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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

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Editorial

Dr Virginia Murray, Director, Chemical Incident Response Service

This Chemical Incident Report is designed to improve our ability to communicate with you. It contains summaries of seven chemical incidents, exercises or case reports, all now headed in red. The Chemical Incident Response Service (CIRS) considers that with public health professionals concerned with incident response as the lessons learned provide examples of the difficulty of managing these events. CIRS is grateful to the relevant Health Authorities for allowing us to include these incidents. A review of definitions (again), CIRS Year 2000 preparations, reports from conferences and other topics are headed in blue. Draft guidance for investigating chronic non-communicable environmental hazards is in the process of development in order to offer a framework for public health physicians to consider a step by step response. Comments on this draft guidance would be helpful. Summary information on the next series of training programmes and a report on a recent course are headed in green. A flyer providing more detailed training information is included with this report. Please let CIRS know if you consider this new design helpful or if you have any other comments about this Chemical Incident Report: 0171 771 5383.

The Public Health Physicians and the Accident and Emergency Clinicians **Chemical Incident Management books** from the Chemical Incident Management Series published by The Stationery Office will be ready for sale within the next month. Each book will cost £40.00. Flyers will be available and will be sent out shortly. CIRS is very grateful for the support of the authors, contributors, editors and publishers.

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A Chemical Incident in the West End of London

Dr J W Kearney, Specialist Registrar; Dr K Lau, Consultant in Communicable Disease Control, Kensington, Chelsea & Westminster Health Authority; R Cliffe, Environmental Health Officer, Royal Borough of Kensington and Chelsea.

The Incident

On Monday 21st September 1998 at 13.45 hours the Health Authority was informed of a chemical spill by the Chemical Incident Response Service (CIRS). The spill had apparently occurred during building work on the roof of a busy department store in London's West End. A chemical, possibly phenol-based, was said to have fallen from scaffolding around the store onto passers-by below. Eleven people had been taken to the Accident and Emergency Department (A&E) at St Thomas's Hospital, and staff there had contacted CIRS for advice.

The A&E was contacted and staff confirmed that eleven people had been seen, their principal symptoms being superficial skin burns and irritation of the eyes. An ambulance paramedic in A&E who had attended the incident believed the spill was not continuing, that the site was roped off, and that the emergency services were on-site. Following confirmation of the precise location of the incident the appropriate Environmental Health Department was contacted and two environmental health officers (EHOs) went to the scene. The Health and Safety Executive (HSE) were informed of the incident, but as the Local Authority Environmental Health Department were the enforcing authority it was not necessary for the HSE to be further involved.

CIRS faxed the information sheet for phenol to the Health Authority but later information obtained from the site indicated that the chemicals involved were used in wet cooling tower treatments and consisted of a broad spectrum isothiazoline ammonium compound together with a scale and corrosion inhibitor. The ammonium compound was acidic, the inhibitor alkaline and either could cause severe irritation to the skin and eyes. The ammonium compound could also produce skin sensitisation. First aid measures for both compounds included drenching the affected parts with plenty of water. Any spillage of the ammonium compound required absorption with a binding material; spillage of the scale and corrosion inhibitor required flushing with water with careful hosing to waste. Subsequently it was discovered that the spillage actually involved a neutral aqueous solution of polyquaternary ammonium compound as well as other chemicals.

The Fire Brigade had sluiced down the affected area and left. The store was next to an underground station entrance with considerable pedestrian traffic. An unknown number of people had been contaminated by the spillage. Some had received first aid on-site consisting of washing affected skin with water but others had sought neither help nor advice. Those most affected had been taken to the A&E. The incident had been declared closed at approximately 15.20 hours by the Metropolitan Police.

Further discussion took place between CIRS, the Health Authority, and the A&E. A total of fourteen people had now attended A&E. All had superficial skin burns but no respiratory symptoms or signs, and thirteen had been or were being reviewed in the Ophthalmology Department. Two other A&E Departments were contacted and reported three other cases, bringing the total to 17. No case required hospital admission or treatment other than simple first aid measures. Advice regarding the disposal of contaminated clothes was given to A&E staff - these were bagged and collected by the EHOs and stored in the Environmental Health Department for possible future analysis. The patients were provided with theatre clothes and appropriate transport arranged. No long term sequelae have been reported. Of the cases attending A&E two were from the North West of England and two from Switzerland.

Approximately $2^1/_2$ hours after the incident had been reported more precise details of the nature of the spillage were obtained by the EHOs on site. During work on the chemical dosing system to a cooling tower a pipe was cut and about a gallon of condensed water containing small amounts of the treatment chemicals spilled out onto the plant room floor on the sixth floor. This was mopped up and disposed of down a rain water pipe which was flushed with two buckets of water. This drain pipe discharged to a hopper two floors below. The hopper was blocked and the resulting overflow from the hopper showered passers-by fifty feet below. No further spillage had occurred.

Lessons Learned

Precise details of the incident were established only by the dispatch of two EHOs; neither the Health Authority or CIRS were contacted directly by a responsible person at the scene - information was obtained largely third hand. Even then the precise identification of one of the chemicals was not made until later which could have meant that misleading advice was given to medical staff.

The risk to any individual involved in this incident was difficult to assess until details of the circumstances of the spillage were obtained. It was considered that the degree of contamination by the diluted cooling tower treatment liquid falling from a height of fifty feet was likely to be limited. This view helped in the decision not to institute an extensive surveillance of A&E departments and general practitioners to ascertain further cases. In addition many of those passing at the time of the incident were either commuters or tourists. This meant a consistent basis for ascertaining cases could not be reached. Long term follow-up of the cases was not thought necessary.

Obtaining the Product Data Sheets for the chemicals concerned was an important step in understanding the nature of the incident: medical staff could give precise information about the chemicals and the necessary treatment and could advise individual patients more effectively. In this incident, respiratory assessments were obtained and attention given to possible chemical contamination of the eyes. Advice was given about the handling of contaminated clothing. Practical points regarding provision of alternative clothing and the issuing of receipts for the clothes by the A&E were addressed. The liability of the store for the incident and the possibility of compensation is currently being discussed.

Press interest included television coverage on a local news bulletin. The Metropolitan Police issued a Press Release. The Health Authority decided against issuing a press release of its own after discussion between the Consultant in Communicable Disease Control (CCDC), CIRS and the Regional Press Office.

This incident illustrates the need for precise, timely information about any incident. The value of a visit to the incident site was demonstrated. The emergency and medical services need to be helped by expert advice from both the CIRS and the Health Authority. Wider aspects of any incident must be considered.

Inadequate curing of water tank linings leading to contamination of drinking water

Dr Sarah Crook, Consultant in Communicable Disease Control; Leslie Finn, Senior Public Health Nurse, Dorset Health Authority

The Incident

In February 1999 a chemical incident occurred in Poole, involving contamination of the water supplies to four large blocks of flats. The incident began on Monday 15 February when three residents from one of four 10 storey blocks of 62 flats (Block 1) reported to local council departments that their domestic water supply had a strange smell and taste, an orange colour and visible scum on the surface. Two of these residents also complained of feeling unwell.

By late evening on 15 February, as a result of further enquiries, environmental health and housing staff had posted notices advising residents not to drink the water until it had been tested and bowsers had been brought in by Wessex Water. In a 'questionnaire' survey of residents, hurriedly carried out by local officials, around 12 residents reported symptoms which included dry throat, funny taste, 'hangover', abdominal pain and diarrhoea. Only one resident had sought medical advice and none had been admitted to hospital. At this stage details of the incident and the actions taken were not reported to the Health Authority (HA).

The water supply to the block of flats was from the mains to three cold water storage tanks, which fed all the drinking, bathing and flushing facilities. There was no direct connection to the mains water supply. Remedial/ renovation work had been carried out on the tanks over the previous 3-4 weeks. This involved stripping out all the old bitumen lining and then relining the tanks with an application of fibreglass gel including curing compounds. The chemicals employed in the relining process were methylethylketone peroxide (MEKP), dimethylphthalate and 4-hydroxy-4-methylpentan-2-one. Two of the three tanks had been treated and put back into service.

On Tuesday 16 February environmental health officers and housing officials continued their investigations, which included arranging for water samples to be tested and informing residents of events, but it was not until the evening of 17 February that CIRS was advised of the incident and early afternoon of Thursday 18 February before the HA was notified. A meeting was immediately arranged between the on-call consultant in Public Health Medicine (CPHM) and staff from environmental health and housing in order to implement the following plan which incorporated advice given by CIRS:

- cut off the water supply to prevent residents using it for any purpose whatsoever
- arrange water samples from the tanks in the three sister tower blocks (the same remedial works had been carried out in these blocks over a similar time period)
- alternative bathing and laundry facilities arranged
- vulnerable residents identified and alternative accommodation found
- residents to receive an explanatory letter from the housing department and a press statement issued
- an information and advice centre with a help-line set up at the local community centre and the local surgery informed
- a letter faxed to all Poole GPs
- a base-line questionnaire on health problems and water consumption drafted

On Friday 19 February a provisional result indicated a raised level of 160 µg/l of styrene in the water sample taken on Tuesday from Block 1 and that xylene might also be present. Arrangements were made for urine sampling of all residents living in the block, together with blood sampling for those residents who had originally complained of symptoms, and for samples to be stored and transported to CIRS after the weekend. Local authority staff arranged to administer the questionnaire to residents. The final questionnaire was not made available to HA staff until after the weekend.

On Monday morning a provisional result on the water supply from Block 2 indicated a high level of styrene at 200 µg/l. Since a further two blocks of flats had undergone similar renovation work it was anticipated that results from these would also be high, representing a total of around 1000 people with a potentially contaminated water supply. After discussion with other colleagues at the HA, the CCDC declared a major chemical incident on the grounds that a large number of people were affected and there was significant media interest. In addition, the incident was not manageable within normal resources and further resources would need to be channelled into controlling it. A formal Incident Control Group was identified and convened at Poole Civic Centre. Further advice from CIRS was incorporated into the subsequent plan of action:

- water supply to be cut off from all four blocks of flats
- questionnaires to be administered to residents of all blocks with the assistance of health visitors
- urine samples to be taken from all residents as a precaution (CIRS to test symptomatic people after matching with questionnaire results)
- alternative means of connecting blocks to mains water supply (special valves) to be sourced and installed by Wessex Water
- courier service to be arranged to get blood and urine samples to CIRS as quickly as possible.

In the days that followed the Incident Control Group met regularly to monitor progress on the investigation and control of the incident. Sixteen samples of blood had been taken from symptomatic people at the first block of flats and no compounds were detected on testing. Urine samples had been obtained from 310 residents as a precautionary measure and it had been decided that if the first 40 urine specimens did not demonstrate the presence of mandelic acid, a breakdown product of styrene, no further testing would be necessary as this would confirm a short acute exposure with no long lasting health effects. A total of 43 urine samples were tested and no compounds were detected. Individual letters were sent advising their results to those residents whose specimens had been tested. By Friday 26 February alternative connections to the mains water supply had been installed at all four blocks of flats, and the water piping systems tested and declared free from hydrocarbons. The acute incident was declared over at 17.35 hours.

Key issues raised by incident

Several key issues arose during the course of this chemical incident:

- failure to notify the HA promptly resulted in a significant delay in initiating the requisite action. The need for alternative water supplies for residents could have been reduced by about one week if the HA had been involved at the beginning of the incident
- the need to ensure priorities are set and personnel are free from competing priorities in order to dedicate their time to managing the incident
- many of the organisational issues could be undertaken by a duty manager and do not require trained public health staff
- the need to make methods of communication between agencies as simple as possible
- the need to develop a consistent method of logging events
- health questionnaires should be drawn up by public health staff whenever possible in order to maximise the value of the survey information collected.

Foaming all over - the foam party

Dr David Williams, Consultant in Communicable Disease Control; Frances Fogg, Public Health Nurse, North Nottinghamshire Health Authority

The Incident

Following a 'teen-night' in a local night club in Newark on 10 March 1999, North Nottinghamshire Health Authority were contacted by CIRS with reports of a chemical contamination incident as a result of a 'foam party'. CIRS were alerted by the National Poisons Information Service, London who had been contacted by Newark Accident and Emergency Department with reports of 20 young people attending and presenting with various skin and eye irritation and exacerbations of pre-existing asthma on the following morning. Up to 200 teenagers aged between 13 and 18 years from two schools in Newark attended the party. To date 25% have presented at Newark A&E and/or to their GPs.

Comment

CIRS believes that foam parties occur relatively frequently, with probably only a few resulting in the adverse health effects reported above. Dr Virginia Murray, CIRS, asked various organisations for their methods of managing any hazard they present and is most grateful for the following advice provided by Sue Holmyard, Divisional Manager, Environment, Engineering and Transportation Department, Dudley Metropolitan Borough Council (DMBC):

'Within DMBC demand for licensed premises under the Local Government (Miscellaneous Provisions) Act 1982, Licensing of Public Entertainments legislation, to conduct foam parties gave concern.

'DMBC identified that health and safety provision for staff and public were required and this included checking the following

- electrical safety, slipping and tripping hazards,
- COSHH assessment for foam
- foam contact with skin, eyes, etc possibly giving rise to

adverse health effects
- managerial supervision and first aid

'Following several site visits it was found that both the management of the premises and the 'foam providers' assumed the other was responsible for safety. A committee report was prepared by the Chief Environmental Health Officer and Chief Legal Officer. It was decided to include as a condition of any entertainment licence that all foam parties be notified to the licensing authority 28 days prior to the event and to include a health and safety risk assessment for the event. The licensing authority would then allow/disallow the event. EHOs could also enforce any relevant health and safety infringements.'

Seveso (Air leak) - Italy, 1976

Jane McKay - a student on the MSc in Toxicology Course at the University of Surrey

The incident

On 10 July 1976, an explosion during the manufacture of trichlorophenol (TCP) near Seveso, Italy, released a mixture of chemicals including 2,3,7,8-tetrachlorodibenzo-*p*-dioxin (TCDD). As a result, several thousand people, many animals and much of the surrounding vegetation in the Seveso area were exposed to an aerosol of TCDD. Fear by the authorities for the health of local residents was justified by the known high toxicity of TCDD in animals and its ability to cause cancer under experimental conditions. Thus as soon as results allowed for the definition of the contaminated area, an immediate evacuation of the people living within this region was ordered. Medical examinations of this potentially exposed population began immediately with long term studies continuing up to the present day.

Toxicology of TCDD

The toxicity of the lipophilic dioxin TCDD is thought to be related to its high affinity binding to the aryl hydrocarbon receptor (AhR) which is found in most tissues. This receptor regulates the expression of genes including CYP1A1. This causes increased production of CYP1A1 enzymes which are incorporated into the membrane of the hepatic and other tissue endoplasmic reticulurn. Here they exhibit catalytic activity towards steroid substrates and polyaromatic hydrocarbons causing biotransformation and induction of various toxic effects. Such toxic effects include abnormalities in skin, thyroid, lung, liver and cell mediated immunity.

Analysis of TCDD

At the time of the incident, human exposure was based primarily on soil levels of TCDD with the area being divided into 3 zones - A, B and R. Zone A the most heavily contaminated area had mean soil levels of TCDD ranging from 15.5 to 580μg/m^2. In zone B the levels of TCDD did not exceed 5μg/m^2 on average. Zone R, an area of lower contamination contained a TCDD concentration that was generally below 1.5μg/m^2. TCDD levels in ground and surface water and in sediment showed consistently negative results that confirmed the low water solubility of the compound. Levels of TCDD in humans and vegetation rapidly decreased as distance from the factory increased. At the time of the accident, no methods were available to measure low dioxin concentrations in small blood samples. It was not until the 1980s that the thousands of carefully collected and stored blood samples could be assayed for serum TCDD levels.

Short term human effects

- 447 cases of acute chemical burns, all were successfully treated
- 193 cases of overt chloroacne were diagnosed. Of these 88% were children. The highest prevalence by far was seen in zone A, all were successfully treated

Long term human effects

- Increased mortality from heart disease in the contaminated area may be related to both the accident experience with its burden of psychosocial stresses and the exposure to TCDD
- A suggestive link in the increase of diabetes and immunological effects is being studied
- A rise in respiratory cancer, gastrointestinal (GI) tract, lymphatic, soft tissue and oesophageal carcinoma
- Increased mortality from digestive cancer in woman and rectal cancer in men. The involvement of the GI tract is apparent
- The incidence of breast cancer was below that expected as was that for endometrial cancer
- Individuals suffering from chloroacne did not show an increased incidence of cancer in 1993
- Systematically higher TCDD blood levels in females than in males
- The sex ratio of the affected population has altered significantly, with almost twice as many female to male births. Hypotheses include the modification of hormonal balance, early abortions of male foetuses and /or genetic effects

Effects on Wildlife and Farm animals

- Shortly after the incident there was an increase in animal deaths, mainly rabbits and poultry.
- Higher levels of mortality were also seen in cattle fed with fodder from the contaminated land
- Levels of TCDD in cow's milk were higher in areas closer to the accident than those further away

Clean up/relief measures

- In zone A the entire layer of top soil was removed and replaced with fresh uncontaminated soil

- In zone B soil was removed from public and private gardens with ploughing and harrowing to dilute surface TCDD in remaining territory
- In the years following the accident TCDD levels dropped in different levels of magnitude
- Between 1982 and 1985 41 barrels of dioxin residue from the chemical plant were disposed of in a high temperature incinerator

This accident hastened the introduction of the Seveso Directives which establishes European legislation on major accident hazards.

Sources of information

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- Bertazzi, PA, Bernucci, I, Brambilla, G, Consonni, D, Pesatore, AC, 1998 The Seveso studies on early and long term effects of dioxin exposure: A review. Environmental Health Perspectives, 106 (S2): 625-633,

Acknowledgement

CIRS is grateful to Dr Julie Haworth from the University of Surrey for providing this and a number of other reports produced by the MSc in Toxicology students at the University.

Psychological Degradation and Fear in a Chemical Environment

Dr Martin Deahl, Consultant and Senior Lecturer in Psychological Medicine, St Bartholomew's Hospital, London.

Serious acute psychological reactions which impair operation efficiency as well as long term psychiatric morbidity such as post traumatic stress disorder (PTSD) are well recognised in rescue workers and emergency service personnel. In these 'high risk' groups the prevalence of PTSD may exceed 30% one or two years following exposure to traumatising events. The risk of PTSD in emergency service workers is exacerbated by their routine repeated exposure to multiple traumatising events.

There have been no studies of emergency service workers which have specifically evaluated the psychological problems associated with working in a chemical environment in which it could be predicted may result in even higher levels of acute and long term psychiatric morbidity. There is some anecdotal evidence to support this view. During the 1991 Gulf War, allied servicemen were routinely exposed to enemy air attack with 'Scud' missiles. It was widely believed at that time that there was significant likelihood that these weapons would be used to deliver chemical weapons (CW) including nerve agents such as Sarin. Faced with this possibility, servicemen were required to wear full Individual Protective Equipment (IPE) during air raids, and observe the chemical safety code.

The incident

Following an air raid in January 1991, in which Scud missiles exploded within a short distance of a UK Field Hospital, with a staff of approximately 1500, forty-one personnel reported sick, having developed serious phobic anxiety related to wearing respirators or the sound of air raid warning sirens. Affected personnel included individuals with extensive experience of working in a chemical environment (e.g. NBC instructors). Anxiety symptoms in this group were severe, sufficient to meet diagnostic criteria for anxiety disorders, and severely impaired operational efficiency.

Following three days of simple behavioural treatment involving graded exposure to the use of respirators in a 'safe' environment and simple exercises in breathing control, in particular preventing hyperventilation wearing a respirator, there was a resolution of symptoms in forty out of forty-one cases.

Comment

Performing rescue duties and emergency service work in a chemical environment creates additional stresses, which increase the likelihood of longer term psychiatric disorder. Rescue threat to self is a major risk factor, both for the acute stress reaction, adjustment disorders and PTSD. The presence of an invisible threat over which an individual has limited control exacerbates stress; and the fear of the unknown and unseen accentuates anxiety. Wearing a respirator considerably increases respiratory effort and exacerbates the effects of hyperventilation worsening anxiety symptoms. The use of IPE in a chemical environment has a degrading effect on physical performance. Fatigue also increases psychological vulnerability. IPE has a seriously degrading effect on both verbal and non-verbal communication, producing a sense of isolation and further increasing vulnerability. Although all military personnel receive nuclear, biological and chemical training and are trained to work in a chemical environment, training is only effective if it is realistic, and it is unclear to what extent training can simulate the experience of a 'real' CW threat.

Research is needed to determine the epidemiology of acute and longer term psychological reactions amongst civilian emergency service workers operating in a chemical environment. Attention should also be given to establishing those elements of training and preparation which psychologically 'protect' workers. Finally continuing vigilance is required by the emergency services to detect established psychiatric disorders such as PTSD in personnel exposed to potentially traumatising experiences.

CIRS Report: Exercise Trafalgar
16 March 1999

Dr Leonie Prasad, Specialist Registrar Public Health, seconded to CIRS & Rico Euripidou, Environmental Epidemiologist, CIRS

Background

Exercise Trafalgar, organised by the Maritime and Coastguard Agency, used the scenario of a tanker carrying chemicals running aground and on fire near Portishead: at the same time there was a prevailing NW wind heading towards Bristol and Gloucester. CIRS was contacted at 09.40 by the CCDC from Avon Health Authority, asking for advice on a list of chemicals: benzene, caustic soda, carbon tetrachloride, methylacrylate and chloroform.

Discussion

These major incident exercises test, identify and can subsequently be used to rectify problems encountered in the management process by the respective collaborators. Some of the main points raised as a result of our experiences were as follows:

- CIRS will ensure that the first person who takes the call about an incident will ask for the CAS/UN numbers as well as the chemical names to avoid any confusion with the chemical identity and hence problems with sending out the wrong information

- CIRS experienced problems with busy fax machines at Silver Command hindering our ability to send information quickly. Alternative lines may need to be made available for priority information and communication at Health Authorities

- CIRS recommends being given sample analysis (environmental and biological) results as soon as possible so that it can give more specific incident management advice

Comment

CIRS is pleased to collaborate on planned chemical incident exercises. When SpRs in Public Health Medicine are seconded to CIRS, it has used these exercises to allow them to test their ability to respond to incidents.

Land contamination: lead in allotment soil

Dr Leonie Prasad, Specialist Registrar Public Health, seconded to CIRS

Land contamination is an area where Public Health will be asked for advice on the potential health effects to humans of exposure to the contaminants concerned. Before land is considered to be contaminated, a source, pathway and receptor must be identified and linked together. In this example, the source was the allotment soil, the pathway directly via soil inhalation or ingestion, and the receptors of concern to Public Health were humans.

Public Health were contacted once the results of the soil analysis were available to the Local Authority (LA). At this stage, we were presented with several incomplete draft reports on the soil and produce contamination levels, and were asked for our advice on potential health effects of the lead as reported. One of the difficulties we encountered was that the reports were not part of a formal risk assessment. Therefore, we had much work to do making sense of the existing information and fitting it into a risk assessment process. This work was done as part of a multidisciplinary team involving the CIRS, MAFF, LA and the laboratory which had provided the reports. Some examples of our difficulties included understanding the difference between wet and dry weight lead levels in the produce which significantly influences interpretation of the results. We also needed to find out how to convert units of measurement used in the reports to those reported in the literature, as well as understanding the limitations of using generic guideline levels to make decisions on whether or not to remediate the site.

As a result of our experiences, several of the recommendations made were as follows: (1) we needed clarification about the role of Environmental Health and (2) a standard approach to the management of these incidents would be useful for Public Health. One of the functions of such an approach might be to provide a checklist of actions that need to be taken as part of a risk assessment process, and information to assist the interpretation of analytical reports. Currently, I am working on such a project with Emma Woodey, the land engineer at the CIRS. We hope to have something ready for circulation and comments in the near future.

The July issue of the CIR will include a more detailed discussion of the problems of managing environmental incidents using this incident as an example. Presently, a paper on the same issue is being written and is due to be submitted for publication shortly.

Reference

Department of the Environment, The Welsh Office and the Scottish Office, 1996. Consultation on Draft Statutory Guidance on Contaminated Land: Volume 2. Crown Copyright,

Ensuring the protection of the public against dangerous, unlicensed, alternative medicines - whose responsibility?

Dr Claude Seng, Consultant in Communicable Disease Control, Dr S Anderson, Specialist Registrar, Brent and Harrow Health Authority

Case Summary

Recently a 48 year old woman resident of Harrow with multiple sclerosis was investigated following complaints of fatigue, loss of appetite, constipation and myalgia. She was found to have severe anaemia caused by lead poisoning She had been taking for several weeks various 'remedies' given to her by an Ayurvedic Practitioner who had visited her at home. These remedies were analysed at the Medical Toxicology Unit laboratory, Guy's and St Thomas' Hospital Trust and two were found to have very high levels of lead and arsenic. These were Guggul (lead 29,000 ppm) and Pulsineuron (lead 12,000 ppm and arsenic 46,000 ppm).

Comment

The Department of Health and the Medicines Control Agency (MCA) were notified immediately. The MCA found that the remedies had been unofficially introduced into the country from India by a relative of the Practitioner. The extent of the distribution of these two medicines is unknown. We found that there was no protocol for rapid dissemination of information for such incidents:

- for **contaminated food** a health hazard system exists in the United Kingdom which can be triggered rapidly. Within hours of the issue of a warning, the environmental health departments can be alerted and the suspected products removed from the shelves

- a similar mechanism exists for **licensed drugs**. Health Authorities are sent urgent messages via a dedicated electronic network (EPINET). The hospitals and general practitioners of that District are then sent the message by fax or those few without fax by first class mail

- it is worrying that with the increasing use of **alternative medicines** in this country, there is no established national mechanism for ensuring the safety of these medicines and also no rapid system to warn the public against taking those remedies identified as dangerous

Comment

The Medical Toxicology Unit is grateful to Dr Seng and Dr Anderson for reporting this case. We have been in discussion with several Health Authorities over similar case reports and would be very pleased to receive any further case reports. Our project on traditional remedies continues with the collaboration with staff at the Royal Botanic Gardens, Kew.

Reforms in legal procedure

Adrian Cooper, Barrister

The reforms initiated by Lord Woolf in the procedure of courts in civil cases and personal injury came into effect on 26th April 1999. They will have a considerable impact on health professionals particularly in claims for clinical negligence.

The purpose of the reforms is to ensure that litigation is a last resort and to encourage openness and pre-action settlements. To this end the new rules include protocols to be followed by claimants and proposed defendants in cases of clinical negligence and personal injury. The protocols require a claimant to send to the proposed defendant a detailed letter of claim which should include health records and any medical report obtained. The proposed defendant is required to respond to the letter of claim within three months. The response must either admit the claim wholly or in part, or if not give reasons why the claim is rejected.

Of course the clinical negligence protocol does not seek to give advice on matters of clinical governance which will have a bearing on healthcare providers' ability to meet the standards within the protocol. Nonetheless it suggests that good clinical governance requires the following to be considered:

- Clinical risk management procedures which can help in the management of risk in the early identification of adverse outcomes
- Adverse outcome reporting procedures including taking statements from key witnesses. It is suggested that these procedures should also cover when and how to inform patients that an adverse outcome has occurred
- The professionals' duty to report known adverse outcomes or untoward incidents

No doubt many of these issues are already the subject of internal procedures and protocols or are under discussion.

It is clear that the clinical negligence protocol and the new rules of procedure will require earlier notice and investigation of adverse incidents which might result in a claim, and a clear and detailed response within a short time of that claim. This would be in marked contrast, in many cases, to the present position. For Public Health professionals increased awareness of circumstances likely to give rise to a claim against them or a third party, and their thorough record keeping and investigation will be necessary to cope with detailed claims and responses under the protocols.

The protocols can be read on the following web site:
http://www.open.gov.uk//cd/civil/procrules_fin/cprot2fr.htm

Draft guidelines for investigating non-communicable environmental hazards

Nicky Connor, PHLS, Communicable Disease Surveillance Centre

Guidance to help public health doctors investigate the health effects of long term exposures to chemicals is being developed by the Faculty of Public Health Medicine. This work was mentioned in the October 1998 Chemical Incident Report. We are now publishing a draft for discussion and comment.

Individuals from a large range of organisations have contributed to this guidance. These include:

Phillip Monk, CCDC, Leicester Health Authority (Chairman)
Nicky Connor, PHLS, Communicable Disease Surveillance Centre
Virginia Murray, Chemical Incident Response Service
Rachel Maclehose, Enviromental Epidemiologist, CIRS, now at South Essex Health Authority
Pat Saunders, Regional Environmental Health Adviser, Chemical Hazard Management and Research Centre, University of Birmingham
John Simpson, CCDC, Wiltshire Health Authority
Alwyn Davies, CCDC, Shropshire Health Authority
Hiliary Fielder. CPHM, seconded to the National Focus for Work on Response to Chemical Incidents, Wales
Lars Jarup, Deputy Director, Small Area Health Statistics Unit, Department of Epidemiology and Public Health, Imperial College School of Medicine, London
Steve Humphries, Environment Agency

The guidance has been further developed at an IPCS/WHO workshop so that international experts have been able to contribute to this draft *(see page 16-17 for a meeting report)*

As well as working on broad principles in this guidance, we are developing a check list to help public health doctors understand the rationale behind environmental investigations and sampling. Comments made on earlier drafts of the guidance recognise that the process of these investigations must be considered together with the structures providing expertise and support to public health departments

The practice of these investigations would also be enhanced by a system to collect information, share experience and identify common problems. This has yet to be developed.

Please comment on this draft guidance. It would be very helpful if you would try it out on some of your old or current investigaions. Your comments and feedback will be helpful as the guidance develops further.

Please contact Nicky Connor on 0181 200 6868 x 4439 nconnor@phls.co.uk or Virginia Murray on 0171 771 5383

The guidance has the the following aims and objectives

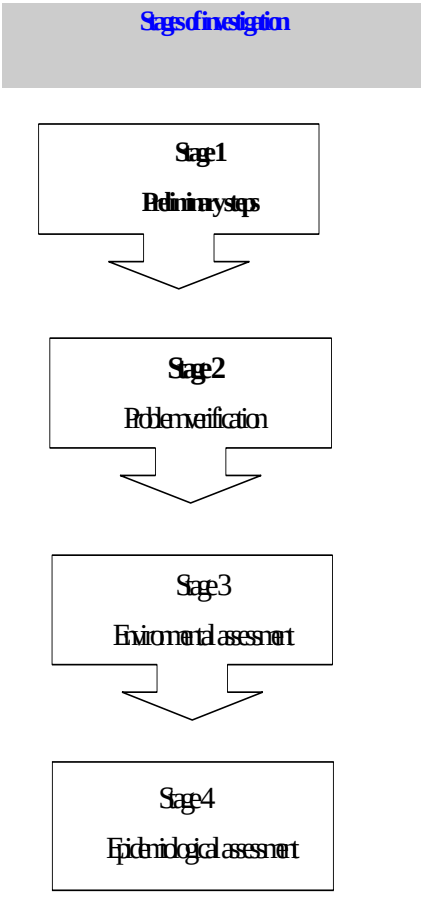
- For NHS Public Health Departments to provide practical help in public health investigations
- To be used when investigating
  - known sources alleged to cause ill health
  - known health effects, when source is alleged
- Aim of guidance
  - to detect problems needing a full investigation
  - to provide a decision making framework

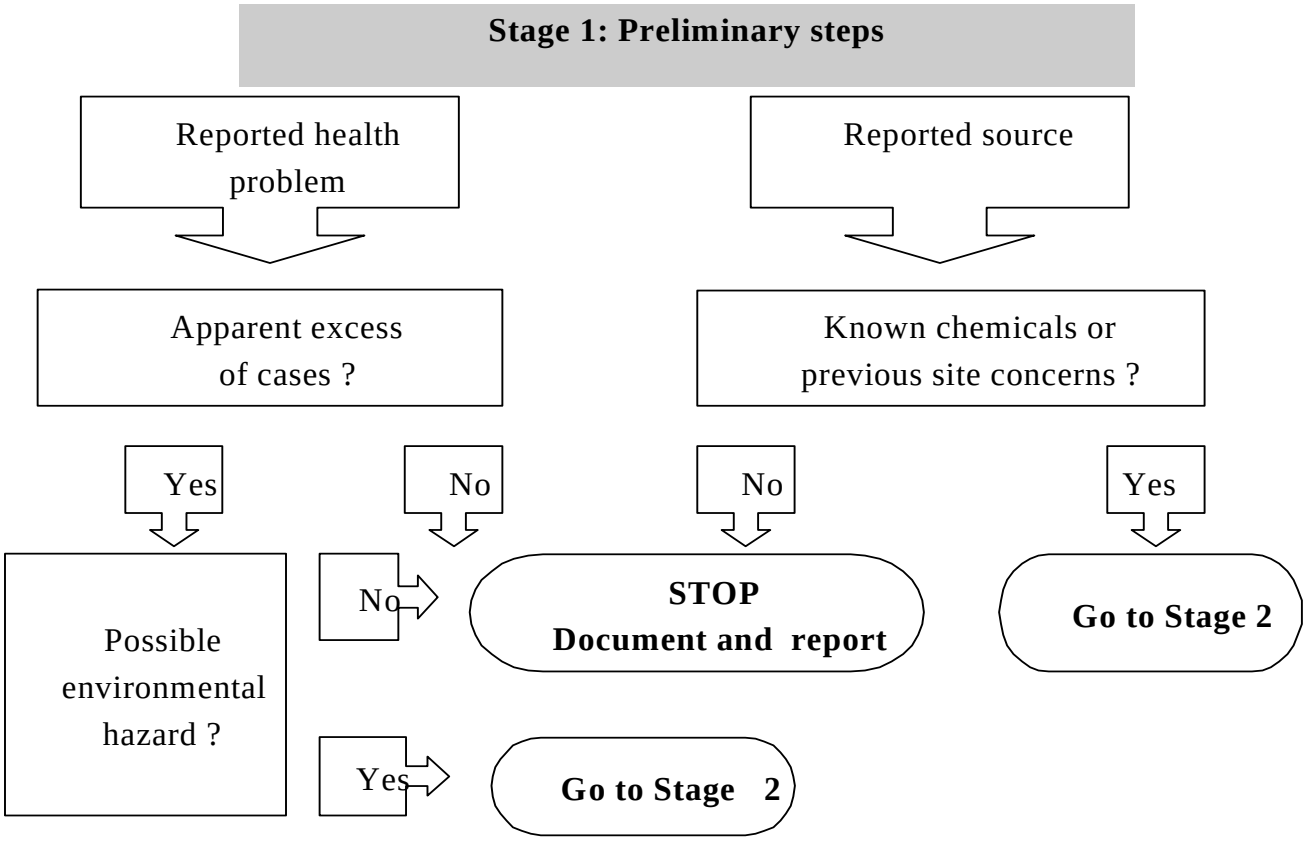
Issues to be considered before undertaking investigation include

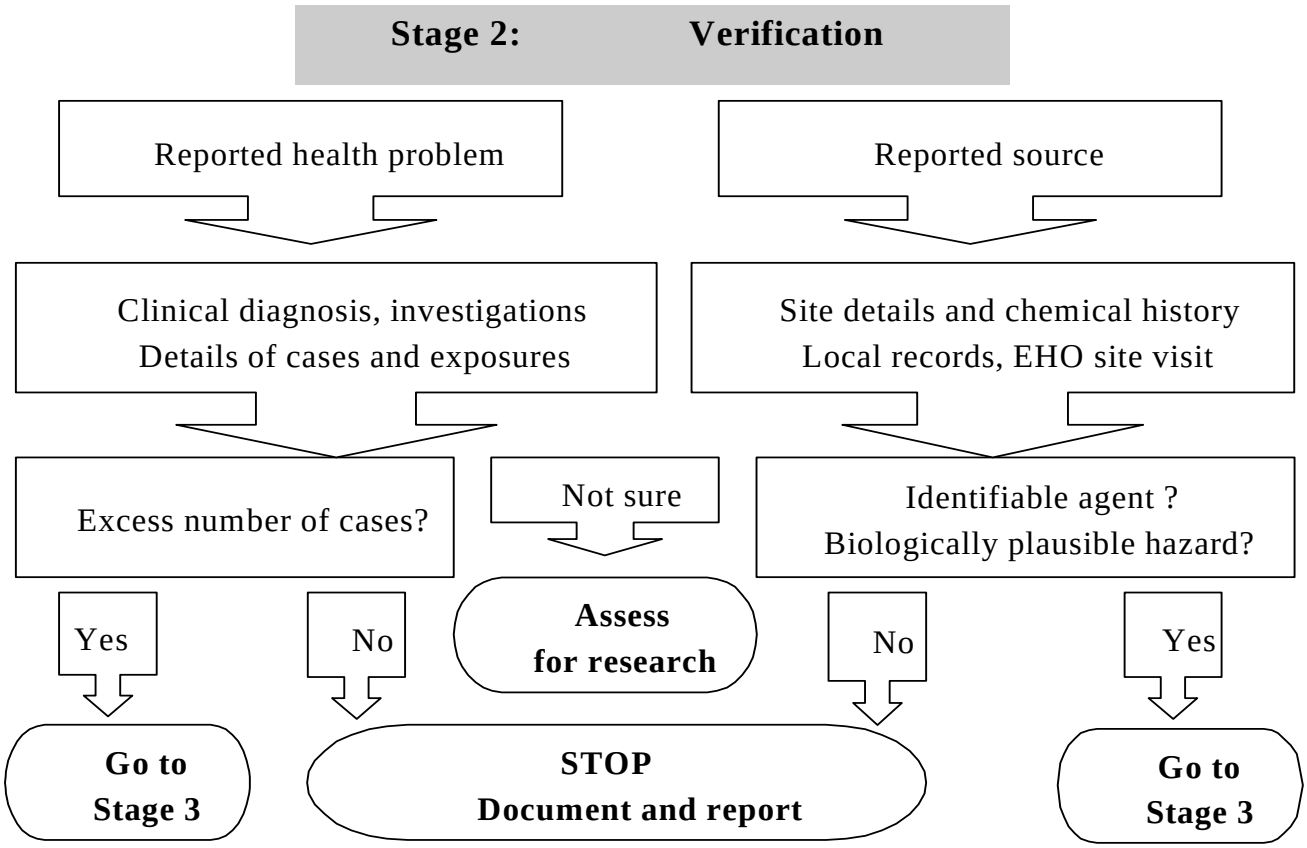
- consider compiling an inventory of local hazards
- develop collaboration with local partners to share information and engage the local community - participation in investigation can be positive

The guidance is in four parts given in Figure 1 with details of each step given on the next two pages.

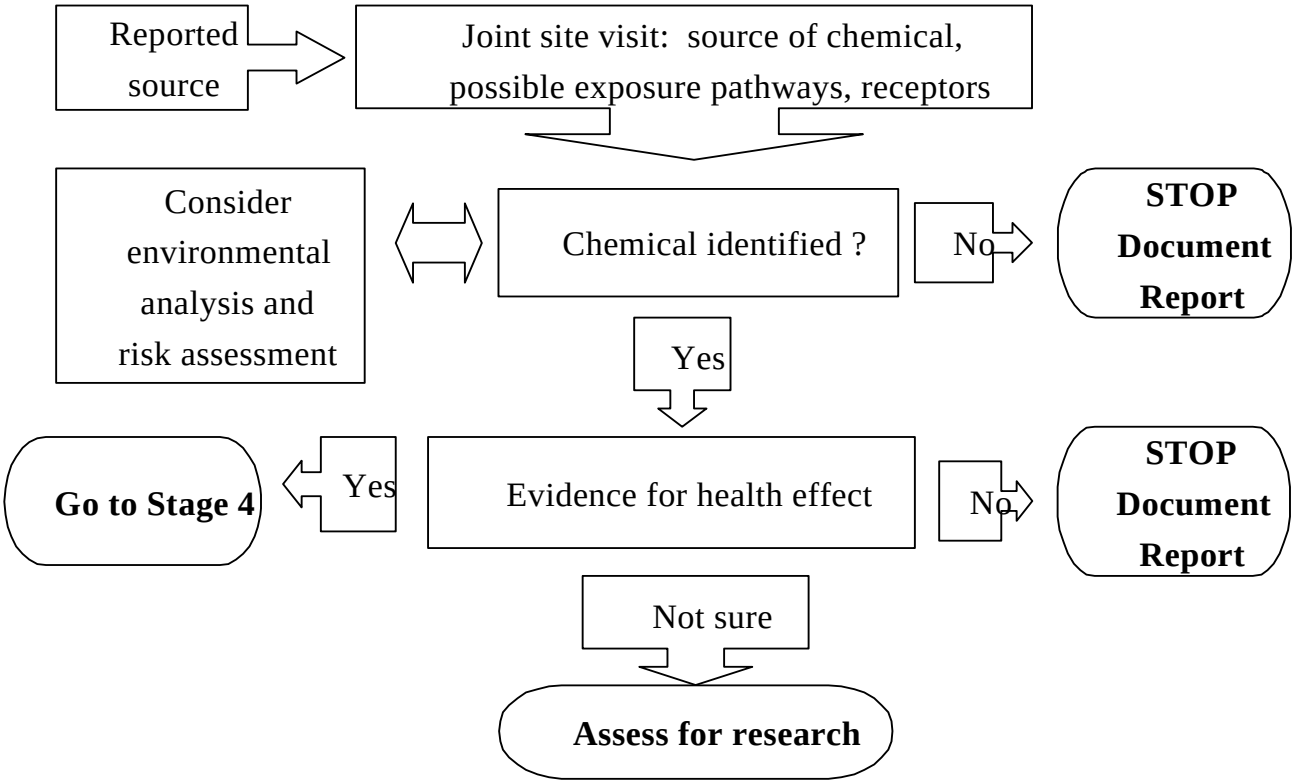
Figure 1: Stages of investigation



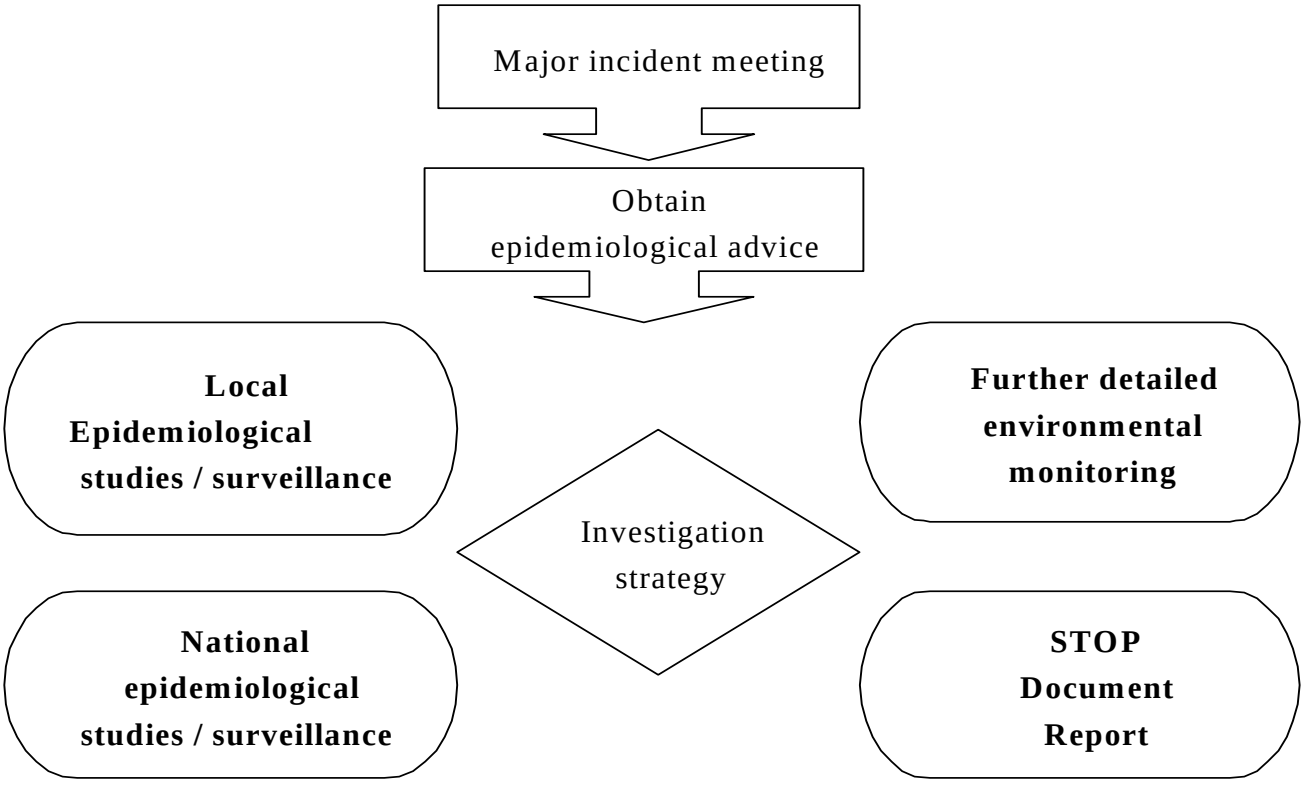

Stage 1: Preliminary steps
Reported health problem
Reported source
Apparent excess of cases ?
Known chemicals or previous site concerns ?
Yes
No
No
Yes
Possible environmental hazard ?
No
STOP
Document and report
Go to Stage 2
Yes
Go to Stage 2


Stage 2: Verification
Reported health problem
Reported source
Clinical diagnosis, investigations
Details of cases and exposures
Site details and chemical history
Local records, EHO site visit
Excess number of cases?
Not sure
Identifiable agent ?
Biologically plausible hazard?
Yes
No
Assess for research
No
Yes
Go to Stage 3
STOP
Document and report
Go to Stage 3

Stage 3: Environmental assessment



Stage 4: Epidemiological Assessment



Questionnaire survey support from CIRS

Rico Euripidou, Environmental Epidemiology, CIRS

CIRS has recently been involved in six chemical incidents where a questionnaire survey has been used as part of the incident investigation. These surveys are useful if they are free of the many possible biases. Elimination of bias is enhanced through appropriate study design, selection of study group and controls and elimination of classification biases [1].

If a Health Authority (HA) decides to conduct a non-infectious epidemiological study CIRS can help to generate a hypothesis based on the toxicological, biological and epidemiological factors of the incident. The questions used to test the hypothesis require careful consideration and should be clear of ambiguity so that they can achieve an unbiased estimate of the effect of a chemical exposure to cause disease.

A questionnaire survey may be useful in the following circumstances:

- after a release of a hazardous chemical(s) which may be harmful to human health
- in the event of a rare chemical exposure with little known toxicological effects
- in the event of a multiple chemical release (e.g. during a fire)
- to confirm appropriate case identification and management

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 and within a reasonable time scale. CIRS can assist with the following as required by individual HAs:

- hypothesis generation following a chemical incident
- questionnaire development and data collection. CIRS holds a series of questionnaires used to investigate various incidents
- software for data entry
- data analysis and interpretation
- dissemination of analysis at incident meetings
- collaboration with Public Health Epidemiologist during a chemical incident

Discussion with various CsCDC and SpRs suggests that a checklist for questionnaire preparation might be helpful. Some important points to consider when constructing questionnaires include:

- first state the objectives of the study and develop a hypothesis to test. Consider which relationships need to be tested and which biases could potentially confound these relationships. The questions asked should then arise from this hypothesis
- define the study population and possible controls and calculate the sample size
- construct a valid case definition using the above framework
- give 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 potential risk factors which may confound exposure data (smoking, alcohol, hobbies, occupation, etc.)
- collect data on symptoms suffered during the chemical incident, consider compiling 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
- collect data on exposure (time, date, duration) and possible routes of exposure e.g. amount of water consumed
- collect data on details of respondent's GP and consent to release medical records if needed
- consider starting a register of those exposed if the exposed include those ill from the incident or with pre-existing illness, the young, the old or pregnant women
- consider how data will be entered and analysed
- it is also important to field test a questionnaire before collecting data from the study population

Source of information

[1]Hennekens CH, Buring JE, 1987. Epidemiology in Medicine. Little, Brown & Co, Toronto

Chemical incident definitions

Catherine Farrow, CIRS Information Scientist

Background

Chemical incidents happen and can result in severe adverse health effects leading to significant morbidity and mortality. It is important, therefore, that the term 'chemical incident' is clearly defined in order that such events are identified easily; this ensures preparedness and consequently allows for a timely and appropriate response.

Objectives

The review was conducted to identify improvements required in the existing definition so that incidents can be

identified more efficiantly by the Chemical Incident Response Service (CIRS) and consequently improve the service CIRS provides.

Methods

All enquiries to the National Poisons Information Service (London) during a 24 hour period (19 October 1998) were assessed by reference to the chemical incident criteria as described in the definitions used by:

- National Focus
- Chemical Hazards Management and Research Centre
- CIRS
- Scottish Centre for Infection and Environmental Health
- Agency for Toxic Substances and Disease Registry
- Commission of the European Communities Directive

Definitions reviewed are given below:

NATIONAL FOCUS FOR WORK ON RESPONSE TO CHEMICAL INCIDENTS AND SURVEILLANCE OF HEALTH EFFECTS OF ENVIRONMENTAL CHEMICALS, Cardiff

An acute event in which there is, or could be, exposure of the public to chemical substances which cause, or have the potential to cause ill health. Occupational incidents are included only when members of the public are potentially affected. For the purposes of the definition, hospital staff and emergency services personnel should be regarded as members of the public

Examples of incidents to be excluded from national surveillance include:

- occupational exposure covered by the Health and Safety at Work Act, e.g. a small spill at a factory in which only employees are exposed
- food contamination incidents dealt with under the Food Safety Act
- incidents involving radioactive substances
- accidental childhood poisoning, e.g. the ingestion of bleach
- incidents involving drugs and other substances of abuse
- suicide attempts involving carbon monoxide, natural gas and other chemicals
- single household exposures to domestic chemicals

By way of contrast, the following incidents should be included:

- cases of non-intentional carbon monoxide poisoning
- workplace exposure in which those not employed by the company responsible for the workplace are exposed
- spills of chemicals in a school laboratory
- a spill in the workplace, resulting in admission to hospital and exposure of hospital staff to the chemicals involved
- workplace incidents resulting in off-site exposure
- food cooked in bleach in a nursing home
- cases of pesticide over spray

CHEMICAL HAZARDS MANAGEMENT AND RESEARCH CENTRE, Birmingham

An unforeseen event which causes ill-health or which has the potential to cause ill-health and necessitates an immediate response

or

One or more individuals suffering from an illness which might be due to such an event

CHEMICAL INCIDENT RESPONSE SERVICE

Unforeseen event leading to acute exposure of two or more individuals to any non-radioactive 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

(Hill and O'Sullivan, 1992)

SCOTTISH CENTRE FOR INFECTION AND ENVIRONMENTAL HEALTH, Glasgow

An event which has the potential to or actually causes ill health and which requires an immediate response

or

One or more persons suffering from medical signs or symptoms potentially associated with such an event

AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY, Atlanta, USA

An uncontrolled or illegal release or threatened release of one or more hazardous substances; ***and*** *the substances that are actually released or threatened to be released include ALL hazardous substances except petroleum products;* ***and*** *the quantity of the hazardous substances which are released, or are threatened to be released, need (or would need) to be removed, cleaned up, or neutralised according to federal, state, or local law;* ***or*** *there is only a threatened release of hazardous substances, but this threat leads to action (e.g. an evacuation) that can potentially impact on the health of employees, responders, or the general public. This action makes the event eligible for inclusion into the surveillance system, even though the hazardous substances are not released.*

COMMISSION OF THE EUROPEAN COMMUNITIES DIRECTIVE

Any incident connected with an uncontrolled development (such as a leak, fire and/or explosion) of an industrial activity involving a serious immediate or delayed hazard to man and/or the environment

Enquiries fulfilling the chemical incident definition criteria for each agency were recorded and resultant definition datasets were compared for consistency of the incidents identified

Results

Total number of calls to NPIS (London) during 19 October 1998: 508. For details of results see table above.

Agency	*Number of incident enquiries*	*Number of chemical incidents*
National Focus	13	12
Chemical Hazards Management and Research Centre	115	114
Chemical Incident Response Service, London	7	7
Scottish Centre for Infection and Environmental Health	115	114
Agency for Toxic Substance and Disease Registry	1	1
Commission of European Communities Directive	23	22

Discussion

It is evident from this brief study that there is great variation between the criteria for the definitions reviewed. It is clear that no ideal definition of a chemical incident exists. This may be partly explained by differences in data sources used , the intended purpose/use of data-sets of the agencies in question, and difficulties in interpretation of the definitions.

Conclusion

Definition is defined in the Oxford dictionary as: *de-fining statement of precise meaning of a term*. The terminology used in a definition of a chemical incident should allow little or no room for interpretation. CIRS proposes that the definition used to identify a chemical incident is revised to improve on the limitations/scope for interpretation to: Examples of incidents to be excluded include:

- accidental childhood poisoning
- incidents involving non-contaminated drugs and other substances of abuse

An unforeseen event involving any non-radioactive substance resulting in potential toxic risk to public health or leading to exposure of two or more individuals resulting in illness or potential illness
or
Two or more individuals suffering from a similar illness which might be due to such an event

- suicide attempts involving chemicals (secondary contamination following such an attempt should be included)
- biological contamination of food
- single household exposures of one individual to domestic chemicals where there is no resultant risk to public health

No definition is ideal, please let CIRS have your views on this currently proposed definition.

A poster of this paper was presented at the Second International Training Conference on Chemical Incidents, 20-22 April 1999, organised by the National Focus for Work on Response to Chemical Incidents & Surveillance of Health Effects of Environmental Chemicals

Chemical Incident Response Service Year 2000 Preparations

Heather Wiseman, Quality Manager, Medical Toxicology Unit.

Each department of the Medical Toxicology Unit (CIRS, NPIS, and Laboratory) has produced a service continuity plan for the millenium weekend. This considers the critical services and equipment which need to be available for the Unit to operate as normal a service as possible and the actions that will be taken if critical equipment or services fail or cease to be available.

The MTU Local Continuity Plan has been prepared in the context of a central/Trust wide continuity plan prepared by the Guy's & St Thomas' Trust.

The MTU has audited all computers, communications equipment and other equipment for year 2000 compliance. Much of the equipment found to be non compliant has already been upgraded or replaced, and all critical equipment will be compliant by December 1999. The Unit has its own electricity generator and the site telephone switchboard has a backup power supply.

There will be full CIRS cover for immediate response at all times from Wednesday 29/12/99 to Friday 07/01/00. In addition our three research engineers will also be on standby and will be provided with bleeps.

New post office regulations on sample packaging

Brian Widdop, Director, Medical Toxicology Laboratory.

Late last year, the Royal Mail announced that it would introduce new regulations on sending infectious materials through the post and that these would apply from 1st January 1999. These regulations had been promulgated by the United Nations and were being implemented by the Civil Aviation Authority and the International Air Transport Association (IAAT). A surprising amount of inland parcel mail is transported by air, even from cities as close as Manchester and Birmingham. Very little warning was given, not least to the NHS users, and as a result the implementation

was delayed until 1st April 1999. The decision has now been put back further, mainly because the Royal Mail are not sure themselves what they want or even what they mean by laboratory samples, HSE has now been brought in to sort out the confusion. Basically, the new packaging must comply with the so-called UN 602 requirements which are described below.

'The system consists of three layers as follows :

Primary receptacle: A labelled primary watertight, leak proof receptacle containing the sample. The receptacle is wrapped in enough absorbent material to absorb all fluid in case of breakage.
Secondary receptacle: A second durable, watertight, leak-proof receptacle to enclose and protect the primary receptacle(s). Several wrapped primary receptacles may be placed in one secondary receptacle. Sufficient additional absorbent material must be used to cushion multiple primary receptacles.

Outer shipping package: The secondary receptacle is placed in an outer shipping package which protects it and its contents from outside influences such as physical damage and water while in transit. Information concerning the sample, such as data forms, letters and other types of information that identify or describe the sample should be taped to the outside of the secondary receptacle.'

This can be translated into plain English as follows:

- ***Primary receptacle:*** a plastic screw-topped tube (e.g. standard blood tube or urine bottle)
- ***Secondary receptacle:*** a plastic container packed with wadding which is leak proof (e.g. a sealable plastic bag)
- ***Outer shipping package:*** a container packed with more wadding which protects the blood tubes or urine bottles from breaking if dropped (e.g. a tough cardboard box)

In other words, we believe that our current packages should satisfy these criteria but we have yet to have them officially approved as UN 602 compliant, one of the problems being that no one seems to know who decides this in the first place.

Over the next few months this confusion should be sorted out, and the likely outcome is that these very strict packaging rules will only apply to samples known to contain dangerous pathogens. Meanwhile do continue to use the packaging you already have and remember that road courier services are not affected. However, this does emphasise the need to have the right sample collection kits available should an incident arise where laboratory tests are essential. We are able to supply these at a minimal cost of £1.50 per kit. If you have any concerns, please get in touch with the Unit on :

Tel: 0171 771 5301, Fax: 0171 771 5363

Conference and meeting reports

Human Health Risk Assessment of Chemicals – *Regulatory Approaches*

British Occupational Hygiene Society (BOHS) Meeting
17 February 1999
Emma Woodey, Land Research Engineer, CIRS

The BOHS was established in 1953 with the aim of promoting the science of occupational hygiene. One way in which this is achieved is by holding special interest scientific meetings. A joint meeting was held with the Royal Society of Chemistry (RSC) on Wednesday 17 February 1999 to present and review current regulatory approaches to human health risk assessment of chemicals. Speakers included representatives from the Health and Safety Executive (HSE), the Ministry of Agriculture, Fisheries and Food (MAFF) and the Department of Health.

The morning session focused on current approaches to risk assessment and gave an overview of the approaches adopted by different government departments when undertaking human health based risk assessment.

The afternoon session concentrated on two novel techniques currently being developed – the use of physiologically based pharmacokinetic (PBPK) modelling in risk assessment, and multiple route chemical exposure assessment. PBPK models take into account the differences between laboratory animals and humans by quantitatively considering body weight, surface area, metabolic capacity and products, blood flow, respiration rate, body fat content and so on.

The most significant conclusion drawn from the meeting was that there is no common framework for carrying out risk assessment and that even between government departments a wide diversity in priorities and procedures can be identified. A steering committee with representatives from a number of Government Departments has been set up in order to outline the existing approaches to risk assessment, identify common procedures, and recognise the major areas of uncertainty and weakness in current procedures. This information is to be published in a report by June 1999.

Breaking Down the Barriers - *Media's Role in Environment and Sustainable Development Issues*

United Nations Environment and Development UK Committee
15 March 1999
Emma Woodey, Faith Oliver, Fiona Welch, Research Engineers, CIRS

This one day seminar discussed the role of the media in environment and sustainable development issues. The main objectives of the seminar were to:

- identify the challenges the media face in reporting envi-

ronment and sustainable development issues
- hear from and question the Environment Minister, Rt Hon Michael Meacher MP, and representatives of the media regarding such issues
- review the barriers identified by the media, via workshops, and consider possible solutions
- to establish a way forward for the media and non governmental organisations (NGOs) to work more closely together

Representatives from the media and NGOs included: Geoffrey Lean, Environmental Correspondent at The Independent on Sunday; Rosie Boycott, Editor of The Express; Charles Secrett, Director of Friends of the Earth; and Shelagh Young, Oxfam.

The seminar day comprised of:

- a key note speech by the Rt Hon Michael Meacher MP
- presentations of research on Media and Sustainable Development
- media panel discussion on 'Why should we report on the environment and sustainable development?'
- NGO panel discussion on 'Why should the media believe NGOs?'
- workshops on science terminology; assumptions by the media; the complexity of scientific issues; science fiction vs. fact; and promotional strategies for sustainable development and Agenda 21

The issues raised regarding barriers to effective communication of general environmental concerns to the public through the media are highly relevant to the discussion of health within the public arena. This is particularly valid for the communication of health risks in relation to environmental hazards.

IPCS project on chemical incidents: working group on investigation of diseases of chemical aetiology and follow-up of chemically exposed subjects

International Programme on Chemical Safety
University of Birmingham: 22/23 March 1999
R Euripidou, Environmental Epidemiologist; Virginia Murray, Director, CIRS.

This international working group was funded by the NHS Executive, West Midalnds and organised by the Chemical Hazards Management and Research Centre (CHMRC), University of Birmingham. CIRS were pleased to be asked as one of the participant organisations. The purpose and the aims of the working group were to explore practical methods to chemical disease investigation and follow-up, and to develop practical guidelines for these investigations for public health use. Presentations of case studies where follow-up of chemically exposed patients was beneficial included:

1. A summary of the ICI fire in Auckland (NZ) presented by Dr W Temple.
2. Large scale Methanol Poisoning in Bahia (Brazil) presented by Dr A Wong.
3. Quebec province Ice Storm (Canada) presented by Dr A Nantel.
4. Reservoir contamination with Fertiliser (Uruguay) presented by Dr C Aonzo.

Dr N Connor, SpR Public Health, presented the work on draft guidance for the long term exposure to chemicals by (*details on page 9 – 11)*. Issues discussed included:

- when to begin an investigation
- the benefits and disadvantages of the community development approach
- difficulties showing cause/effect mechanism and biological pathways of chemicals
- risk communication
- inappropriate selection of cases, controls and confounding factors.

Prof. Roy Harrison presented a talk on environmental issues and chemical incidents. Using examples presented by him, Pat Saunders and Andrew Kibble of CHMRC, he showed that monitoring should only be undertaken using a quality assured analytical procedure likely to represent peak human exposure over time intervals appropriate to the time taken by the pollutant to elicit a biological effect within the emission source. Dr S. Walter raised a valuable series of epidemiological issues and chemical incidents.

Two groups were requested to address separately the investigation of long term chronic chemical incidents, and to develop draft guidelines on the follow-up of potentially acute chemically exposed subjects. The draft guidance considered issues relating to:

- clinical follow-up of potentially exposed subjects
- guidance on harmonised/comparable data collection that can be used internationally
- aqusition of scientific knowledge on human toxicology

Some key points to come out of discussion included the need :

- for guidance on harmonised reporting features (IPCS uses 4 languages) and severity grading - a common score as well as harmonised recording of treatments, biomedical and chemical classification are needed
- for awareness by GPs of chemical incidents
- to show a caring response and to understand population perceptions of chemical exposure. Factors influencing actions include the nature of the incident (visible e.g. smoke or invisible e.g. landfill toxins require different risk communication)
- to seek timely and appropriate ethical approval
- to consider issues about the dissemination of results
- to consider issues relating to acceptable risk

Survey of decontamination facilities

Dr Peter Horby, SpR Public Health seconded to CIRS

CIRS has recently undertaken a questionnaire survey of decontamination facilities and equipment in accident and emergency departments in the six Regions that hold contracts with CIRS (these are Anglia and Oxford, North Thames, South Thames – pre 1st April 1999, Trent, North West and South and West). The response rate was very good (80%) and the data is currently being analysed. The results will be available in the near future.

CHEMET

Fiona Welch, Air Research Engineer, CIRS

CHEMET provides a map of an area thought to have been affected by a possible chemical release from a spill or fire

Introduction

CHEMET is a service run by the National Meteorology Office to provide meteorological advice as support to Police and Fire and Rescue Services during emergencies involving the atmospheric release of toxic chemicals into the atmosphere.

CHEMET has military roots as knowledge of battlefield meteorology was required during the First World War when gas was used, for this reason the service falls under the funding and jurisdiction of the MOD.

How does it operate?

CHEMET is operated by the forecasters in one of the six regional weather centres in the UK. If a CHEMET request comes from the appropriate emergency services the forecaster will give the incident their full attention.

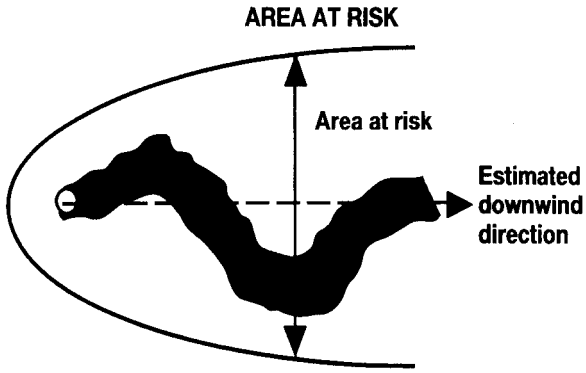
What is the product?

CHEMET is designed to be very simple for a fast response. Targets stipulate that the forecasters must respond with a map indicating the "area at risk" within thirty minutes; average response is approximately 17 minutes with map and *form B* being sent by fax.

The map is Ordnance Survey 1:50,000 with 1km square grid. The 'area at risk' accounts for the likely path of the plume, plus an allowance for plume meander and drift. The information required to provide a plot of 'area at risk' is the six figure OS reference and the time of release. Details of local weather and topography will be requested, but their own weather data and maps will be used. The system assumes that the release is neutrally buoyant and as such the forecasters do not need to know the chemical involved. They also do not take account of the volume discharged. An extended release (over one hour) will simply widen the area at risk. There is a modified version which can be used for a dense gas such as chlorine.

Example of area at risk overlay is given in the figure below

This map is accompanied by *CHEMET form B.* This gives weather details in two sections. The basic forecast consists of wind direction, wind speed in km/hr and basic dispersion details, and any remarks. Incidence of rain is significant as it will have a wash-out effect. Specialist forecast informa



tion is also included and gives details which would only be of use to an expert who may be on site at larger emergencies.

A typical forecast will be valid for three to four hours. If the incident continues beyond this time or conditions change, an updated forecast will be issued.

Comment

CHEMET primarily take calls from the Police and Fire services as they are usually in charge of an incident. However they will take requests from the Environment Agency if they are taking the lead on an incident. Should a relevant incident occur in your area, it may be helpful to ask the Police or Fire Service for a copy of the response.

Personnel at the Meteorological Office believe that not all Police and Fire services are fully aware of the facility and it is consequently underused. This has been reinforced by recent experiences of CIRS. CHEMET is free to the services mentioned and it may be wise to encourage its use. Discussing it with the appropriate services in advance may be beneficial as part of your multi-agency emergency response plans.

There are plans to modify this service in line with developments in dispersion modelling technology.

First Review of Air Quality Strategy

Fiona Welch, Air Research Engineer, CIRS

The UK National Air Quality Strategy was discussed in Chemical Incident Report 10, October 1998. The first review has now been completed [1]. The results are provided in the table shown below.

Some criticism has been raised that although five of the eight air quality objectives will be tightened, the objective for PM_{10} will be weakened and it is likely that this will also happen for nitrogen dioxide and ozone. These changes have been made because the original objectives will be more difficult to meet than was originally expected.

It is of concern that PM_{10} is the pollutant with the highest potential impact on human health. However Environment Minister, Michael Meacher, described the existing provisional objective as 'unrealistic'.[2]
A group on Economic Appraisal of the Health Effects of Air Pollution (EAHEAO)[3] was set up by the Department of Health to aid the review, with a view to establish society's 'willingness to pay' (WTP). However the results have proved both controversial and difficult to interpret and it was felt inappropriate to use them as part of the cost/benefit analysis of the strategy.

Sources of Information

1 The Review of the UK National Air Quality Strategy and the report of the Interdepartmental Group on Costs and Benefits are both available from DETR Free Literature, PO Box 236, Wetherby, S3 7NB, telephone: 0870 122 6236.
2 ENDS Report 188, January 1999 *(see page 19)*
3 The Economic Appraisal of the Health Effects Of Air Pollution is available from The Stationery Office, £17.50. An executive summary of this report is available on the internet: http://www.doh.gov.uk/hef/airpol/airpolh.htm

Existing and proposed air quality objectives

Pollutant	Existing objective for 2005[A]	Measured as	Proposed new objective[A]	Proposed EC limit value[A]
Benzene	5ppb	Annual mean	5ppb by 2003, 1ppb (indicative) by 2005	1.66ppb by 2010
1,3-Butadiene	1ppb	Annual mean	1ppb by 2003	-
Carbon monoxide	10ppb	8-hour mean	10ppb by 2003	8.5ppb by 2005
Lead	0.5g/m^3	Annual mean	0.5g/m^3 by 2004, 0.25g/m^3 by 2008	0.5g/m^3 by 2005 (2010 near industrial sources)
NO_2	150ppb	Hourly mean	104.6ppb by 2003, up to 18 exceedences[B]	104.6ppb by 2003, up to 18 exceedences
	21ppb	Annual mean	Unchanged[B]	21ppb by 2010
Ozone	50ppb	8-hour mean, up to 10 exceedences	Unchanged[C]	-
PM_{10}	50g/m^3	24-hour mean, up to 4 exceedences	50g/m^3, maximum of 7-20 exceedences by 2004[D,E], also annual limit of 31g/m^3	50g/m^3, up to 35 exceedences by 2005[F] and up to 7 by 2010
SO_2	100ppb	15-min mean, up to 35 exceedences	Unchanged	131ppb 1-hour limit, up to 24 annual exceedences; 46.8ppb 24-hour limit, up to 3 annual exceedences

[A] UK deadlines refer to the end of the year in question, while EC deadlines refer to the start of the year
[B] Objectives remain provisional
[C] Indicative level only
[D] Precise number of permitted exceedences still to be determined
[E] Original objective for 2005 retained as indicative level
[F] Different monitoring techniques make this equivalent to the proposed UK objective for 2004.

Book and Journal Review

Environmental Information: a guide to sources

By Nigel Lees and Helen Woolston. (Pp viii + 267; £32.00), 1997. The British Library. ISBN: 0-7123-0825
Fiona Welch, Air Research Engineer, CIRS

This book, published by the British Library's Science Reference and Information Service is the second, updated edition of this comprehensive guide to environmental information. Environmental issues have been divided into 14 chapters:

1. General environmental information
2. Business
3. Environmental law
4. Air pollution
5. Water pollution
6. Solid waste and waste disposal
7. Contaminated land and liability
8. Chemicals and the environment
9. Energy
10. Transport
11. Recycling
12. Noise pollution
13. Conservation and ecology
14. Agriculture and food

Each chapter summarises key issues, followed by entries on databases, printed sources and organisations relevant to that field. As would be expected from a libary publication, all entries are well indexed and easy to use. The foreword quotes Jonathon Porrit, then director of Friends of the Earth describing the first edition in 1992 as "an essential travel guide to the green world". The section on organisations is particularly useful, as it helps to find out which companies specialise in a particular field, or the business of a company mentioned in a report.. Although it is possible that specialists may find some information lacking, this is a valuable reference book that provides a good broad introduction to any environmental work and is suitable for professionals concerned with environmental issues.

Non-medical Environmental and Engineering Journals held by CIRS

Emma Woodey, Fiona Welch, Faith Oliver
Research Engineers - CIRS

In response to requests from public health doctors for information on non-medical environmental and engineering journals, the following article gives brief details on the journals currently held at CIRS.

ENDS

The ENDS Report is a source of accurate, independent information for business, industry and Government, published by Environmental Data Services Ltd. It introduces all new environmental statutes and regulatory developments, and also features some 'court' cases, for example, a spillage resulting in water contamination, or an explosion resulting in an odour nuisance for local residents. Feature sections cover specialist topics in greater detail. The journal is published monthly, dating back to 1978. CIRS holds copies starting from February 1998. Articles from past editions of the ENDS Report are available on a searchable CD-ROM. This facility is currently not available at CIRS, but may be purchased in the future.

Environment Business Magazine

Environment Business Magazine is a bi-monthly publication that covers all business related environmental issues from the latest monitoring equipment to European legislation, training to IPPC (Integrated Pollution, Prevention and Control) guidelines. Feature sections have included: a contaminated land legislation update; air monitoring; and a guide to software for environmental monitoring. Copies dating back to May 1998 are held at CIRS.

Local Authority Waste and Environment

This journal is published monthly, CIRS holds some copies dating from November 1997 but a full set is not available. The journal contains articles on landfill management, waste handling, air quality, education and training.

The Chemical Engineer

This is the fortnightly industry journal of the Institute of Chemical Engineers (IChemE). A full set of this journal dating back to August 1997 is available at CIRS. It contains environmental information specific to the chemical and process industries including: standards; legislation; health and safety; and details of larger industrial accidents which may constitute a chemical incident.

Wastes Management

This is the monthly journal of the Institute of Wastes Management. Copies dating back to January 1996 can be accessed through CIRS. Articles discuss current waste disposal options, including landfill and incineration, as well as remediation of contaminated sites using, for example, bioremediation.

WWT - Water and Waste Treatment

The journal contains news, products and technology on water, waste water and waste treatment. It is published monthly, but only limited copies from November 1998 are held at CIRS.

More information on the above journals can be obtained from Emma, Fiona, or Faith at CIRS.

Specialist Air Strategy Training Day

Fiona Welch, Air Research Engineer, CIRS

The first specialist training day was held by CIRS on 11 February 1999. This focused attention on the management of air related chemical incidents. The day covered a range of issues from acute and more dramatic events such as fires to chronic health effects of urban air pollution, such as that addressed by the UK National Air Quality Strategy (UKNAQS), *see page 18*. As usual we combined lectures with exercises, case studies and discussion periods.

We had external input from academia on the subjects of 'Scientific and engineering aspects of air pollution evaluation and modelling' (Prof. Alan Robins, Professor of Environmental Fluid Mechanics, University of Surrey) and 'The health perspective to devising the UKNAQS' (Prof. Peter Burney, Professor of Public Health Medicine, Guy's, King's and St Thomas' Hospital Medical School). A more practical external input was given to us by representatives from Southwark Local Authority Pollution Control Team. The day also included a review of topical areas which CIRS is involved with, which included work on fires and investigation of long term exposure to point source chemicals.

During discussions it became apparent that those in Public Health would like more information in advance on what to do in the event of fires etc. It also became clear that there is a need for the research reviewing the current status and potential role of dispersion modelling for incident management.

Our evaluation forms indicated that the day was very well received. Overall the course was give 88% in terms of relevance, and 82% for effectiveness for CPD purposes, indicating those who attended intend to modify their practices in light of what they have learned. It was also apparent that Public Health would like to receive further training within a multi-disciplinary context.

I would like to take this opportunity to thank all those who attended and helped to make the day successful. Your feedback will be of great use in shaping subsequent training and the overall work of CIRS.

Training Days
1999 – 2000 Programme

Following the success of previous training days, CIRS is pleased to announce the 1999 – 2000 Training Programme. For booking information on these courses and further details please contact for Rico Euripidou or Catherine Farrow on 0171 771 5382 for the CIRS courses, for the 14th December 1999 Heather Wiseman 0171 771 5295 and for the Part-time Toxicology course, Prof John Timbrell 0171 333 4789. Details of the courses are published in the enclosed flyer which we would be grateful if you would circulate in your Health Authority

CIRS Update for CCDC's (Three days for contract holders)
Thursday 1st July 1999, Thursday 7th October 1999 and Thursday January 27 2000
((for CsCDC and CsPHM who have responsibility for chemical incidents and who have attended the basic course)
Courses will be held at St Thomas' Hospital, Block 9.

CIRS How to Respond to Chemical Incidents – basic course (Two training days for contract holders)
Friday 9th July 1999 and Wednesday 24th November
(for CsPHM and Specialist Registrars on call).
Courses will be held at St Thomas' Hospital, Block 9.

CIRS Land Contamination Incidents:
Thursday 14th October 1999
((for CsCDC, CsPHM and Specialist Registrars and Local Authority Environmental Health Officers).
Course will be held at St Thomas' Hospital, Block 9.

CIRS Water Contamination Incidents:
Thursday 11th November 1999
((for CsCDC, CsPHM and Specialist Registrars and Local Authority Environmental Health Officers).
Course will be held at St Thomas' Hospital, Block 9.

Management of Chemical Incidents in A&Es -
Tuesday 14th December 1999
(for A&E Consultants, Senior Medical Professionals and Senior Nurses).
Course will be held at St Thomas' Hospital, Block 9.

Part-time course in Toxicology
Six three day modules between September 1999 and June 2000
For more information please contact Prof John Timbrell, Department of Pharmacy, King's College, London, on 0171 333 4789. Staff of the Medical Toxicology Unit support and contribute to this course.

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