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Chemical Decontamination Update: Guidance for Health Boards

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Purpose and Summary of Document:

The process for managing and decontaminating chemically contaminated patients has changed. This document summarises the rationale behind these changes and provides guidance on how Health Boards can update their plans.

NHS organisations are requested to note these changes and update their emergency plans accordingly.

The document has been developed in consultation with and agreed by Welsh Government Health & Social Services Group (Health Resilience)

Work Plan reference:

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1 PURPOSE

The process for managing and decontaminating chemically contaminated patients has changed. At the request of the Welsh Government led Health Emergency Planning Advisory Group, Public Health Wales with support from Public Health England's Centre for Radiation, Chemicals and Environmental Hazards (Cardiff) have produced this guidance that summarises the rationale behind these changes. The guidance also explains how the NHS in Wales will need to update their plans to ensure that these changes are implemented and adopted to manage chemically contaminated patients.

The key principles set out in this document are:

- Dry decontamination as the default response to chemical exposure.
- Wet decontamination may still be required.
- Based on evidence based research from the ORCHIDS project.
- First aid approach to decontamination.
- Designed with best interest of the patient – it is quicker and reduces exposure.

The changes described in this document have already been incorporated into the Initial Operational Response (IOR) for emergency service personnel attending the scene of a Chemical, Biological, Radiation or Nuclear (CBRN) or Hazardous Material (Hazmat) incident. NHS Trusts in England have also been required to update their current plans and practices to reflect these changes.

Therefore NHS organisations are requested to note these changes and update their emergency plans accordingly. This should include Hazmat and CBRN plans. We are also recommending that Health Boards ensure and that all front line staff are trained on the key aspects of chemical decontamination. This will ensure that patients, whether decontaminated at scene or within Health Board facilities, benefit from a consistent approach.

This guidance does not change any aspects of the decontamination process for biological or radiological contamination.

Wet decontamination remains the default process for dealing with biological and radiological contaminants.

2 BACKGROUND

This document provides practical guidance to Health Boards in Wales on planning, preparing for, and managing chemically contaminated patients. It highlights recent changes to the evidence base on the decontamination process for chemicals and address key principles and arrangements that need to be in place to respond to such events. The guidance also provides links to key sources of information and materials that can be used to update plans and train staff.

The key purpose of decontamination is to save life. The new changes described in this document are designed with the best interest of the patient in mind and set out a first-aid approach to decontamination. They are research based and have been demonstrated to improve patient outcomes.

3 CHANGES TO EXISTING CHEMICAL DECONTAMINATION PROCEDURES

3.1 Non-caustic chemicals

The Optimisation Research Chemical Incident Decontamination Systems (ORCHIDS)¹ project has delivered quantitative evidence on the optimum techniques for dealing with chemically contaminated patients. One of the outcomes of the ORCHIDS project has been the development of evidence-based best practice guidance for optimised decontamination. This has been shown to improve patient outcomes and has led to a change in the approach to managing people contaminated with non-caustic chemicals (See Box 1).

The ORCHIDS project has demonstrated that rapid disrobe followed by dry decontamination is effective at removing non-caustic chemicals from the skin and reduces the absorption of chemicals through the skin.

The single most important step is the prompt removal of clothing (down to underwear if possible). Disrobe procedures should be, where possible, conducted by the casualty themselves. This should be as quick as possible and ideally within 15-20 minutes following exposure. Dry decontamination should then be undertaken using absorptive materials such as paper towels (blue roll), surgical dressings, cloths etc. to blot the skin. Where hair is contaminated wet decontamination of hair is recommended but this should follow the disrobe and dry decontamination process. More detail on the dry decontamination process is given in Section 6: Response.

¹ <http://www.orchidsproject.eu/>

The principle underlying disrobe and dry decontamination aim to provide a “first aid” approach to decontamination which can be delivered by non-specialist healthcare staff in any setting and, importantly, without delay. By reducing exposure time it can reduce adverse health effects in the patient and permit faster access to medical care. As a result it is a rapid and flexible approach to decontamination that is designed with best interest of the patient; it is quicker and reduces exposure.

These changes do not necessarily alleviate the need to seek specialist advice and advice should be sought on the need for further decontamination techniques, clinical treatment of patients, the reactivity of the chemical with water etc.

The default process for non-caustic chemicals is to disrobe followed by dry decontamination.

3.2 Caustic chemicals

Wet decontamination using water should only be used for decontamination where the chemical(s) is confirmed as being caustic or corrosive or if the patient is displaying signs and symptoms consistent with exposure to caustic substances. Wet decontamination also remains the default decontamination process for biological or radiological contaminants.

The ORCHIDS project also looked at optimising techniques for wet decontamination and for recommends a change in the duration of showering to between 45 to 90 seconds using a washing aid such as a cloth. More information on the wet contamination process is given in Section 6: Response.

For caustic chemicals, disrobe followed by wet decontamination is still recommended.

3.2.1 Box 1: Examples of caustic and non-caustic chemicals

A caustic or corrosive chemical is a chemical that can burn or corrode tissue on contact. The terms corrosive and caustic can be interchangeable although caustic tend to refer to alkaline/basic compounds and corrosives to acids and oxidisers.

Examples:

- Acids such as sulfuric (sulphuric) acid, nitric acid, hydrochloric acid, formic acid, acetic acid
- Oxidisers such as hydrogen peroxide
- Alkali (bases) such as sodium hydroxide, potassium hydroxide, calcium hydroxide
- Alkali metals such as sodium hydride, lithium hydride
- Strong bases such as amides (e.g. sodium amide), alkoxides (e.g. sodium alkoxides)

4 POLICY

These changes in chemical decontamination are mirrored in the Initial Operational Response (IOR) programme that was developed under the Joint Emergency Interoperability Programme (JESIP)² and published by the Home Office. IOR sets out the way the blue light emergency services will respond at the scene of a CBRN/Hazmat incident³. In Wales, the Welsh Ambulance Service Trust (WAST) has primacy for the medical intervention for casualties at the scene including decontamination and may be assisted by the Fire and Rescue Service.

The IOR is based on work of the ORCHIDS project and has been updated to reflect changes in the chemical decontamination process. As a result, Health Boards can expect that any patients managed at scene by the emergency services will have been risk assessed and decontaminated in line with the disrobe and dry decontamination process prior to transfer to hospital. By adopting this approach, Health Boards can ensure standardisation with the emergency services and consistency in the way contaminated people are managed at the scene or at hospital.

IOR has been rolled out to the blue light services in England and Wales. In England, NHS England has also rolled out the IOR programme to acute NHS Trusts and all Trusts were required to update their current plans and

² <http://www.jesip.org.uk/home>

³ <http://naru.org.uk/initial-operational-response-programme-guidance-launched/>

practices to reflect the changes to existing decontamination processes by December 2015.

5 PLANNING

The Civil Contingencies Act (2004) requires Health Boards to plan for, and respond to, a wide range of incidents and emergencies that could affect health or patient care. This includes managing chemically contaminated patients. These plans must be updated and tested regularly to ensure that they reflect the need for timely disrobe and decontamination in light of new evidence on effective chemical decontamination. Health Board estates and facilities such as Emergency Departments and Primary Care centres may receive chemically-contaminated people as a result of chemical accidents or incidents. Plans and procedures should cover two specific scenarios:

- Incidents when people self-present at emergency departments or other Health Board locations.
- Incidents where people are managed at the scene by the emergency services and are then transferred to hospital.

Comprehensive guidance on planning and response is available from NHS England Emergency Preparedness, Resilience and Response⁴. This has been reviewed by Public Health Wales and is considered a relevant and highly useful resource for Health Boards in Wales.

5.1 Planning

Plans and procedures should be coordinated with those of the emergency services, especially WAST, so that there is consistency in understanding how chemically contaminated people should be managed both at scene and when they arrive at hospital, and in service delivery.

Health Boards should ensure that they have plans in place for both hospitals with designated emergency departments and other NHS facilities including other hospitals, Primary Care centres, GP Surgeries and other relevant facilities.

For hospitals with designated emergency departments these plans should include detailed arrangements for responding to, and managing, chemically contaminated patients, mobilising of specialist equipment, provision and use of PPE, medical interventions and treatment etc. Forensic aspects may need to be considered if there is a possibility of subsequent criminal investigation such as in the case of a chemical fatality or a CBRN event.

⁴ <https://www.england.nhs.uk/ourwork/eprp/>

For hospitals without emergency departments and other primary care facilities plans should cover, as a minimum, arrangements for dealing with self-presenters through initial disrobing and dry decontamination (including, if necessary, wet decontamination of hair) and procedures for escalating an incident.

It is not thought that plans will require a major re-write. Instead, existing, well tested plans and operating procedures will simply need to be updated to reflect the new changes. Plans should include the provision for re-robing and aftercare which, depending on the circumstances, may involve admission to hospital for treatment and observation, discharge etc. The plans should also include guidance on handling clothes and valuables including the need to obtain scientific advice on whether such items can be returned, require decontamination or disposal. Staff welfare also needs to be considered including options to assess and, if necessary, quarantine staff who may have become secondarily contaminated.

Public Health Wales have developed an e-learning training package to support Health Board staff and which provides links to useful and practicable guidance (e.g. NHS England EPRR and London Trust Action Cards). Details of this resource, a list of key guidance and contact details to specialist advice for chemical incident is given in the Appendix.

5.2 Training and exercises

Health Boards should ensure that all relevant staff are aware of the changes in the decontamination process and are aware of their roles and responsibilities in the event of a chemical contamination incident.

This will require regular training for all staff that may be involved in managing chemically contaminated people. All front line staff involved in managing, decontaminating and treating people will need to be trained. This should include reception staff (who are most likely to come into first contact with a patient requiring decontamination) as well triage and assessment staff. All staff should be aware of the need for early identification of chemical contamination, early disrobing, local protocols for containment, isolation and lockdown, alerting and escalating mechanisms etc.

Each Health Board should have a lead officer identified to deliver the training and have an established documented training programme for ensuring staff receive appropriate initial and refresher training. As it is important that the decontamination process is consistent with that undertaken by the Emergency Services, it is strongly recommended that joint training is undertaken with WAST Hazardous Area Response Team (HART) and Special Operations Response Team (SORT) teams.

6 RESPONSE

6.1 Healthcare response

Decontamination can be broadly categorised as “wet” or “dry”. Wet decontamination relies on the use of water (sometimes with detergents such as bleach) to wash and rinse potentially contaminated areas of the hair and skin while dry decontamination uses powders or fabric materials to absorb and remove contaminants from the skin surface. Materials may include paper tissue (e.g. blue roll, kitchen paper, and toilet paper), nappies, wound dressings etc.

Evidence from the ORCHIDS programme suggests that for non-caustic chemicals immediate disrobing followed by dry decontamination is a safer and more effective option. It is a quicker option and reduces unnecessary dermal exposure to chemicals. Disrobing is typically an order of magnitude more effective than decontamination only and therefore removal of clothes to underwear should be an immediate priority. The effectiveness of both disrobe and decontamination are time dependent and most effective within 15 to 20 minutes of exposure. While clinically there may be little benefit to the patient after one hour, disrobing is still recommended to reduce the risk to hospital staff.

If contaminated patients are able to self-dry decontaminate then this is the best option and should be under the supervision of hospital staff. Both dry and wet decontamination can be improvised without the need for specialist resources and equipment and speed is of the essence.

The guidance covers external contamination and it is possible that patients may be internally contaminated due to, for example, ingestion or inhalation of chemicals. The Health Board response should include an assessment of the risk of secondary contamination during treatment of contaminated people such as the risk of off-gassing. While the risk of off-gassing can be reduced by disrobing under certain circumstances, this can be an important source of secondary contamination especially where the patient has ingested the chemical. In such cases PPE may be required to reduce the risks from off-gassing from the patient and/or contaminated vomit. Off-gassing can be difficult to manage unless a side ward with independent ventilation is available. In cases only involving the inhalation of gases, the potential for off-gassing is reduced and PPE is unlikely to be required. The level of PPE required should be based upon the unique circumstances of the incident, with reference to appropriate Hazmat/CBRN plans. It is the responsibility of the Health Board to ensure that appropriate PPE is available and that staff are suitably trained in its use.

All contaminated waste materials, clothing and personal items should be double bagged, labelled and stored for further evaluation and disposal at a

later date. This is important for crime scene investigations. Any materials used in the decontamination process should be treated as contaminated and not used on other casualties.

Clean-up/remediation of contaminated areas and materials within healthcare facilities is the responsibility of the property owners. Specialist advice on disposal and clean-up can be sought from the Government Decontamination Service (GDS) who may be able to assist in identifying a suitable contractor to undertake the clean-up.

A risk assessment is required to determine the appropriate response level and decontamination option and also to ensure the safety of both the patient and staff. It may be appropriate to review and update the risk assessment as necessary during the incident.

The risk assessment should cover the following key elements as shown in the checklist below (6.1.1). A flowchart summarising the decontamination process for caustic and non-caustic chemicals is shown in Box 6.1.3.

6.1.1 Risk Assessment Checklist

Patient	Assess using STEP 1-2-3 Plus (see Box 2)	<input type="checkbox"/>
	Are there age, gender, cultural needs (e.g. modesty)	<input type="checkbox"/>
	Safety issues	<input type="checkbox"/>
	Communication	<input type="checkbox"/>
Agent involved	What is known about the chemical(s) involved? <ul style="list-style-type: none"> • Caustic/corrosive <input type="checkbox"/> • Non-caustic/non-corrosive <input type="checkbox"/> 	
	What is the physical state of the chemical(s) involved <ul style="list-style-type: none"> • Gas <input type="checkbox"/> • Liquid <input type="checkbox"/> • Solid <input type="checkbox"/> 	
	How has the patient been exposed? <ul style="list-style-type: none"> • Inhalation <input type="checkbox"/> • Contact with skin or clothes <input type="checkbox"/> • Ingestion <input type="checkbox"/> 	
	When did it happen? Time since exposure / contamination?	<input type="checkbox"/>
Available resources	Sufficient trained staff available?	<input type="checkbox"/>
	Access to specialist equipment (e.g. portable or fixed decontamination facilities, PPE)	<input type="checkbox"/>
	Access to up to date Action Cards identifying who will do what, when and where?	<input type="checkbox"/>
	If necessary seek specialist advice from the emergency services, Public Health Wales, National Poisons Information Service	<input type="checkbox"/>
Scale of response required?	How many people are presenting?	<input type="checkbox"/>
	How many people are exposed (what is the potential for further presenters)?	<input type="checkbox"/>
	Has decontamination been performed at the scene? If so what type of decontamination has been undertaken and by whom?	<input type="checkbox"/>
	Are there other injuries?	<input type="checkbox"/>
The healthcare setting	What type of setting? <ul style="list-style-type: none"> • Emergency Department <input type="checkbox"/> • Primary Care <input type="checkbox"/> • GP <input type="checkbox"/> • Walk-in Facility <input type="checkbox"/> 	
	What type of building? <ul style="list-style-type: none"> • Is there the ability to lock down part or all of the building (e.g. the reception) if necessary? <input type="checkbox"/> 	
	Weather conditions (cold, wet etc)	<input type="checkbox"/>
Staff	Are all staff trained and aware of emergency plans, roles etc.	<input type="checkbox"/>
	Is PPE available and are staff trained to use it?	<input type="checkbox"/>
	Staff welfare issues?	<input type="checkbox"/>
	Service/business continuity/	<input type="checkbox"/>

6.1.2 Box 2. Safety triggers for emergency personnel STEP 1-2-3 Plus

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:

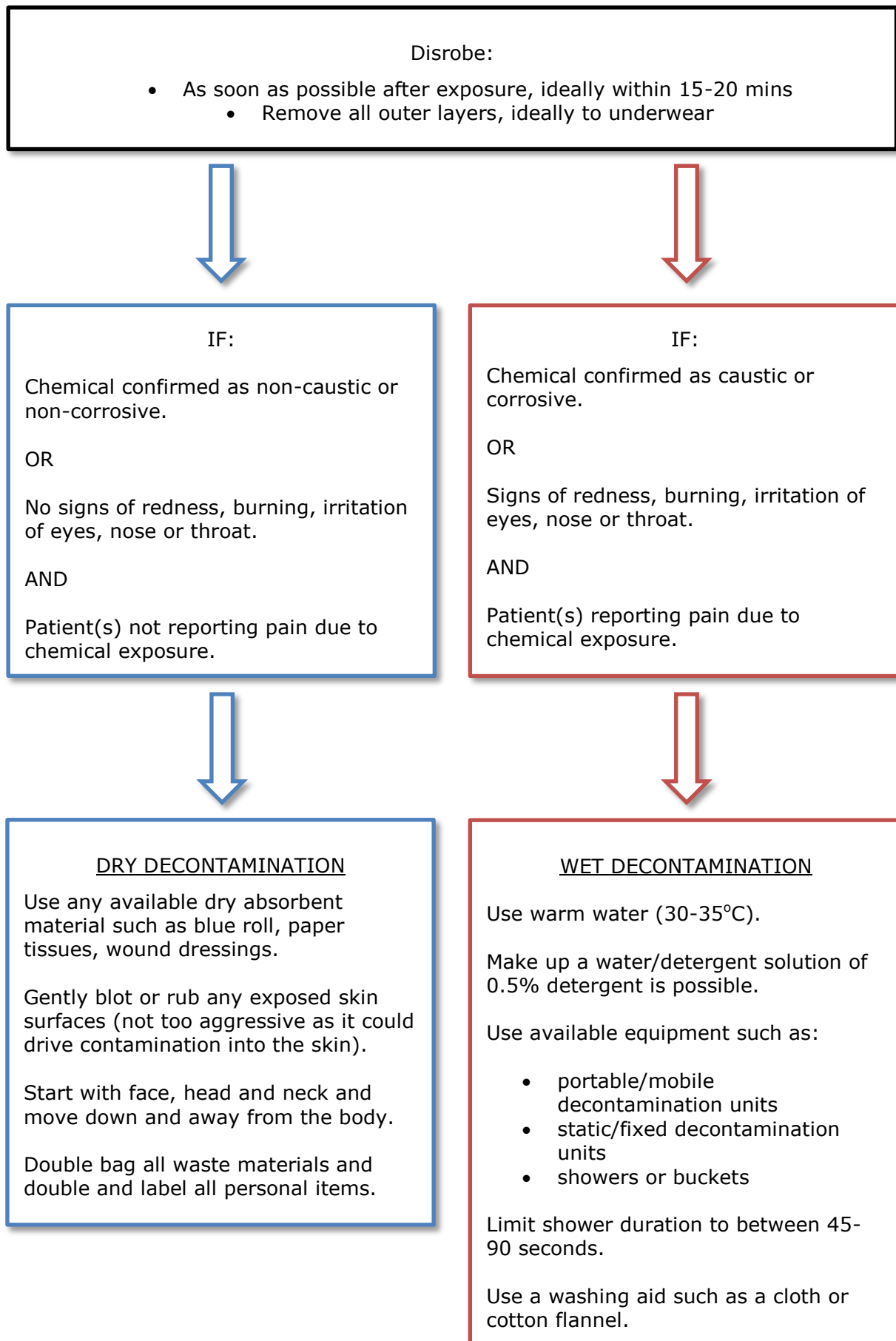
- DO NOT approach the scene – CBRN contamination likely

Plus

Action can be taken in the absence of specialist equipment and resources such as PPE:

- Disrobe
- Dry decontamination (if appropriate)

6.1.3 Box 3: Decontamination options



6.2 Mass casualty decontamination response

This guidance is aimed at the management of self-presenting patients in healthcare settings. The responsibility for the decontamination of large numbers of casualties remains with the Ambulance Service and/or Fire and Rescue Service at the scene. The principles identified through the ORCHIDS project have been implemented as the standard UK means of performing mass decontamination whether wet or dry. It is recognised that healthcare facilities are not able to manage large numbers of casualties, especially those requiring wet decontamination. In any scenario where hospitals are unable to manage multiple patients requiring decontamination, assistance and support should be support from the Ambulance and/or Fire and Rescue Service.

7 Recommendations

Health Boards are recommended to undertake the following:

- Be aware of the changes to guidance around the chemical decontamination process.
- NHS organisations are requested to update all emergency plans and protocols to reflect these new changes.
- Ensure all relevant staff have refresher training and are aware of all the key principles behind these changes. It is recommended that such training is mandatory for all front line staff including reception staff.
- Hold joint training exercises (when practicable) with WAST teams such as HART and SORT to ensure consistency in response to managing chemically contaminated patients.
- Test decontamination arrangements annually and physical resources weekly.
- Use this guidance and e-learning from Public Health Wales to assist with updating plans and training.

8 Appendix: Key sources of information and guidance

8.1 Public Health Wales resources

Two Workshops on updates to the decontamination process were held in Cardiff and Wrexham in 2015. These covered the evidence base behind the disrobe and dry decontamination process, the IOR and practical experience of NHS Trusts in England in implementing the changes.

Videos and copies of the presentations and associated resources from the workshop are available at www.publichealthwales.org/IOR. This webpage is password protected and passwords can be obtained by contacting Dan Rixon at Public Health Wales (Daniel.Rixon@wales.nhs.uk).

8.2 Guidance

Chilcott RP (2014). Managing mass casualties and decontamination. *Environ Inter* 72: 37-45. <http://dx.doi.org/10.1016/j.envint.2014.02.006>

Chilcott RP (2009). An overview of the Health Protection Agency's Research and Development Programme on Decontamination. *Chem Hazard Poison Rep*;15:26–8. Available at: <https://www.gov.uk/government/publications/chemical-hazards-and-poisons-report-issue-15>

Chilcott RP. CBRN contamination. In: Ayers J, Harrison R, Nichols G, Maynard RL, editors. *Textbook of environmental medicine*. London: Hodder Arnold; 2010.

National Ambulance Resilience Unit (NARU) IOR for NHS Ambulance Service. Available at: <http://naru.org.uk/videos/initial-operational-response-ior-for-nhs-ambulance-services/>

National Ambulance Resilience Unit (NARU) IOR for the wider NHS. Available at: <http://naru.org.uk/videos/ior-nhs/>

National Ambulance Resilience Unit (NARU) Major Incident Action cards. Available at: <http://naru.org.uk/documents/major-incident-initial-action-cards/>

NHS England. Preparation for incidents involving hazardous materials: guidance for primary and community care facilities. Available at www.england.nhs.uk/ourwork/epr/hm/

NHS England Emergency Preparedness, Resilience and Response (EPRR) – Chemical incidents: Planning for the management of self-presenting

patients in health care settings <http://www.england.nhs.uk/wp-content/uploads/2015/04/epr-chemical-incidents.pdf>

NHS England Core Standards for Emergency Preparedness, Resilience and Response. Available at: <https://www.england.nhs.uk/wp-content/uploads/2015/06/nhse-core-standards-150506.pdf>

NHS England Emergency Preparedness, Resilience and Response Framework. Available at: <https://www.england.nhs.uk/wp-content/uploads/2015/11/epr-framework.pdf>

NHS England. Summary of published key strategic guidance for health EPRR. Available at: <https://www.england.nhs.uk/ourwork/epr/gf/>

NHS London. Preparation for incidents involving Hazardous Materials: Guidance for Primary and Community Care facilities. Available at: <http://www.londonccn.nhs.uk/store/documents/hazardous-material-incident-guidance-for-primary-and-community-care.pdf>

Public Health England CBRN e-learning. Available at www.ehealthlearning.org.uk

Southern Health NHS Foundation Trust (England). Standard Operating Procedure for Self-Presenting Patients (Hazmat/CBRN). Available at: <http://www.southernhealth.nhs.uk/EasysiteWeb/getresource.axd?AssetID=88474&type=full&servicetype=Inline>

8.3 Specialist advice

Public Health Wales Health Protection Team

- Telephone: 0300 00 300 32
- Email: publichealth.environment@wales.nhs.uk

Public Health England Centre for Radiation, Chemicals and Environmental Hazards Wales (working hours)

- Telephone: 02920 416388
- Email: ChemicalsCardiff@phe.gov.uk

PHE Chemicals hotline (24 hours): 0344 892 0555

National Poisons Information Service (NPIS): 0344 892 0111

Government Decontamination Service (GDS) (on-call duty officer): 0300 1000 316