NHS England
Emergency Preparedness, Resilience and Response (EPRR)

Chemical incidents: Planning for the management of self-presenting patients in healthcare settings
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Chemical incidents: Planning for the management of self-presenting patients in healthcare settings

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This material should be read in conjunction with the NHS England Emergency Preparedness Framework. All material forming the guidance is web based and prepared to be used primarily in that format. The web-based versions of the Guidance including underpinning materials have links to complementary material from other organisations and to examples of the practice of and approach to emergency planning in the NHS in England.

The web version of the guidance is available at http://www.england.nhs.uk/ourwork/eprr/

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PURPOSE

1. This document gives guidance to National Health Service (NHS) funded organisations in planning, preparing and responding to chemical emergencies and managing people who may have been exposed to chemicals as a result of an accident or deliberate release. It highlights and addresses the particular features of an incident involving chemicals over and above the generic planning and response arrangements that need to be in place for all other major incidents and emergencies.

2. This guidance provides specific updated information and guidance on changes to aspects of the decontamination process for certain chemical incidents. It does **NOT** change any aspects of the decontamination process for biological or radiological contamination.

3. NHS funded organisations need to ensure that they have in place appropriate plans to respond to all hazards.

4. Promoting equality and addressing health inequalities are at the heart of NHS England’s values. Throughout the development of the policies and processes cited in this document, we have:

   - Given due regard to the need to eliminate discrimination, harassment and victimisation, to advance equality of opportunity, and to foster good relations between people who share a relevant protected characteristic (as cited under the Equality Act 2010) and those who do not share it;

   - Given regard to the need to reduce inequalities between patients in access to, and outcomes from, healthcare services and in securing that services are provided in an integrated way where this might reduce health inequalities.

Definitions used in this guidance

5. In this guidance the following terms and abbreviations are used:

<table>
<thead>
<tr>
<th>Term</th>
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<tr>
<td>Casualty</td>
<td>Person who is symptomatic and contaminated presenting to emergency services and at health facilities</td>
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<tr>
<td>Caustic</td>
<td>Capable of burning, corroding, dissolving or eating away by chemical action. Causing a burning or stinging sensation. Causing irritation.</td>
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<tr>
<td>CBRN and CBRNE</td>
<td>Chemical Biological Radiological Nuclear and Chemical Biological Radiological Nuclear Explosives. A term used to describe Chemical, Biological, Radiological, Nuclear and Explosive materials.</td>
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CBRNE terrorism is the actual or threatened dispersal of CBRN material (either on their own or in combination with each other or with explosives), with deliberate criminal, malicious or murderous intent.

**Contaminant**
A substance in an incident or disruption that is either present in an environment where it does not belong or is present at levels that might cause harmful effects to humans or the environment.

**Contamination**
The presence of a minor and unwanted constituent (contaminant) in material, physical body, natural environment, at a workplace.

**Clinical Decontamination**
The process where contaminated persons are treated individually by trained healthcare professionals using purpose designed decontamination equipment.

**Decontamination**
The process of cleansing the human body and other surfaces to remove contaminants, or the possibility (or fear) of contamination, by hazardous materials including chemicals, radioactive substances, and infectious material.

**DIM**
Detection, Identification and Monitoring.
Provided by Fire & Rescue Services, DIM provides a capability to a major national incident, involving actual or potential chemical, biological, radiological or nuclear (CBRN) or hazardous materials (HAZMAT).

**Dry decontamination**
The blotting and rubbing of exposed skin surfaces with dry absorbent material.

**Emergency decontamination**
A procedure carried out in advance of specialist resources where it is judged as an imperative that decontamination of people is carried out as soon as possible.

**Exposed persons**
Self-presenters at NHS funded provider locations or those at scene who are asymptomatic.

**Exposure**
Where someone has come into contact with a Contaminant / Hazardous Material.

**HART**
Hazardous Area Response Team
Specially recruited and trained personnel who provide the ambulance response to major incidents involving hazardous materials, or which present hazardous environments, that have occurred as a result of an accident or have been caused deliberately.
HAZMAT | Hazardous materials also called HAZMAT
Abbreviation for hazardous materials although it is commonly used in relation to procedures, equipment and incidents involving hazardous materials.

IOR | Initial Operational Response
The IOR programme has been introduced by the Home Office across all blue light emergency services and to key first responders including the NHS, to improve patient outcomes following contamination with hazardous materials (HAZMAT) or a chemical, biological, radiological or nuclear (CBRN) incident.

Improvised decontamination | The use of an immediately available method of decontamination prior to the use of specialist resources

Interim decontamination | The use of standard equipment to provide a planned and structured decontamination process prior to the availability of purpose designed decontamination equipment

JESIP | Joint Emergency Services Interoperability Programme
A programme that aims to improve the ways in which police, fire and ambulance services work together at major and complex incidents

NARU | National Ambulance Resilience Unit
NARU works with all NHS Ambulance Trusts in England – and those in the Devolved Administrations – to help strengthen national resilience and improve patient outcomes in a variety of challenging pre-hospital environments. This includes working to support the development of properly trained, equipped and prepared ambulance responders to deal with hazardous or difficult situations, particularly mass casualty incidents that represent a significant risk to public health.

NHS | National Health Service

ORCHIDS | Optimisation through Research of Chemical Incident Decontamination Systems
The ORCHIDS project aims to strengthen the preparedness of European countries to react to incidents involving the deliberate release of potentially hazardous substances. Response capabilities can be enhanced by identifying ways of optimising decontamination processes for emergencies involving large numbers of casualties
Patient
A person who may require disrobing and decontamination having been at or near the location of a hazardous materials release and who was potentially exposed and therefore potentially contaminated and who may require some form of care (e.g. decontamination, supportive medical care, lifesaving interventions, antidote therapy, communication and reassurance)

PHE
Public Health England
PHE is charged with protecting the health and well-being of United Kingdom citizens from infectious diseases and with preventing harm and reducing impacts when hazards involving chemicals, poisons or radiation occur

PPE
Personal Protective Equipment
Protective clothing, helmets, goggles or other garment designed to protect the wearer's body from injury.

Self-presenters
People may leave a scene before cordons are put in place, either attempting to flee from danger or not immediately realising that they may have been contaminated and turn up at A&E, a primary or community care facility, or another healthcare facility

STEP 1-2-3
Safety triggers for emergency personnel
Step 1 – One collapsed casualty:
• approach using normal procedures – CBRN contamination unlikely.
Step 2 – Two collapsed casualties at one location – CBRN contamination possible:
• approach with caution. Consider all options
• if CBRN possible or suspected follow the advice for STEP 3.
Step 3 – Three or more collapsed casualties at one location:
• DO NOT approach the scene – CBRN contamination likely

STEP 1-2-3 Plus
The Plus indicates that action can be taken in the absence of specialist equipment and resources such as PPE

Wet decontamination
The use of water to aid the removal or reduction of hazardous materials to lower the risk of further harm to those affected and/or cross contamination

Worried well
Members of the public who may be near to an incident when it happens, or who have heard about it third hand, and who are worried that they have been affected by the incident, or consider themselves likely to need medical intervention
Audience

6. This document contains principles for preparing, planning, responding and recovering from an incident involving chemical contamination regardless of cause, source or scale. It is strategic national guidance for NHS funded organisations in England.

7. The principles set out in this document apply to:
   a. All NHS organisations at each level including NHS England;
   b. Providers of NHS funded and commissioned care;
   c. General Practitioners (GPs); and,
   d. Other primary and community care organisations e.g. Out Of Hours services; Community Pharmacies; Walk In Centres.

8. All Accountable Emergency Officers (AEOs) and emergency preparedness managers must be familiar with the principles set out in this document and ensure arrangements appropriate to their organisation are in place.

9. Preparedness to respond to a hazardous materials (HAZMAT) incident or a CBRN / CBRNe incident forms part of the annual NHS England assurance process based on the NHS England Core Standards for Emergency Preparedness, Resilience & Response (EPRR).

The Policy Context

10. This guidance should be used in conjunction with and in the context of:

   a. The Civil Contingencies Act 2004
   d. The posters published by the National Ambulance Resilience Unit (NARU) and the Joint Emergency Services Interoperability Programme (JESIP) entitled “The way the NHS responds to HAZMAT / CBRN events is changing” in 2013.
   e. The results of the ORCHIDS Project
   f. Guidance and protocols for chemical hazards published by Public Health England
   h. Hazardous Material Incident Guidance for Primary and Community Care settings
   i. National Ambulance Service CBRNE and HAZMAT guidance, November 2013

and subsequent versions of these documents as they are revised.
The aim and scope of the guidance

11. The basic tenet of this guidance is that the overriding priority is the saving of life.

12. The aim of the document is to provide generic guidance on the response expected from NHS Acute Trusts (including Foundation Trusts) and other NHS funded organisations involved in a health response to decontamination of self-presenting persons. It forms part of the NHS Emergency Preparedness Framework 2013 published by the NHS England.

13. The scope of the guidance is:
   - to cover incidents when self-presenting people arrive at NHS Acute Trusts (including Foundation Trusts) and other NHS funded facilities. It is otherwise assumed that the majority of people involved in an incident involving potential exposure to hazardous chemical, biological and radiological substances will have been disrobed and decontaminated at the scene by the emergency services
   - to provide practical information on how to approach and deal with an incident - based on the IOR principles.

14. The subject matter considered here is limited to external contamination of people resulting from an accidental or intentional chemical release. Radiological material and biological agents also pose important risks. Many of the concepts presented here may apply to those agents.

15. This guidance does not include advice on:
   - Disrobe/decontamination at scene by Ambulance Services or Fire & Rescue Services
   - Decontamination of biological, radiological or nuclear contaminants;
   - Ingestion of chemicals.

Summary of changes to Decontamination Procedures

16. The Initial Operational Response (IOR) defined in paragraph 4, has changed the approach to non-caustic chemical decontamination. Disrobing followed by dry decontamination is now the default process for managing persons contaminated by non-caustic chemicals. Typically non caustic chemicals will not produce any immediately obvious changes to the skin while caustic chemicals such as acids and alkalis may cause pain or blistering or discoloration. In some cases alkalis may not cause immediate pain following dermal exposure.

17. For all other (caustic) contaminants where decontamination is indicated, the default process for managing persons remains the same, that is, wet decontamination. Dry decontamination using an absorptive material, such as cloths or paper hand towels, to blot rather than rub the skin, provides effective removal of non-caustic chemical contaminants, and importantly rapidly diminishes the potential impacts of further chemical absorption through the skin.
18. However, further work is required to ascertain whether dry decontamination is sufficient to ensure that hair is decontaminated. The best advice that can be currently recommended is that a flexible risk based approach be taken, and that people with, for example, long or thick matted hair are advised to wash it in running water leaning forward (so as hair wash water does not run off onto the face and body) as the final stage of the disrobe and dry decontamination process. The decision to wash hair will need to take account of the disposal of waste water.

19. As with all tasks carried out in the NHS, safety, including patient and staff safety, is paramount. Safety within a decontamination environment can only be achieved with appropriate training and practice that must be regularly refreshed and by the use of dynamic risk assessment.

20. The emergency services will be undertaking the disrobe and decontamination of people at the scene of an incident using the principles of the IOR. All NHS funded providers need to ensure that their facilities and services are prepared to respond:

a. to people who have left the scene of an incident before the emergency services arrive and have not undergone disrobe and/or decontamination and later re-robe and present at a healthcare facility, or

b. where an incident has not yet been reported to the emergency services and people arrive at a healthcare facility unheralded.

21. The IOR is predominantly aimed at ensuring an immediate “first aid” type approach that is capable of being delivered by non-specialist staff in any setting without delay.

22. Research indicates that the single most important step for decontamination of people contaminated by non-caustic chemical material is the prompt removal of clothing, at least to underwear, ideally within 15-20 minutes of exposure to the contaminant (or as soon as is reasonably practicable) and the use of dry decontamination.

23. It does not mean that subsequent specialist advice may not also recommend the use of alternative decontamination processes including wet decontamination. Wet decontamination is advised for the decontamination of hair following the disrobe and dry decontamination.

24. During wet decontamination the duration of decontamination has changed to between 45 and 90 seconds and ideally, to use a washing aid such as a cloth.

The underpinning principles

25. The patient decontamination principles are described here from a strategic perspective. The principles are meant to guide, but not specify, operational practices that remain the responsibility of individual organisations. The guidance is evidence based to the extent possible and the supporting evidence is documented and briefly discussed.
26. The purpose of this guidance is to standardise the way in which casualty decontamination is carried out throughout England, so that Decontamination Teams in NHS funded organisations have the ability to work seamlessly with the ambulance services and the fire and rescue services, all of which have national arrangements based on the same principles.

27. Previous protocols for the response to a chemical incident dictated that unprotected responders should withdraw from the scene and not approach people who might be contaminated and await the arrival or establishment of specialist trained and equipped assets. Recent research has pointed to the need for a more rapid and flexible approach that is more patient focused yet maintains the health, safety and wellbeing of contaminated people and responders assisting them (whether at scene or at NHS funded premises).

28. The ORCHIDS project (Optimisation through Research of Chemical Incident Decontamination Systems), delivered quantitative evidence on the optimum techniques for dealing with a range of potential contaminants and scenarios requiring emergency mass casualty decontamination. A description of the ORCHIDS project and its principal findings is presented at Annex C.

29. This guidance uses the research and results from a number of projects including the ORCHIDS project and the IOR to Chemical Biological Radiological Nuclear (CBRN), sometimes referred to as CBRNe where the ‘e’ stands for ‘explosive’, and Hazardous Materials (HAZMAT) Incidents.

   It should be noted that:
   - Not all potentially contaminated people will require follow-on treatment or evaluation at a health care facility;
   - Some people will leave the incident scene prior to responders arriving;
   - Some people, who were not at risk of contamination and do not require any medical assistance, may still present for evaluation and treatment, including requesting decontamination.

30. Patient disrobe and dry decontamination is an important mitigation process that:
   - Is a ‘first aid’ measure that is proven to reduce exposure
   - reduces adverse health effects in the patient;
   - permits faster access to medical care;
   - protects the health, safety and wellbeing of staff;
   - protects the integrity of the health care infrastructure.

31. Previous guidance has not been able to provide a well-defined end point to the decontamination process. The implicit aim of the process was the complete removal of chemical contamination. This is a resource intensive aim, without evidence to support any differences there are in the short-term or long-term health outcome for the patients; it did not prevent the secondary contamination of responders and their equipment and of NHS facilities; nor did it contribute to the safety and resilience of the community.
32. Therefore in this guidance the goals of patient disrobe and decontamination are:

- Achieving an improvement in patients' health outcomes by reducing morbidity and mortality;
- Achieving an improvement in patients' health outcome by preventing delayed morbidity;
- Protecting the health and functioning of responders and other staff by preventing their secondary contamination;
- Assuring the best health outcome for the most patients so that:
  a. those people requiring supportive or definitive medical care receive it in a timely fashion;
  b. the majority of minimally exposed people may be able to bypass medical evaluation, preserving medical resources for those with the most urgent needs

**Rationale**

33. In the year to March 2014, there were 448 CBRN incidents reported to Public Health England. Of these:

- 216 were ‘white powder’ incidents
- 115 were chemical releases
- 61 were chemical suicides
- 38 subsequently were identified as drug incidents relating to home drug laboratories
- 13 were biological releases
- 5 were explosion incidents.

34. In the year to March 2014, there were 778 Hazardous Material events reported to Public Health England (PHE). Of these:

- 13 of these were for swimming pools
- 32 involved farms and other agricultural related incidents.

35. In the same period 10% of the calls to PHE came from the NHS, including GPs and NHS 111, seeking advice on how to respond to a chemical incident.
PLANNING

General principles for planning

36. Previous guidance for dealing with people who had been contaminated by non-caustic chemicals required responders and other staff to withdraw from the scene and the people, and to await specialist staff and equipment to arrive or to be deployed.

37. The new approach is based on using STEP 1,2,3 Plus where the Plus indicates that action can be taken in the absence of specialist equipment and resources such as PPE. The principle changes required to plans are shown at Annex A in the context of an outline of an acute Trust decontamination plan.

38. All NHS funded organisations should have in place appropriate and proportionate plans and response arrangements. A commonality of response will be required for all incidents involving chemical contamination regardless of cause, source or scale. This relates particularly to the need to ensure timely disrobe and decontamination in accordance with the latest research on the process.

39. All plans need to be coordinated and should include arrangements for:
   - Describing/detailing how contaminated people will have been managed at the scene and in the pre-hospital / health facility context so that there is a clear understanding of what will have happened to contaminated people before they arrive.
   - All hospitals with fully designated emergency departments should have plans that include arrangements for response to incidents involving chemical contamination.
   - All NHS funded facilities including, for example, Urgent Care Centres, primary care centres, and Walk In Centres should have appropriate and proportionate plans that will enable them to deal with self-presenting people who believe they may have been contaminated. As a minimum these plans should include arrangements for the initial disrobing of contaminated people, dry decontamination and long or matted hair washing (where indicated), and the escalation and reporting of an incident as appropriate. Existing guidance Preparation for incidents involving hazardous materials: guidance for primary and community care facilities is available at www.england.nhs.uk/ourwork/eprr/hm/

40. Realistic, deliverable and tested plans should be in place to respond to a chemical contamination incident. Some emergencies can be handled at a local level but, where the scale of an incident puts it beyond the capacity of local resources, the first recourse is usually to request mutual aid with services in adjoining areas.

41. Plans need to recognise that significant numbers of people concerned about the health impact of a chemical contamination incident but not necessarily affected may attend hospitals and other NHS sites, even though they do not require any subsequent intervention or treatment.
Training and Exercising

42. Training and exercising arrangements will need to be in line with the requirements of NHS England assurance processes including the current version of the Core Standards for Emergency Preparedness, Resilience and Response. Arrangements will also need to be appropriate and proportionate to the type and size of organisation.

43. NHS funded organisations will need to ensure that staff are well prepared and can be supported appropriately in the event of a chemical contamination incident. This will require NHS funded organisations to, as appropriate:
   a. Facilitate training for staff who may be called upon to manage chemically contaminated people, including information on what signs and symptoms may be present. This should include clinical and non-clinical staff as appropriate.
   b. Ensure staff that may form part of a decontamination team are provided and trained in the use of appropriate Personal Protective Equipment (PPE) including the Powered Respiratory Protective Suit (PRPS) if that is appropriate. Staff need to be competent and rehearsed in their response to a chemical incident with training that is provided at appropriate intervals on an ongoing basis and which requires mandatory attendance.
   c. Maintain accurate records of all staff that have undergone specific training.
   d. Ensure that appropriate staff receive updates to their training in line with local training requirements and when there are any significant changes to national or local procedures.
   e. Investigate where training and training materials can be sourced, for example, from NHS England; from Public Health England; from Resilience Direct.
RESPONSE

Dynamic risk assessment

44. The approach taken in this guidance is based on the principles of dynamic risk assessment and takes account of the impact on NHS funded services and its patients on dealing with incidents involving potentially hazardous substances.

45. A risk-based approach should be used to determine the appropriate response level and associated strategies and tactics (including PPE, medical interventions and decontamination). Figure 2 shows the effectiveness of the disrobe and decontamination stages expressed as the “rule of tens”.

46. Despite the best efforts of the emergency services, it is likely, especially in larger incidents, that some people who may be contaminated will leave the immediate area and seek assistance from any nearby healthcare facility. This facility could be a GP practice, a community hospital, a mental health hospital as well as an Emergency Department.

47. A balance must be achieved between the need to protect healthcare facilities, staff and uncontaminated patients and the provision of timely and appropriate care to people self-presenting from a HAZMAT / CBRN / CBRNe incident.

48. Dynamic risk assessment takes into account the rapidly evolving nature of an incident. Risk assessment needs to be carried out as soon as possible and in consultation with any other emergency service partners. The aim is to balance the need to save life and reduce harm with the need to mitigate risk to NHS staff members.

49. The key elements of the risk assessment process are:
   - keeping the patient at the centre of the process
   - confirming what you are seeking to achieve e.g. safe decontamination of people
   - identifying hazards e.g. nature of contaminant/agent; scale of event; length and quantity of hair and whether advice needs to be given to wash hair.
   - deciding who might be harmed and how e.g. staff members; public; NHS facilities;
   - consideration of the impact of the external environment e.g. the state of the weather.
   - evaluation of the risks and decision on precautions and control measures e.g. disrobing; dry decontamination; need to proceed to wet decontamination.
   - recording the elements of the decontamination process e.g. keeping patient records; logging the incident.
   - reviewing of the assessment and updating as necessary.

50. Dynamic risk assessment underpins any response to a HazMat/CBRN incident. In instances where there is a lack of warning and a need for urgent action, prompt risk assessment and decision making might be required based on limited information and advice from other organisations and/ or from the people involved.
in the incident themselves. This may result in a decision for urgent decontamination of people whose contamination status is not clear.

51. In this context, the dynamic risk assessment process should focus on the following elements illustrated in Figure 1.

**Focus on the person to be disrobed and decontaminated**
- communication
- safety e.g. protection from hypothermia
- modesty e.g. take account of cultural needs; gender needs
- provision of accessible instructions and information e.g. provision of interpreters; provision of pre-prepared printed instructions

**What resources are available and required?**
- numbers and type of available staff
- variation by time of day / day of the week
- access to specialist equipment including wet decontamination and PPE
- quantity of any equipment that can be made available
- deployment of staff e.g. pre-allocation of staff at the start of each Emergency Department shift to roles in the event of an incident

**Is anything known about the agent?**
- what is known about the contaminating agent? Is that information from a reliable source?
- new approach can only be used on non-caustic chemicals
- all other agents to be dealt with in accordance with existing plans / guidance
- what processes will be needed to seek advice about an agent be sought from the National Poisons Information Service (NPIS) or PHE?

**What is the scale of response required?**
- how many people presenting?
- how many people at scene?
- what is the nature of any injuries?

**What is the environment to work in?**
- what is the setting e.g. acute hospital; primary care; community or mental health facility?
- what is the type of building?
- is there the ability to lockdown?
- what is the weather and its impact e.g. wind direction; temperature?
Protection of Staff

52. The level of PPE required should be based upon the unique circumstances of the incident, with reference to appropriate plans and guidance for the organisation and taking account of training in its use.

Response – at scene

53. This description of what happens at scene is included here to help inform NHS funded organisations of the revised approach to management of decontamination at scene.

54. Previous protocols for the response to a HAZMAT / CBRN incident, dictated that unprotected emergency responders should withdraw from the scene and await the arrival of specialist trained and equipped assets (STEP 1-2-3).

55. Research has indicated that a rapid response is critical for effective life-saving following a HAZMAT / CBRN incident. Specific actions, which include the removal
of casualties from the area of gross contamination and the removal of their outer clothing within the first 15-20 minutes (or as soon as is reasonably practicable) can save life and can be achieved without putting NHS staff and emergency service responders at undue risk of exposure by them employing the STEP 1-2-3 Plus method as set out in the IOR.

56. There is a significant change to current procedures at the scene with the introduction of disrobing and decontamination by the emergency services as the first response.

Response – at Emergency Departments and other appropriate NHS funded provider locations and facilities

Disrobing

57. To match the response at the scene, the response in the Emergency Department (and other similar NHS funded facilities) must change to take account of the research. This process is outlined here.

58. The process of disrobing is highly effective at reducing reaction to HAZMAT / CBRN materials when performed as soon as possible after exposure. Disrobing should ideally be undertaken within 15 to 20 minutes but should still be done even if this time ideal time period has been exceeded.

59. If disrobing is followed immediately by appropriate decontamination done effectively, research has shown that staff can be confident of removing the vast majority of skin contaminants

Improvised Decontamination

60. Improvised emergency decontamination is the use of an immediately available method of decontamination prior to the use of specialised resources. This should be performed on all disrobed people as a priority.

61. Dry decontamination, which should be considered the default process for non-caustic chemical incidents, is the use of dry absorbent material such as paper tissue or cloth to blot the exposed skin.

62. Unless casualties are demonstrating signs or symptoms of exposure to caustic or irritant substances, for example, redness, itching and burning of the eyes or skin, exposed skin surfaces should be blotted and rubbed with any available dry, absorbent material such as paper tissues (e.g. blue roll). All waste material arising from disrobing and decontamination should be double bagged in clinical waste bags (or equivalent) and tied for disposal at a later stage.

63. Existing local procedures should be followed for processes including re-робing, handling of personal items, and management of hazardous waste.
Figure 2: Effectiveness of disrobe and decontamination stages expressed as the “rule of tens”

64. **Wet** decontamination – only to be used if there signs and symptoms of caustic chemical substance – is the use of water from any available source such as taps, showers, hose-reels, sprinklers. Paragraph 76 and following below give more detail of wet decontamination.

65. **Emergency decontamination** would be performed on all disrobed casualties, unless medical advice is given to the contrary.

66. **Generally in the initial stages** of an incident and dependent on the symptoms and needs of the contaminated people, casualties, other people or first responders may initiate dry decontamination.

**Medical intervention / countermeasures**

67. Health care services across England have responsibility to undertake disrobe, decontamination and re-robing of live casualties following an incident involving chemical, biological or radiological materials or substances. Disrobing and decontamination is considered to be a medical intervention because without it, casualties’ health would deteriorate. This function is largely carried out by...
ambulance services at the scene of an incident. However, in a large-scale incident or emergency, health service resources may need to decontaminate people particularly those who self-present. Existing local processes for re-robing should be incorporated into the revised processes.

68. At the point where clinical care needs to be applied, any risk assessment already undertaken should be reassessed.

69. Casualties should undergo dynamic re-triage in the event of any significant delay as symptoms may have developed during the waiting period. Clinical care can then be applied if necessary.

70. Seeking access to counter measures should not deter or delay healthcare staff in carrying out life-saving activities.

**Interim Wet Decontamination**

71. Water should not be used for decontamination unless casualty signs and symptoms are consistent with exposure to caustic substances such as acids and alkalis, or the contamination has been identified as biological or radiological in nature. Interim wet decontamination is the use of standard equipment to provide a planned and structured decontamination process prior to the availability of purpose-designed decontamination equipment. There is no national standard for interim decontamination though the option of applying this method could be from any available source of water such as taps, showers, hose reels, sprinklers, etc. When using water, it is important to try and limit the duration of decontamination to between 45 and 90 seconds and ideally, to use a washing aid such as a cloth. This change is indicated by the ORCHIDS research. Existing local processes for the management of contaminated waste should be followed.

**Clinical Decontamination**

72. Clinical Decontamination is the process where trained healthcare professionals using purpose designed decontamination equipment treat contaminated persons individually. This is full wet decontamination using Clinical Decontamination Units. All appropriate NHS facilities (usually hospitals with Emergency Departments) should have plans in place to allow prompt deployment of such equipment.

73. Clinical decontamination can be undertaken by several means:

74. **Mobile Decontamination Units** are collapsible temporary structures that in most cases are stored at Hospital Emergency Departments. These units require assembly prior to use. Ideally, NHS Trust Boards and other appropriate NHS organisations should have, as far as reasonably practical, the capability to deploy these units as quickly as possible following receipt of intelligence alerting an Emergency Department of an incident or of the arrival of self-presenting casualties. It is recognised that rapid deployment of such equipment does pose logistical problems and relevant Trusts should therefore have plans in place to deploy such resources when appropriate.
75. **Static Decontamination Units** are semi-permanent structures sited outside Emergency Departments. Arrangements should be in place to ensure that such units can be fully operational in as short a period as possible following receipt of intelligence alerting an Emergency Department of an incident or of the arrival of self-presenting casualties.

76. **Decontamination Rooms** are permanent facilities sited within a hospital. Such facilities are purpose built and sited in an area of the building that allows the segregation of potentially contaminated casualties from the remainder of the hospital. These rooms should be provided with appropriate ventilation and effluent collection systems that are separate from those of the rest of the building. Arrangements should be in place to ensure that such a facility can be fully operational in as short a period as possible following receipt of intelligence alerting an Emergency Department of an incident or of the arrival of self-presenting casualties. NHS organisations should consider fixed decontamination facilities when designing new buildings.

**Response – at other NHS premises including Urgent Care Centres and primary care facilities**

77. The response to the presentation of contaminated people at NHS premises and services other than an acute setting with an Emergency Department, should aim to follow the principles and approaches outlined in the guidance above.

78. The response made should be appropriate and proportionate to the setting and the event.

79. Reference can be made to existing guidance, Preparation for incidents involving hazardous materials: guidance for primary and community care facilities is available[^1].

**Recovery from CBRN and HAZMAT incidents**

80. Business Continuity Plans should be reviewed to ensure that they reflect changes made to Major Incident and Incident Response Plans.

81. Should the incident be extended, have a serious impact upon the NHS funded organisation’s operations or upon local residents’ health or care, recovery planning may be needed to manage the transition back to normality. Should this be needed, the planning should be started as soon as this need is recognised, i.e. during the incident response. Recovery planning may be carried out internally and/ or on a multi-agency basis. If multi-agency recovery planning is needed, it will be led by the Local Authority as part of their statutory role. NHS organisations should identify as part of their Incident Response Procedures, an appropriate process for recovery management, including allocation of recovery specific senior personnel, drawing up and implementing a recovery plan, liaising with partners

and contributing to the community recovery effort led by the Local Authority as necessary; the extent of the incident impact will dictate the extent of the recovery plan.

82. NHS organisations and NHS funded organisations must ensure there are robust arrangements in place that support responding to the psychosocial needs of patients and staff affected by significant incidents, emergencies, and disasters.

83. NHS organisations and NHS funded organisations must ensure staff welfare in general. Welfare includes anything that is done for the comfort and improvement of staff. Measures include monitoring working time and should be in line with the Working Time Regulations (1998) and subsequent amendments. NHS incident commanders must be aware of the potential for stress and/or fatigue to impact upon individual performance and decision-making. They must ensure that they are cognisant of their own and their teams levels of stress and fatigue and that effective arrangements are in place to minimize the potential impact such as rest-breaks and shift systems for protracted incidents.

84. HAZMAT / CBRN incidents may lead to heightened levels of psychological stress amongst staff, together with any potential additional physical impacts related to decontamination (such as the wearing of PPE or undertaking decontamination in one of the described facilities.

Equality and diversity

85. Equality and diversity are at the heart of NHS England’s values. Throughout the development of the policies and processes cited in this document, we have given due regard to the need to eliminate discrimination, harassment and victimisation, to advance equality of opportunity, and to foster good relations between people who share a relevant protected characteristic (as cited in under the Equality Act 2010) and those who do not share it.
**Task and Finish Group**

The ‘task and finish’ group was convened prior to the implementation of the Health and Social Care Act 2012.

Peter Boorman (Chair), Deputy Head of Emergency Preparedness, Response & Resilience, NHS England (London Region)
Steve Bland, Surgeon Commander, Royal Navy and Consultant in Emergency Medicine, Portsmouth Hospitals NHS Trust
Nick Castle, Nurse Consultant, Resuscitation, Frimley Park Hospital NHS Foundation Trust
Simon Clarke, Consultant Emergency Physician, Frimley Park Hospital NHS Foundation Trust
Steve Day, Charge Nurse, Emergency Department, University College Hospitals London NHS Foundation Trust
Francesca Garnham, Emergency Department Consultant, Guy’s and St Thomas’ NHS Foundation Trust
Hazel Gleed, Emergency Planning Manager, St George’s Healthcare NHS Trust, latterly Senior Officer EPRR, NHS England (National)
Tony Hallett, Assistant Director Resilience, Guy’s and St Thomas’ NHS Foundation Trust
James Hebdon, Emergency Planning Manager, Barking, Havering & Redbridge University Hospitals NHS Trust, latterly EPRR Officer NHS England (London)
Robert Kamanyire, Health Protection Agency
Verity Kemp, Project Management Support, NHS England (London)
Allan Newman, Emergency Planning Trainer, Imperial College Healthcare NHS Trust
Chris Perry, Ambulance Advisor, Emergency Preparedness Resilience & Response Division, Department of Health
Robert Pinate, Nurse Consultant, Emergency Department, Kings College Hospital NHS Foundation Trust
John Stephenson, Medical Director, National Ambulance Resilience Unit
David Walker, Resilience Manager, Great Western Hospitals NHS Foundation Trust & NHS Swindon, latterly Regional Head of Emergency Preparedness, Resilience and Response, NHS England (Midlands and East)
Annex A: Indicative principle contents for an NHS funded organisation’s decontamination plan

Including a summary of changes that may be required for the approach to decontamination of people possibly exposed to non-caustic chemicals.

**Note:** while this section is primarily aimed at NHS Acute Trusts (including Foundation Trusts), other NHS funded organisations may find this a useful tool.

For all plans: keep the person / patient who may be contaminated at the centre of all actions

<table>
<thead>
<tr>
<th>Indicative plan section headings</th>
<th>Indicative content of section</th>
<th>Where changes might be needed based on the newly published research findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Governance section</td>
<td>Version control</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Validation process/committee/Board</td>
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<tr>
<td></td>
<td>Accountable officers</td>
<td></td>
</tr>
<tr>
<td>Partnership working</td>
<td>Details of roles and responsibilities</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Partnership roles</td>
<td></td>
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<tr>
<td></td>
<td>Access to specialist information</td>
<td></td>
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<tr>
<td>Command &amp; Control</td>
<td>Activation of plan</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Links to other relevant plans – such as major incident plan, lockdown plan</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Information gathering</td>
<td></td>
</tr>
<tr>
<td>Summary section</td>
<td>Outline of immediate actions required including recognition of HAZMAT or CBRN incident</td>
<td>Modify to account for new approach to decontamination for non-caustic chemicals</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Emphasise that a timely response is paramount particularly that disrobe, and dry decontamination take place within 15-20 minutes of the incident or as soon as is reasonably practicable</td>
</tr>
<tr>
<td>Indicative plan section headings</td>
<td>Indicative content of section</td>
<td>Where changes might be needed based on the newly published research findings</td>
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</tbody>
</table>
| **What type of incident is this?** | Background / introductory information about:  
- potential scope of an incident  
- scenarios that may present including HAZMAT and CBRN  
- basic information on responses including recognition, safety including selection of PPE and hazard avoidance, First aid and casualty management  
- identification of processes and procedures including use of PPE, key locations and where to set up equipment  
- identification of differences in management of chemical, biological, radiological and nuclear responses  
- communication and notification including lockdown, cordons and other security considerations  
- internal hospital incident vs. external incident | Focus on early identification event  
Training of frontline staff who may have the first encounter with people who have been contaminated including reception staff in EDs, UCC, at GP and Primary Care Centres  
Modify existing plans for the disrobe and decontamination of people contaminated by non-caustic chemicals. Emphasise that a timely response is paramount particularly that disrobe, and dry decontamination take place within 15-20 minutes of the incident or as soon as is reasonably practicable  
Wet decontamination should be undertaken for between 45 and 90 seconds. |
| **Triage and casualty assessment** | Triage as part of a dynamic risk assessment process;  
- Clinical Assessment (primary survey and toxidrome recognition  
- Life-saving Interventions (LSIs)  
- Casualty Hazard Management (Decontamination / Isolation)  
- Supportive management  
- Definitive management including antidotes and surgery | If non caustic chemicals are suspected, consider the revised process for dry decontamination  
Communication within the organisation and with partner agencies |
<table>
<thead>
<tr>
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<th>Indicative content of section</th>
<th>Where changes might be needed based on the newly published research findings</th>
</tr>
</thead>
</table>
| Medical management              | Building on triage and re-triage considering:  
  - Clinical Assessment (primary survey and toxidrome recognition)  
  - Life-saving Interventions (LSIs)  
  - Casualty Hazard Management (Decontamination / Isolation)  
  - Supportive management  
  - Definitive management including antidotes and surgery | If non caustic chemicals are suspected, consider the revised process for dry decontamination  
Communication within the organisation and with partner agencies  
Where to refer to for further advice |
| Casualty hazard management       | Decontamination processes  
Isolation processes | Access to materials for dry decontamination  
- creative use of existing resources e.g. blue towel  
- identify pathways and areas for decontamination  
- process for disrobe and re-robe  
- further consideration of hair after the initial dry decontamination  
- use of improvised decontamination processes  
- who to refer to for further advice |
| Casualty flow                    | Local arrangements described for casualty flow |  |
| Equipment                        | What equipment there is and where it is and what it might be used for  
  - Decontamination tents  
  - PPE  
  - Other equipment  
  - Antidotes/POD availability and access  
  - Others | Consideration of the local type of decontamination facility that is available  
- Fixed structure  
- Exo-skeleton  
- Inflatable |
<table>
<thead>
<tr>
<th>Indicative plan section headings</th>
<th>Indicative content of section</th>
<th>Where changes might be needed based on the newly published research findings</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ACTION CARDS</strong></td>
<td>Allocation of key roles at each shift handover Action cards may include:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- immediate actions</td>
<td>Ensure that all front line staff – including reception staff, triage and</td>
</tr>
<tr>
<td></td>
<td>- action cards by role and by scenario</td>
<td>assessment staff – are aware of the need for:</td>
</tr>
<tr>
<td></td>
<td>- decontamination procedures by scenario</td>
<td>- early identification</td>
</tr>
<tr>
<td></td>
<td>- points of contact and emergency information</td>
<td>- early disrobing</td>
</tr>
<tr>
<td><strong>Training</strong></td>
<td>Key training requirements for each level of staff</td>
<td>- local isolation procedures</td>
</tr>
<tr>
<td></td>
<td>PPE training</td>
<td>- appropriate alerting mechanisms</td>
</tr>
<tr>
<td><strong>Exercising</strong></td>
<td>Details of how the plan is validated/exercised</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Details of learning incorporated as a result of local exercising</td>
<td></td>
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<tr>
<td></td>
<td>Details of inter-agency exercising</td>
<td></td>
</tr>
<tr>
<td><strong>Recovery</strong></td>
<td>Link to business continuity plans where appropriate</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Debrief process and report production</td>
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<tr>
<td></td>
<td>Staff support</td>
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</tr>
</tbody>
</table>
Annex B: Diagram illustrating a Hazardous Substance Management Pathway

That can be applied to self-presenting contaminated patients or patients exposed to chemicals presenting at NHS funded organisations including Emergency Departments

Hazardous Substance Management Pathway
Apply to Self-Presenting Contaminate Patient or Patient Exposed to Chemicals presenting at NHS funded organisations
Including Emergency Departments

Begin Emergency Decontamination Procedures
In context of Dynamic Risk Assessment

<table>
<thead>
<tr>
<th>ISOLATE</th>
<th>Limit movement and contact with patient</th>
</tr>
</thead>
<tbody>
<tr>
<td>DISROBE</td>
<td>Instruct patient to disrobe and bag their clothes in bag supplied. This can remove up to 90% of the contaminant.</td>
</tr>
<tr>
<td>CONTAIN</td>
<td>Air con off / Consider unit compartmentalisation and lockdown</td>
</tr>
<tr>
<td>ASSESS</td>
<td>Proportionate approach / Is substance known / DIM Team required / Pre-hospital information via Ambulance Service / Fire Service</td>
</tr>
<tr>
<td>DECONTAMINATION</td>
<td>Wet Decontamination for caustic (burning) substances. Dry decontamination for other non-caustic substances. Consider possible secondary contamination eg friends/relatives/others</td>
</tr>
</tbody>
</table>

HAZMAT or CBRN?

Consider Business/Service Continuity
Activate local HAZMAT plan
Consider possibility of other local self-presenters
Assess level of PPE required
Assess for wet or decontamination
Observe for secondary contamination / exposure
Inform NHS England and Public Health England
Liaise with specialist sources of advice such as PHE or NPIS
Consider countermeasures (UK National Reserve Stock)
Consider Fire Service Mass Decon termination support
Consider BCM and Recovery arrangements

Consider Business/Service Continuity
Activate local CBRNe plan
Consider possibility of other local self-presenters
Assess level of PPE required
Assess for wet or decontamination
Observe for secondary contamination / exposure
Inform NHS England and Public Health England
Liaise with specialist sources of advice such as PHE or NPIS
Consider countermeasures (UK National Reserve Stock)
Consider Fire Service Mass Decon termination support
Consider BCM and Recovery arrangements

With grateful acknowledgement to Pennine Acute Hospitals NHS Trust
Annex C: The ORCHIDS Project: background and principle findings

The current response to CBRN is predicated on process rather than patient outcome and is mainly based on perceived best practice.

The Optimisation Research Chemical Incident Decontamination Systems (ORCHIDS) project aimed to strengthen the preparedness of European countries to react to incidents involving the deliberate release of potentially hazardous substances. The intention was to enhance response capabilities by identifying ways of optimising current decontamination processes for emergencies involving large numbers of casualties.

This project delivered quantitative evidence on the optimum techniques for dealing with a range of potential contaminants and scenarios requiring emergency mass casualty decontamination, by addressing a full range of issues through applied toxicological research to mass casualty decontamination exercising and simulation modelling. Applied research into priority contaminants was undertaken in a programme of laboratory research trials using a range of toxic materials and chemical warfare agents. The outcome of these trials provides evidence-based recommendations on the optimum techniques for effective decontamination. A series of operational research trials with human participants using simulant agents have tested the efficacy of the optimised decontamination methods. Two large-scale mass casualty decontamination exercises were also conducted, focusing on the operational processes and capacities of decontamination facilities. Quantitative data generated from the operational research trials and exercising was used to create a realistic simulation model of mass casualty decontamination response. This model has been used to test response capacity to mass casualty scenarios.

The ORCHIDS project was the first to explore mass casualty decontamination from ‘first principles’. Evidence-based best practice guidelines have been produced and disseminated to key stakeholders within the EU and beyond. Recommendations for the procurement of second-generation mass decontamination response programmes have also been generated.

This became the ORCHIDS programme that started in April 2008 and comprised the following projects:

- **ORCHIDS 1**: The purpose of this project was to evaluate existing mass casualty decontamination procedures to identify rational means of optimising efficiency.
- **ORCHIDS 2**: This project was designed to specifically address the time-dependencies of disrobing and decontamination and to assess existing and novel personal decontamination products as a potential form of interim decontamination.
- **Clot and Clean**: Whilst mainly limited to wound decontamination, a number of studies performed during the project have direct relevance to personal decontamination and so have been included in this review.

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2 Clot and clean refers to the two principal aims of developing a product to arrest uncontrolled haemorrhage and neutralise the effects of CW agents from penetrating wounds.
Two further projects were instigated during the course of the programme to address specific questions arising from initial laboratory work:

- **ORCHIS**: The objective of this short (6 month) human volunteer study was to build upon the initial outcomes of ORCHIDS 1 to evaluate the impact of pictorial washing instructions, duration of showering and the provision of a washing aid (cotton flannel) on the efficiency of mass casualty decontamination using a biological/radiological (BR) simulant on human volunteers.
- **MSD**: The purpose of this short (6 month) human volunteer study was to determine the minimum duration of showering required to perform a full and effective body wash.

**Summary of Principal Findings of the ORCHIDS Project**

Overall, the existing mass casualty decontamination procedure can be optimised to improve performance. However, the evidence suggests that immediate disrobing followed by dry decontamination is safer, substantially more effective and should be the default option when managing an incident. The following points provide a summary of the main findings.

1. **Flannel or washing aid.**
   - Provision of a washing aid (such as cotton flannel) significantly enhances the effectiveness of mass casualty decontamination.

2. **Disrobe and decontamination.**
   - Disrobing is generally an order of magnitude more effective than decontamination and so removal of clothing should be an immediate priority if a chemical exposure is suspected.
   - Disrobing and decontamination are most effective if performed within the first 15 minutes of exposure.
   - The effectiveness of disrobing and decontamination then rapidly decreases: after a delay of one hour, there may be little clinical benefit (although still an operational imperative to reduce risk to responders).
   - The rapidity with which disrobing and decontamination need to be performed is referred to as the ORCHIDS timeline.

3. **Water-related effects**
   - The use of water has many disadvantages and so shower duration should be as short as possible: 1.5 minutes was identified as being the minimum shower duration practically attainable in a healthy adult population.
   - In theory, a halving of shower duration may potentially double the throughput of casualties via mass decontamination units.

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3 Minimum Shower Duration.
4. Dry decontamination
   • Use of dry decontaminants is generally safer than wet decontamination.
   • A research project (“EDICTAS”) is currently underway to identify what readily available products (such as blue roll, tissue paper, etc) may be used to allow implementation of the ORCHIDS timeline.

Conclusions
This programme of R&D has identified several means for optimising the current UK mass casualty decontamination provision. The recommended changes may improve the overall effectiveness of decontamination and may result in increased throughput of individuals. However, a number of issues were identified. Principally, the current system may not be in alignment with anticipated timescales required to deploy an effective disrobe and decontamination procedure. Secondly, dry decontamination should be the default option for decontamination as it is quicker and safer.

Primary Recommendations

• The ORCHIDS (mass decontamination showering) protocol should be introduced as the standard UK means of performing mass casualty decontamination. The key features are the provision of a wash cloth and decreased shower duration.

• A more rapid response for facilitating effective disrobe and decontamination at the scene of an incident is required. One potential means of addressing this would be to store disrobe packs containing an interim decontamination product at response nodes such as fire or ambulance stations or encourage the use of readily available absorbent products such as incontinence pads, wound dressings or paper tissue.