



Natural Hazards

Public Health Considerations



Health

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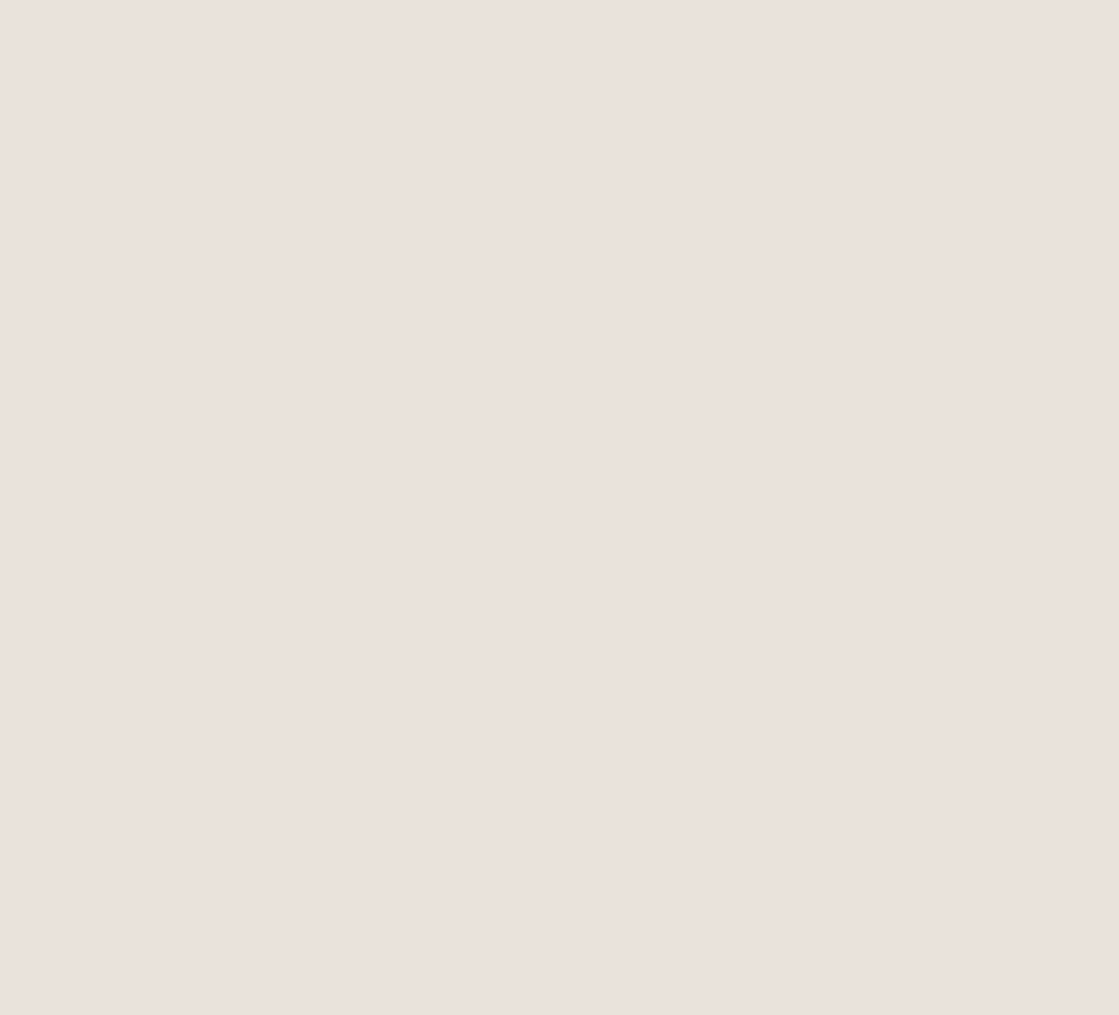
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Introduction

Natural hazards include extreme weather and geological events that may, but do not always, result in natural disasters. NSW public health services have a key role in identifying health risks and implementing management strategies when natural hazards affect the health of the population. A well-prepared workforce with access to appropriate tools and systems to support disease mitigation and control is an essential component of effective public health emergency preparedness, operational response and sustained recovery.

Natural Hazards: Public Health Considerations provides advice on the combat agencies for different natural hazards. In some cases, public health services will advise a partner agency about important messages to disseminate. In these circumstances, information is channelled through the State Health Communications Controller. This requires close collaboration with health colleagues and partner agencies.



How to use this handbook

This handbook is a rapid reference tool that supports the immediate preparation, response and recovery phases of public health emergency management of natural hazards. It is not an exhaustive manual, but may be particularly useful for newer members of health protection teams or those acting in more senior positions.

Section one focuses on the preparation and response phases of public health management of natural hazards. It begins by providing an overview of public health issues that are common to all natural hazards. It then describes the natural hazards that may be encountered in NSW and identifies the relevant combat agency. This section also explores the primary public health issues resulting from direct contact with various natural hazards and suggests key messages for dissemination.



Section two addresses generic public health considerations during recovery from the impact of various natural hazards.

Section three lists resources for more comprehensive information about the public health response to different natural hazards. The links have been imbedded in the electronic PDF version of this handbook to facilitate online access.

The appendix provides a summary of additional references on the public health issues associated with natural hazards.

This handbook is available for download from the NSW Health website www.health.nsw.gov.au (search Natural Hazards: Public Health Considerations). Hard copies of this handbook have also been distributed across the health protection network to support use during power disruptions.



SECTION 1: **PREPARATION AND RESPONSE**

All natural hazards

Several public health issues and associated messages are common to all natural hazards and these are outlined in this section. It is important that the affected community is encouraged to follow the instructions given by the designated combat agency and emergency services. This may involve listening to the radio or watching TV for warnings from local officials and checking for updates on the relevant combat agency's website. Care must be taken to communicate health protection messages effectively with certain populations that are particularly vulnerable during all natural hazards.



Primary public health issues

Infrastructure compromise

- ✚ Water unavailability or contamination (drinking water/natural waterways) increases the risk of gastrointestinal and skin infection
- ✚ Sewer unavailability or sewer backflow may reduce the ability to undertake sanitation practices
- ✚ Disrupted roadways and transport systems endanger motorists and may delay access to health care
- ✚ Power cuts can impact public health services (e.g. vaccine cold chain) and water/food safety (e.g. water treatment plants, food refrigeration)
- ✚ Risk of electrocution from downed power lines

Messages

- ✚ Avoid contact with potentially contaminated water and follow instructions when a Boil Water Alert is issued (NOTE: for more details see “Cleaning up the aftermath” – page 61)
- ✚ Wash hands with soap and clean water frequently
- ✚ Keep an adequate supply of medication at home in case you are unable to attend your regular medical appointment
- ✚ Food can be consumed safely provided fridge and freezer doors have been kept shut for 4 hours and 24 hours respectively (NOTE: for a more prolonged loss of electricity see “Power outage” – page 58)
- ✚ Avoid downed power lines

Mental health and emotional injury

- ✎ Stress on individuals, families and communities may be elevated by both direct and indirect threats

Messages

- ✎ Liaise with the Mental Health Controller to include relevant messages in public communications

Most at risk

- ✎ Older adults and young children
- ✎ People with underlying medical conditions (particularly cardiovascular, cerebrovascular and respiratory disease)
- ✎ People socially isolated (e.g. living alone/homeless)
- ✎ People who have limited mobility (e.g. wheelchair/bed)
- ✎ People dependant on electrical devices (e.g. home dialysis)
- ✎ People dependant on daily medication who are not able to take this medication due to improper storage or compromised access to supplies
- ✎ People temporarily displaced and/or living in conditions with poor sanitation
- ✎ People from socioeconomically disadvantaged groups
- ✎ People who work outdoors (e.g. labourers, fire fighters)





1.2

Bush fire

www.health.nsw.gov.au
(search 'bush fire')



Background

- ✦ Combat agency: NSW Rural Fire Service
- ✦ NSW has a State Bush Fire Plan (search “State Bush Fire Plan” at www.emergency.nsw.gov.au)

Location & seasonality

- ✦ In NSW, the peak bush fire risk usually occurs in spring and early summer when prolonged periods of hot and dry weather are accompanied by unstable atmospheric conditions and high winds
- ✦ Maps identifying bush fire prone areas are available from local councils

Primary public health issues

(see also ‘all hazards’ – page 8)

Air quality (smoke)

- ✦ Irritation of the eyes, nose, sinuses and throat
- ✦ Smoke inhalation can exacerbate shortness of breath, cough and existing heart and lung conditions (e.g. chronic bronchitis, emphysema, asthma)

Messages

- ✦ Sensitive people should limit the time they spend outdoors
- ✦ The best way to avoid breathing in the smoke is to remain inside with the windows and doors closed, preferably in an air-conditioned building
- ✦ Avoid vigorous physical activity and ensure adequate medication is accessible while following action plans for asthma/chronic obstructive pulmonary disease (COPD)
- ✦ Monitor air quality on the Office of Environment and Heritage website (www.environment.nsw.gov.au search ‘air quality index’)

Building and structure damage

- ✎ Injury from collapsed structures, debris, shattered glass and/or fallen trees
- ✎ Increased public concern about potential exposure to asbestos (in dust form) from damaged structures

Messages

- ✎ If unable to move away from a collapsing structure, drop to knees and cover head and back of neck with arms while taking cover under a sturdy desk, table or bench
- ✎ Minimise exposure to damaged structures, particularly those known to be manufactured using asbestos (www.health.nsw.gov.au search 'advice to health professionals asbestos')

Direct heat exposure

- ✎ Skin burns may result from direct exposure to fire/embers or contact with surfaces heated by the flames
- ✎ Increased risk of heat-related illness (NOTE: for more details see "Heat-related illness" – page 36)

Messages

- ✎ Treat minor burns under cool, running water for 20 minutes and cover with cling film
- ✎ Seek immediate medical treatment for burns that are severe, large (bigger than a 50 cent coin), near the face/throat, affecting a joint or encircling a digit (e.g. finger)
- ✎ Maintain safe distances from fires and avoid exposure to hot environments (NOTE: for more details see "Heat-related illness" – page 36)

Temporary housing

- ✦ Evacuation centres and first responder camps present increased risk of secondary public health concerns if not appropriately managed (e.g. gastroenteritis outbreaks)

Messages

- ✦ Infection control messages should be provided for populations in evacuation centres and camps for personnel supporting the response (NOTE: for more details see the NSW Health guideline Major Evacuation Centres: Public Health Considerations)

Most at risk

(see also “all hazards” – page 8)

- ✦ People with heart and chronic respiratory conditions (including asthma)



Health impact of previous bush fire in NSW

17 October – 25 October 2013: Warm, dry and windy weather contributed to more than 100 fires across NSW. Smoke affected air quality throughout the state and when compared to the same period in previous years, there was a 19% increase in Sydney Emergency Department presentations for asthma, with the greatest risk in the 5-64 age group (55% higher than usual).





1.3

Cyanobacteria bloom

www.health.nsw.gov.au
(search 'cyanobacteria')



Background

- ✦ Combat agency: Regional Algal Coordinating Committees are responsible for local management of algal blooms and the State Emergency Operations Controller takes control if a multi-agency response is required
- ✦ NSW has a draft Algal Risk Management Sub Plan (search “Algal Risk Management Sub Plan” at www.water.nsw.gov.au) and the Australian Drinking Water Guidelines include fact sheets specific to cyanobacteria blooms (search ‘drinking water guidelines’ at www.nhmrc.gov.au)

Location & seasonality

- ✦ Drought and higher temperatures in the summer may result in an increase in the number of cyanobacteria blooms and subsequent toxin release
- ✦ Cyanobacteria blooms occur most commonly in still or slow moving water and have previously occurred across NSW

Primary public health issues

(see also ‘all hazards’ – page 8)

Direct toxin exposure

- ✦ Contact with harmful toxins produced by cyanobacteria can occur by ingestion, dermal exposure or inhalation and may cause skin, gastrointestinal, hepatic or neurological disorders

Messages

- ✎ Avoid all contact and ingestion of water affected by a potentially toxic cyanobacteria bloom and follow instructions issued by relevant authorities (including warning signs erected near waterways and the advice of the local water authority)

Most at risk

(see also “all hazards” – page 8)

- ✎ People living near or in regular contact with bodies of still or slow flowing water
- ✎ People dependent on water supplies commonly affected by toxic cyanobacteria blooms
- ✎ People already susceptible to cyanobacteria toxins (e.g. people with hepatitis, liver cirrhosis or kidney damage)



Health impact of previous cyanobacteria blooms in NSW

November 1991: The world's largest cyanobacteria bloom extended over more than 1000 kilometres of the Barwon-Darling River System and a State of Emergency was declared. It is estimated that more than 10,000 livestock were killed and emergency water supplies were required in several towns.



1.4

Dust storm

www.health.nsw.gov.au
(search 'dust storm')



Background

- ✎ Combat agency: The State Emergency Operations Controller takes control during a dust storm if a multi-agency response is required
- ✎ Dust particles can vary in size from coarse (non-inhalable), to fine (inhalable), to very fine (respirable)

Location & seasonality

- ✎ Periods of severe and widespread drought can dramatically increase the likelihood of major dust storms, particularly during the summer months
- ✎ Dust storms are most likely to occur in the dry and arid regions of central and western NSW

Primary public health issues

(see also 'all hazards' – page 8)

Air quality (dust)

- ✎ Irritation of the eyes, nose, sinuses and throat
- ✎ Dust inhalation can exacerbate shortness of breath, cough and existing heart and lung conditions (e.g. chronic bronchitis, emphysema, asthma)
- ✎ Poor visibility can create dangerous driving conditions and increase the risk of injury from motor vehicle accidents

Messages

- ✎ Sensitive people should limit the time they spend outdoors
- ✎ The best way to avoid breathing in the dust is to remain inside with the windows and doors closed, preferably in an air-conditioned building

- ✎ Avoid vigorous physical activity and ensure adequate medication is accessible while following action plans for asthma/chronic obstructive pulmonary disease (COPD)
- ✎ Avoid driving if poor visibility compromises safety
- ✎ Monitor air quality on the Office of Environment and Heritage website (www.environment.nsw.gov.au search 'air quality index')

Most at risk

(see also “all hazards” – page 8)

- ✎ People in dry and dusty environments
- ✎ People with heart or chronic respiratory conditions (including asthma)



Health impact of previous dust storm in NSW

23 September 2009: A dust storm in Sydney created extremely high levels of particulate matter in the air. When compared to other periods, the risk of presentation to emergency departments was increased for all-causes (4.3%), respiratory complaints (20%) and asthma (23%). This was particularly prevalent in people in the <5 years and >65 years age groups.



1.5

Earthquake

www.emergency.cdc.gov
(search 'earthquake')



Background

- ✎ Combat agency: The State Emergency Operations Controller takes control after an earthquake
- ✎ Ongoing vigilance to reduce injury risk and ensure public safety is required as aftershocks often occur following an initial earthquake

Location & seasonality

- ✎ Earthquakes occur sporadically in NSW and are considered an event of low probability but high consequence

Primary public health issues

(see also 'all hazards' – page 8)

- ✎ Air quality (dust) – see page 24
- ✎ Building and structure damage – see page 15
- ✎ Landslide – see page 43
- ✎ Temporary housing – see page 16
- ✎ Tsunami – see page 53

Most at risk

 (see also 'all hazards' – page 8)

- ✎ People living along fault lines
- ✎ People in multi-storey buildings (e.g. apartment/office buildings)



Health impact of earthquake in NSW

28 December 1989: A Richter magnitude 5.6 earthquake caused damage to approximately 50,000 buildings in and around Newcastle. There were 13 deaths and more than 160 people were injured as a result of collapsed buildings and damaged infrastructure.

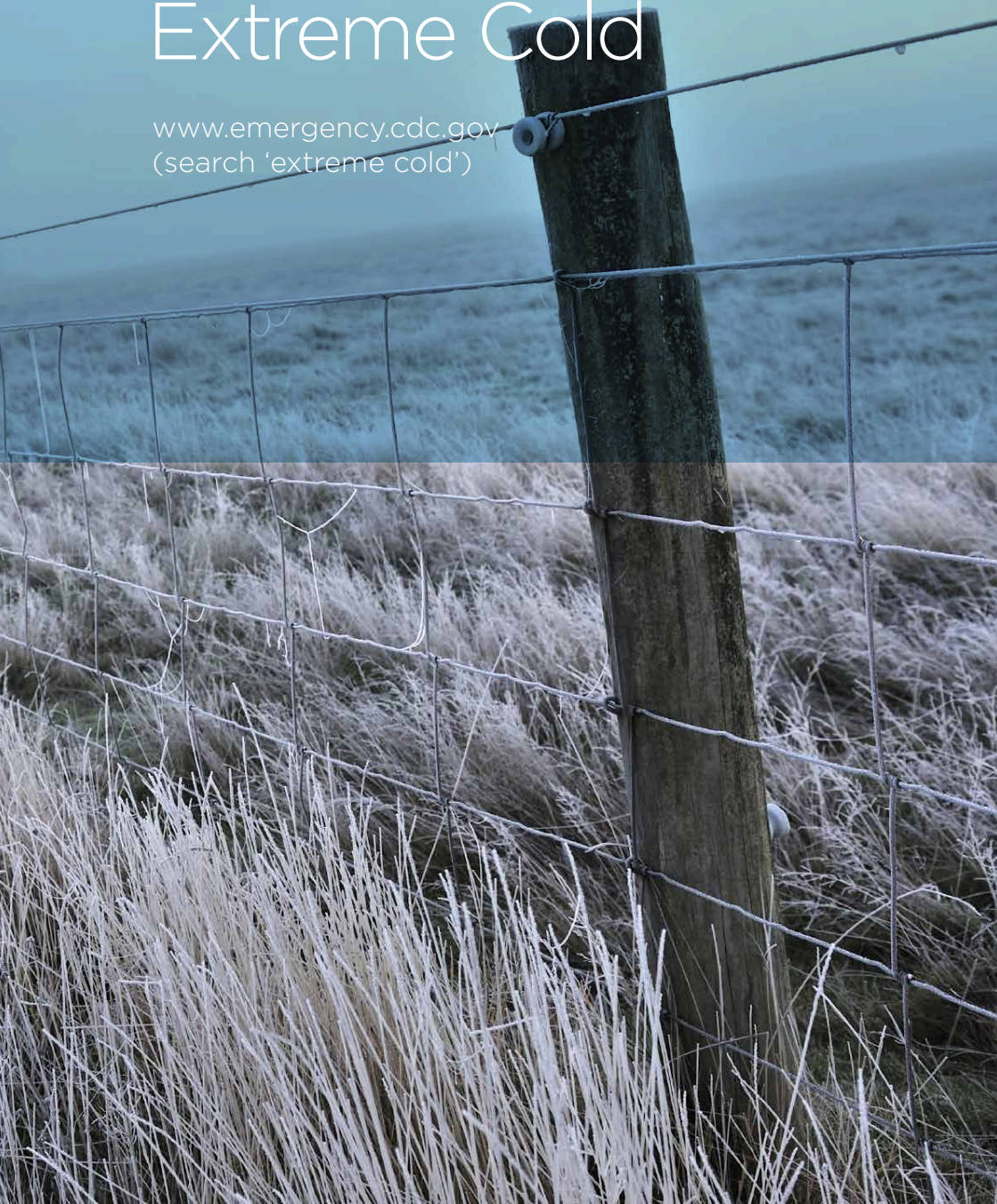




1.6

Extreme Cold

www.emergency.cdc.gov
(search 'extreme cold')



Background

- ✦ Combat agency: The State Emergency Operations Controller takes control during periods of extreme cold if a multi-agency response is required
- ✦ Low temperatures associated with extremely cold weather may produce ice, snow and freezing rain

Location & seasonality

- ✦ In NSW, extreme cold is most likely to occur in the winter months from June to August
- ✦ Extremely cold weather is most likely to occur in the alpine regions of southeastern NSW

Primary public health issues

(see also 'all hazards' – page 8)

Falls risk

- ✦ Increased risk of fractured wrists, arms and hips from slipping on icy and wet surfaces

Messages

- ✦ Signpost slippery surfaces, wear appropriate footwear and avoid contact with these areas as much as possible

Cold exposure

- ✦ Hypothermia and frostbite may occur after extended periods of direct exposure to cold environments and surfaces
- ✦ Inhaling cold air can promote bronchoconstriction and exacerbate existing lung and cardiovascular conditions

Messages

- ✦ Stay inside adequately heated buildings when possible and avoid prolonged contact with cold surfaces
- ✦ Avoid spending extended periods outdoors and ensure adequate medication is accessible while following action plans for asthma/chronic obstructive pulmonary disease (COPD)

Most at risk

(see also “all hazards” – page 8)

- ✦ People at increased risk of osteoporosis (e.g. elderly women)
- ✦ People with poor peripheral circulation (e.g. diabetics)
- ✦ People with poorly insulated shelter



Health impact of previous extreme cold in NSW

Between 1997 and 2007, there were 231 deaths in Australia attributed to exposure to “excessive natural cold”. Mortality from other causes is also higher during periods of cold weather even when it is not extreme. As an example, in New South Wales there was a mean annual excess of 224 deaths per year in the winter months between 1979 and 1997 due to coronary artery related disease.



1.7

Extreme heat

www.health.nsw.gov.au
(search 'extreme heat')



Background

- ✎ Combat agency: The State Emergency Operations Controller takes control during a heatwave if a multi-agency response is required
- ✎ NSW has a State Heatwave Sub Plan (search “State Heatwave Sub Plan” at www.emergency.nsw.gov.au)

Location & seasonality

- ✎ In NSW, the summer months (particularly January) are more prone to heatwaves
- ✎ Heatwaves can occur across NSW

Primary public health issues

(see also ‘all hazards’ – page 8)

Heat-related illness

- ✎ Increased risk of morbidity and mortality that is particularly prominent in people with existing chronic diseases (e.g. cardiovascular and respiratory disease) and if power failures limit normal cooling methods (e.g. fans, air-conditioners)
- ✎ Increased risk of dehydration (dizziness, tiredness, irritability, thirst, bright/dark yellow urine, loss of appetite, fainting)
- ✎ Increased risk of heat exhaustion (heavy sweating is accompanied by the symptoms of dehydration with the addition of pale skin, fast/weak pulse, breathing fast/shallow, muscle weakness/cramps, headaches, nausea/vomiting)
- ✎ Increased risk of heat stroke (red, hot and dry skin, a sudden rise in core body temperature $\geq 40.5^{\circ}\text{C}$, dry swollen tongue, confusion, poor coordination, slurred speech, aggressive/bizarre behaviour, loss of consciousness, seizures/coma)

Messages

- Refer to NSW Health's "Beat the Heat" website
- Drink plenty of cool non-alcoholic fluids
- Stay in shaded cool places and/or use cool sponges/baths to control body temperature
- Reduce physical activity and wear lightweight clothing
- Take care of others and never leave children or pets in closed parked cars
- Heat stroke is life threatening and requires immediate medical attention (NOTE: for more details search 'beat the heat' on www.health.nsw.gov.au)

Most at risk

(see also 'all hazards' – page 8)

- People taking certain medications
- People who are overweight/obese



Health impact of previous extreme heat in NSW

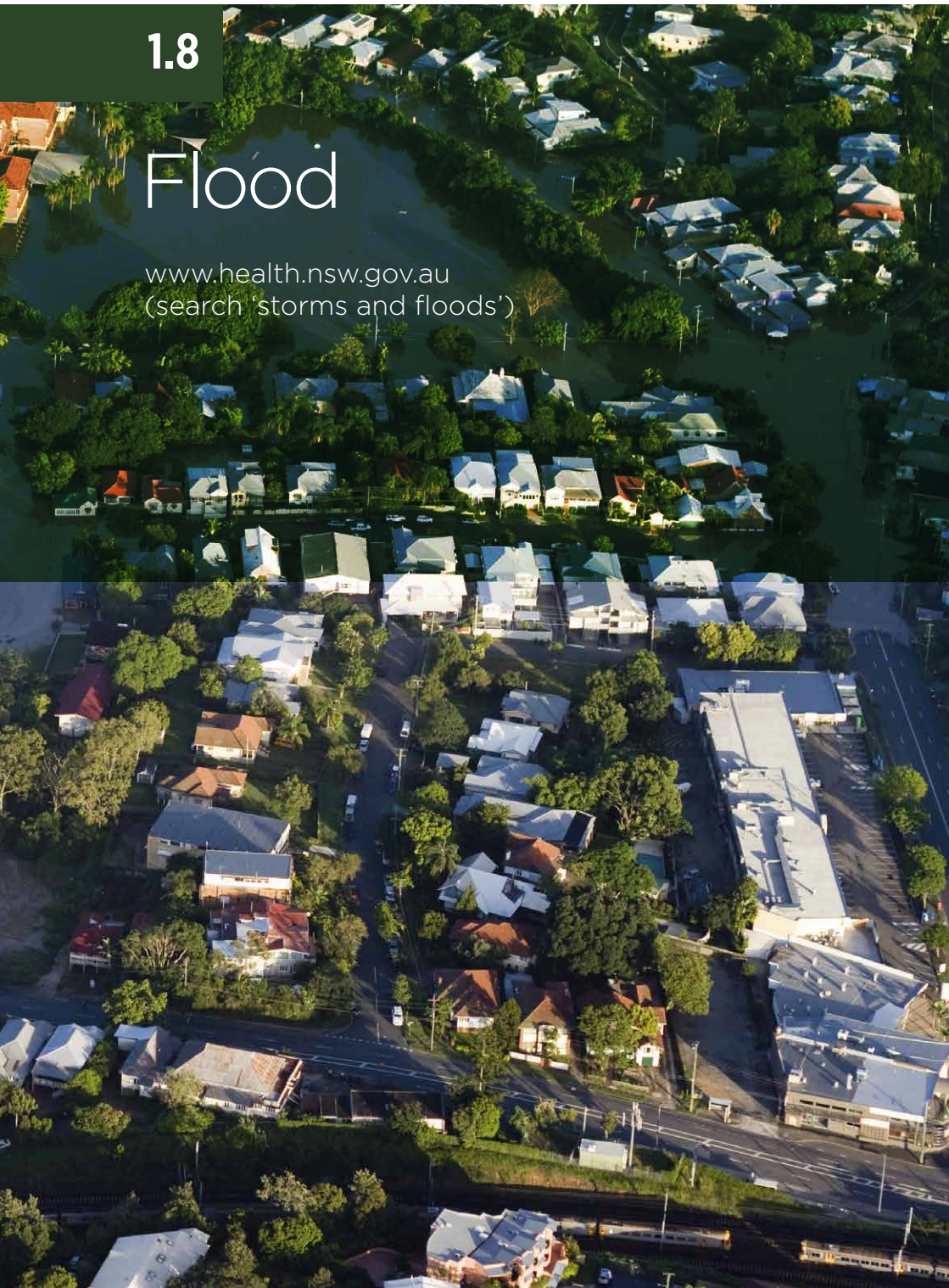
31 January – 06 February 2011: A heatwave of record breaking duration affected Sydney and caused an estimated 104 and 236 Emergency Department visits for heat effects and dehydration respectively. This included one day that had the highest counts observed in the past 5 years. There were also 116 ambulance calls for heat exposure and all-cause mortality increased by 13% during this period.



1.8

Flood

www.health.nsw.gov.au
(search 'storms and floods')



Background

- ✎ Combat agency: NSW State Emergency Service
- ✎ NSW has a State Flood Sub Plan (search “State Flood Sub Plan” at www.emergency.nsw.gov.au)

Location & seasonality

- ✎ Floods are more frequent in the northern half of NSW during summer and in the southern half during winter
- ✎ Topography can be used to predict the onset and severity of sudden flash flooding, slowly developing floods and/or dam failures in NSW

Primary public health issues

(see also ‘all hazards’ – page 8)

Building and structure damage

- ✎ See page 15

Temporary housing

- ✎ See page 16

Water inundation

- ✎ Increased risk of drowning (including inside a motor vehicle) and injury from exposure to fast flowing water with hidden submerged dangers
- ✎ Hypothermia when trapped in floodwaters or exposed to cold climatic conditions for extended periods (NOTE: for more details see “Extreme cold” – page 31)
- ✎ Contaminated floodwaters may carry a range of viruses, bacteria and parasites that can affect the immediate surroundings and people downstream
- ✎ Increased risk of mosquito borne diseases after floodwaters have receded

Messages

- ✎ Avoid entering floodwaters in a motor vehicle, on foot and/or to swim
- ✎ Avoid prolonged exposure to cold water or climatic conditions (NOTE: for more details see “Extreme cold” – page 31)
- ✎ Avoid contact with floodwater as much as possible, but when necessary wear appropriate protective clothing (i.e. boots, gloves) and wash exposed skin thoroughly afterwards
- ✎ Open cuts or sores exposed to floodwater should be washed with clean water and covered with a waterproof dressing
- ✎ Avoid mosquito proliferation and bites by emptying water-holding containers outside the house, using repellent and wearing loose, light and long clothing

Most at risk

(see also ‘all hazards’ – page 8)

- ✎ People living in low-lying and flood-prone areas



Health impact of previous flood in NSW

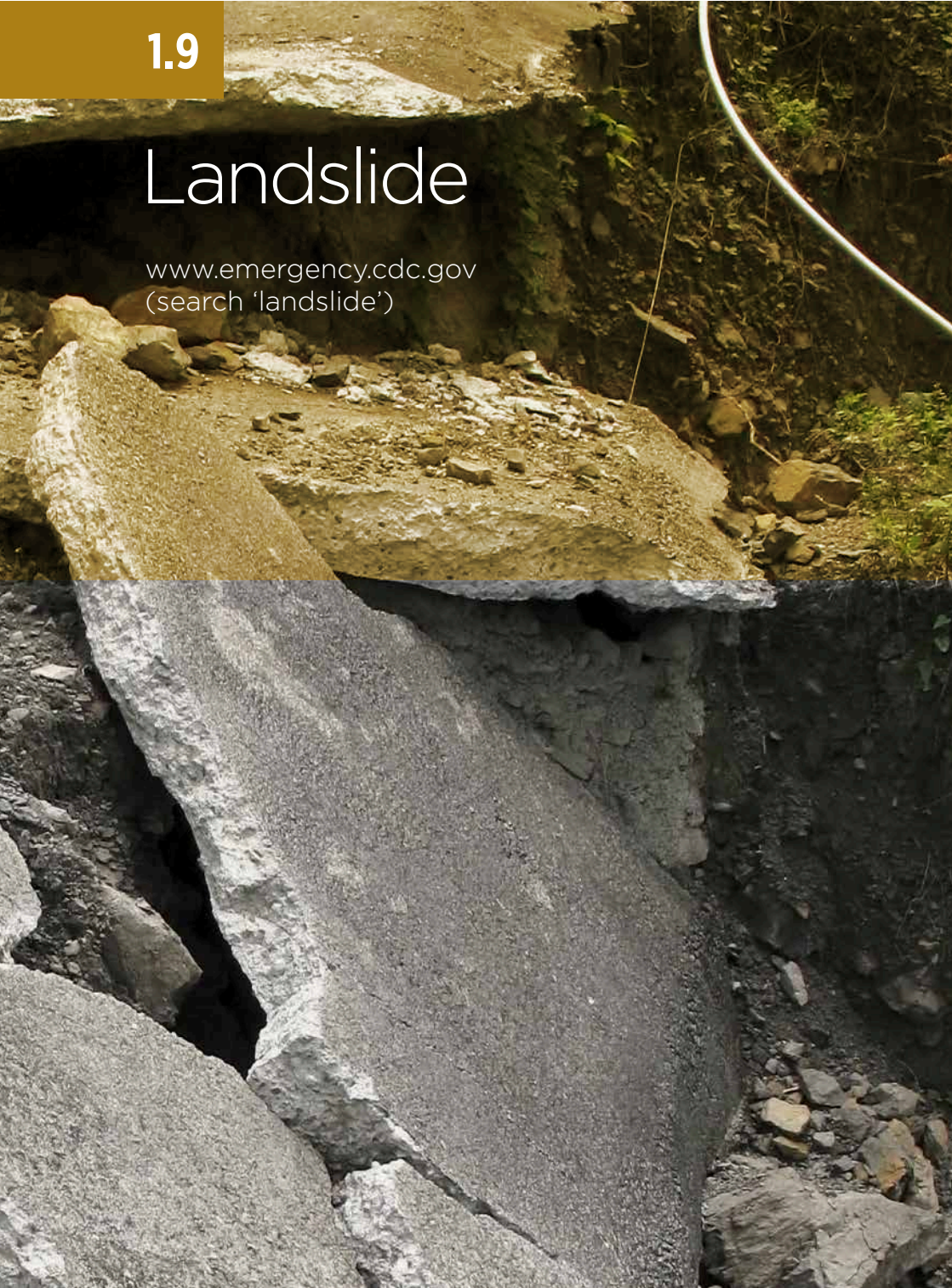
20 February – 26 March 2012: Torrential rain in the Snowy Mountains and Riverina caused the flooding of 2000 properties in NSW. During this period, flood-related problems were identified during the triage of 93 people presenting at Emergency Departments linked to the PHREDSS data system. The main reasons for presentation included: difficulty accessing health services (21 people), medication provision (16 people), tetanus immunisation (12 people) and skin rash/infection (10 people).



1.9

Landslide

www.emergency.cdc.gov
(search 'landslide')



Background

- ✦ Combat agency: The State Emergency Operations Controller takes control during a landslide
- ✦ Landslides usually occur secondary to floods, severe storms and/or earthquakes

Location & seasonality

- ✦ Landslides do not follow a seasonal pattern
- ✦ Susceptible areas are often identifiable and this enables risk assessment and mitigation to be undertaken

Primary public health issues

(see also 'all hazards' – page 8)

Building and structure damage

- ✦ See page 15

Temporary housing

- ✦ See page 16

Direct traumatic injury

- ✦ Increased risk of injury from rapidly moving water/debris and subsequent suffocation if entrapment occurs

Messages

- ✦ Liaise with responsible agencies to ensure safety messages about trauma and injury are included in the information disseminated to the public

Most at risk

(see also 'all hazards' – page 8)

- ✎ People living in areas where bush fires or human activities have destroyed vegetation (includes surfaces altered by construction of buildings and roads)
- ✎ People in areas where landslides have previously occurred
- ✎ People situated at the bottom of steep slopes or canyons (including channels along creeks or rivers)



Health impact of previous landslide in NSW

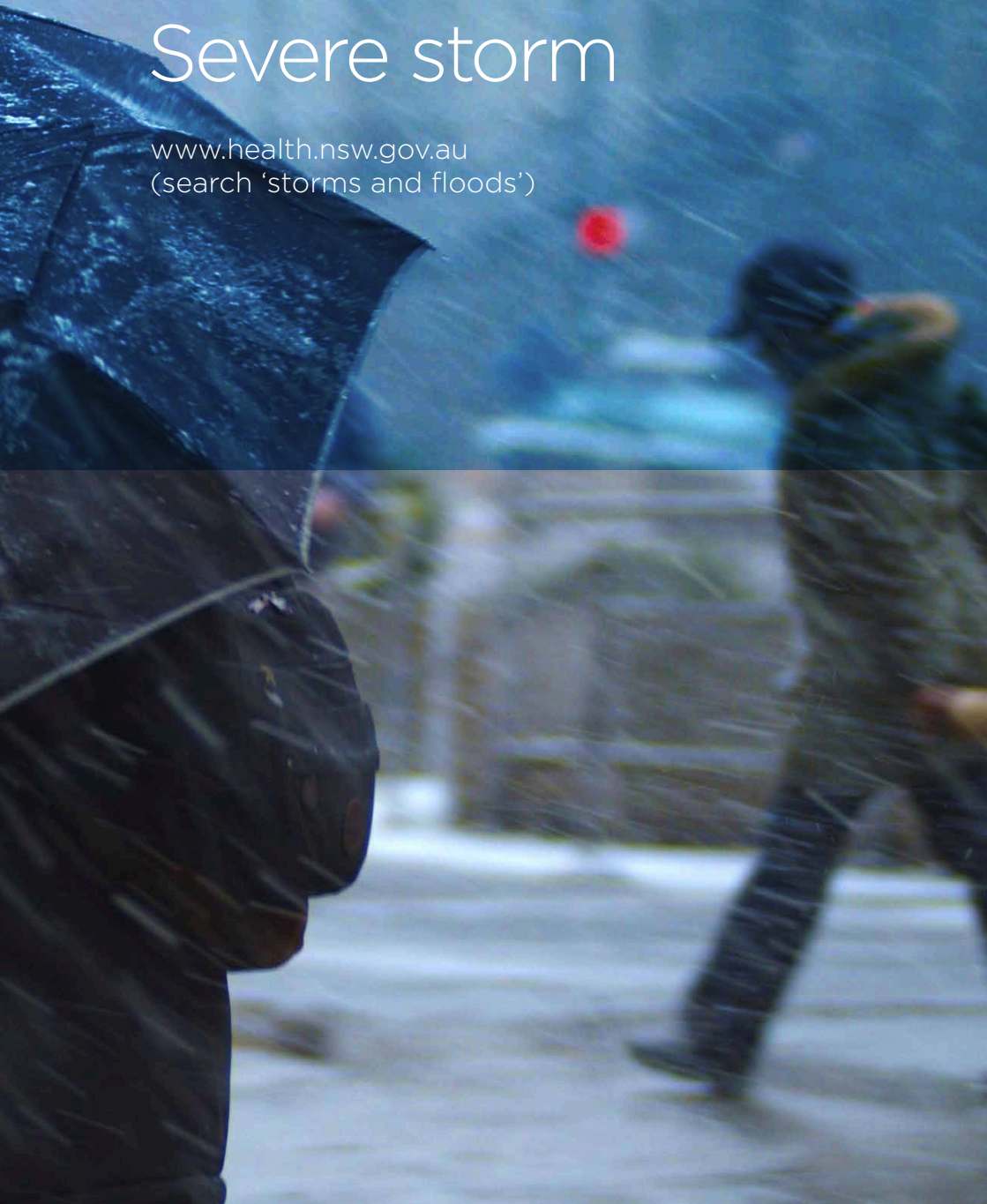
30 July 1997: A landslide at the village and ski resort of Thredbo destroyed two ski lodges. Landslides typically cause high mortality and few injuries and on this occasion 18 people were killed.



1.10

Severe storm

www.health.nsw.gov.au
(search 'storms and floods')



Background

- ✎ Combat agency: NSW State Emergency Service
- ✎ NSW has a State Storm Sub Plan (search “State Storm Sub Plan” at www.emergency.nsw.gov.au)
- ✎ Severe storms include thunderstorms, tornadoes (extremely damaging winds in a typical funnel cloud shape) and cyclones (low pressure systems with intense sustained gale force winds with heavy rains), which all may produce high winds, heavy rain, snow, sleet, hail, ice, lightning, thunder, water spouts and/or storm surges

Location & seasonality

- ✎ Severe storms can occur across NSW, but most commonly affect coastal areas and mountain ranges
- ✎ Severe storms can occur throughout the year, but most commonly occur in summer and autumn

Primary public health issues

(see also ‘all hazards’ – page 8)

Building and structure damage

- ✎ see page 15

Flood

- ✎ see page 39

Temporary housing

- ✎ see page 16

Air quality (allergens)

- ✎ Allergen inhalation can exacerbate respiratory symptoms and some severe storms can cause “thunderstorm asthma”

Messages

- ✎ Watch for asthma symptoms, especially in young children. Symptoms include wheezing, shortness of breath, tightness in the chest or persistent coughing – seek medical attention if symptoms persist
- ✎ Avoid vigorous physical activity and ensure adequate medication is accessible while following action plans for asthma/chronic obstructive pulmonary disease (COPD)
- ✎ Monitor air quality on the Office of Environment and Heritage website (www.environment.nsw.gov.au search ‘air quality index’)

Direct traumatic injury:

- ✎ Increased risk of injury from hail, lightning strike, flying objects or damaged trees and property

Messages:

- ✎ Remain indoors and consider using helmets and child car seats to protect against head injury if winds are extremely strong

Most at risk

(see also “all hazards” – page 8)

- People who live in coastal locations
- People in mobile homes or other easily-damaged shelters
- People remaining in vehicles and not seeking shelter



Health impact of previous severe storm in NSW

7 June 2007: A severe storm brought heavy rains of up to 275mm in 24 hours and gale-force winds exceeding 130km/hr to Newcastle, Gosford, Wyong and Sydney. There was widespread damage to houses, businesses, schools, hospitals, nursing homes and community health centres. Ten people died as a result of the storm and approximately 6000 residents were evacuated.





1.11

Tsunami

www.emergency.cdc.gov
(search 'tsunami')



Background

- Combat agency: NSW State Emergency Service
- NSW has a State Tsunami Emergency Sub Plan (search “Tsunami Emergency Sub Plan” at www.emergency.nsw.gov.au)

Location & seasonality

- Tsunamis that could affect NSW may be generated by earthquakes and may have travelled great distances to hit vast lengths of coastal land
- Tsunamis can occur at any time during the year

Primary public health issues

(see also ‘all hazards’ – page 8)

Building and structure damage

- See page 15

Water inundation

- See page 40

Direct traumatic injury

- See page 44

Temporary housing

- See page 16

Water contamination (brackish)

- Drinking and cooking with brackish water (i.e. a mixture of fresh and salt water) for an extended period may be associated with secondary health issues from increased ingestion of sodium and other contaminants

Messages:

- Avoid using brackish water for drinking and cooking (NOTE: boiling brackish water can increase concentrations of sea salts and other contaminants)

Most at risk

(see also “all hazards” – page 8)

- People in low-lying coastal areas



Health impact of previous tsunami in NSW

23 May 1960: An earthquake in Chile caused the largest tsunami known to have affected the NSW coast (i.e. 1.8 metres in Eden, 1.2 metres in Iluka, 1.0 metre in Sydney Harbour). The tsunami was much larger in other locations (i.e. 10.7 metres in Hawaii). Although there were no confirmed deaths in Australia, it caused extensive destruction and up to 6,000 deaths in locations throughout the Pacific.



SECTION 2: RECOVERY

Public health issues are likely to develop during recovery from a natural disaster if community members and responders are not provided guidance on mitigating these risks.

While the acute response phase may have passed, public health services often remain active in conjunction with local government environmental health services.

Public health activities commenced during the preparation and response phases should be maintained until the underlying issues have been resolved. There are also additional risks that may need to be addressed during the recovery phase.

2.1 Power outage

Power outages frequently occur during and after natural hazard events. NSW has developed an infrastructure that is highly dependent on electricity and prolonged power outages can have serious public health implications.

Primary public health issues

Climate exposure

Disruption to electrical heating/cooling may expose people to extreme weather and unsafe temperatures

Fire safety

Be aware of the risk of smoke inhalation, burns and fire danger when using candles and naked flames

Food preservation

The NSW Food Authority refers to the 'golden rules of food safety':

- ✎ Keep it cold
- ✎ Keep it clean
- ✎ Keep it hot
- ✎ Check the label

For further advice see the NSW Food Authority website (www.foodauthority.nsw.gov.au search 'keeping food safe in an emergency').

Generator use and other carbon monoxide producing machinery:

Put generators and other carbon monoxide producing equipment outside as far from dwellings as possible and use monitors to avoid poisoning

Sewage/water contamination

Follow existing processes when responding to contamination incidents (www.health.nsw.gov.au search for 'water quality')

Boil Water Alerts may be necessary if drinking water quality is compromised

Vaccine/medicine preservation:

Do not open freezers and refrigerators until power is restored and consider packing medicine/vaccine in coolers with icepacks when an outage lasts ≥ 4 hours

Record fridge/vaccine temperatures and outage duration data and consult with your local public health unit before using or discarding the vaccines

For further advice search 'National Vaccine Storage Guidelines' on www.immunise.health.gov.au.



Health impact of a previous prolonged power outage

In August 2003, a power outage in northeastern USA (including New York City) lasted three days and had widespread public health ramifications:

- ✚ Failure of electric water pumps meant that high-rise residents were without water
- ✚ Failure of back-up generators caused accidental release of untreated sewage, which led to beach closures
- ✚ Failure of four hospital emergency generators affected the capacity to cope with people attending hospital to source power for electrical medical equipment
- ✚ Compromised city rubbish and waste collections, particularly from food outlets, contributed to concerns about the rodent population
- ✚ Enhanced monitoring of hospital admissions and emergency department presentations for diseases caused by spoiled food or contaminated water identified a spike in diarrhoeal conditions three days after the blackout
- ✚ Increased surveillance of food wholesalers and retail stores for food spoilage was necessary
- ✚ Compromised phone systems and emergency lighting in the Emergency Operations Centre at the Department of Health and Mental Hygiene building (lower Manhattan)
- ✚ Collected emergency department syndromic surveillance system data manually instead of using established electronic reporting systems

Beatty ME, Phelps S, Rohner C and Weisfuse I, *Blackout of 2003: Public Health Effects and Emergency Response Public Health Reports* - Jan-Feb 2006, Vol 121

2.2 Cleaning up the aftermath

Most natural hazard events will require some form of cleaning up during the recovery phase. During this period public health hygiene measures should be strongly encouraged. Although cleaning up is an integral step in preventing secondary public health issues, the process can also have direct public health implications if not carefully managed.

It is important to continue to monitor infectious and water-/insect-transmitted diseases until normal health services, water systems, housing, utilities and social services have been restored. Public health services will also need to liaise closely with the designated recovery authority to ensure messages are disseminated to the affected community.

Primary public health issues

Receding floodwaters after inundation

- ✎ Clean all floodwater-affected surfaces
 - Use a mild detergent, vinegar diluted in water or diluted household bleach (follow label instructions)
 - Hard-surfaced floors, walls and sinks should be thoroughly cleaned with hot soapy water and disinfected by wiping or spraying with a chlorine bleach solution or a product labelled as a disinfectant (follow label instructions)
 - Wash soft fabric articles on hot (>60°C) cycle
 - Direct sunlight is best for drying out items, otherwise increase heating and ventilation indoors
- ✎ Reduce the risk of toxic exposure by avoiding contact with floodwaters that may contain oils, paints, freons, cleansers and other noxious chemicals from a generally deteriorating environment

- Reduce the risk of skin infection by avoiding contact with previously flooded grassy areas for at least one week and using protective clothing (eg. rubber boots, waterproof gloves, mask, goggles) to prevent direct contact with floodwater (particularly cuts/lacerations)
- Wash hands with soap and clean water frequently (including after the removal of gloves)
- Reduce the risk of gastrointestinal infection, particularly among people staying at evacuation centres or responder camps, by avoiding ingestion of contaminated food/water, hand washing and following Boil Water Alerts
 - For further advice see:
 - www.foodauthority.nsw.gov.au (search 'keeping food safe in emergencies')
 - www.nhmrc.gov.au (search 'Australian Drinking Water Guidelines')
- Consider the most appropriate methods to reduce the risk of mosquito proliferation and associated diseases (e.g. removing standing water)
 - For further advice see:
 - www.health.nsw.gov.au (search 'mosquito')

Residual dust after high winds or structure damage

- Remove dust to reduce risk of ongoing airway irritation
 - use a broom head covered by a dry stocking to create a static charge to collect the dust
 - start high (including above ceiling lamp shades) and work down before vacuuming the floor last
 - shake items like cushions, mats and rugs outside
 - use white vinegar to wash windows
 - always vacuum before mopping

Debris after high winds or structure damage

- ✎ Avoid contact with potentially hazardous chemicals such as asbestos, ash from burnt treated timber (eg. copper chrome arsenate), garden/farm products, medicines, metals/residues from burnt appliances, carbon monoxide gas leaks and general household chemicals (e.g. cleaning products, pool chlorine) (www.health.nsw.gov.au search 'advice to health professionals asbestos')
- ✎ Be aware of potential physical hazards such as downed live power lines, unstable structures at risk of further collapse, smouldering coals and fallen trees
- ✎ Reduce the risk of injury by using protective equipment (e.g. boots, overalls with long sleeves, mask) and heeding warnings when using unfamiliar tools or equipment (e.g. chainsaw)
- ✎ Liaise with medical professionals regarding the treatment of infected wounds that have been contaminated with soil using antibiotics that cover gram-negative bacteria

Disruption to utilities (e.g. gas, water, electricity)

- ✎ Residents should ensure utilities have been checked by registered professionals before returning to live in homes
- ✎ Consider if advice regarding waste removal services is necessary



SECTION 3:
**OTHER KEY
RESOURCES**

NSW Government

NSW Health

www.health.nsw.gov.au

- *Major Evacuation Centres: Public Health Considerations*
- *Public Health Field Response Guidelines*
- *NSW Health A to Z of infectious diseases*
- *NSW Health environmental health factsheets*
- *NSW Health water quality resources*

NSW Ministry for Police and Emergency Services

www.emergency.nsw.gov.au

- *Government, you and what to do:
A guide to natural disasters in NSW*

Australian Government

Australian Emergency Management Institute

www.em.gov.au/aemi

- *Disaster resilience education for schools*

International resources

World Health Organization

www.who.int

➤ *Technical guidelines – natural disaster profiles*

Centers for Disease Control and Prevention

www.bt.cdc.gov

➤ *Natural disasters & extreme weather*

Public Health England

www.hpa.org.uk

➤ *Extreme weather events and natural disasters*

APPENDIX: SUMMARY MATRIX

	Tsunami [pg. 53]	Severe Storm [pg. 47]	Landslide [pg. 43]	Flood [pg. 39]	Extreme Heat [pg. 35]	Extreme Cold [pg. 31]	Earthquake [pg. 27]	Dust Storm [pg. 23]	Cyanobacteria [pg. 19]	Bushfire [pg. 13]
Primary public health issues for preparation and response to each type of natural hazard										
Air quality (allergens) [pg. 49]			✓							
Air quality (dust) [pg. 24]	✓									
Air quality (smoke) [pg. 14]		✓	✓							
Building and structure damage [pg. 15]		✓	✓	✓						
Cold exposure [pg. 32]						✓				
Direct heat exposure [pg. 15]										
Direct toxin exposure [pg. 20]									✓	
Direct traumatic injury [pg. 49]		✓					✓			
Falls risk [pg. 32]										✓
Heat-related illness [pg. 36]										✓
Infrastructure compromise (water, sewage, transport, power) [pg. 9]					✓			✓	✓	✓
Mental health and emotional injury [pg. 10]									✓	✓
Temporary housing [pg. 16]										✓
Water contamination (brackish) [pg. 55]										
Water inundation [pg. 40]										

Note: This table is a guide only and each natural hazard event should be risk assessed individually.



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