.

Consultants' experience and views

41 consultants responding had been in post for between 0-4 years, 30 for 5-9 years and 31 for 10 or more years. Of these 85 were taking part in the on call rota and 17 were not.

49 had responded to at least one chemical incident, 29 had taken the lead, 5 had been attached to a Chemical Incident Provider Unit, 74 had attended training days or simulation exercise and 10 had no experience. 7 of the latter had a CCDC role and were mainly from the North Thames region.

26 consultants did not answer the question 'How much time do you think a typical public health trainee should spend on non-infectious environmental hazards in total during training?' 49 gave responses of between 1 and 4 months. 23 thought less than 1 month, and 4 said more than 4 months. The range was from 1 week (a DPH with more than 10 years experience) to 6 months to a year (a CCDC with more than 10 years experience). Many commented that the answer depends on whether the trainee is intending a career as a CCDC.

Consultants were asked to rate the importance of the same 16 learning objectives in non-infectious environmental hazards as essential, desirable or low priority. The results are given in figure 3.

Comparison of trainees' and consultants' views

Like trainees, consultants rated 'understanding the different agency roles in NIEH control, containment and mitigation' as essential more often than any other training objective (78% consultants and 75% of trainees). Interestingly there was also complete concordance of ranking of those objectives felt to be least essential to NIEH training between consultants and trainees. From 'learning methods of controlling and preventing chemical incidents' (39% of consultants and 41% of trainees rated essential) to 'gaining knowledge of the toxicology of a range of NIEHs' (10% of consultants and 10% of trainees rated this essential). However, more than half of all respondents regarded all the listed objectives as at least desirable for public health training.

Conclusions

The findings from this survey provide some clarification of priorities for public health training in NIEHs and will be used to inform the CIRS training programme. Any comments would be welcome and could contribute towards the preparation of a more formal report that will be fed back to the Faculty of Public Health working group reviewing competencies for training and submitted for publication.

Acknowledgement

Thanks to Ivan House for help with processing the data and to all the consultants and trainees who took part.

CIRS Training Days

CIRS is pleased to announce the full 2000 Training Days programme. For booking information on these courses and further details please contact Rico Euripidou 0207 771 5381 for these courses. Detailed information about these courses can be found on the enclosed **training flyer**

Please note: Courses from September 2000 onwards will be run at the Sherman Education Centre, Thomas Guy House, Guy's Hospital, next to London Bridge.

CIRS Land Contamination Training Day

Thursday 18 May 2000, held in the West Wing Committee Room at St Thomas' Hospital, London

CIRS Pesticide Training Day

Thursday 8 June 2000, held in the West Wing Committee Room at St Thomas' Hospital, London

CIRS Update for CsCDC

Thursday 15 June 2000, held in the West Wing Committee Room at St Thomas' Hospital, London

Friday 8 December 2000, held in Sherman Education Centre, Thomas Guy House, Guy's Hospital

CIRS How to Respond to Chemical Incidents

Friday 22 September 2000, held in Sherman Education Centre, Thomas Guy House, Guy's Hospital

CIRS Air Contamination Training Day

Tuesday 17 October 2000 held in Sherman Education Centre, Thomas Guy House, Guy's Hospital

CIRS Water Contamination Training Day

Thursday 23 November 2000 held in Sherman Education Centre, Thomas Guy House, Guy's Hospital

If Health Authorities would like additional support with training please contact CIRS and discuss with *Dr Virginia Murray's secretary Mrs Joan Bennett on 0207 771 5383*

Table 1: An audit of attendees by job status and Region for Chemical Incident Response Service public health training between January 1998 and March 2000

Region / Status	Eastern	London	North West	South East	South West	Trent	Other	**Total**
CCDC	12	23	21	19	6	5		**86**
CPHM	4	3	8	11	3	4	2	**35**
DPH	2	2	5	1		2		**12**
SnR	1	3						**4**
SpR	21	21	14	28	14	14	2	**114**
EHO			9	5		2		**16**
Nursing	4	6	8	2	3	4		**26**
SHO				1	3	0		**4**
PH Specialist / Scientist		1	3	1	1			**6**
GP			2					**2**
not specified			1		2			**3**
Total	**44**	**59**	**71**	**68**	**30**	**31**	**4**	**308**

Key:
CCDC: Consultant in Communicable Disease Control
CPHM: Consultant in Public Health Medicine
DPH: Director of Public Health
SnR: Senior Registrar in Public Health
SpR: Specialist Registrars in Public Health
SHO: Senior House Officer

Nurses: includes all categories of nurses
PH Specialist/Scientist: includes managers in Public Health positions and scientific officers.
EHO: Environmental Health Officers
GP: General Practitioners

An audit of Public Health training by CIRS

Rico Euripidou,Environmental Epidemiologist, CIRS

An audit of Public Health professionals and others attending CIRS training days on response and management of chemical incidents since January 1998 to March 2000 was undertaken. The data has been obtained from all courses run by CIRS both in London and around the Regions. All attendees have been counted even if an individual has attended more than one course. All these courses have received CME (continuing medical education) accreditation.

The variables examined included the regions from which the attendees originated and their status within the Health Authority. SpRs attended training days most frequently followed closely by CsCDC. SpRs most frequently attended the 'How to Respond to Chemical Incidents' training days with CCDC's most frequently attending the 'Update for CCDC's' Training Day and our 1999 training development of specialist Land, Air and Water training days.

CIRS is pleased that these training days have been well received and so fully attended and feel that specialist training days are the way forward for the future. We have thus organised an additional 2000 training day: 'Pesticide chemical incidents training day' as well as continuing with the specialist Air, Water and Land days.

Please see page 19 for summary information and the accompanying Training Flyer for further information on the 2000 courses.

Medical Toxicology Unit Web Site

The Unit's web site is in the process of development. Already it contains copies of the last five chemical Incident Reports which you can print off directly from the site. Other data is going in as agreed and we hope that you will let us know what you would like to find there. The address is www.medtox.org.uk

New London Telephone numbers:

Don't forget to change the numbers for London in your chemical incident plans as follows:

0171 771-5383 is now 020 7771-5383

Chemical Incident Report

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