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Recognition and diagnosis of deliberate chemical release

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Deliberate chemical release (including use of chemical weapons to target individuals) may occur as a criminal or terrorist. This is uncommon, but poisons centres and clinical toxicologists must be prepared to provide rapid and accurate advice when needed. The deliberate releases of sarin in Matsumoto (1994) and Tokyo (1995) illustrate the potential clinical and public health impact, while recent events in the United Kingdom and Malaysia emphasise the ongoing threat and need for preparedness.

Chemical release may be suspected because of the method used to disseminate the chemical (e.g. an explosion), because a gas may be seen or smelt, or vapour or liquid contamination of surfaces may be seen. Other clues include multiple casualties presenting with similar clinical features and nearby dead or sick animals. It may sometimes be difficult to recognise that a deliberate chemical release has taken place, especially if the release is occult or if the effects of the chemical are delayed. Casualties may present to several healthcare facilities and the connection between them may not be obvious. Poisons centres may be the first to identify a pattern from enquiries that they receive from different sources. Targeting of an individual with a chemical weapon may be especially challenging to recognise because the attack may be occult and the lack of other casualties prevents a pattern of features being recognised.

Irrespective of the agents involved, responders need to use appropriate personal protective equipment (PPE) and casualties need high quality supportive care including airway management, oxygen, ventilation, intravenous access and fluid management as well as decontamination. Early identification of the likely chemical involved is important for (a) optimum clinical management including early use of appropriate antidotes when these are available, and (b) this informs the appropriate use of PPE and decontamination.

The following should be considered as potentially responsible agents when deliberate release is suspected; it is helpful to consider them in this order, excluding first those that require early use of specific antidotes(*); cyanide*; anticholinesterases* (e.g. nerve agents), opioids* (e.g. fentanyls), hydrogen fluoride*, vesicants/blistering agents (e.g. sulphur mustard), choking agents (e.g. chlorine, phosgene, ammonia); riot control agents (e.g. CS gas); other incapacitating agents (e.g. anticholinergics, volatile anaesthetics) and chemicals of biological origin (e.g. ricin).

This presentation will compare the clinical toxidromes associated with exposure to chemical weapons and provide a logical approach to diagnosis, which is intended to support appropriate initial investigation and management.