Lessons learnt from a factory fire with asbestos-containing fallout

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Abstract

Background Fallout containing asbestos from a factory fire at Tranmere, Wirral, England, landed on a highly populated urban area with an estimated 16,000 people living in the area worst affected, which included a shipbuilding community. There was considerable public concern over the health impact of the acute environmental incident, and great media interest.

Methods A descriptive study was carried out of the acute environmental incident and its management, and the difficulties encountered.

Results Practical lessons learnt include need for: increased fire-fighter awareness of potential adverse health effects from asbestos in the structure of buildings; early involvement of both Local Authority environmental health and National Health Service public health departments; creation of a systematic local database of potential environmental health hazards in the structure of buildings as well as their contents; 24 hour on-call arrangements with laboratories expert in analyses of fire fallout; rapid quantitative analyses of multiple environmental samples; district written policy on handling asbestos incidents; systematic assessment of fright and media factors in public impact of an incident; dedicated public help-lines open long hours; consistent evidence-based public messages from all those communicating with the public; measurement of asbestos levels in the street and homes for public reassurance; local and health authorities' subscription to an environmental incident support service; formation of an acute environmental incident team to jointly manage and publicly report on airborne acute environmental incidents; clear government definition of responsibilities of different agencies.

Conclusions This paper provides a description of important lessons learnt during an acute environmental incident with asbestos-containing fallout. It will be helpful to those involved in the practical planning for and management of future incidents.

Keywords: asbestos, environmental exposure, mesothelioma, lung neoplasm

Introduction

The perception of the health risks of asbestos has engendered fear and panic across the world. The predominant malignant diseases caused by asbestos are lung cancer and malignant mesothelioma of the pleura and peritoneum. Asbestos is a term that includes six natural silicate minerals with a fibrous crystalline structure, which are divided into serpentines, whose sole member is chrysotile (white asbestos), and amphiboles, which include crocidolite (blue asbestos) and amosite (brown asbestos). The individual minerals have different biological and pathological effects. Asbestos has been used by man since antiquity, but it is only since the end of the last century that massive scale industrial mining and production began. Asbestos fibres are ubiquitous environmental contaminants, such that everybody is exposed to some extent in both air and water.

An acute environmental incident, which can be defined as ‘an unforeseen event which causes ill-health, or which has the potential to cause ill-health and which necessitates an immediate response’, or ‘one or more individuals suffering from an illness which might be due to such an event’, occurred following a factory fire in Tranmere. The acute and long-term health effects of the fire have been reported elsewhere. The purpose of this paper is to consider in particular the lessons learnt from the management of this incident.

Description of fire and incident

Tranmere Tannery, Wirral, England, lay on the Mersey estuary and had been disused since October 1993. It was subject to arson on 22 September 1994, with the fire involving a 40 m x 70 m area of a four-storey steel-framed building with timber floors and a roof clad with profiled steel sheeting covered with asbestos–bitumen felt. The fire was stopped (defined as no more appliances needed to put fire out) 2 hours 40 minutes after the original call. Debris and ash were visibly deposited on an area four miles long by one mile wide. A member of the public alerted the local environmental health department that the fallout might contain asbestos, and laboratory analysis confirmed that a...
large piece of debris contained substantial quantities of chrysotile and traces of amosite. Two road sweepers and six manual crews of three men each with brushes, shovels and litter pickers collected material for disposal at a licensed landfill site. Clean-up staff wore protective white suits and dust filtering face masks. The public were informed about the incident through the media via a series of press releases, by a public address system, and by a telephone help-line. A summary of events in the early management of this incident is given in Table 1.

The main concern of the public over the handling of this incident was the delays in warnings, as the following citations from the local press clearly illustrate: ‘As far as I’m concerned the warning came 16 hours too late. The fire started at 1 am but the first we knew about the danger was about 5 pm when men in white suits started spraying the pavements.’ ‘The stuff was everywhere. My little boy was treading in it on the way to school and there are large flakes in the back where he plays’ (Birkenhead News, 28 September 1994). ‘There is anger that offici...
were registered with Wirral TUC for possible future compensation.9

The population living in the areas affected by fallout was estimated to be between 16,000 people in the worst affected area and 48,000 people at most.9 Because of continuing worries about this incident a report on the public health aspects of this incident was commissioned by the Local Health Authority.9

What lessons can be learnt?

With the benefit of hindsight, how might ‘officialdom’ improve its public service in future? The following discussion focuses on how services may be improved and does not judge relative performance in this incident against how peer agencies might have performed.

Sprinkler system to prevent fire

‘It shall be the duty of every employer to conduct his undertaking in such a way as to ensure, so far as is reasonably practicable, that persons not in his employment who may be affected thereby are not thereby exposed to risks to their health or safety’ (Health and Safety at Work etc. Act 1974, Section 3.1). Following a huge warehouse fire in Sheffield in which asbestos–bitumen felt was deposited over a wide area, it was recommended that unoccupied buildings should contain automatic fire detection equipment or sprinklers.10 A few months before the Tranmere fire an arson attempt was aborted by sprinklers. In this fire the sprinkler system did not work. During the fire investigation it was found that the sprinkler stop valves were turned off. It was not discovered when this had occurred or who was

Figure 1 Fire raging during the night at the British Leather factory, Tranmere, 22 September 1994. (Photo Dave Bird.)
recognizable. Had the sprinkler system worked this fire may have been prevented.

Recognition of acute environmental incident and delays in warning the public

The Fire Brigade’s initial top priority has to be to control the fire, which they did excellently. The main public criticism in this incident was that warnings were not given earlier. The Fire Brigade did not recognize the possibility of an acute environmental incident, although mitigating circumstances were that the Fire Brigade’s priority was the control of a very serious and dangerous fire, it was night-time, the health risk is likely to be negligible, and release of asbestos is likely to have occurred unrecognized in many industrial fires. The number of fires recognized to be associated with asbestos fallout with potential health effects in England is unknown, although seven incidents involving the explosive release of asbestos fibres during fires were recorded by the All Wales Environmental Health Surveillance Project during 1993–1995. Fire Service research has shown that asbestos–bitumen coated metal may generate a grey paper-like ash in fires, which can be distributed considerable distances and potentially release free asbestos fibres. In the very large Brightside Lane fire in Sheffield, in which smoke as well as bitumen–asbestos felt was deposited in the environment during daylight, Environmental Health Officers (EHOs) were called in within three hours of the detection of the fire. Two ways of improving this situation are, first, further training to help the Fire Brigade recognize the potential hazard posed by asbestos, and, second, even if a hazard is not recognized, calling the Local Environment Health Department early when potentially harmful quantities of debris are deposited in the environment.

The Tannery had been subject to Fire Brigade inspection under Section 1(i)(d) of the Fire Services Act 1947 and an information card detailing hazards (while occupied) and the geographical layout of the site was available to attending fire appliances. This system does not take account of unoccupied buildings or the structure of buildings. A district wide geographical information database on potential environmental health hazards including those posed by large buildings should be considered. Such a database could then be used to warn firefighters and other agencies of health risks in buildings. The database would need to be collaboratively compiled by the various public bodies involved in ensuring the safety of buildings, etc., such as the Local Authority, Health and Safety Executive (HSE), Fire Brigade and building owners.

The local laboratory was not able to make a definitive identification of asbestos, and this led to several hours of diagnostic delay while a specimen was then sent to an accredited laboratory. It is recognized that the identification of asbestos in a fire can be difficult. However, some delay could have been avoided if the samples had been dealt with by an accredited laboratory in the first instance; therefore, local emergency plans need to (1) identify laboratories that have the required experience to reliably analyse fire-affected asbestos samples in an emergency, (2) define procedures for obtaining laboratory technical staff 24 hours a day, and (3) ensure that definitive results are fed back to a multi-agency team (see below) managing the incident as soon as possible.

After learning of possible asbestos in fallout, the Environmental Health Department had to visit sites of concern, collect and analyse samples, weigh up risks, decide on how to handle the incident, organize a clean-up operation, contact other agencies, and write and distribute a press release. This was against the backdrop of an acute environmental incident not being recognized by other agencies, and the initial contact being from a member of the public. Although a press release could have been communicated earlier, the major source of delay was late involvement of the Environmental Health Department. Given that even with computerized databases the content of fallout could be different than expected, it would seem reasonable that local emergency plans should involve environmental health services whenever there is potentially harmful environmental fire fall out. In addition, National Health Service (NHS) public health departments also need to be involved early when there may be a health risk. A district written policy on how to handle an asbestos fallout, including what to advise the public, as in the case in Walsall, would be useful to try to reduce delay and ensure consistent advice. If there is doubt as to whether a health hazard exists District teams should assume there is one until shown otherwise.

Many specimens of environmental fallout were taken yet all acute action was based on the analysis of only one sample. It was reported to the public in a press release that the HSE laboratories found ‘Brown and White Asbestos in some large pieces of ash fallout’. This was inaccurate in that only one specimen was analysed on the day of the incident, and misleading in that only a trace of amosite was found, and this could have been a background contaminant. Analysis of a further five specimens two weeks later did not include quantitative analysis, and they were destroyed before repeat analyses could be done. Analysis of a further batch of 11 specimens by another laboratory showed that eight had chrysotile, the five in which quantitative analysis was possible had 48–61 per cent chrysotile, and in none of these 11 samples was any amosite identified. Even a year after the incident, neither the EHOs managing the incident nor the public were aware of the insignificant quantities of amosite, and consideration that amosite was present did make a difference to how the incident was managed. The lessons are that quantitative and multiple sample collection and analyses are useful and should be performed as emergencies, and that better communication is needed between laboratory and front-line staff.

Public communication and public relations

In the first press release given by the Local Authority, the public were advised: ‘Large pieces of ash like substance have been
found nearer to the tannery, this should also be thoroughly wetted and placed in a bag and then placed in a dustbin. Following identification of brown and white asbestos, this advice was contradicted in the second press release an hour later: ‘the public are requested not to handle any large pieces of ash fallout’. An extensive report in the Daily Post of 23 September 1994 stated: ‘The public were told that if disturbed the asbestos pieces can release dangerous fibres which could affect health’.

Reassurances about negligible health risks given by local officials were contradicted by messages given by Wirral TUC and solicitors. For instance, following a report on occupational mesothelioma mortality in Britain, Wirral News Group reported the Wirral TUC spokesman as saying: ‘It is absolutely terrifying to hear that one man in 40 could die of asbestos poisoning. These figures are far higher than originally assumed. It makes a mockery of the reassurances released by the council.’ The Wirral Globe of 25 January 1995 reported: ‘Solicitors said “We are gravely concerned as to the future health of the residents in this area involving both men, women and children and especially a number of pregnant women who are affected by the fire”. Anyone wishing to lodge a claim for compensation can contact...’ Ideally, the local TUC and solicitors should be giving similar evidence-based messages as public agencies about the risk to public health, but for various political and economic reasons this may be difficult to achieve in practice, and clearly added to both the fright and media interest of this incident.

Researchers on both sides of the Atlantic concluded that the public perception of asbestos risk is much greater than the reality. There is also widespread agreement about the difficulties of informing the public about magnitudes of risk. The Department of Health has published a good practice guide in communicating public health risks, and it emphasized that the public impact will be amplified by ‘fright factors’, which make risk less acceptable, and ‘media triggers’, which tend to amplify media interest. This incident scored high in both categories, which suggested a high profile scare (Table 2). The assessment of risk posed by this incident was correct but the degree of public impact was underestimated, and the use of such a checklist may help forewarn about a high-profile scare. The checklist also demonstrates the many factors that can influence the public impact of an incident.

An accessible and dedicated public telephone help-line, rather than the relatively low-key telephone advice available largely in office hours through the Environmental Health Department, would have been helpful in this incident. It would also have been useful to have brought in and shown independent external expertise early.

In a fire in a factory with an asbestos cement roof in Birmingham in 1988 downwind air monitoring showed negligible free asbestos levels. In this incident it was judged that air asbestos level measurements were not needed, except in monitoring of demolition work, because levels above background were unlikely to be detected. Although requested by

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<table>
<thead>
<tr>
<th>Table 2 Checklist of presence or absence of fright factors and media triggers in this incident</th>
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<tbody>
<tr>
<td><strong>Fright factors making risks less acceptable</strong></td>
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<tr>
<td>Risk seen as involuntary (e.g. pollution versus sports)</td>
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<tr>
<td>Risk seen as inequitable (some profit whereas others suffer)</td>
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<tr>
<td>Risk seen as inescapable by taking personal precautions</td>
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<tr>
<td>Source of risk unfamiliar or novel</td>
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<tr>
<td>Risk man-made rather than natural</td>
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<tr>
<td>Damage may be hidden and irreversible</td>
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<tr>
<td>Danger to small children or future generations</td>
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<tr>
<td>Form of harm arouses particular dread (e.g. cancer)</td>
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<tr>
<td>Victims identifiable rather than anonymous</td>
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<tr>
<td>Risk appears poorly understood by science</td>
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<tr>
<td>Contradictory statements from responsible source</td>
</tr>
<tr>
<td><strong>Media triggers which tend to amplify media interest</strong></td>
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<tr>
<td>Questions of blame</td>
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<tr>
<td>Alleged secrets and ‘cover-ups’</td>
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<tr>
<td>‘Human interest’ through heroes, villains, dupes, etc.</td>
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<tr>
<td>Links to existing high-profile issues or personalities</td>
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<tr>
<td>Conflict (between expert or experts versus public)</td>
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<tr>
<td>Story as a sign of further problems</td>
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<tr>
<td>Many people at risk, even if at low levels (‘It could be you!’)</td>
</tr>
<tr>
<td>Strong visual impact</td>
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<tr>
<td>Links to sex and/or crime</td>
</tr>
<tr>
<td>Reference back to other reportage (‘A story because it’s a story’)</td>
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Adapted from checklist from Department of Health.
members of the public, it was also judged that monitoring of air asbestos levels in people’s homes was not necessary. Although scientifically defensible this position ignores the public reassurance that could have arisen had air levels been measured, and shown to be negative. In Walsall, measurement of air fibre levels in asbestos contamination incidents has been found useful in reassuring the public, and is suggested in the Borough Council’s guidelines on handling chemical incidents.14

Acute environmental incident team
There are more than 11 million known chemical substances, with 60 000–70 000 in regular commercial use, and about 1000 new ones being developed each year.22 Chemical incidents may vary from the occasional chemical catastrophe, to the ever-increasing number of low-level incidents (such as this one), which none the less demand the time of the public health agencies. There are few data available on the type, range and nature of the ‘low-level’ incidents.

In this incident there were roles for the Fire Brigade, Police, Local Authority Environmental Health and Buildings Departments, HSE, NHS especially the Health Authority, Occupational Health Services, Waste Disposal Authority, and the Ministry of Agriculture, Fisheries and Food. Although members of involved agencies met after the event, there was not a formal incident team. Gathering the facts about this incident for a public health report was difficult partly because staff were aware of pending litigation. The owners of the factory declined to co-operate altogether. Better inter-agency working and co-ordination would have helped improve the management of this incident. A model for inter-agency co-ordination in airborne incidents could be an adaptation of that successfully used for waterborne environmental incidents where a multi-agency team is responsible for managing the incident and public relations, and for writing a public incident report.23–25

Occupational health services role
Emergency services personnel, as in this incident, may be exposed to contamination from acute environmental incidents.26 The Fire Brigade have detailed procedures for dealing with possible contamination of their workforce,27 and their occupational health staff need access to all the facts of an incident. For instance, after a factory fire involving an asbestos cement roof, an occupational health team had an important role meeting with trade unions, and holding a confidential counselling service.20 The role of specialized occupational health services, especially those of the emergency services, needs to be included in plans for acute environmental incidents and they need a close relationship with the incident team. In this incident a higher profile for the occupational health services may have defused some of the concerns of the Wirral TUC and emergency workforce.

Planning and responsibilities for acute environmental or chemical incidents
The Health Authority (HA) role in chemical incidents is not to take overall responsibility, but rather to co-ordinate NHS involvement in diagnosis, treatment and follow-up; and to plan a co-ordinated NHS response.28 Further guidance about emergency incidents requires HA to have a designated individual to ensure it has advice available; have a chemical incident plan; have access to medical advice; undertake monitoring and surveillance after an incident; and evaluate the public health impact of the incident.29 Further guidance makes clear an HA’s public health responsibilities for chemical incidents, although the Fire Service is responsible for dealing with hazards, and Local Authorities in planning for incidents.30 In this incident the Health Service’s emergency plans were not activated as there were no casualties, and initial health advice was obtained from the HSE. Given the HA’s responsibilities for public health following an incident, it is important that HA staff are given the opportunity for early involvement in incidents, and this needs to be reflected in the emergency plans of appropriate agencies. Further, the HSE has a large amount of expertise in environmental health and risk assessment, and its role and responsibilities in such incidents need to be clarified so that best use is made of its resources.

Gaining rapid access to authoritative external expertise in this incident was problematic. Since 1996, the Health Authorities in the North-West of England have had an arrangement with the Chemical Incident Response Service at Guy’s & St Thomas’ Hospital to provide advice in non-infectious environmental hazards, and there are four other similar services across the United Kingdom (V. Murray, personal communication, 1998). Recently a co-ordinating service has been created, the National Focus.31 Amongst other activities it ensures liaison with the Department of Health and other government departments and agencies.31 All these developments are welcome, but best protection of the public will also require better co-ordination across government departments so that all organizations have clear and consistent messages about roles and responsibilities in acute environmental incidents.

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References


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