Guideline

NSW Public Health Services Standard Operating Procedure for an Explosive Event

Summary The purpose of this Guideline is to provide guidance to NSW public health services on their roles and responsibilities in response to an explosive event.

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GUIDELINE SUMMARY

NSW PUBLIC HEALTH SERVICES STANDARD OPERATING PROCEDURE FOR AN EXPLOSIVE EVENT

PURPOSE

The purpose of the *NSW Public Health Services Standard Operating Procedure for an Explosive Event* is to provide guidance to NSW public health services on their roles and responsibilities in response to an explosive event.

KEY PRINCIPLES

Bombs and explosions can cause unique patterns of injury seldom seen outside combat. Whether accidental or deliberate, public health concerns may remain for several weeks or months after the event. Explosive events have the potential to inflict numerous casualties with multiple injuries and can occur in more than one time or place.

In response to notification of an explosive event, public health services should:

1. Ensure appropriate personnel have been notified
2. Work with your Local Health District Health Services Functional Area Coordinator to ensure mutual understanding of communication channels and responsibilities
3. Support the combat agency with public health risk assessment and risk management activities through appropriate channels
4. Provide advice on risk communication messages to the public, partner agencies and health professionals particularly regarding communicable disease risks and prevention.

USE OF THE GUIDELINE

This document provides guidance for public health services regarding their roles and responsibilities in response to an explosive event.

This document should be used as a guide rather than a mandatory directive. It does not replace the need for the application of expert judgement to each individual situation.

This document should be read in conjunction with the NSW emergency management plans outlined in section 1.

REVISION HISTORY

Version	Approved by	Amendment notes
April 2016 (GL2016_013)	Deputy Secretary Population and Public Health, and Chief Health Officer	New guideline

ATTACHMENT

1. NSW Public Health Services Standard Operating Procedure for an Explosive Event – Guideline.

NSW Public Health Services Standard Operating Procedure for an Explosive Event

NSW GOVERNMENT Health

GUIDELINE

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CONTENTS

1 BACKGROUND

1.1 Introduction

The purpose of this document is to provide guidance to NSW public health services on their roles and responsibilities in response to an explosive event.

Bombs and explosions can cause unique patterns of injury seldom seen outside combat. Whether accidental or deliberate, public health concerns may remain for several weeks or months after the event. Explosive events have the potential to inflict numerous casualties with multiple injuries and can occur in more than one time or place.

Approximately half of all initial casualties will generally seek medical care over a one-hour period, with a high likelihood that the less severely injured self-present prior to transport of the more severely injured casualties. Large explosive events have the capacity to rapidly overwhelm both human and material resources.

Explosive event key facts:

1. All bomb events have the potential for chemical, biological and/or radiological contamination.
2. Biological foreign bodies can become projectiles that contribute to the spectrum of blast injury, and appropriate post-exposure prophylaxis should be considered.
3. Particular agents should be considered in the long-term management (see appropriate protocols).

Key actions for public health services

If you are reading this plan because you have been notified of an explosive event you should do the following:

1. Ensure appropriate personnel have been notified
2. Work with your LHD HSFAC to ensure mutual understanding of communication channels and responsibilities
3. Support the combat agency with public health risk assessment and risk management activities through appropriate channels
4. Provide advice on risk communication messages to the public, partner agencies and health professionals particularly regarding communicable disease risks and prevention.

This document should be read in conjunction with the following government plans:

Whole of Government Sector	NSW State Emergency Management Plan (EMPLAN) https://www.emergency.nsw.gov.au/publications/plans/emplan.html
	NSW Hazmat/CBRN Emergency Sub Plan https://www.emergency.nsw.gov.au/publications/plans/sub-plans/hazardous-materials.html
	NSW State Counter Terrorism Plan http://www.secure.nsw.gov.au/about-us/nsw-counter-terrorism-plan/
	NSW Recovery Plan https://www.emergency.nsw.gov.au/publications/plans/supporting-plans/recovery.html
Whole of Health Sector	NSW Health Service Functional Area Supporting Plan (NSW HEALTHPLAN) http://www0.health.nsw.gov.au/policies/PD/2014/PD2014_012.html,
Public Health Sector	NSW Public Health Supporting Plan http://www0.health.nsw.gov.au/policies/pd/2015/PD2015_002.html
	NSW Public Health Services SOP for Hazmat/CBRN Emergencies http://www0.health.nsw.gov.au/policies/gl/2016/GL2016_014.html

2 EPIDEMIOLOGY

2.1 Contaminated bomb sites

Many dangerous substances are incinerated in the detonation of a bomb or during an explosion, however, all bomb events have the potential for chemical, biological and/or radiological contamination.

2.2 Blast injuries classification

The injury patterns following an explosive event are a product of the composition and amount of the materials involved, the surrounding environment, the delivery method, the distance between the victim and the blast, and any intervening protective barriers or environmental hazards.

The four categories of blast injuries are:

Primary – injury from over-pressurisation force (blast wave) impacting on the body surface – may lead to tympanic membrane rupture, pulmonary damage and hollow viscous injury

Secondary – injury from projectiles

Tertiary – injuries from displacement of victim by the blast wind

Quaternary – all other injuries from the blast (includes burns, toxic exposures and exacerbations of chronic illness)

In reality, most blast casualties have a combination of the above injury categories and their injuries may be best categorized as complex combinations of each category.

2.3 Secondary devices

In a terrorist event, it is not uncommon for secondary devices to be placed in locations where it is likely the public will gather – including health care facilities. This should be considered when setting up a control or coordination centre. The LHD HSFAC should be consulted with any questions.

2.4 Blood borne pathogens

Victims presenting from the scene may have been exposed to blood-borne pathogens. Advice regarding communicable disease risk prevention is outlined in Section 3.

2.5 Special considerations for incidents with deliberate intent

Incidents that are thought to be of malicious intent will have a high level of NSW Police Force involvement. The public health response to the incident will remain largely the same, although public health services may need to work with Police through existing emergency management channels to support an investigation. Some information surrounding the investigation may be subject to additional security restrictions.

3 ADVICE TO CLINICIANS

3.1 Communicable disease prevention

When evaluating management choices for casualties of bombings or other mass-casualty events, healthcare providers should assume that exposure to blood from other injured persons is likely unless available information on the circumstances of injury suggests otherwise.

Blast injuries result occasionally in traumatic implantation of bone or other biologic material that is alien to the wounded person. Testing of such matter is not recommended as a useful adjunct for clinical management of wounded persons.

Public health authorities can provide assistance in assessing exposure risk for affected groups of injured persons. Tetanus risk is not dependent upon blood exposure.

The background prevalence of blood borne viruses in the Australian population is generally low. However, exposure to blood, body fluids and foreign bodies (such as bone or other debris) may pose an infection risk.

3.1.1 Categories of injuries

1. Directly injured in explosion with major penetrating injuries or non-intact skin exposure
2. Directly injured in explosion with membrane exposure only (e.g. tympanic)
3. Superficial intact skin exposure without membrane exposure.

3.1.2 Recommended actions

Consider the following matrix in determining the category of exposure and initial management.

Category	Hepatitis B	Hepatitis C	Tetanus	HIV
1 Penetrating injuries or non-intact skin exposure	For categories 1-2: Determine patient's vaccination status. If previously unvaccinated or previous incomplete vaccination history, and no known contraindication to vaccination, administer a single age-appropriate dose of hepatitis B vaccine (first dose preferably within 24 hrs, and not later than 7 days post-exposure), and advise to complete the vaccine course. If documented non-responder to HBV vaccine or known infectious source, consider Hepatitis B immunoglobulin along with vaccine dose. **Seek ID specialist advice.**	Test at 0 and 4-6 months	Evaluate, immunise if appropriate	Generally, no action
2 Mucous membrane exposure only		Generally, no action	No action	Generally, no action
3 Superficial **intact** skin exposure without mucous membrane exposure	No action	No action	No action	No action

3.1.3 Hepatitis B

Generally, it is safer to be more liberal in the use of hepatitis B vaccine (HBV) as post-exposure prophylaxis. It is recommended for individuals presenting with non-intact skin or

mucous membrane exposure (Categories 1-2). The vaccine should be administered to those who:

- Lack a reliable history of immunisation against HBV, or are known non-responders to HBV vaccination, and
- Have no previous history of contraindication to immunisation against HBV.

Patients should be advised to check their prior vaccination history and have additional doses as necessary to complete the course.

Generally hepatitis B immunoglobulin (HBIG) is not warranted in this situation – consider ONLY for people who are previously unvaccinated or non-responders if there was exposure to a known infectious source.

3.1.4 Hepatitis C

Baseline and follow-up hepatitis C virus (HCV) testing should be considered for persons injured during bombings or other mass-casualty events whose penetrating injuries or non-intact skin are suspected to have come into contact with another person's blood or body fluids. There is no prophylaxis recommended for hepatitis C. If testing is performed, obtain a baseline (within 7-14 days) and follow-up (4-6 months) HCV antibody and alanine aminotransferase (ALT) (Category 1; generally no action for Category 2).

If a decision is made to perform testing:

- Baseline testing for HCV antibody and ALT should be performed within 7-14 days of the exposure
- Follow-up testing for anti-HCV and ALT should be performed 4-6 months after exposure to assess seroconversion, preferably arranged as part of discharge planning
- HCV RNA testing should be performed at 4-6 weeks if an earlier diagnosis of HCV infection is desired
- Positive anti-HCV with low signal-to-cut-off value should be confirmed using a more specific supplemental assay before communicating the results to the patient, and
- Persons who are tested or are identified as a candidate for testing regarding exposure to HCV while undergoing evaluation or treatment in the immediate response to a mass-casualty event should be discharged with a referral for follow-up and written information on pre-discharge treatment.

3.1.5 Tetanus

Although tetanus is not transmitted from person to person, contamination of wounds with debris (e.g. from a projectile) might increase the risk of tetanus among persons injured in

mass-casualty settings. Proper wound care and debridement play a critical role in tetanus prevention.

In the setting of an acute response to a mass-casualty event, failure to provide a tetanus vaccination when needed could result in preventable illness, whereas unnecessary vaccination is unlikely to cause harm. Age-appropriate vaccines should be used if possible. However, in a mass-casualty setting, this might not be possible, and any tetanus vaccine formulation might be used, because the tetanus toxoid content is adequate for tetanus prophylaxis in any age group. In this setting, the benefit of supplying tetanus prophylaxis outweighs the potential for adverse reactions from formulations from a different age indication.

A substantial proportion of patients in this setting might be unable to provide a history of vaccination or history of contraindications to tetanus toxoid--containing vaccines, and the majority of wounds sustained will be considered tetanus-prone because they are likely to be exposed to dirt or faeces.

Thus, a wounded adult patient who cannot confirm receipt of a tetanus booster during the preceding 5 years should be vaccinated with tetanus and diphtheria toxoids vaccine (Td) or tetanus toxoid, reduced diphtheria toxoid, and acellular pertussis vaccine (Tdap). Similarly, a child with an uncertain vaccination history should receive a tetanus booster as age-indicated by the standard childhood immunisation table. *The Australian Immunisation Handbook* (current edition) should be referred to for the most recent advice on tetanus immunisation.

3.1.6 Human Immunodeficiency Virus

Generally, no post-exposure prophylaxis (PEP) is warranted for HIV. Consider action ONLY if exposure is to a known or highly likely HIV-infected source.

Because of the potential toxicities of antiretroviral drugs, PEP is recommended unequivocally only for exposures to sources known to be HIV-infected. The decision to use PEP following unknown-source exposures is to be made on a case-by-case basis, considering the information available about the type of exposure, known risk characteristics of the source, and prevalence in the setting concerned.

In the rare situation in which PEP is recommended, it should be initiated as soon as possible after exposure, and specimens from the exposed person should be collected for baseline HIV testing. However, PEP should not be delayed for the results of testing. If PEP is used, certain other laboratory studies also are indicated. Consultation with healthcare professionals knowledgeable about HIV infection is recommended, and is particularly important for paediatric patients and pregnant women. All persons for whom HIV PEP has been initiated should be referred to a clinician experienced in HIV care for follow up.

3.1.7 Risk Assessment

To determine appropriate actions in response to the evaluation of casualties of bombings or other mass-casualty events, healthcare providers should:

- Assess individual exposure risk by categorizing the patient into one of three exposure risk categories (see 3.1.1) that are numbered sequentially from the highest (category 1) to the lowest (category 3) level of exposure risk and assign each person to the highest level risk category for which he/she qualifies
- Identify the appropriate risk category and pathogen-specific management recommendation(s), and
- Determine the appropriate action to take in response to management recommendations.

3.2 Tympanic membrane rupture

Traumatic rupture of the tympanic membrane is a common blast injury (16% of all injuries). It does not necessarily correlate with the presence of more severe trauma.

Traumatic blast injury is often associated with some hearing impairment, which may be permanent. Blast-induced tympanic membrane injury is less likely to spontaneously heal than other mechanisms of injury and will often require surgical repair.

Advice should be provided to clinicians to keep the ear canal clean and dry. Aminoglycoside or other ear drops should not be inserted and a referral should be made to an ear, nose and throat specialist.

4 ADVICE FOR RESPONDERS AND OTHER PERSONNEL

Responders and persons engaged in debris removal or construction are often at risk for incurring wounds throughout the duration of response and clean-up work. As a routine public health measure, healthcare providers should offer tetanus toxoid vaccination to all response workers who do not have a reliable history of receipt of a tetanus toxoid-containing vaccine during the preceding 10 years, regardless of whether the healthcare visit was for a wound. Such persons might encounter potential exposure situations throughout the duration of their work in response to a mass-casualty situation.

Healthcare personnel, emergency response, public safety and other workers (e.g. construction workers and equipment operators) who are injured and exposed to blood while providing assistance after a mass-casualty event should be managed according to existing guidelines and standards for the management of occupational exposures. Healthcare personnel and first responders whose activities involve contact with blood or other body fluids should have been previously vaccinated against HBV and tetanus.

Healthcare personnel and emergency response workers should be reminded to wear appropriate personal protective equipment and maintain stringent infection control practice.

5 PUBLIC HEALTH RESPONSE

The public health response is likely to continue after the site has been rendered safe by Fire and Rescue NSW.

5.1 Notification and initial response

Public health personnel may be notified of the incident through various channels, including: the Local Health District Health Services Functional Area Coordinator (LHD HSFAC), State Public Health Controller or the media. An assessment should be made as to the number and types of casualties.

The status of any environmental threats should be ascertained and appropriate actions to protect the health of the public advised to the State HSFAC (via the LHD HSFAC/Public Health Controller).

Advice should be provided to treating clinicians regarding the risk of blood borne viruses and the need to consider tetanus prophylaxis (see section 3) above.

5.2 Case definition

5.2.1 Sample case definition:

Persons who were directly exposed to fumes, smoke, blood or blast effects <in the appropriate geographic area> <at the specific time> AND/OR first responders, surrounding staff or hospital staff who responded to, or were involved in, the event.

5.2.2 Rationale for case definition

Persons who were directly exposed to fumes, smoke, blood or blast effects <in the appropriate geographic area> <at the specific time>.

These people may require urgent follow up for health reasons, depending on their exposures. They are also vulnerable to longer term health effects – in most cases, individuals should be followed up by their primary health care provider.

First responders, surrounding staff or hospital staff who responded to or were involved in the event: events such as 9/11 have shown this group may also be vulnerable to longer-term health effects, including respiratory health and mental health issues. Education to primary health care providers may be required to facilitate care for these groups.

5.3 Managing information

5.3.1 Liaison with NSW Police disaster victim registration

Preparing an accurate list of all people exposed or potentially exposed (including response personal, media and onlookers) will be important if ongoing symptoms monitoring is required. An exposure definition will be important to clarify who is considered to be at risk and their level of risk.

NSW Police coordinates a NSW disaster victim register. It is possible to request information from this system for public health purposes. This should be coordinated through the State HSFAC via the State Public Health Controller.

5.3.2 Use of health surveillance systems

The NSW Ministry of Health operates the Public Health Real-time Emergency Department Surveillance System (PHREDSS). The PHREDSS team should be consulted in the days following the event to search for patients who are presenting with explosion-related symptomatology.

Retrospective surveillance should be undertaken using a key word search using words or phrases related to the bombing or likely injury patterns may assist in mapping the presentation pattern of those exposed (eg self-presenters to non-designated hospitals).

People may also present to their general practitioner or pharmacist; consideration should be given to communicating with these groups to assist with identification of cases.

5.3.3 Contacts of cases

Not applicable.

5.3.4 Environmental assessment

Fire and Rescue NSW and the NSW Environment Protection Authority as the lead agency for the Environmental Services Functional Area should be consulted regarding the clean-up of hazardous materials.

5.3.5 Epidemiological studies

An expert advisory group may be convened by the Public Health Controller to consider epidemiological studies if necessary. For most incidences a health register would not be required.

On-going monitoring of the health status of affected individuals is best managed by their primary health providers, with advice from specialists as required.

6 REFERENCES

Catchpole MA, Morgan O. Physical Health of Members of the Public Who Experienced Terrorist Bombings in London on 07 July 2005. *Prehosp Disaster Med* 2010;25(2):139-144.

Centers for Disease Control and Prevention. Recommendations for Post Exposure Interventions to Prevent Infection with Hepatitis B Virus, Hepatitis C Virus, or Human Immunodeficiency Virus, and Tetanus in Persons Wounded During Bombings and Similar Mass-Casualty Events — United States, 2008. *MMWR* 2008;57(No. RR-6).

Ritenour, A. et al. Tympanic Membrane Perforation and Hearing Loss From Blast Overpressure in Operation Enduring Freedom and Operation Iraqi Freedom Wounded. *J Trauma* 2008;64:S174-178.