Public Health Response to Release of a Substance of Concern

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Prepared on behalf of the Public Health Medicine Environment and Health Group

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Public Health Response to Release of a Substance of Concern

1.1 Purpose

The following document outlines the initial response for Consultants in Public Health Medicine / Medical Officers of Health if contacted about the deliberate release or possible exposure to a substance of concern which may be a chemical or biological agent.

1.2 Lead Agency

An Garda Siochana (AGS) are the lead agency in responding to such incidents as detailed in the Strategic Emergency Management (SEM) National Structures and Framework document and associated Annexes[1] and the Framework for Major Emergency Management[2]. The algorithm for the agreed escalation management is available in Appendix 1.

1.3 Threat Analyses

AGS carry out a Preliminary Threat Analysis on site when a possible threat is found. There are two possible outcomes to the Preliminary Threat Analysis:

1. *Threat discounted*: No further action required
2. *Threat not discounted*: If threat is not discounted by AGS the HSE Ambulance Service will be contacted. AGS should provide information on the reason why they are not discounting the threat. The two reasons are:
    - There are indicators (e.g. symptoms in exposed, nature of target or specific intelligence) that this may actually be a substance of concern.
    - There is an "investigative impasse", i.e. the only identified threat is that there is an unknown substance.

Public health assistance may be required and requested through ambulance control when a threat is not discounted. The joint threat analysis is carried out by AGS, supported by the Defence Force Explosive Ordnance Disposal team (EOD), Fire Service and public health. The EOD perform a Field Testing which may eliminate specific substances of concern. A confirmation analysis is carried out where the field analysis has a positive finding, or when considered necessary by AGS based on the joint threat analysis.

2.0 Public Health Role

- Public health risk assessment (PHRA)[3] and input into joint threat analysis
- Provision of public health advice and information
- Provision of post-exposure prophylaxis if indicated

[1] https://www.emergencyplanning.ie/system/files/media/file-uploads/2018-06/Strategic%20Emergency%20Management%20National%20Structures%20and%20Framework_0.pdf
[2] http://mem.ie/framework-documents/
[3] https://www.hse.ie/eng/services/list/5/publichealth/publichealthdepts/env/on-call-resources.html

3.0 Initial call handling

When contacted by ambulance control, obtain initial information using the METHANE acronym. The following list may be helpful.

Identify whether it is a possible CBRN incident
Why is it suspicious? Is it a high profile location/building? Is there any intelligence to suggest the threat of a deliberate release?
The 5 W's: What **is it;** Where **is it;** Why **is it suspicious;** Who **found it:** When **was it found**
What is the extent of the possible incident/exposure?
Have people been exposed and who are they? Request that contact details of those exposed be taken for possible post-exposure prophylaxis or health surveillance.
Are there casualties / ill persons?
What are the severity and type of signs and symptoms?
Have people been evacuated?
Has onsite decontamination been considered?
What other measures have been taken to avoid additional exposure?
Has the EOD team been deployed to the scene?

This information is used to inform your PHRA.

4.0 Initial Public Health Advice

Consider initial advice (before results of EOD field testing) re decontamination and those exposed.

4.1 Decontamination

If EOD field testing is not yet available you may need to consider decontamination while awaiting test results. Evacuation away from the scene of contamination followed by immediate disrobing and decontamination is the most effective measure to save lives in a CBRN event. The maximum benefit of this will be realised if conducted within fifteen minutes of exposure[4]. Decontamination is not needed if the chemical agent released is a gas[5], [i].

The preferred decontamination method is:

- Disrobe
- Dry decontamination is the default decontamination method
- Wet decontamination for caustic substances / or where biological or radiological exposure is identified

The HSE National Emergency Operations Centre (NEOC) will alert the Regional Ambulance Management and Regional Decontamination Team structure if clinical decontamination is considered necessary[6].

Please refer to the decontamination guidance in the on-line resource at https://www.hse.ie/eng/services/list/5/publichealth/publichealthdepts/env/ra-initial-response.pdf

4.2 Quarantine / Infection Control

Quarantine is only required in exceptional circumstances but you may need to consider quarantine of those exposed while awaiting test results based on the outcome of the joint threat analysis.

Standard and transmission based infection control precautions should be recommended based on the outcome of the joint threat analysis. Please refer to the HPSC infection control guidelines available at https://www.hpsc.ie/a-z/microbiologyantimicrobialresistance/infectioncontrolandhai/guidelines/.

[4] https://www.jesip.org.uk/uploads/media/pdf/CBRN%20JOPs/IOR_Guidance_V2_July_2015.pdf

[5] Public Health England: Chemical, biological, radiological and nuclear incidents: clinical management and health protection. 2018 Available at https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/712888/Chemical_biological_radiological_and_nuclear_incidents_clinical_management_and_health_protection.pdf

[6] http://www.nationalambulanceservice.ie/aboutnationalambulanceservice/Policies-and-Procedures/NASNEOC05-Activation-Procedure-for-Clinical-Decontamination-Teams.pdf

5.0 Where EOD Field Test indicates possible substance of concern or situation escalating for some other reason (e.g. exposed symptomatic)

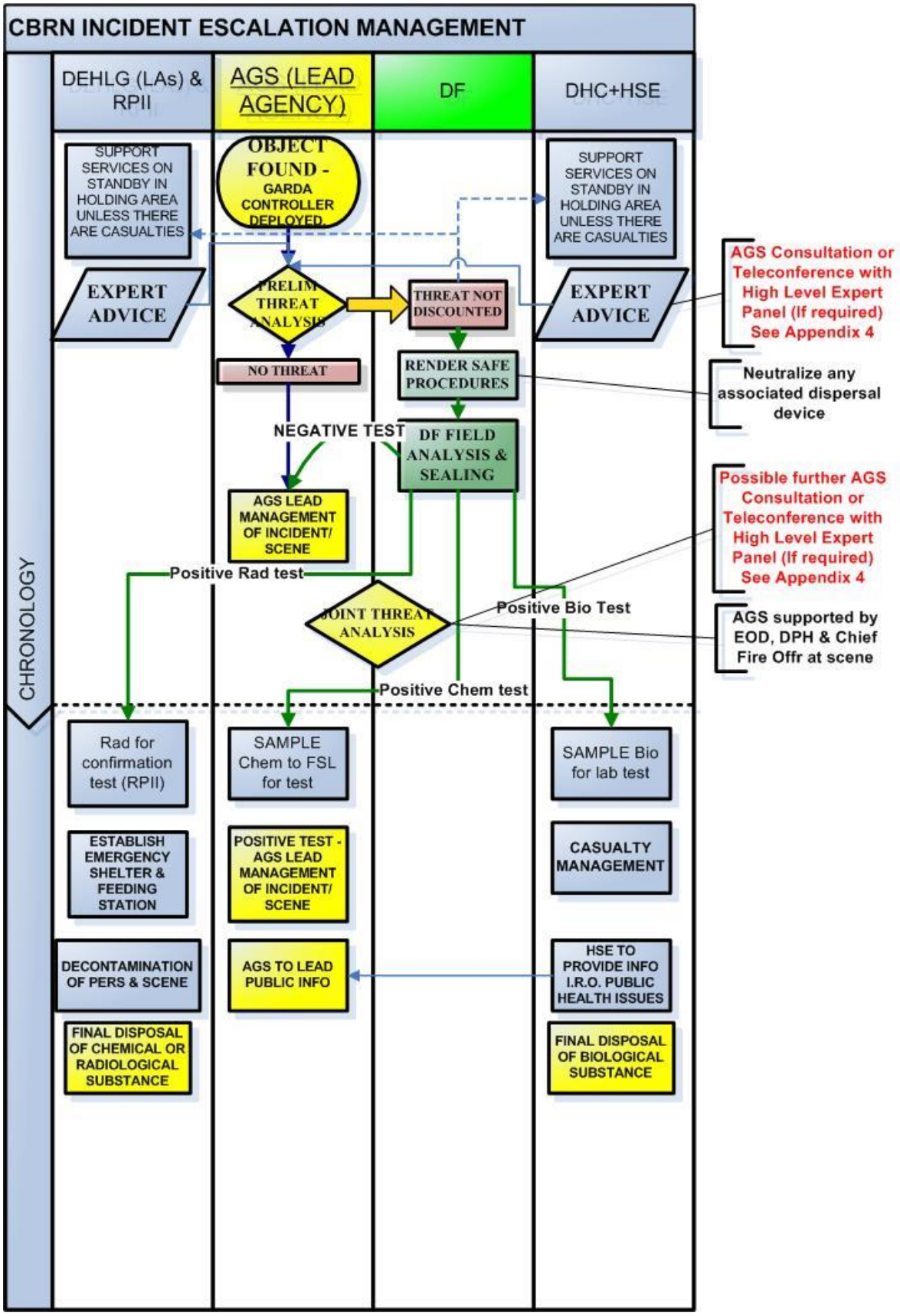
If the initial investigation indicates chemical or biological exposure or if those exposed are symptomatic provide initial public health advice and seek further relevant expert advice. See Appendices 2 - 5 below for summary information on chemical agents, toxins, biological agents, and post-exposure prophylaxis.

5.1 Inform and alert others, as appropriate including the AND Public Health.

Inform and alert others, as appropriate including the AND Public Health.

Contact information for expert support and advice (including PHE-CRCE, NPIC and the HPSC) is available at the password protected public health physician on call website: https://www.hse.ie/eng/services/list/5/publichealth/publichealthdepts/guide/

Appendix 1: Protocol for responding to a deliberate CBRN incident



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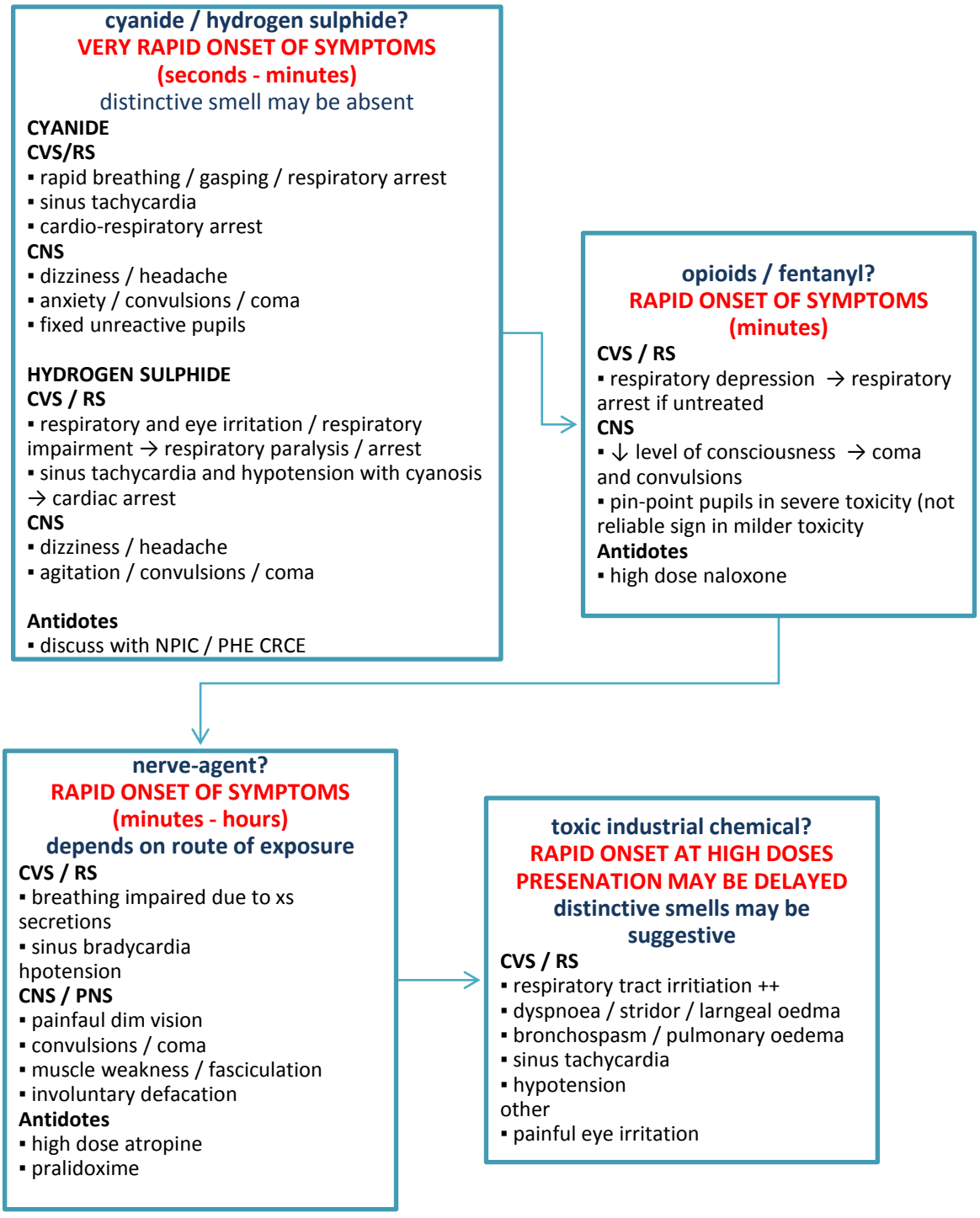
Appendix 2: Chemical Agents

Chemical substances are likely to have a more rapid onset of symptoms than biological substances

Evaluating rapidly evolving chemical exposure syndromes[7]. Consult with NPIC / PHE-CRCE



[7] Adapted from Public Health England: Chemical, biological, radiological and nuclear incidents: clinical management and health protection. 2018 Available at

Appendix 3: Toxins (ricin and abrin)[8]

Ricin/abrin exposure should always be treated as a potential deliberate release

Effects after ingestion

- Abdominal pain / cramps
- Vomiting, often profuse
- Diarrhoea, may be bloody
- Gastrointestinal bleeding
- Hypovolaemic shock, DIC, multiple organ failure

Effects after inhalation

- Fever
- Cough
- Dyspnoea
- Tight chest
- Fibropurulent pneumonia
- Non cardiogenic pulmonary oedema / ARDS
- Respiratory failure

Discuss management with NPIC / PHE-CRCE

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/712888/Chemical_biological_radiological_and_nuclear_incidents_clinical_management_and_health_protection.pdf

[8] Public Health England: Chemical, biological, radiological and nuclear incidents: clinical management and health protection. 2018 Available at https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/712888/Chemical_biological_radiological_and_nuclear_incidents_clinical_management_and_health_protection.pdf

Appendix 4: Biological Agents[9]

The following tables describe the findings from some biological agents. The management should be discussed with HPSC, PHE-CRCE and other experts.

Anthrax

- rapid onset of severe febrile illness, sepsis or respiratory failure with wide mediastinum on CXR
- painless black-scabbed ulcer on arm, neck or face with extensive local swelling
- gram positive rods (or Bacillus sp) in blood or CSF assessed not to be contaminants
- haemorrhagic meningitis
- unexplained febrile death
- inhalational anthrax is very rare indeed: a single confirmed case in the UK suggests deliberate release
- injectional anthrax may be linked to batches of contaminated drugs and is a public health emergency

Clinical features depend on route of exposure – cutaneous, inhalational or gastrointestinal.

Botulism

- symmetrical descending flaccid paralysis, with prominent bilateral cranial nerve signs, without fever and without sensory loss
- a single suspected case of botulism is a public health emergency, regardless of the circumstances

Brucellosis

- fever of unknown origin
- endocarditis (culture negative)
- hepatitis (negative for HAV, HBV, HCV markers with granulomata on biopsy)
- a single confirmed case with no history of travel to endemic area or of occupational exposure suggests deliberate release

Glanders

- cavitating pneumonia unresponsive to standard antibiotic or antituberculous therapy
- severe unexplained sepsis, especially if cluster of linked cases
- severe febrile illness with bloody nasal discharge or eye infection or visceral abscesses
- in Ireland, a single confirmed case with no history of laboratory exposure suggests deliberate release

Plague

- rapid onset of severe unexplained febrile respiratory illness
- unexplained death following a short febrile or septicaemic illness
- pneumonia with haemoptysis, especially if two or more linked cases
- a single case of plague acquired in Ireland suggests deliberate release

[9] Public Health England: Chemical, biological, radiological and nuclear incidents: clinical management and health protection. 2018 Available at https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/712888/Chemical_biological_radiological_and_nuclear_incidents_clinical_management_and_health_protection.pdf

Q Fever

- community acquired pneumonia, especially if two or more linked cases
- endocarditis (culture negative)
- hepatitis (negative for HAV, HBV, and HCV markers, with granulomata on biopsy)

Smallpox

- abrupt onset of moderate fever and severe prostration
- a characteristic rash (begins on third day of illness, most dense on extremities and face, and with all pocks on any one part of body at the same stage of development)
- a single suspected case of smallpox is a public health emergency

Tularemia

- severe unexplained febrile illness or febrile death
- fever, single painful ulcer, with tender local lymphadenopathy
- cluster of cases of unexplained pneumonic or febrile illness

VEE

- febrile illness and history of travel in endemic area in the two weeks before onset, and / or viral meningitis or encephalitis, or a
- cluster of cases of flu-like illness with encephalitis / neurological symptoms in a small proportion of the cases
- in Ireland, a single confirmed case with no history of recent travel or of occupational risk suggests deliberate release

VHF

- fever of unknown origin and recent travel to endemic area or with flushed swollen face / haemorrhage
- a single confirmed case in Ireland, even if from endemic area, should be investigated to exclude deliberate release

Appendix 5: Post-exposure prophylaxis for suspected exposure to deliberate release of a bacterial agent (e.g. anthrax, plague, tularemia)

Based on: *Public Health England Chemical biological radiological and nuclear incidents: clinical management and health protection*, 2018.[10]

Always consult with PHE-CRCE, HPSC and other experts.

The decision to offer post-exposure prophylaxis should be taken after a risk assessment has been completed as to the likelihood and extent of exposure. The current recommendations for post-exposure prophylaxis for suspected exposure to deliberate release of a bacterial agent are provided below.

The use of antibiotic prophylaxis is usually divided into two phases:

- **initial treatment phase** where simplicity and speed of initiation of prophylaxis is critical and uncertainty about the population at risk may lead to a relatively large group of people needing initial prophylaxis.
- **extended treatment phase** where better information has allowed the population at risk to be more clearly identified and the most appropriate antibiotic to be used on the basis of age, pregnancy or other considerations.

The initial treatment phase will use ciprofloxacin as the first choice antibiotic for all age groups.

Choice of Initial prophylaxis (10 day supply)

	Antibiotic	Contraindications
1st line	ciprofloxacin	established history of severe allergic reaction
2nd line	doxycycline	• under 8 years of age (but use at any age if 1st & 3rd line options are contraindicated) • pregnant or breast feeding • established history of severe allergic reaction
3rd line	amoxicillin / co-amoxiclav	• NOT for tularemia (not sensitive to penicillin) • established history of severe allergic reaction
If ciprofloxacin and amoxicillin / co amoxiclav are contraindicated then **doxycycline** should be used at any age.		

The table below shows the drug/s of first choice and alternatives (for use when the drug of first choice is contraindicated or is not available) in order of preference. It also includes alternatives for

[10] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/712888/Chemical_biological_radiological_and_nuclear_incidents_clinical_management_and_health_protection.pdf

use when the organism is known to be sensitive to the drug (eg amoxicillin for anthrax): these alternatives, when appropriate, may be particularly useful for small children, pregnant women and babies. Except where specified, antibiotic prophylaxis should begin, if possible, within 24 hours of exposure.

Pre and post-exposure prophylaxis regimes

Disease/ Agent	Post-exposure prophylaxis Adults	Post-exposure prophylaxis Children	Duration
Anthrax	Ciprofloxacin 500mg orally bd or Doxycycline 100mg orally bd or Amoxicillin 500mg orally tds	Amoxicillin 25-40mg/kg orally tds or Doxycycline 2.5mg/kg orally bd	Seek national advice. May be indicated for up to 60 days
Botulism	Not indicated		
Brucellosis	Doxycycline 100mg orally bd and Rifampicin 600mg-900mg orally daily Pregnancy: use rifampicin alone	Doxycycline 2.5mg/kg orally bd and Rifampicin 10-15mg/kg orally daily	21 days (low risk) 6 weeks (high risk)
Glanders and melioidosis	Co- trimoxazole 960mg orally bd or Doxycycline 100mg orally bd	Co-trimoxazole 24mg/kg orally bd	7 days
Plague	Ciprofloxacin 500mg orally bd or Doxycycline 100mg orally bd	Ciprofloxacin 10mg-15mg/ kg orally bd (not to exceed 1g per day) or Doxycycline 2.5mg/kg orally bd	7 days
Q fever	Doxycycline 100mg orally bd or Co-trimoxazole 960mg orally bd (children, pregnant or breast-feeding women)	Co-trimoxazole 24mg/kg orally bd	*Begin prophylaxis 8-12 days after exposure (if taken earlier it will merely delay illness onset)
Smallpox	Vaccine given immediately or very soon after exposure reduces the severity of infection		
Tularemia	Ciprofloxacin 500mg orally bd or Doxycycline 100mg orally bd	Ciprofloxacin 10mg-15mg/ kg orally bd (not to exceed 1g per day) or Doxycycline 2.5mg/kg orally bd	14 days
VEE	Not indicated		
VHF	Seek expert advice		

Useful references

1. **Chemical, biological, radiological and nuclear incidents: clinical management and health protection**
    a. Public Health England
    b. Published: 2018
    c. Available URL: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/712888/Chemical_biological_radiological_and_nuclear_incidents_clinical_management_and_health_protection.pdf
2. **Initial Operational Response to a CBRN Incident**
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    c. Available URL: https://www.jesip.org.uk/uploads/media/pdf/CBRN%20JOPs/IOR_Guidance_V2_July_2015.pdf
3. **Activation Procedure for Clinical Decontamination Teams.**
    a. National Ambulance Service
    b. Published: August 2015
    c. Available URL: http://www.nationalambulanceservice.ie/aboutnationalambulanceservice/Policies-and-Procedures/NASNEOC05-Activation-Procedure-for-Clinical-Decontamination-Teams.pdf
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    a. DOH/NDSC
    b. Published: 2002
    c. Available URL: https://www.hse.ie/eng/services/list/5/publichealth/publichealthdepts/guide/bio-threat.pdf
5. **Safety Advisory / Guidance Note: SAGN005:01Suspicious Packages**
    a. National Health and Safety Function, Workplace Health and Wellbeing Unit, National HR Division
    b. Published: April 2016, updated April 2018
    c. Available URL: https://www.hse.ie/eng/staff/safetywellbeing/healthsafetyand%20wellbeing/suspicious%20packages%20biological%20chemical%20threats.pdf

Additional resources

https://www.hse.ie/eng/services/list/5/publichealth/publichealthdepts/env/ra-initial-response.pdf
www.mem.ie (Framework for MEM, guidance and protocols)
https://www.opcw.org/resources/assistance-and-protection/practical-guide-medical-management-chemical-warfare-casualties
https://www.opcw.org/our-work/responding-use-chemical-weapons
https://ec.europa.eu/echo/what/civil-protection/mechanism_en

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[i] Explanatory note regarding the recommendation that decontamination is not required if chemical exposure is a gas: Normally at ambient temperatures gas exposure is via inhalation, and decontamination is not necessary unless - clothing is contaminated, there is an aerosol or mist, or there is evidence of dermal irritation.