CORRESPONDENCE

Surveillance systems and the role of a preventive medical team in chemical incidents

Editor—In their review of the role of a medical team in the emergency management of chemical incidents, Baxter et al have highlighted the health issues and current deficiencies in disaster planning that persist. Health professionals from active participation.1 Plans, the needs for them, and for epidemiological surveillance are well described.2,4 There are also statutory requirements for district health authorities to have in place plans for reacting to such incidents.5,6 They must include the designation of an officer responsible for collecting events and a long-term follow up as appropriate.

Although active surveillance systems are in place in Scotland and Wales, in England at the local level there is as yet no allocated funding for active surveillance. The Department of Health has asked (personal communication), when toxicological problems occur in the general environment:

How often, if at all, is a real risk of harm at issue?

How often, if at all, are local services unable to cope?

How frequently has there been difficulty in obtaining necessary information and advice?

What criteria should be used to research these questions and who should do the work?

Hospital accident and emergency department records are one useful source of routinely collected data to help answer these questions and identify future preventive measures.7 As an example, and although the hitherto unpublished data were collected 16 years ago, I hope the following audit of an acute chemical incident will help to support the recommendation of Baxter et al for active surveillance systems that allow rapid collation of information on health effects in the exposed population.

On June 11 1980, a lorry carrying 35-gallon drums of sodium hypochlorite, shed its load while negotiating an exit of the M5 motorway near Bristol. Several of the drums burst, spreading the powder. Shortly afterwards it began to rain. The resultant chemical reaction released a cloud of sulphur dioxide that fortunately dispersed upwards.

Sulphur dioxide is an irritant gas due to the formation of sulphurous and sulphuric acids on contact with moist mucous.8 Although the public were not affected, under a newspaper heading, "Families alerted in poison peril" the Bristol Evening Post correctly reported that "police and emergency services were poised to evacuate hundreds of families from Avonmouth today following a chemical lorry disaster" and that some "emergency workers were overcome by a gas cloud". Accident and emergency department records were used to explore the health effects (table 1).

Of the 19 firemen seen at hospital, 17 were taken there by ambulance and two referred themselves. In contrast, 13 of the 14 police officers referred themselves. However, only six of 19 (32%) of the firemen had any respiratory symptoms recorded on arrival whereas 11/14 (79%) police officers did.9,10 Two ambulance staff with respiratory symptoms were not taken to hospital by their colleagues. All of those with symptoms were given oxygen by facemask, and bronchodilators or steroids taken routinely to hospital. The two police officers were admitted for inpatient treatment of tracheobronchitis or pneumonitis. All were discharged within four days.

The presentation patterns suggest that emergency workers taken to hospital by ambulance from this incident were less likely to have respiratory symptoms than personnel who referred themselves. Accident and emergency department records were puzzled. Subsequent inquiry showed that local firemen exposed to chemical incidents and for which personal breathing apparatus was worn, were entitled by their trades union to medical examination afterwards. At the time, there were no policies for other emergency personnel involved in such incidents. The findings were used by emergency planning officers to ensure that after any such future exposures fire brigade staff would be first seen, wherever possible, at or near the incident by medical staff experienced in toxicological problems instead of being taken routinely to hospital, and that any unprotected emergency personnel would not be exposed to high concentrations of chemicals.

The emergency plans for dealing with chemical incidents were revised to incorporate these places. Elsewhere too, attention has been drawn to the need in such situations for protocols to manage many casualities exposed to chemicals, particularly when they arrive at hospital without warning.11

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Factors affecting recognition of cancer risks of nuclear workers

Editor—We would like to comment on a recent paper by Knaale and Stewart on factors affecting recognition of cancer risks of nuclear workers.1

The statistical techniques used in this paper differ substantially from those used in other analyses of various groups of radiation workers.2,3 In their analysis, Knaale and Stewart fit several models by maximum likelihood techniques to various cohorts of United States Department of Energy radiation workers involving those at Hanford. They claim to find evidence of a significant excess of cancer risks, with a very low doubling dose (8.2 mSv) and a highly curvilinear (downward bending) dose-response. As the authors point out, these findings are somewhat at variance with the analyses of cancer risk in the Japanese bomb survivors and in most other occupationally exposed groups of workers, although as confidence intervals are not quoted for their fitted model parameters it is difficult to assess the extent of the statistical incomparability.

However, there are at least two serious methodological problems in their analysis. First, it is that the excess-risks in their model take integer values and therefore the statistics used to estimate significance probably do not have the desired symptomatic distribution.2 Therefore the tests for significance may be incorrect. The second and more serious problem with the authors' calculations is that when they allow the parameters to vary, and in particular the minimum-age-at-exposure parameters, the number of degrees of freedom in the dataset, as determined by the numbers of records with non-zero effective doses, reduces considerably. By doing this, the analysis only takes account of a small data subset. The authors take no account of this in their analyses and it will much reduce the nominal significance of the fits. For example, the favoured fourth model fitted to fatal cancers incorporates an age-at-exposure parameter which effectively discards all doses received before the age of 58.

In summary, this paper suffers from several quite serious methodological weaknesses, which are sufficient to invalidate the results of the authors' analysis. A more reliable analysis of at least the Hanford workforce data has been published,2 which finds convincing indications of a trend with dose

Presentation patterns of the 35 emergency workers exposed to sodium hydroxide

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<thead>
<tr>
<th>Workers</th>
<th>Self</th>
<th>Ambulance</th>
<th>Any respiratory symptoms</th>
<th>Present</th>
<th>Absent</th>
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<td>17</td>
<td>17</td>
<td>2</td>
<td>15</td>
</tr>
<tr>
<td>Firemen</td>
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<td>14</td>
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<td>1</td>
</tr>
<tr>
<td>Police</td>
<td>1</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Totals</td>
<td>17</td>
<td>18</td>
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</table>
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