INTERIM GUIDANCE DOCUMENT

Initial clinical management of patients exposed to chemical weapons

World Health Organization

This document will expire on 31 January 2015

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INITIAL CLINICAL MANAGEMENT OF PATIENTS EXPOSED TO CHEMICAL WEAPONS

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Contents

INTRODUCTION

This interim guidance is aimed at healthcare workers who may receive patients exposed to chemical weapons at their healthcare facilities.

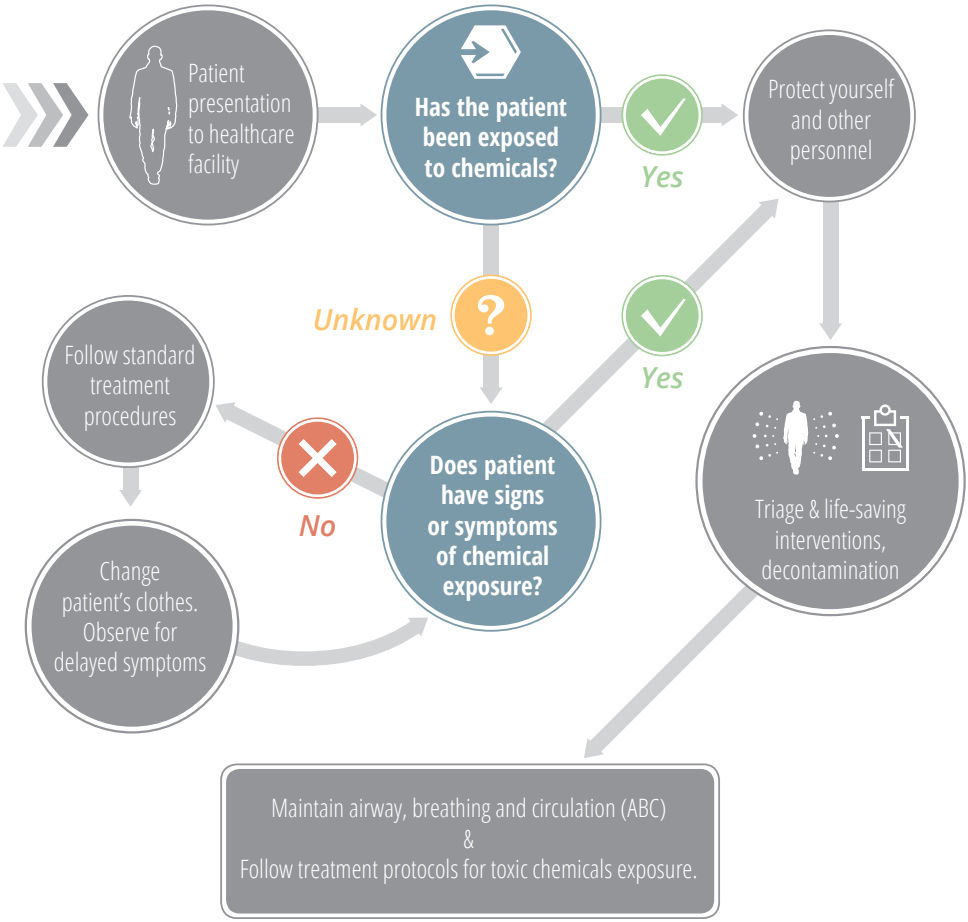
The guidance follows the case management flowchart on the next page.

It provides questions to guide the identification of contaminated patients, recommendations on personal protection, procedures for decontamination, guidance for triage and identification of categories of exposure, and treatment regimens for individual chemicals.

Users should study the contents of this document carefully and apply the principles and framework to their own situation and health care facilities.

Clinical work in this field should be accompanied with complete and practical training.

INITIAL MANAGEMENT OF PATIENTS FLOWCHART



DECIDE WHETHER PATIENT HAS BEEN EXPOSED TO CHEMICALS

KEY PRINCIPLES

- Patients may have been exposed to chemicals through inhalation, contact with the skin or eyes, by ingestion or by a contaminated projectile e.g. shrapnel.
- Exposure to a gas, vapour or aerosol may not leave visible signs of contamination but can still require decontamination.
- Patients presenting at healthcare facilities following exposure to chemical weapon events should be considered by default as contaminated and require urgent decontamination.
- Patient decontamination should occur in combination with triage and the provision of life-saving interventions.
- Injuries from trauma and other medical complications may also be present.

Before the patient enters the healthcare facility ask the following questions

1 What is the history of exposure of the patient?

A	Where was the patient? When did they start experiencing symptoms? What did they experience first? Were others experiencing similar symptoms?
B	Did the patient notice an unusual smell, e.g. garlic (indicates mustard gas), bitter almonds (indicates cyanide), fresh hay or grass (indicates phosgene).
C	Take a family / patient / witness / first responder report.
D	Use contextual information (e.g. health authorities, law enforcement, reputable media sources etc.)

2 Can you observe any signs of chemicals on or around the patient?

A	Dust, powder or liquid droplets on body surface or clothes.
B	Discoloration of clothes, scorching or damage to clothing (e.g. indicating a chemical reaction).
C	Non-exposed persons accompanying the patient show symptoms and signs suggesting secondary exposure.
D	If available, chemical agent detection procedures/equipment (e.g. a chemical agent monitor, rapid test for sulfur mustard or cholinesterase activity) should be utilized.

3 Are there signs and symptoms of exposure?

Does the patient appear unwell? See list of signs and symptoms on pages 15-17.

If there is any suspicion that the patient is contaminated with chemicals, decontamination is an immediate priority. Contaminated clothing should be removed as soon as possible and discarded appropriately as chemical waste.

PROTECT YOURSELF AND OTHER PERSONNEL

Personal Protective Equipment (PPE) is essential to first responders and personnel responsible for decontamination, triage and emergency treatment at the healthcare facility.

KEY PRINCIPLES

- Healthcare workers are mainly exposed to toxic chemicals through direct contact with the agent on patients' skin / clothing or by inhalation or mucosal contact with a vapour hazard.
- The effective use of PPE is dependent on availability, training and an understanding of the mechanisms of secondary exposure.
- Appropriate standards and levels of PPE are dependent on the resources at different healthcare facilities and on the properties of the chemical agent.
- All PPE confers a loss of mobility, dexterity, vision and ability to communicate freely. PPE also places an increased physiological burden on the user.
- Even at higher levels of protection, PPE does not completely eliminate the risk of agent penetration due to eventual break-down in protective barriers.
- PPE should be removed carefully to avoid touching contaminated areas. It should be removed in a designated location and disposed of as hazardous waste

General principles should be employed to provide a minimum level of staff protection before healthcare workers decontaminate and treat exposed patients.

CONTACT HAZARD

The main contact hazard can be prevented by wearing appropriate gloves (nitrile or butyl rubber, not latex). The number and thickness of the gloves used will depend on the dexterity required by the user.

Chemically-resistant clothing should also be worn if available. If not available, then as a minimum disposable, fluid-resistant clothing or gowns should be utilized and regularly changed.

VAPOUR HAZARD

Standard medical and surgical masks offer no respiratory or mucous membrane protection from toxic vapours.

An air-purifying respirator, e.g. with an activated charcoal filter, or self-contained breathing apparatus is required. Respirators require training, safety testing and fit testing.
They can only be worn by users for limited time periods.

PREPARE FOR EMERGENCY DECONTAMINATION

Decontamination is the reduction or removal of toxic agents so that they are no longer hazardous. This is achieved through physical removal or by chemical inactivation.

Emergency decontamination involves actions that can be applied as soon as possible after exposure, with the aim of reducing absorption and limiting the risk of secondary exposure. Depending on the assessment of the situation and the resources available, it may be followed by a more thorough decontamination.

Methods for decontamination can be adapted to the situation and the resources available. Patient decontamination methods are broadly divided into 'wet' (using water) or 'dry' (removing clothes and using absorbent materials). Viscous or oily agents may be difficult to remove by one method alone.

KEY PRINCIPLES

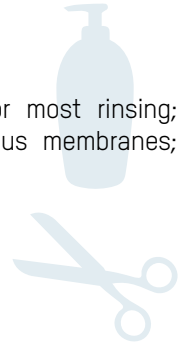
- Exposed patients should be decontaminated outside, prior to entry into healthcare facilities, even if they are not displaying symptoms.
- Removal of clothing is a highly effective method of decontamination.
- Decontamination should be implemented/supervised by appropriately trained personnel wearing adequate PPE.
- When possible, self-decontamination should be emphasized and supported by clear guidance and instructions.
- Methods of decontamination, whether 'dry' or 'wet' should be adapted to local resources and the situation.
- Decontamination should occur in parallel with triage and the provision of life-saving interventions.
- Contaminated waste or clothing should be disposed of safely.

Ensure that a decontamination area is marked and cordoned off, with single points for entry/exit, and that all people leaving the area have been decontaminated. Security personnel should be assigned to the area for crowd control and to ensure appropriate flow of individuals into /out of the decontamination area. These personnel should wear appropriate PPE.

Depending on the resources available, medical personnel must decide in advance what level of resuscitation will be attempted before, or in, the decontamination area, as well as the criteria for resuscitation.

BASIC EQUIPMENT
FOR EMERGENCY "RINSE, WIPE, RINSE" DECONTAMINATION.

- Scissors
- Buckets (5-10 litres size)
- Sponges/soft brushes/washcloths
- Clean water source (ideally lukewarm water)/ hosepipe for most rinsing; saline solution for wound irrigation, eyes and other mucous membranes; distilled water for mustard if possible
- Liquid soap/washing up liquid/shampoo without conditioner
- Disposable towels/drying cloths
- Large plastic bags (for clothing and double bagging)
- Small clear plastic bags
- ID/Triage labels/tags/pens
- Sturdy containers for used decontamination equipment
- Replacement clothing or sheets/blankets
- Stretchers



REMOVE CONTAMINATED CLOTHING AS SOON AS POSSIBLE. THIS SIGNIFICANTLY REDUCES CONTAMINATION.

- Explain what you are going to do before you start and as you go along.
- Remove/cut off clothing gently and speedily. Do NOT pull clothing off over the head. If clothing is adherent to patient, do not rip, pull or tear: soak gently and thoroughly with water until clothing can be separated from underlying tissue.
- Gently handle scissors to cut off clothes, avoiding sensitive or wounded body areas. Lift clothes carefully so as not to harm.
- Remove shoes as they may hold contaminated soil.
- Remove all accessories: jewellery, watches, rings, hearing aids, contact lenses.
- Fold clothing inside out to contain contamination. Glasses may be decontaminated and returned to the patient once clean.
- Place clothing and accessories in a large plastic bag and label as hazardous.
- Lift the person from the cut-off clothes to a clean stretcher and blanket.
- Decontaminate affected areas (see below).

Practical challenges associated with disrobing are maintaining the privacy of casualties and the provision of replacement garments.

DECONTAMINATION USING THE RINSE – WIPE – RINSE TECHNIQUE

Emergency wet decontamination using the 'rinse – wipe - rinse' technique is simple, effective and requires minimal equipment and training. This technique may be adapted to the situation and available resources.

If soap is not available decontamination should still be carried out using water. Similarly if cloths/soft brushes etc are not available rinsing with water or soapy water is preferable to doing nothing.

A specialised decontamination solution (e.g. RSDL) may be used if available.
Contain all solid waste and water run-off from the decontamination process, where possible. This is important for preventing secondary contamination.

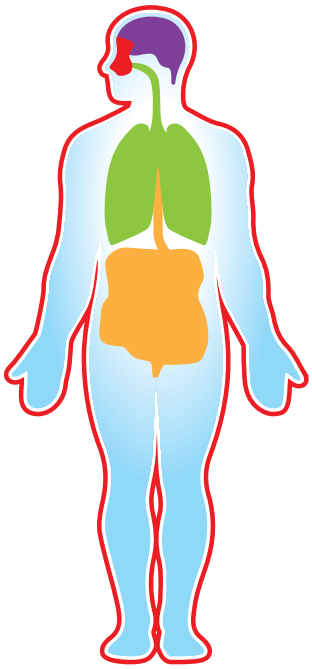
Step 1	Blot off any liquid on the skin with clean absorbent material e.g. a wound dressing or incontinence pad. Gently brush off any solids, e.g. powder.
Step 2	Gently rinse/wash affected areas with soapy water (0.9% saline for open wounds): this dilutes the contaminant and removes particles and hydrophilic chemicals. Start with face/airways first and work down to toes. Pay special attention to skin folds, skin creases, nails, ears, and hair. Flush eyes copiously with 0.9% saline (or distilled water for sulphur mustard) as needed. If possible, use copious amounts of water as small amounts of water could facilitate the spread and absorption of some chemicals.
Step 3	Wipe affected areas gently but thoroughly with sponge or soft brush or washcloth: this removes organic chemicals and petrochemicals (not water soluble). Sponges and washcloths must be replaced regularly.
Step 4	Gently rinse affected areas.
Step 5	Gently dry cleaned areas with disposable towels. Consider dressing open wounds.
Step 6	Transfer patient to a new stretcher in the clean zone and wash 'dirty' stretcher for future use.
Step 7	Make sure all staff self-decontaminate before leaving the decontamination area. This may require a change of clothing, so additional clothes should be available for staff.

In later care of the patient, consider any debris removed when treating trauma injuries as contaminated.

TRIAGE AND IDENTIFY CLASS OF EXPOSURE

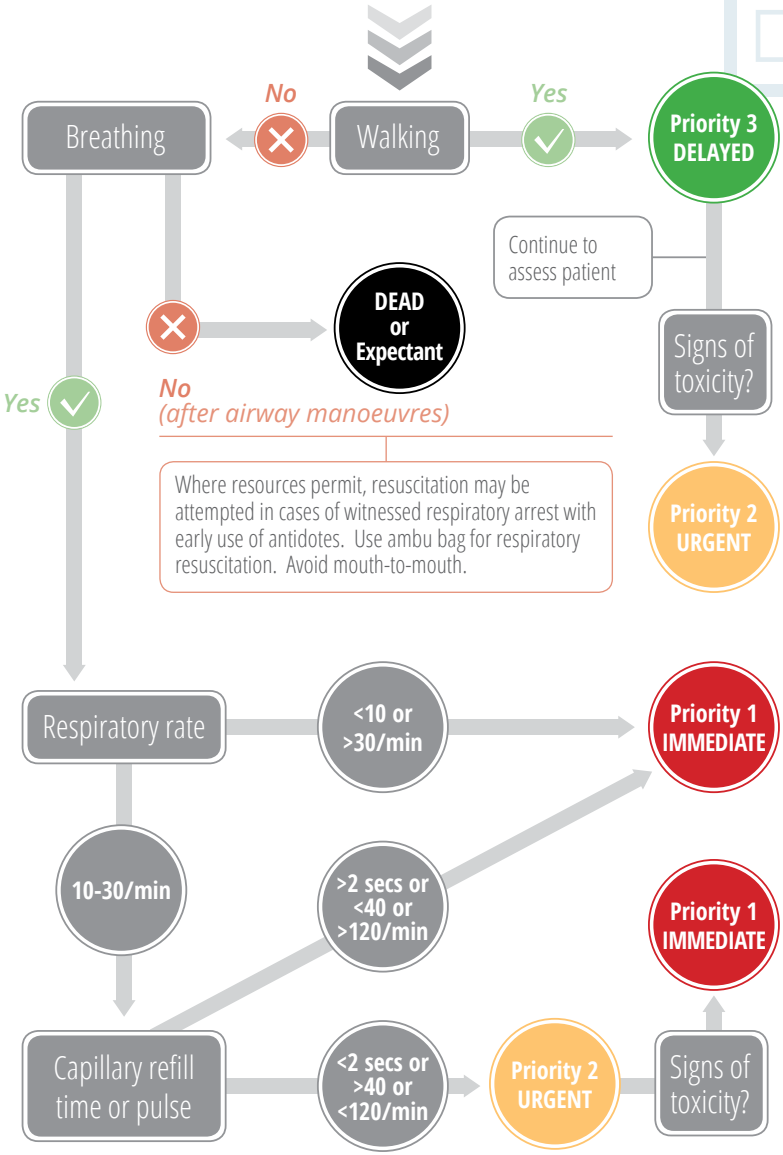
Triage activities should be adapted to the resources available at the healthcare facility and the scale/severity of the event. It is a dynamic process, that frequently requires repeat assessments and categorisation. The flow chart on the following pages are applicable to a mass casualty event, and to resource-limited settings. Flow chart vital signs are based on adult and child parameters.

The clinical signs shown below provide a guide to the type of chemical possibly involved. The full list of signs and symptoms should be consulted for further clinical diagnosis (see below). Note that individual patients may present differently, therefore, the overall picture presented by a range of patients should be considered. Respiratory signs and symptoms may be present following exposure to any of the agents. Poisoning with an organophosphorus compound (e.g. nerve agent) can be confirmed on-site by measurement of reduced red-cell cholinesterase activity using a rapid-test kit.

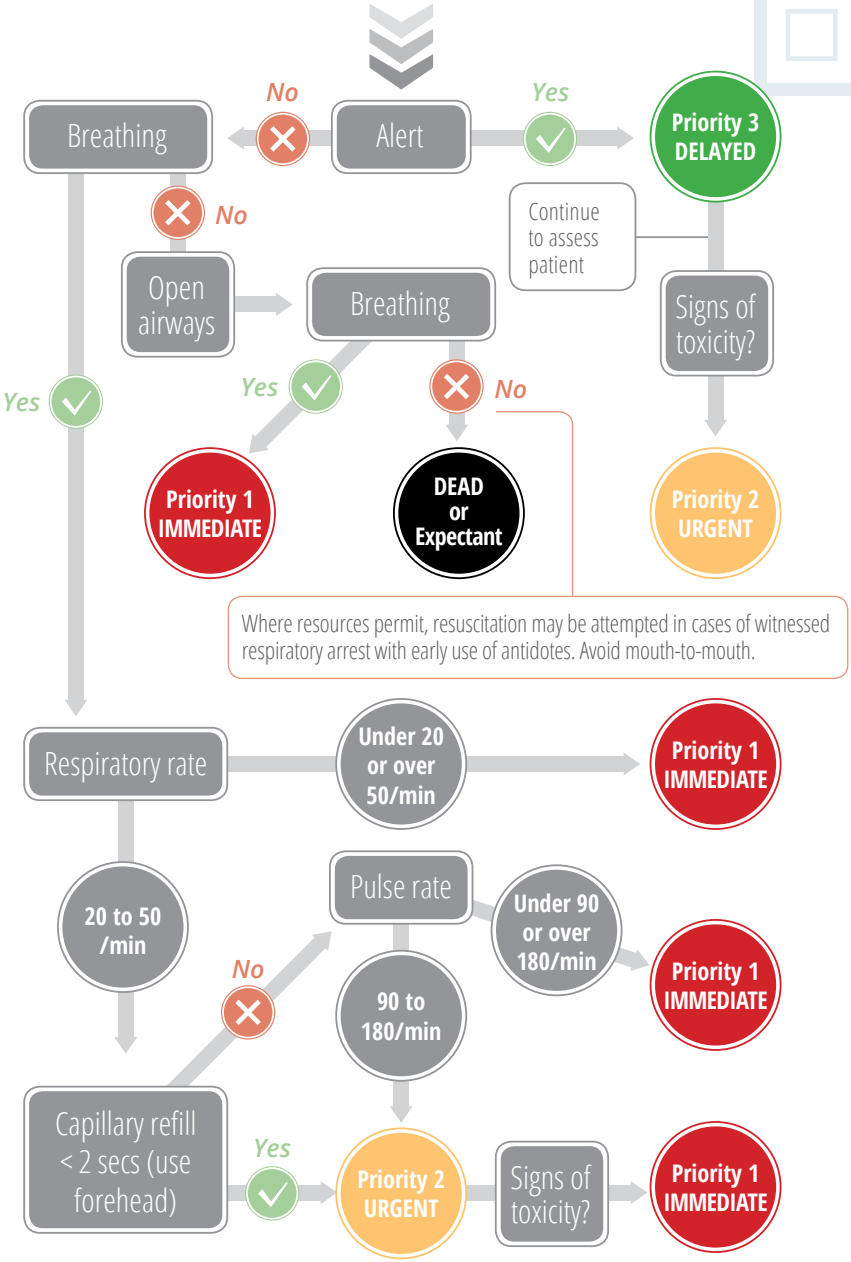


CENTRAL NERVOUS SYSTEM	
Seizures	CYANIDE / NERVE AGENTS
Hyperthermia	BZ / AGENT 15
EYE, NOSE AND SKIN	
Constricted pupils	NERVE AGENT / OPIOIDS
Dilated pupils	NERVE AGENT / CYANIDE
Dry mouth & skin	BZ/AGENT 15
Eye Irritation	BLISTER AGENTS / RIOT CONTROL AGENTS (RCAs) / LUNG IRRITANTS
Blistering of skin	BLISTER AGENTS
Cyanosis	CYANIDE
RESPIRATORY TRACT	
Asphyxiation	CYANIDE
Copious secretions	NERVE AGENTS
Delayed respiratory distress	BLISTER AGENTS
Delayed pulmonary oedema	LUNG IRRITANTS
DIGESTIVE TRACT	
Nausea	LUNG IRRITANTS / RCAs / INCAPACITATING AGENTS / CYANIDE
Diarrhoea	NERVE AGENTS
MUSCOLOSKELETAL	
Fasciculations	NERVE AGENTS

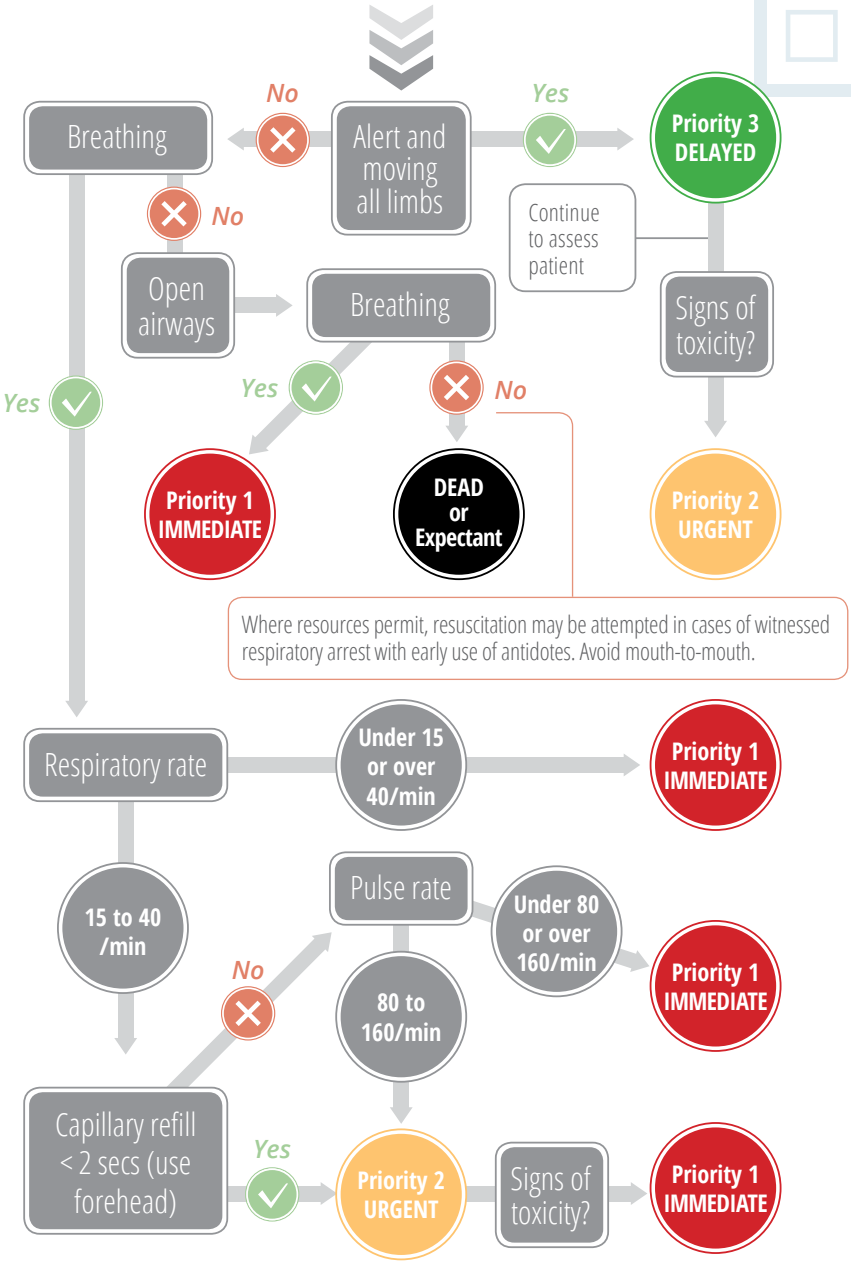
TRIAGE: ADULT



TRIAGE: PAEDIATRIC 50-80CM (OR 3-10KG)



TRIAGE: PAEDIATRIC 80–100CM (OR 11–18KG)



SIGNS AND SYMPTOMS OF CHEMICAL EXPOSURES

Class of chemical exposure		Signs and symptoms
CHEMICAL WARFARE AGENTS		
Nerve agents (e.g. Tabun, Sarin or VX)	Mild	Dizziness, anxiety, headache, weakness Chest tightness, rhinorrhoea, coughing Sweating, salivation, lacrimation Nausea, Mild bradycardia and hypotension
	Moderate	Restlessness, confusion, drowsiness, loss of consciousness Miosis/mydriasis*, eye pain Muscle twitching, fasciculation Abdominal pain, vomiting, diarrhoea Bradycardia/tachycardia*, hypotension / hypertension*, pallor Dyspnoea, bronchorrhoea, bronchospasm, respiratory depression
	Severe	Convulsions, flaccid paralysis, deep coma Involuntary micturition/defecation Respiratory failure, pulmonary oedema, cyanosis
	Fatal	Coma, convulsions, hypersecretions and apnoea within a few minutes of exposure

*Depending on whether the muscarinic or nicotinic syndrome is dominant, miosis or mydriasis, bradycardia or tachycardia, hypotension or hypertension may occur.

Class of chemical exposure	Signs and symptoms
CHEMICAL WARFARE AGENTS	
Blister agents (e.g. mustard gases, lewisite)	Lachrymation, eye irritation, conjunctivitis, corneal damage, transient blindness Hoarse voice, sore throat **Delayed signs and symptoms (several hours):** Redness and blisters of the skin with pain. Later on, detachment of the upper skin layers with impaired wound healing. Blister formation is typically delayed following exposure to sulfur mustard, but rapid following exposure to lewisite. Upper airway irritation Respiratory distress – usually a late complication Immune deficiency
Cyanide	Gasping for air, asphyxiation Mydriasis Seizures Tachycardia, arrythmias Confusion Nausea Cherry-pink skin (cyanosis also possible)
INCAPACITATING AGENTS	
Agent 15, BZ	Mydriasis Altered consciousness, delusions, hallucinations Dry mouth and skin Tachycardia Hyperthermia Ataxia
Opioids	Miosis, drowsiness, dizziness, ataxia, coma, respiratory depression, apnoea

Class of chemical exposure	Signs and symptoms
RIOT CONTROL AGENTS (RCA)	
Tear gas / riot control agents	Stinging and burning sensation to eyes and mucous membranes Lachrymation/salivation Runny nose Tight chest Headache Nausea
OTHER TOXIC CHEMICALS	
Chlorine	Eye redness and lachrymation Upper airway irritation Cough (may be productive) Suffocation or choking sensation, tight chest Shortness of breath/wheezing Hoarse voice Nausea and vomiting **Delayed signs and symptoms (a few hours):** pulmonary oedema
Phosgene	Eye redness and lachrymation Nausea and vomiting Tight chest, shortness of breath/wheezing Hypotension **Delayed signs and symptoms (up to 72 hours):** pulmonary oedema

TREATMENT PROTOCOLS FOR CHEMICAL WEAPON EXPOSURES

THIS TABLE PROVIDES BRIEF INFORMATION ON TREATMENT AND CANNOT ADDRESS ALL EVENTUALITIES.

- The antidote regimens listed below are for guidance, there are a number of regimens in current use by medical authorities in different countries.
- For all exposed patients an 'ABCDE' medical assessment should be undertaken.
- Supportive care including invasive ventilation when available, is vital in the management of exposed patients, in conjunction with the use of antidote regimens.
- Patients may continue to deteriorate in hospital, particularly if complete decontamination was not achieved, therefore all patients should be monitored.
- Be aware of potential for blast and penetrating injury associated with a violent incident.
- After the initial response, expert consultation should be sought in order to address potential complications.

[1] A-Airway; B-Breathing; C-Circulation; D-Disability; E-Exposure and Environment

Chemical	Antidotes	Initial treatment	Notes and supportive therapy
NERVE AGENTS (e.g. sarin, GB, VX, tabun)	**ATROPINE**	**ADULT** 2mg IM or IV every 5-10 minutes. For severe symptoms, up to 6mg can be given on initial dose. **CHILD** 0.05 -0.1 mg/kg IM or 0.02 mg/kg IV (not to exceed 2mg per dose) every 5-10 minutes. Higher doses/rates of atropine may be required but must be titrated against clinical response.	• Administer to all moderate and severe cases. • Correct hypoxia if possible prior to atropine to prevent life-threatening arrhythmia. • Assisted ventilation may be required for severe exposure. • Careful monitoring is required in atropine use to ensure that an adequate dose is given and to prevent overdose. • During atropine therapy, where possible, place patient on an ECG monitor. • Do not use pupil size as a guide to adequate atropine administration. • Repeated antidote administration may be necessary until "atropinisation" achieved by: 1. Clear chest on auscultation. 2. Heart rate > 80 beats per minute. 3. Dry skin (axillae). • Onset of symptoms from dermal contact with chemicals in liquid form may be delayed. Observe contaminated asymptomatic patients. • Autoinjector formulations are available for these antidotes. Standard autoinjectors are intended for adults: the needles are too long for the muscle bulk of very young children and the dose of antidotes is too high. The use of a standard autoinjector could be considered in the case of a severely poisoned child needing urgent treatment, however, the described limitations should be taken into account.

Chemical	Antidotes	Initial treatment	Notes and supportive therapy
NERVE AGENTS (e.g. sarin, GB, VX, tabun)	**OXIMES**	**ADULT** Pralidoxime (as chloride or mesylate salt): 30 mg/kg (up to 2g) slow IV. Repeat every 4-6 hrs, or give infusion of 8-10 mg/kg/hr OR Obidoxime: 250 mg IM or slow IV followed by infusion of 750 mg in 24 hours. Maximal daily dose 1000 mg **CHILD** Pralidoxime (as chloride or mesylate salt): 15 -30 mg/kg slow IV. Repeat once at 30-60 minutes, then at one hour intervals for 1-2 doses, as necessary. OR Obidoxime: 4 - 8 mg/kg by slow IV; in case of need followed by infusion with 10 mg/kg/24 hours	• To regenerate acetylcholinesterase • Other oximes such as HI-6 can be utilized but are not widely available • Autoinjector formulations are available for these antidotes. Standard autoinjectors are intended for adults: the needles are too long for the muscle bulk of very young children and the dose of antidotes is too high. The use of a standard autoinjector could be considered in the case of a severely poisoned child needing urgent treatment, however, the described limitations should be taken into account.

Chemical	Antidotes	Initial treatment	Notes and supportive therapy
NERVE AGENTS (e.g. sarin, GB, VX, tabun)	**BENZODIAZEPINES**	**ADULT** Diazepam 5-10 mg IV/IM (higher doses up to 40 mg, may be necessary). **CHILD** Diazepam 0.05 to 0.3 mg/kg IV/IM (maximum 10 mg).	• For treatment of seizures or empirically in severe cases. • Other benzodiazepines (e.g. lorazepam, midazolam) can be used.
BLISTER AGENTS (e.g. Sulfur mustard, lewisite)	Mainly supportive care +/- Sodium thiosulfate	If severe exposure to mustard is suspected, consider use of intravenous sodium thiosulfate to decrease systemic effects. This must be done within first hour, and preferably 20 minutes after exposure.	**EYES:** Irrigate with distilled water or copious 0.9% sterile saline solution and then use sterile petroleum jelly or ophthalmic ointments, such as 5% boric acid to prevent eyelids sticking together. Prevent infection with a topical antibiotic e.g. Sulfacetamide eye drops. Apply local anaesthetic drops if necessary to relieve blepharospasm and enable eye examination (though anaesthetic drops may increase risk of damage to the cornea). Do not patch the eye. **SKIN:** Wash affected skin with copious amounts of soap and water. Itching can be

Chemical	Antidotes	Initial treatment	Notes and supportive therapy
BLISTER AGENTS (e.g. Sulfur mustard, lewisite)	Mainly supportive care +/- Sodium thiosulfate	If severe exposure to mustard is suspected, consider use of intravenous sodium thiosulfate to decrease systemic effects. This must be done within first hour, and preferably 20 minutes after exposure.	reduced by local applications of cooling preparations, e.g. calamine lotion, or water. Apply silver sulfadiazine cream and cover with sterile dressing. Analgesics should be given as required. **RESPIRATORY TRACT:** Cough may be relieved by codeine. In severe cases, aggressive airway management and bronchial lavage with mechanical ventilation / positive end expiratory pressure (PEEP) and oxygen administration may be required. Cricothyrotomy rather than endotracheal intubation may be appropriate when there is significant upper airway involvement. Bronchodilators may be useful if bronchospasm is significant. The use of mucolytics such as N-Acetylcysteine may be of benefit. In the case of ingestion do not induce vomiting.

Chemical	Antidotes	Initial treatment	Notes and supportive therapy
BLISTER AGENTS (e.g. Sulfur mustard, lewisite)	**LEWISITE** specific antidote	**DMPS** (Dimaval®): IV and oral use. Dose regimen in severe poisoning with lewisite: **ADULTS:** **Day 1:** 250 mg DMPS IV every 3-4 hours (1.5 – 2.0 g DMPS/day) **Day 2:** 250 mg DMPS IV every 4-6 hours (1.0 – 1.5 g DMPS/day) **Day 3:** 250 mg DMPS IV every 6-8 hours (0.75 – 1.0 g DMPS/day) **Thereafter:** Thereafter: 250 mg DMPS IV every 8-12 hours (0.5 – 0.75 g DMPS/day) followed by 250 mg DMPS 1 – 3 times per day or switch to oral dosing (100 mg 1-4 times per day).	British anti-lewisite (BAL) / dimercaprol remains available in some formularies. While it can be effective, it has significant toxicities. Expert advice should be sought regarding its use if DMPS is not available.
LUNG IRRITANTS (e.g. chlorine, phosgene)		N-Acetylcysteine (NAC) may be of benefit following exposure to chlorine or phosgene.	• Put patient at rest in a semi-upright position and keep warm. • Give symptomatic therapy as required e.g. oxygen and bronchodilators • Assisted ventilation may be required • Treat cough with codeine 30-60mg/ daily.

Chemical	Antidotes	Initial treatment	Notes and supportive therapy
CYANIDE	**AMYL NITRITE** (first aid)	Crushed 0.3ml ampoule inhaled for 15 sec, may repeat after 3-5 min. Amyl nitrite ampoules may be broken into an Ambu bag or similar resuscitator if the patient is not breathing.	•100% oxygen therapy, ventilate and intubate, if indicated. •Patients who reach hospital alive after having inhaled cyanide probably do not need antidotal treatment since cyanide acts quickly. •Monitor the patient for metabolic acidosis. Use of 50 – 100 ml of 8.4% solution sodium bicarbonate may be considered. Correct electrolyte imbalance. •Sodium nitrite and 4-DMAP may cause haemolysis in patients with G6PDD.
CYANIDE	**1.** **SODIUM THIOSULFATE**	**ADULT:** Sodium thiosulfate: 400mg/kg to max of 12.5g (e.g. 1.6ml/kg to max 50ml of 25% solution) over 10 minutes. Additional doses may be given if necessary. **CHILD:** Sodium thiosulfate: 400mg/kg to max of 12.5g (e.g. 1.6ml/kg to max 50ml of 25% solution) over 10 minutes. Additional doses may be given if necessary.	•Sodium thiosulfate is used together with sodium nitrite or 4-DMAP. •Sodium thiosulfate alone may be used in mild cyanide poisoning. •Sodium thiosulfate is sometimes used with hydroxocobalamin but this is not essential.

Chemical	Antidotes	Initial treatment	Notes and supportive therapy
CYANIDE	**SODIUM NITRITE**	**ADULT:** Sodium nitrite 300mg (e.g. 10ml of 3% solution) by slow IV over 5-10 min. Sodium nitrite can be repeated at 50% of the original dose after 30mins if no improvement. **CHILD:** Sodium nitrite: 4-10 mg/kg to max of 300mg by slow IV. (3% solution: 0.13-0.33ml/kg). Sodium nitrite can be repeated at 50% of the original dose after 30 mins if no improvement.	•To induce methaemoglobinemia; not recommended in smoke inhalation •Used with sodium thiosulfate.
CYANIDE	or **4-DMAP**	3-4 mg/kg IV. One dose only - do not repeat	•To induce methaemoglobinemia; not recommended in smoke inhalation •Used with sodium thiosulfate.
CYANIDE	Alternatively **2.** **HYDROXOCOBALAMIN**	**ADULT:** 5g IV over 15 min **CHILD:** 70mg/kg IV over 15 min.	•Safer for patients with hypotension but must use high-dose formulation which is not so widely available. •If sodium thiosulfate is also given take care not to administer both drugs through the same IV line

Chemical	Antidotes	Initial treatment	Notes and supportive therapy
CYANIDE	Alternatively **3.** **DICOBALT EDETATE**	**ADULT:** 300mg IV over one minute followed by a further 300 mg if response does not occur after one minute, followed by dextrose (50 ml of 50% dextrose solution)	NB Does not require concomitant use of sodium thiosulfate. May cause severe side effects particularly in the absence of cyanide.
INCAPACITANTS BZ, Agent 15	**PHYSOSTIGMINE**	**ADULT:** 2-3 mg IV then maintenance 2-4 mg /hour (caution bradycardia). Aim to switch to oral administration as soon as possible (2-5mg / 1-2 h). Therapy should not be stopped too early (4-5 days depending on the severity of poisoning).	Provide symptomatic treatment, with the aim of preventing the patient harming themselves by their actions. Attempt to resolve the situation without physical or chemical restraint. If necessary, however, sedate with a benzodiazepine **ADULT:** Midazolam 1-2mg IV every 2-3 minutes until patient can be safely managed, or if IV access cannot be gained 5-10mg IM

Chemical	Antidotes	Initial treatment	Notes and supportive therapy
INCAPACITANTS **Opioids**	**NALOXONE**	**ADULT:** Initial dose: 0.4 to 2 mg IV. If the desired degree of counteraction and improvement in respiratory function is not obtained repeat every 2-3 mins. If no response is observed after 10mg of naloxone being administered the diagnosis of opioid-induced or partial opioid-induced toxicity should be questioned. **CHILD:** Initial dose: 5-10 µg/kg IV. If this does not result in the desired degree of clinical improvement, a subsequent dose of 100µg/kg may be given.	Can also be given IM or subcutaneously if the IV route is not possible, however, onset of action will be slower.

METHODS EMPLOYED IN THE DEVELOPMENT OF THIS GUIDANCE

EVIDENCE RETRIEVAL

The recommendations in this document are based on a review of existing guidance rather than on a process of systematic evidence review. Once a systematic review of the evidence can be undertaken, and the quality of the evidence assessed, a standard WHO Guidance document may be issued.

THE USE OF EXISTING GUIDANCE

The recommendations issued in this document are based on a preliminary assessment of selected existing guidance on emergency decontamination, triage and treatment regimens for a range of highly toxic chemicals.

Guidance documents were selected based on their availability, either publicly or via WHO Collaborating Centres. The main sources were guidance documents developed by UK and US national institutions. Only English language guidance was consulted. Selected guidance documents were reviewed paying particular attention to their own sources of evidence and their applicability to the contexts of all WHO Member States, including those in resource-limited settings. Other standard clinical texts were consulted as appropriate.

A list of the sources used can be found below.

EXPERT REVIEWERS

A number of WHO technical staff and external international experts were involved in the development of these recommendations. These experts were consulted at the outset, during the formulation of recommendations and during the final review of the document. These experts are listed below.

A WHO Expert Meeting was held on 9-10 December 2013 in Geneva, Switzerland to review the substantive content of the Interim Guidance and to assess the current state of the evidence. Twelve experts from nine countries and two observer organizations participated in an in-depth review of the recommendations, and changes agreed at the meeting have been incorporated into the text.

The Interim Guidance has also been shared with the Global Health Security Action Group (GHSAG) and members of the Chemical Events Working Group have also participated in the review of the document.

EXTERNAL EXPERTS

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CONFLICT OF INTERESTS

All experts and consultants were required to submit a completed Declaration of Interests form. These were reviewed by the technical department. No financial conflicts of interest were identified.

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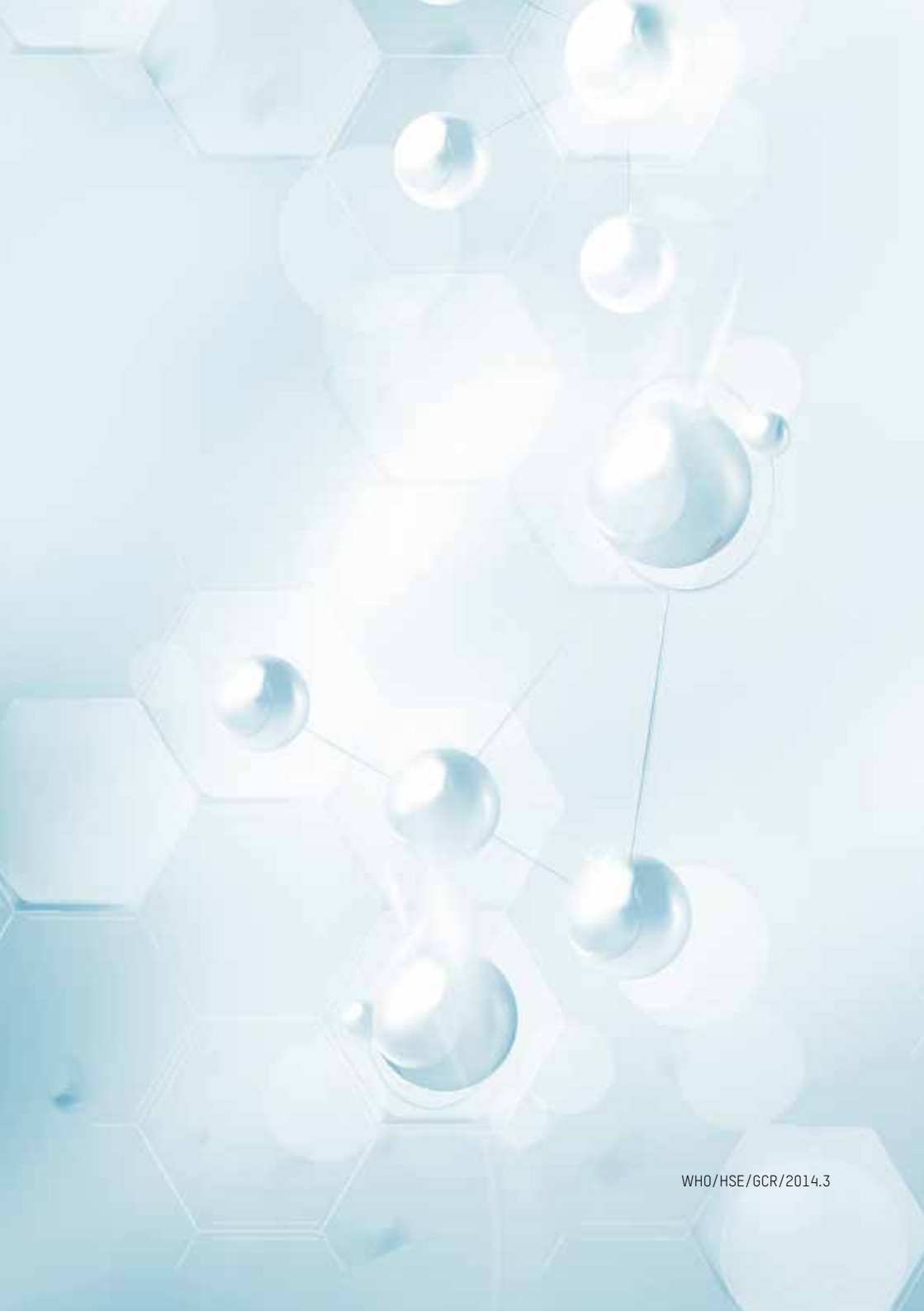

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