Disaster Health

Australian Institute for
Disaster Resilience

Disaster Health

Handbook **1**

Australian Government

Attorney-General's Department

History of the Australian National Disaster Resilience Handbook Collection

The first publications in the original Australian Emergency Manual Series were primarily skills reference manuals produced from 1989 onwards. In August 1996, on advice from the National Emergency Management Principles and Practice Advisory Group, the Series was expanded to include a more comprehensive range of emergency management principles and practice reference publications.

In 2011, Handbooks were introduced to better align the Series with the *National Strategy for Disaster Resilience*. Compiled by practitioners with management and service-delivery experience in a range of disaster events, the handbooks comprised principles, strategies and actions to help the management and delivery of support services in a disaster context.

In 2015, the Australian Institute for Disaster Resilience (AIDR) was appointed custodian of the handbooks and manuals in the series. Now known as the Australian Disaster Resilience Handbook Collection, AIDR continues to provide guidance on the national principles and practices in disaster resilience in Australia through management and publication of the Collection.

The Handbook Collection is developed and reviewed by national consultative committees representing a range of state and territory agencies, governments, organisations and individuals involved in disaster resilience. The Collection is sponsored by the Australian Government Attorney-General's Department.

Access to the Collection and further details are available at www.knowledge.aidr.org.au.

Australian National Disaster Resilience Handbook Collection (2011 –)

Handbook 1   Disaster health

Handbook 2   Community recovery

Handbook 3   Managing exercises

Handbook 4   Evacuation planning

Handbook 5   Communicating with people with a disability – National Guidelines for Emergency Managers

Handbook 6   National Strategy for Disaster Resilience – community engagement framework

Handbook 7   Managing the floodplain: a guide to best practice in flood risk management in Australia

> **Guideline 7-1**   Guideline for using the national generic brief for flood investigations to develop project specific specifications
>
> **Guideline 7-2**   Technical Flood Risk Management Guideline: flood emergency response classification of the floodplain
>
> **Guideline 7-3**   Technical flood risk management guideline: flood hazard
>
> **Template 7-4**   Technical project brief template
>
> **Guideline 7-5**   Technical Flood Risk Management Guideline - flood information to support land-use planning
>
> **Guideline 7-6**   Technical flood risk management guideline: assessing options and service levels for treating existing risk
>
> **Practice Note 7-7**   Considering flooding in land-use planning activities

Handbook 8   Lessons management

Handbook 9   Australian Emergency Management Arrangements

Handbook 10   National Emergency Risk Assessment Guidelines *(plus supporting guideline)*

    Guideline 10-1 National Emergency Risk Assessment Guidelines: practice guide

Handbook 11   *renamed Guideline 10-1 National Emergency Risk Assessment Guidelines: practice guide*

Handbook 12   *Spontaneous volunteer management*

Australian Emergency Management Manual Series

The most recent list of publications in the Manuals series includes 46 titles.

The manuals have not been reviewed since 2011 or earlier and the Manual Series is undergoing a review which will see relevant Manuals move into the Handbook Collection. Current and past editions of the Manuals will remain available on the AIDR Knowledge Hub at www.knowledge.aidr.org.au.

Manual Series Catalogue: 2004 - 2011

Manual 1   Emergency management concepts and principles (2004)

Manual 2   *Australian Emergency Management Arrangements (superseded by Handbook 9)*

Manual 3   Australian Emergency Management Glossary (1998)

Manual 4   Australian Emergency Management Terms Thesaurus (1998)

Manual 5   *Emergency risk management – applications guide (superseded by Handbook 10)*

Manual 6   *Implementing emergency risk management – a facilitator's guide to working with committees and communities (superseded by Handbook 10)*

Manual 7   Planning safer communities – land use planning for natural hazards (2002, currently under review)

Manual 8   *Emergency catering (2003, archived)*

Manual 12   Safe and healthy mass gatherings (1999)

Manual 13   Health aspects of chemical, biological and radiological hazards (2000)

Manual 14   Post disaster survey and assessment (2001)

Manual 15   Community emergency planning (1992)

Manual 16   Urban search and rescue – capability guidelines for structural collapse (2002)

Manual 17   Multi-agency incident management (replaced by AIIMS)

Manual 18   Community and personal support services (1998)

Manual 19   *Managing the floodplain (superseded by Handbook 7)*

Manual 20   Flood preparedness (2009)

Manual 21   Flood warning (2009)

Manual 22   Flood response (2009)

Manual 23   Emergency management planning for floods affected by dams (2009)

Manual 24   Reducing the community impact of landslides (2001)

Manual 25   Guidelines for psychological services: emergency managers guide (2003)

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PREFACE

This edition of the previously named Disaster Medicine Manual has been radically revised to reflect current thinking about the health aspects of disasters in Australia. While it maintains a similar format to the previous editions, it has been designed as a starting point for those interested in disaster health and presents the Australian Government's perspective on disaster health nationally.

A key change to the manual is the new title of Australian Emergency Management Handbook Disaster Health. This represents the whole-of-health focus that goes into the prevention of, preparedness for, response to and recovery from disasters in Australia. The previous title of Disaster Medicine Manual linked with the many clinically orientated aspects of the earlier editions, focused attention on the more medical aspects of disasters, and in particular emphasised the role of doctors and nurses in the response to disasters. It is hoped this third edition of the manual has a more comprehensive health approach and incorporates a broader perspective on the disaster health field.

A further strategy of the new manual is to refer readers to authoritative resources and relevant sources of additional information whenever possible. Earlier editions have suffered because changes in the field of disaster health occur rapidly, thereby dating the manual's contents. It is hoped that by directing readers to appropriate sources it is more likely they can access up-to-date information.

An extensive literature review formed the basis for much of this revised edition's contents. It is important for health policy to be evidence-based wherever possible and the inclusion of references from recent peer-reviewed journals supports the contents of this manual.

A number of case studies have been included in this new edition of the manual, using real-life examples to highlight some of the key points from the text. The focusing of disaster health theory around examples from the community will help to set the discussions in their proper context.

Finally, this edition of the manual was developed in consultation with Australian experts in the field of disaster health, including representatives from each state and territory. With this wealth of experience and variety of viewpoints, a balanced and comprehensive introduction to the subject of disaster health has been developed.

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INTRODUCTION

Fortunately major disasters that have a significant impact on the health of Australians are rare. When they occur, however, the effects can be devastating both in terms of morbidity and mortality. Given this, it is essential to make every effort to minimise the impact of all aspects of disasters when they strike.

Disaster health is the study and collaborative application of various health disciplines to the *prevention* of, *preparedness* for, *response* to and *recovery* from the health problems arising from a disaster. It is a field of healthcare practice that is truly multi-disciplinary with a wide range of skill sets required to comprehensively approach disasters from a health perspective.

This manual is designed to give an overview of the principles and practices associated with disaster health. It has been developed as a starting point for people with an interest in disaster health in the Australian context and to provide a platform from which further study and education can be built.

The manual is split into four main sections. Section 1 considers disasters in the Australian context including the types of disasters that affect Australians as well as the health arrangements in place to deal with them. Section 2 looks at some important disaster health concepts. This includes concepts such as surge, risk, resilience and the approaches to emergency management. Section 3 focuses on the more practical aspects of disaster health such as triage, transportation, mental health, and Australian Medical Assistant Teams, among others. Finally Section 4 highlights other issues relating to disaster health including ethical issues and training needs. Many of the chapters provide key texts to enhance the reader's knowledge on a particular topic, as well as references that can be used as more detailed background reading. A number of the key resources are also listed below.

Disaster health is a broad and complex subject and gaining experience in the field is essential to understanding many of its varied aspects. This manual is just the start and it is up to individual readers to decide where this journey will take them.

KEY RESOURCES

Texts

Australasian Fire Authorities Council 2005, *The Australasian Inter-service Incident Management System: a management system for any emergency* (3rd ed). East Melbourne

Australian Standards 2010, 4083:2010 *Planning for emergencies – health care facilities.* NSW: SAI Global Ltd

Australian Standards 2009, AS/NZS ISO 31000:2009 *Risk management – principles and guidelines.* NSW: SAI Global Ltd

Norton,I. and Trewin A, Eds Australasian health disaster response (2011)-An Operational guide incorporating MIMMS Wiley and Blackwell

The Sphere Project 2011, *Humanitarian charter and minimum standards in disaster response.* Oxford: Oxfam Publishing

Websites

Emergency Management in Australia: www.ema.gov.au

The Department of Health and Ageing: www.health.gov.au

The Sphere Project: www.sphereproject.org

The World Health Organization: www.who.int

How to use this handbook

To guide the reader, the following symbols are used throughout the handbook.

Key point

Case study

Other references/resources

SECTION A: AUSTRALIA AND DISASTER HEALTH

CHAPTER 1
Disasters and Australia

> **Key points**
> - **Disasters can have very significant health impacts**
> - **Australians are also affected by disasters that occur overseas**
> - **The threat from acts of terror impacts on disaster health preparedness in Australia and internationally**
> - **Risk, emergencies and disasters are all important concepts in disaster health**

The Australian emergency management glossary (Commonwealth of Australia 1998) defines a disaster as:

> *A serious disruption to community life which threatens or causes death or injury in that community and/or damage to property which is beyond the day-to-day capacity of the prescribed statutory authorities and which requires special mobilisation and organisation of resources other than those normally available to those authorities.*

One of the most obvious and significant health impacts of a disaster is the large number of deaths that may occur as a result. Table 1.1 shows the 10 Australian disasters that have caused the most deaths during the past century.

It is clear from this data that in terms of mortality, natural disasters have had the biggest health impact, particularly environmental events such as heatwaves. Some of the better-known disasters not listed in Table 1.1 include the 1983 Ash Wednesday bushfires which killed 75 people, the 1977 Granville rail disaster which killed 83 people and Cyclone Tracey which killed 65 people in 1974. During the past decade storms and floods have had a significant impact on Australians, due to the number of people they have affected and their relative frequency (Figure 1.1).

Australians are also affected by disasters that occur overseas. The Indian Ocean tsunami in 2004 saw one of the highest mortality rates from a single disaster in recent times, with over 270,000 people killed across numerous countries. Many more people were displaced, injured or suffered ongoing adverse health outcomes. Among those that died were more than 20 Australians.

Table 1.1: Top 10 Australian disasters in the past century by number of people killed (source: Attorney-General's Department Disasters Database: www.disasters.ema.gov.au/Default. aspx)

Disaster	Date	No. killed
Heatwave – southern states	1939	438
Heatwave – Victoria/South Australia	2009	404
Cyclone – Port Hedland	1912	173
Bushfire – Victoria (Black Saturday)	2009	173
Heatwave – widespread	1912	147
Heatwave – widespread	1911	143
Cyclone – Broome	1935	141
Heatwave – widespread	1926	130
Cyclone – North Queensland	1911	122
Heatwave – widespread	1913	122

Acts of terror have impacted on Australian lives too. As yet no such disasters have occurred on Australian shores but the attack on the World Trade Centre in 2001 not only led to the deaths of 10 Australians but also changed the face of disaster planning worldwide. After the World Trade Centre disaster, acts of terror have been committed much closer to home. In 2002 three bombs were detonated in the town of Kuta in Bali. Of the 202 fatalities 88 were Australians. Many casualties were transported to Australia via Darwin for treatment. There were further bombings in Bali in 2005 which led to Australian casualties and a significant response from Australian emergency management organisations. Personal accounts from healthcare workers who responded to some of these disasters are referenced at the end of this chapter.

During the past century relatively few major disasters have had a significant impact on the health of Australians. It is clear, however, that an increasing number of incidents have affected Australians during the past decade. There is increased community awareness about potential disasters and their effects, and a growing expectation that agencies will be prepared to respond appropriately. This combined with the growing threat from acts of terror means that all Australians should be prepared for the possible health impacts of disasters.
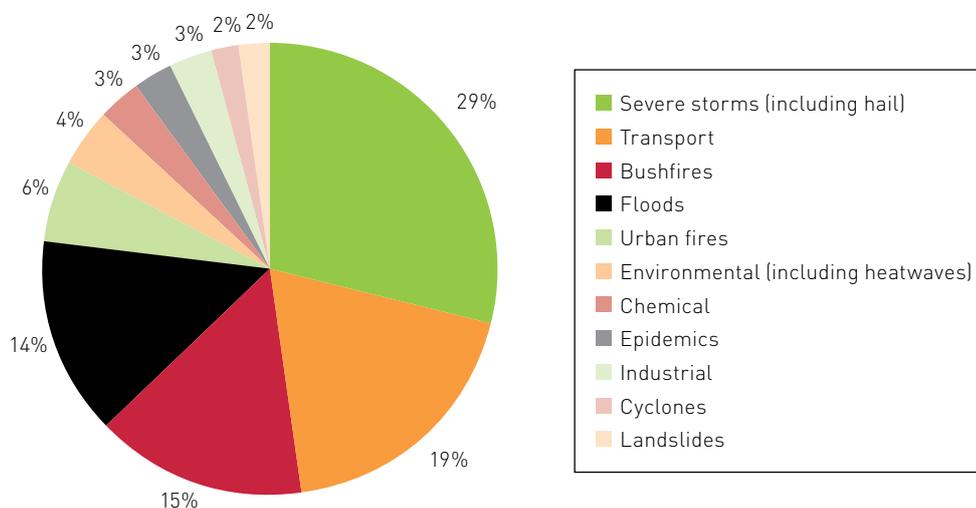
Figure 1.1: The relative frequency of specific disasters in Australia from 2000–2009 (source: Attorney-General's Department Disasters Database: www.disasters.ema.gov.au/Default.aspx)

Definitions

To conceptualise disaster health it is important to understand some of the more frequently used concepts in the field of emergency management. The *Australian emergency management glossary* uses the following definitions:

Hazard   A potential or existing condition that may cause harm to people or damage to property or the environment.

Emergency An event, actual or imminent, which endangers or threatens to endanger life, property or the environment, and which requires a significant and coordinated response.

Risk   The chance of something happening that will have an impact on objectives. It is expressed in terms of consequences and likelihood of those consequences.

Disaster   A serious disruption to community life which threatens or causes death or injury in that community and/or damage to property which is beyond the day-to-day capacity of the prescribed statutory authorities and which

requires special mobilisation and organisation of resources other than those normally available to those authorities.

The new focus of this updated manual involves a move away from disaster medicine towards the concept of disaster health. The following definition will be used:

Disaster health The collaborative application of various health disciplines to the prevention of, preparedness for, response to and recovery from the health problems arising from a disaster.

Other references/resources:

Attorney-General's Department Disasters Database: www.disasters.ema.gov. au/Default.aspx [accessed August 2010]

Commonwealth of Australia 1998, *Australian Emergency Manuals Series: Manual 3 – Australian emergency management glossary.* ACT: Emergency Management Australia

Fisher, D & Burrow, J 2003, 'The Bali bombings of 12 October, 2002: lessons in disaster management for physicians'. *Internal Medicine Journal.* 33: 125-126

Pearce, A, Mark, P, Gray, N & Curry, C 2006, 'Responding to the Boxing Day tsunami disaster in Aceh, Indonesia: Western and South Australian contributions'. *Emergency Medicine Australasia.* 18: 86-92

CHAPTER 2
Australian health emergency response arrangements

> **Key points**
> - **Cooperation and collaboration between the Australian Government and the state and territory governments are key to Australia's health emergency response arrangements**
> - **Health protection in Australia is part of national security**
> - **Functional plans support the national health emergency response arrangements**
> - **State and territory governments can request assistance from the Australian Government through appropriate mechanisms**

The primary responsibility for managing the response to emergencies in Australia lies with state and territory governments. The Australian Constitution does not give the Australian Government statutory authority to direct states and territories on issues relating to emergency management. Therefore there is a **cooperative** and **collaborative** approach to emergencies of national significance.

Commonwealth legislation includes the *Quarantine Act 1908* to reduce the risk of introducing human diseases into Australia and the *National Health Security Act 2007*, which provides for the exchange of public health surveillance information between the Australian Government, states and territories, and the World Health Organization (WHO). There is also international legislation in the form of the International Health Regulations 2005 (IHRs) that aims to strengthen prevention, detection, protection and control of public health events of international significance. *The National Health Security Act 2007* was developed in part to implement the IHRs in Australia.

Health protection in Australia is linked to national security. The definition of national security has been broadened to include climate change, biosecurity, natural disasters and the economy, as well as the traditional realms of defence and intelligence. This is in line with an **all hazards** approach to disaster management. As part of this whole-of-government approach a new crisis management model has been developed in the form of the Australian Government Crisis Management Framework. This framework will be supported by the newly established Parliament House Briefing Room and the National Crisis Coordination Centre.
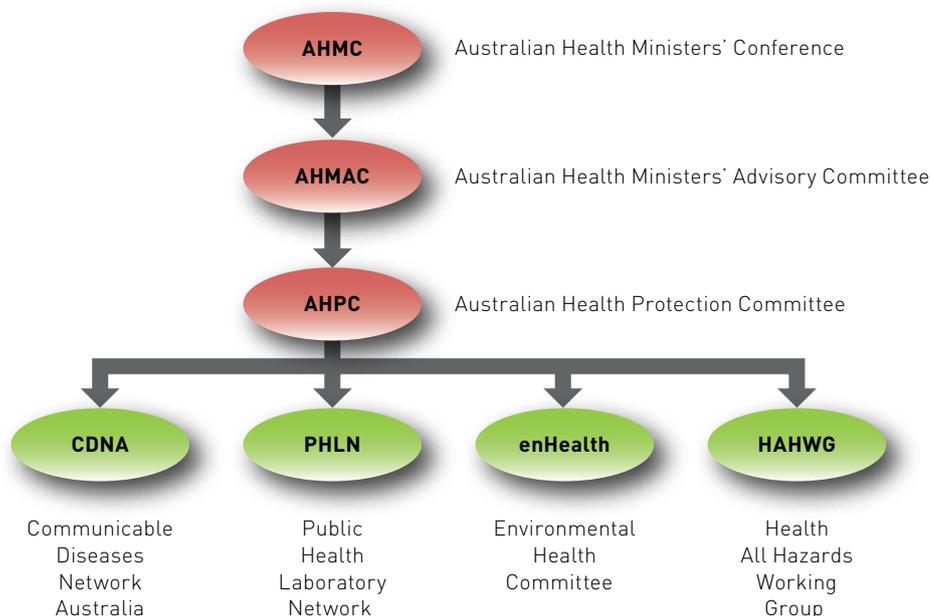
Figure 2.1: **The relationships between national committees involved in the Australian health emergency response**

Currently the health emergency response arrangements at a national level (the National Health Emergency Response Arrangements – NHERA) are coordinated and promoted by the Australian Health Protection Committee (AHPC). This committee comprises representatives from the Australian Government and the states and territories, and was established in 2006 by the Australian Health Ministers' Advisory Council (AHMAC). The AHPC is assisted by the Department of Health and Ageing (DoHA). Within the DoHA the Office of Health Protection (OHP) leads the prevention and preparedness policy agenda at a national level and maintains the DoHA National Incident Room (NIR), which coordinates the operational response to national health emergencies.

The NHERA are constantly evolving to ensure the best-possible framework for the health response to disasters. Functional plans form the pillars that support the NHERA (Figure 2.2). Three plans have been produced or are being developed:

- the *Domestic response plan for mass casualty incidents of national consequence* (AUSTRAUMAPLAN) – including three annexes focusing on:

  - severe burns

- paediatrics

- terrorism

- the *Emergency response plan for communicable diseases and environmental health threats of national significance* (CDEHPLAN) – including communicable disease control (epidemic and pandemic arrangements) and environmental health (response to climate change and natural disasters)

- the *Chemical, biological, radiological and nuclear counter-terrorism plan* (CBRNPLAN).

The AHPC and its subcommittees may develop further plans. Emergency Management Australia (EMA) has produced additional plans for the overall management of a range of

National Health Emergency Response Arrangements
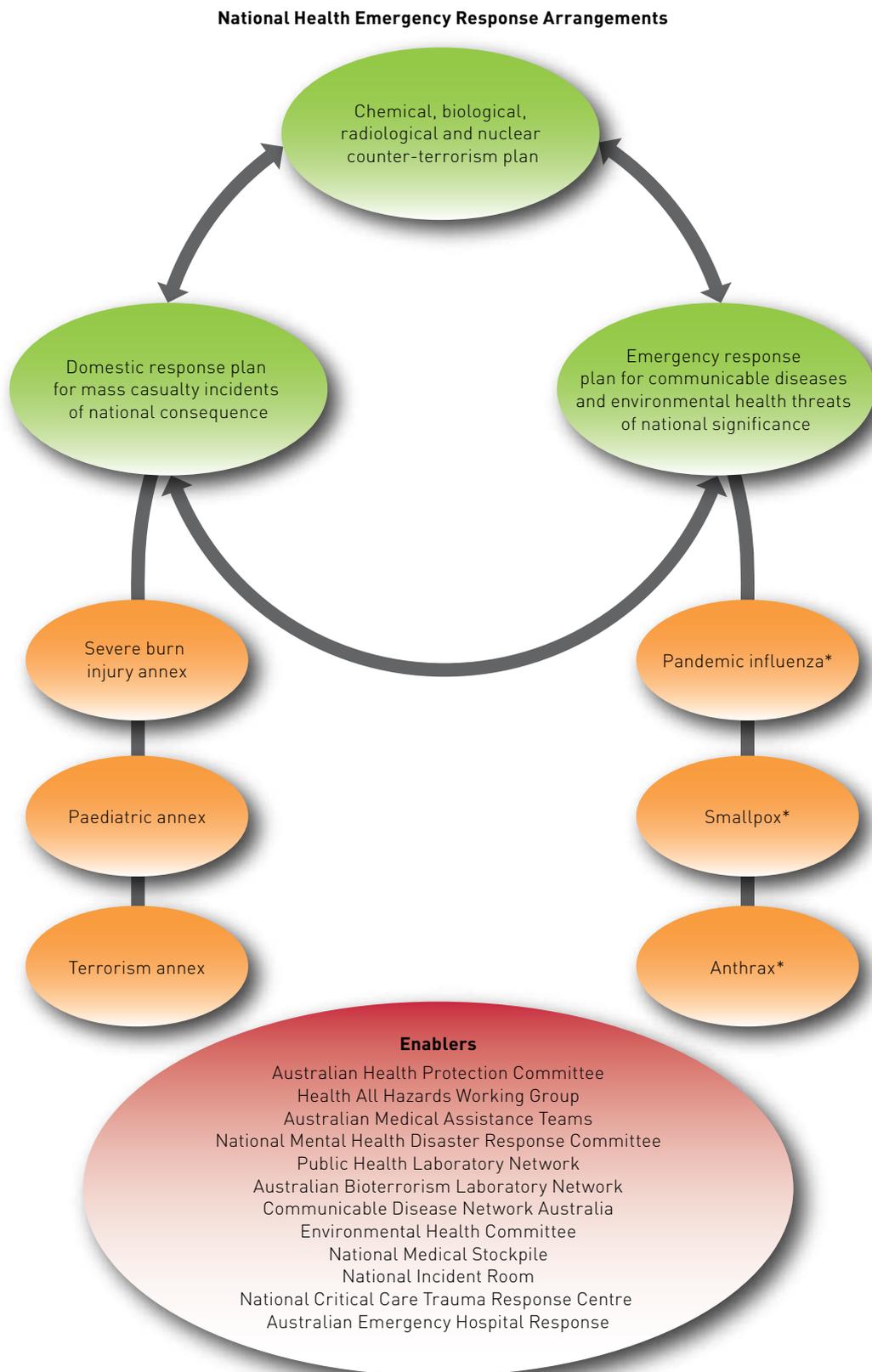
*Examples of current plans with new plans to be developed, e.g., Henipah viruses

Figure 2.2: **The National Health Emergency Response Arrangements (2009)**

At all levels of government there is a **comprehensive approach** that allows rational and strategic emergency management through *prevention, preparedness, response* and *recovery* (PPRR). While functional plans support the *response* and *recovery* components, all levels of government (Australian, state and territory, local) are continually striving to *prevent* hazards and to *prepare* for (and hopefully mitigate) their impacts.

Each state and territory has legislation in place to allow it to manage health emergencies, including public health acts and emergency management acts. These jurisdictions may also request assistance from the Australian Government. These requests may be made directly through the AHPC or the DoHA NIR given the appropriate trigger (see below) but must acknowledge the mechanisms of the *Australian Government disaster plan* (COMDISPLAN) or the *National counter terrorism plan* (NCT-P) when they have been activated.

The plans that form part of the NHERA framework may be activated when domestic or international events:

• impact, or threaten to impact, two or more of the states and territories

• have the potential to overwhelm or exhaust a state or territory's health resources

• are of a scale or complexity that warrants a nationally coordinated response.

Other references/resources:
Australian Government Department of Health and Ageing 2009, *Health emergency preparedness and response.* Available at: www.health.gov.au/internet/main/publishing.nsf/Content/health-pubhlth-strateg-bio-index.htm [accessed 27 October 2010].
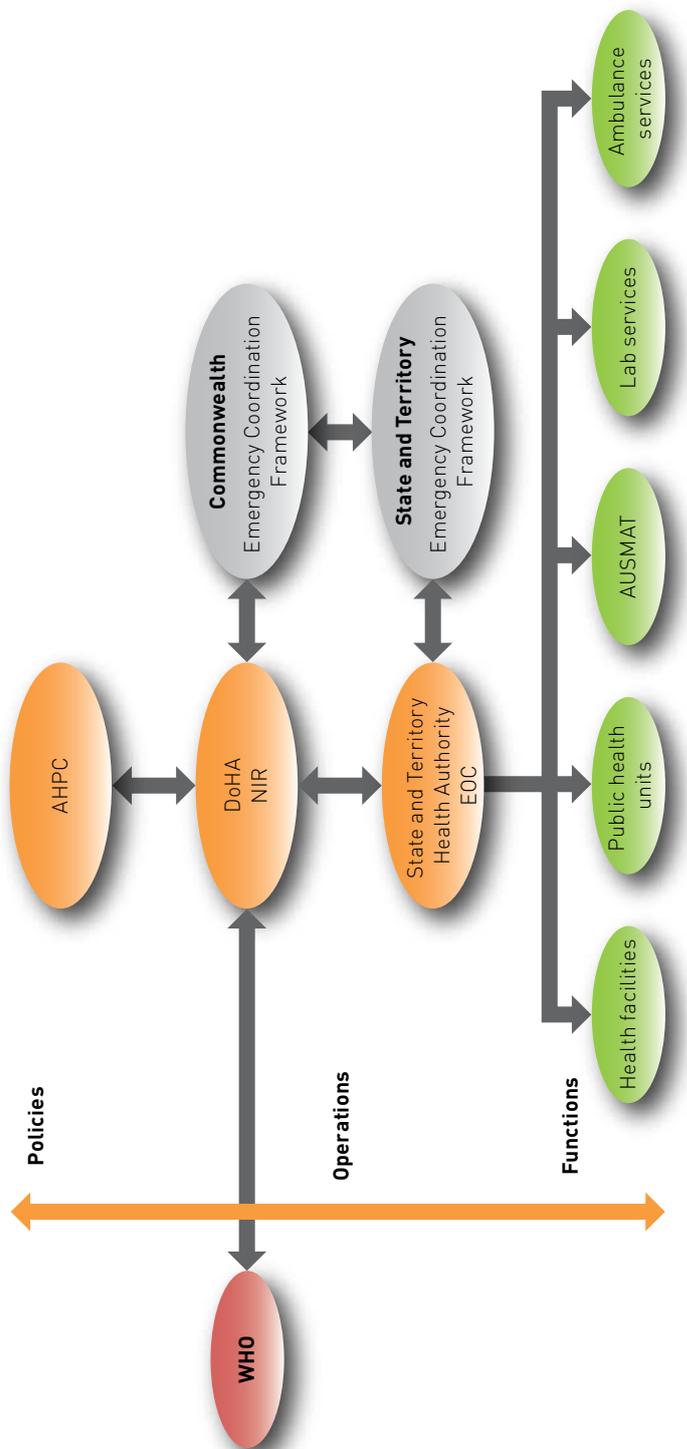
Figure 2.3: **Governance structure for the NHERA**

SECTION B: DISASTER HEALTH CONCEPTS

CHAPTER 3
Disaster resilience and emergency management

> **Key points**
> - **Disaster health is concerned with all health aspects of a disaster**
> - **Approaches to emergency management include the comprehensive approach, the all hazards approach, the all agencies approach and the prepared community**
> - **Disaster resilience is now a core concept in Australia**

Given the increasing regularity and severity of natural disasters, Australian governments have recognised that a national, coordinated and cooperative effort is required to enhance our capacity to withstand and recover from emergencies and disasters. In 2011 the National strategy for disaster resilience was launched which recognises that a national, coordinated and cooperative effort is needed to enhance Australia's capacity to withstand and recover from emergencies and disasters. A disaster-resilient community is one that works together to understand and manage the risks that it confronts. Disaster resilience is the collective responsibility of all sectors of society, including all levels of government, business, the non-government sector and individuals. If all these sectors work together with a united focus and a shared sense of responsibility to improve disaster resilience, they will be far more effective than the individual efforts of any one sector.

Across Australia, managing disasters is largely the responsibility of state and territory governments, with local governments also playing a significant role. It is uncommon for a disaster to be so large that it is beyond the capacity of a state or territory government to deal with effectively. State and territory governments have arrangements with each other to share resources when necessary. During major disasters or adverse events, a state or territory government may seek federal assistance. Underlying this effort, emergency management in Australia is built on the concept of *prevention*, *preparedness*, *response* and *recovery* (PPRR).

Emergency management concepts

During the past 20 years there has been a considered move to give greater emphasis to prevention and recovery in addition to response. It is vital, however, that governments and emergency services remain well prepared to respond to disasters and other adverse

events. Governments have comprehensive systems in place to support recovery and significant effort is now being devoted to preventing disasters, where possible.

There are four main concepts in emergency management:

Comprehensive approach

The comprehensive approach considers *prevention, preparedness, response* and *recovery* activities as a part of a non-linear and interactive process. These four aspects of emergency management are often referred to as PPRR and have been highly influential in Australia and overseas. This forms the base of an approach to emergency management that recognises the need for:

- *prevention*: to hinder, deter and mitigate disasters, while maintaining readiness to deal with disaster events

- *preparedness*: to protect our people, assets, infrastructure and institutions from disaster events; and to establish, train and exercise arrangements to respond to, and recover from a disaster event

- *response*: to respond rapidly and decisively to a disaster event and manage its immediate consequences

- *recovery*: to return national and community life to normal as quickly as possible after a disaster event, through the restoration of social, economic, physical and environmental wellbeing.

All hazards approach

The national health arrangements in Australia are an essential part of the Australian Government's National Security Framework. National security incorporates hazards such as climate change, biosecurity and natural disasters. There are a large number of potential hazards and many of these are not always predictable. Disasters are often grouped into natural, technological, biological and social disasters, and further sub-grouped into those that are intentional (i.e. acts of terror) and non-intentional (i.e. accidents). While some hazards will require specific measures, the adoption of an all hazards approach to disaster health arrangements is intended to manage any disaster that may eventuate, even if it was unforeseen. The all hazards approach can be

incorporated into the comprehensive approach as described above.

All agencies approach

All disasters involve multiple agencies and it is essential they work together to manage emergencies across all levels of government. This is particularly the case in disaster health where the focus has previously been on emergency doctors and nurses who respond to disasters. The all agencies approach recognises that governments, healthcare services, healthcare workers and the community should all be coordinated in their contribution to emergency management and building a disaster-resilient Australia.

The prepared community

The concept of the prepared community applies the comprehensive, all hazards and all agencies approaches at the local level, typically at the local government level, and relies on the principles of a graduated response. This process identifies that the initial responsibility for responding to an emergency rests at the local level. When an emergency requires resources beyond the capability of the local community, support needs can be escalated to districts, jurisdictions and ultimately to a national level.

Disaster response: command, control and coordination

During multi-agency response operations it is important to have structures in place to help administer disaster health arrangements. These structures are either established through legislation or incorporated by agreement in emergency plans:

- *Command*: the direction of members and resources of an organisation in performing that organisation's role. Command operates vertically within an organisation.

- *Control*: the overall direction of emergency management activities in an emergency response situation. Control operates horizontally across organisations.

- *Coordination*: the bringing together of organisations and elements to ensure an effective response. It is generally concerned with the acquisition and application of resources. Coordination relates primarily to resources (organisations, personnel or equipment) and may operate vertically within an organisation as a function of

the command process or horizontally across organisations as a function of control.

In Australia the incident management structure most commonly applied is the Australasian Inter-service Incident Management System (AIIMS). Further information on incident command structures can be found in Chapter 11 – Hospital disaster planning.

Disaster-resilient Australia

Disasters affect people, the economy, infrastructure and the environment and we need to continue improving our resilience to them. We need to develop and embed new ways of doing things to enhance existing arrangements across and within governments, as well as among businesses, the not-for-profit sector and the community more broadly.

Community resilience can be defined in many ways. Rather than define disaster resilience, the national strategy for a disaster resilience focuses on the common characteristics of disaster-resilient communities, individuals and organisations, which are:

• functioning well while under stress

• successful adaptation

• self-reliance

• social capacity.

Resilient communities also have strong social support systems, such as neighbourhoods, family and kinship networks, social cohesion, mutual interest groups, and mutual self-help groups. The National Strategy for Disaster Resilience published by the Attorney-General's Department develops these ideas and is an important starting point.
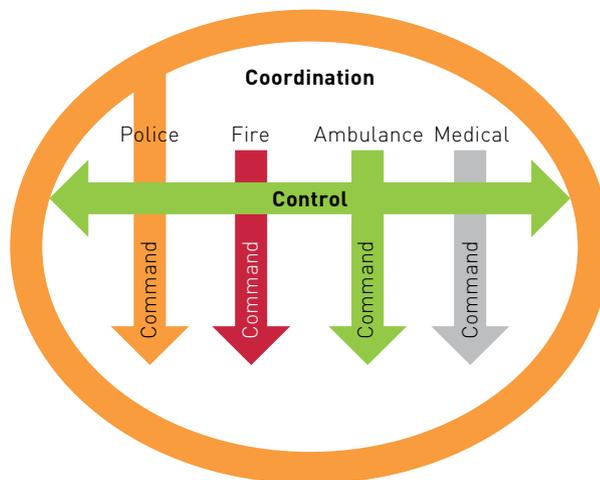
Figure 3.1: The relationship between command, control and coordination for a health emergency response (adapted from Snell 2007)

Other references/resources:

The Australasian Fire Authorities Council 2005, *The Australasian Inter-service Incident Management System: a management system for any emergency*. East Melbourne

Commonwealth of Australia 1998, *Australian Emergency Manuals Series: Manual 3 –Australian emergency management glossary*. ACT: Emergency Management Australia

Commonwealth of Australia 2011, National Strategy for Disaster Resilience COAG adopts National Disaster Resilience Strategy 14/2/2011

Gibson, C & Tarrant, M 2010, 'A "conceptual models" approach to organisational resilience'. *The Australian Journal of Emergency Management*, 25 (2), pp 6-12

Prosser, B & Peters C 2010. 'Directions in disaster policy'. *The Australian Journal of Emergency Management*, 25 (3) pp 8-11

Snell, R 2007, *Mass casualty and major incident guide*. SA: SA Ambulance Service

SECTION B: Disaster health concepts

CHAPTER 4
Disaster health planning

Key points

- **Planning is an essential component of all aspects of disaster health**
- **The planning process is cyclical and requires constant review**
- **All plans should work together at all levels of governance**
- **Disaster epidemiology helps the planning process**
- **Rapid needs assessment applies epidemiological principles to determine the immediate responses required following a disaster**

'Failing to plan is planning to fail'

Why plan?

The importance of planning in disaster health cannot be overemphasised. Planning is an integral part of the *preparedness* process and is essential to ensure an effective *response* and optimal *recovery*. After all reasonable *prevention* measures have been taken, effective disaster health planning is the key to reducing the health impacts of disasters.

The planning process

An example of the planning process is given in Figure 4.1 and described here. For further detail see the *Australian Emergency Manuals Series: Manual 43 – emergency planning*.

The planning process is cyclical and requires careful **communication** and **consultation** at each stage. The continuous **monitoring** and **review** of plans will involve testing them on a regular basis and adapting them when necessary.

- **Identify and establish planning committee** – established emergency planning committees will normally have this role and will have the authority to develop plans.

- **Conduct emergency risk assessment** – this is a tool to identify risks and establish ways to reduce those risks. Risk is considered further in Chapter 7.

- **Identify responsibilities** – control and coordination arrangements and the roles and responsibilities of the organisations involved are determined by legislation, government direction, inter-agency agreement or the planning committee.
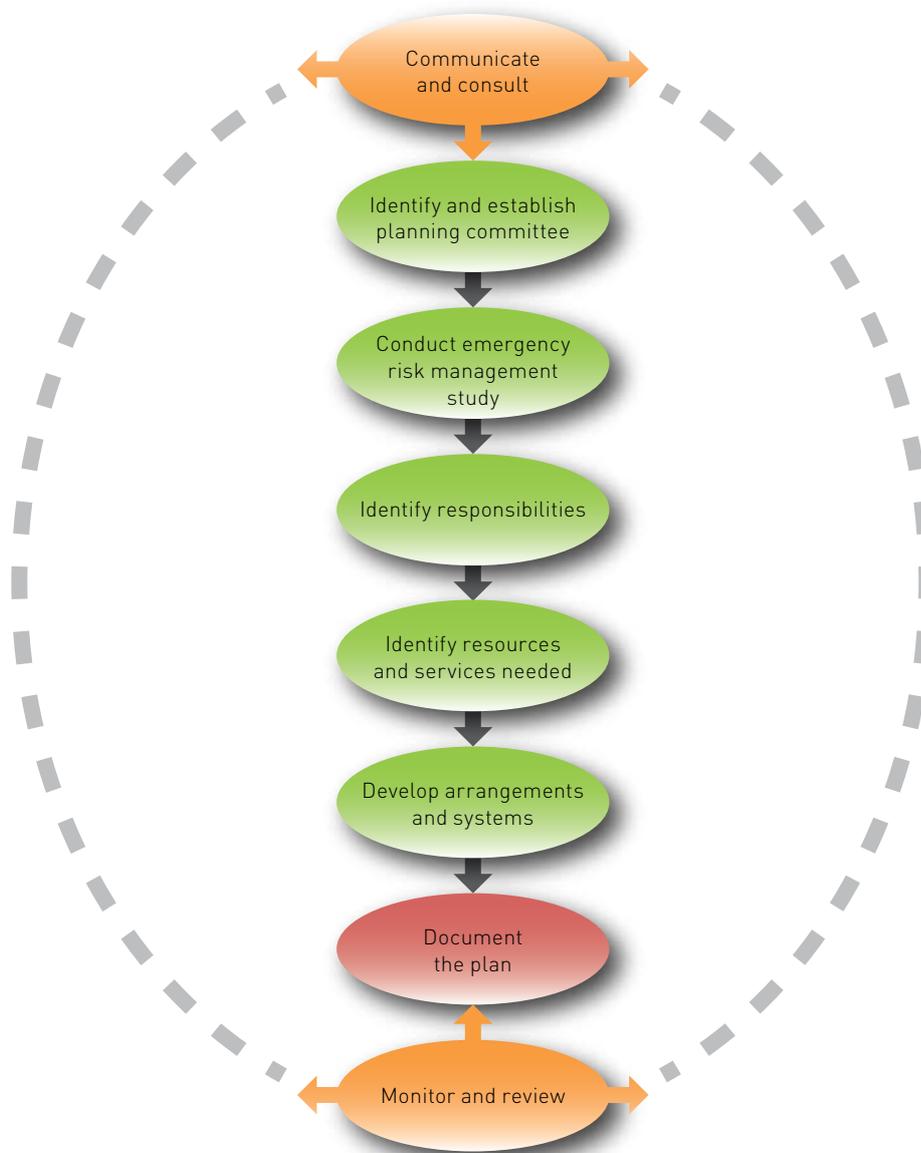
Figure 4.1:   The emergency planning process

- **Identify resources and services needed** – resource analysis identifies the resources and services that might be required (including human resources), those that are currently available, and any shortfalls that exist.

- **Develop emergency management arrangements and systems** – specific management arrangements are identified for *preparedness*, *response* and *recovery*.

Prevention opportunities may also be identified. Emergency management systems may include: communications; public education; emergency operations centre management; liaison; information management; preparation and dissemination of public warnings; resource management; and financial management.

- **Document the plan** – documentation should start at the beginning of the planning process and include: results of the risk management study; the main plan; functional and threat-specific plans; and operating procedures. The written plan is a living document and should be constantly reviewed and updated.

While this process is ongoing it is important to implement the plan at a suitable juncture so that all appropriate personnel are aware of the plan and receive the necessary training in preparation for when it may be activated.

The planning process may seem daunting but it is a process that often builds on capacity that has already been developed. It is rarely a process that starts from scratch; instead effective planning will enhance resilience as part of *preparedness*.

Emergency planning structure

To achieve the best outcomes plans should be developed to work with other plans that already exist. Plans at lower levels of governance should dovetail into plans at higher levels (Figure 4.2). Roles and responsibilities should be consistent between different plans to ensure they function smoothly.

Australian Government disaster health plans

At present three plans forming part of the National Health Emergency Response Arrangements have been produced or are being developed:

- *Domestic response plan for mass casualty incidents of national consequence* (AUSTRAUMAPLAN) – including three annexes focusing on:

    - severe burns

    - paediatrics

    - terrorism
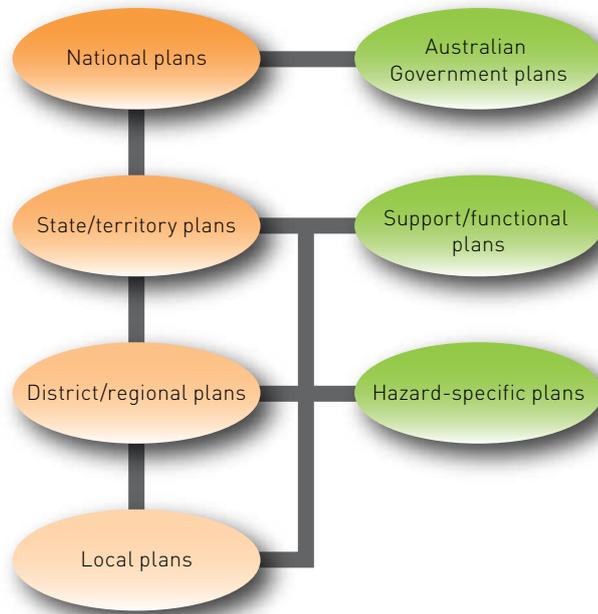
Figure 4.2: **An example of the emergency planning structure**

• *Emergency response plan for communicable diseases and environmental health threats of national significance* (CDEHPLAN) – including communicable disease control (epidemic and pandemic arrangements) and environmental health (response to climate change and natural disasters)

• *Chemical, biological, radiological and nuclear counter-terrorism plan* (CBRNPLAN).

Further government disaster plans are available in Appendix 4.

Disaster epidemiology and rapid needs assessment

Gathering data and information is important for mitigating the impact of disasters on vulnerable populations and to aid the planning process. Disaster epidemiology is the discipline that studies factors such as lifestyle, biological constitution and other social determinants on the incidence and distribution of disease as it concerns disasters. Disaster epidemiology enables health planners to anticipate the health problems associated with specific disasters and to identify those groups that may be at particular risk.

It is important to note that there are difficulties in conducting epidemiological studies due to the unpredictable nature of hazards, thus making forward planning of studies nearly

impossible. Most studies looking at the longer-term health impacts of disasters are therefore retrospective, with the associated difficulties of identifying the populations involved and their health issues. There is also an element of error involved in recalling the events.

As well as providing useful epidemiological evidence to help plan for future disasters, surveillance methods can be used in the immediate aftermath of a disaster to facilitate the process of rapid needs assessment. This rapid epidemiological evaluation is used to identify the extent of the health impact and what resources are required in response. Teams involved in rapid needs assessment must have undertaken appropriate training such as that offered by the National Critical Care and Trauma Research Centre. It is important that teams involved in rapid needs assessment collaborate with each other so as not to waste resources repeating work. Many organisations have produced tools to aid the rapid assessment process. A suggested example of such a tool (created by Australian researchers) can be seen in Appendix 5.

Other references/resources:

Bradt, DA & Drummond, CM 2003, 'Rapid epidemiological assessment of health status in displaced populations – an evolution toward standardized minimum, essential data sets'. *Prehospital & Disaster Medicine*, 18(1), 178-185

Commonwealth of Australia 2004, *Australian Emergency Manuals Series: Manual 43 – emergency planning*. ACT: Emergency Management Australia

Commonwealth of Australia 2001, *Australian Emergency Manuals Series: Manual 14 – post disaster survey and assessment manual*. ACT: Emergency Management Australia

Greenough, PG, Lappi, MD, Hsu, EB, Fink, S, Hsieh, YH & Vu, A 2008, 'Burden of disease and health status among Hurricane Katrina-displaced persons in shelters: a population-based cluster sample'. *Annals of Emergency Medicine,* 51(4), 426-432

Savitz, DA, Oxman, RT, Metzger, KB, Wallenstein, S, Stein, D & Moline, JM 2008, 'Epidemiologic research on man-made disasters: strategies and implications of cohort definition for World Trade Center worker and volunteer surveillance program'. *Mount Sinai Journal of Medicine*, 75(2), 77-87

CHAPTER 5
Risk: risk management, assessment and communication

> **Key points**
> - **Risk is the effect of uncertainty on objectives**
> - **Risk management is a fundamental part of good governance**
> - **There are five elements in the risk management process**
> - **Risk communication is a vital part of effective risk management**
> - **Business continuity is a special case of risk management**

'In 1995, Standards Australia and Standards New Zealand developed a risk management standard: AS/NZS 4360:1995 *Risk management*. It emphasised the management of risk rather than the management of hazards. The emergency management sector recognised the value of this approach and contextualised risk management approaches were published by Emergency Management Australia in 2000 on behalf of the emergency management sector.

This provided a common framework supporting the continued evolution of disaster management. Comprehensive emergency management enabled thinking about approaches beyond response and relief. The use of risk management was crucial in providing a common conceptual framework and language for the emergency management sector to engage more widely across the economy and society. It was also flexible enough to cope with a wide range of contexts.

The Australian/New Zealand risk management standard has been adopted by most organisations in Australia as the basis for risk management activity. In 2009 the International Standards Organisation created an international standard, based on AS/NZS 4360:2004 *Risk management*. The international standard ISO 31000:2009 *Risk management – principles and guidelines* extends the risk management process to include principles for risk management and specifies a framework for embedding risk management into standard governance and business practices. The critical point about risk management is it being a systematic process to ensure limited resources are best allocated for an entity to deal with the uncertainty associated with achieving objectives. An entity can be a single person, a local government or a large multi-national corporation. If there are objectives to be met then risk management is necessary to ensure they are achieved. The way risk management is applied in a small rural health

clinic is very different to a large tertiary hospital, however the concept and principles are identical.

Emergency risk management (ERM)

ERM deals with a family of risks that have the potential for very significant impacts on the objectives of a community or organisation. The consequences of these risks will be of a magnitude requiring non-routine management or activities; for example, a cyclone, an extended power failure or a pandemic. Most public safety risks can be managed by routine operations and practices (business as usual) such as clearing roads of foliage, immunisation programs, attending road accidents and putting out house fires. However, some risks if they materialise require many organisations to work together to ensure the best outcomes for the community. Typically these low-probability high-consequence phenomena are associated with natural, biological, technological and industrial sources of risk.

Risk management is a five-element process (outlined in Figure 5.1). This provides an approach for communities and organisations to hold a structured discussion about how to deal these sorts of problems. The process is described in detail in the *Australian Emergency Manuals Series: Manual 5 – emergency risk management applications guide*. The manual also describes how to apply the process at community level. The *Critical infrastructure emergency risk management and assurance manual* provides advice on implementing ERM at an organisational level. The *National risk assessment guidelines* are also a valuable resource and details are listed at the end of this chapter.

Risk communication and consultation

Communication and consultation are fundamental to the risk management process and should take place with internal and external stakeholders during all stages of the process. Because emergency risk management deals with events that do not happen very often, communication and consultation are particularly important. It is crucial that all those who need to be involved (e.g. because they are responsible for the process or have a vested interest) are not only kept informed, but also invited to contribute to the process – to establish a common understanding of how decisions are made. It is also
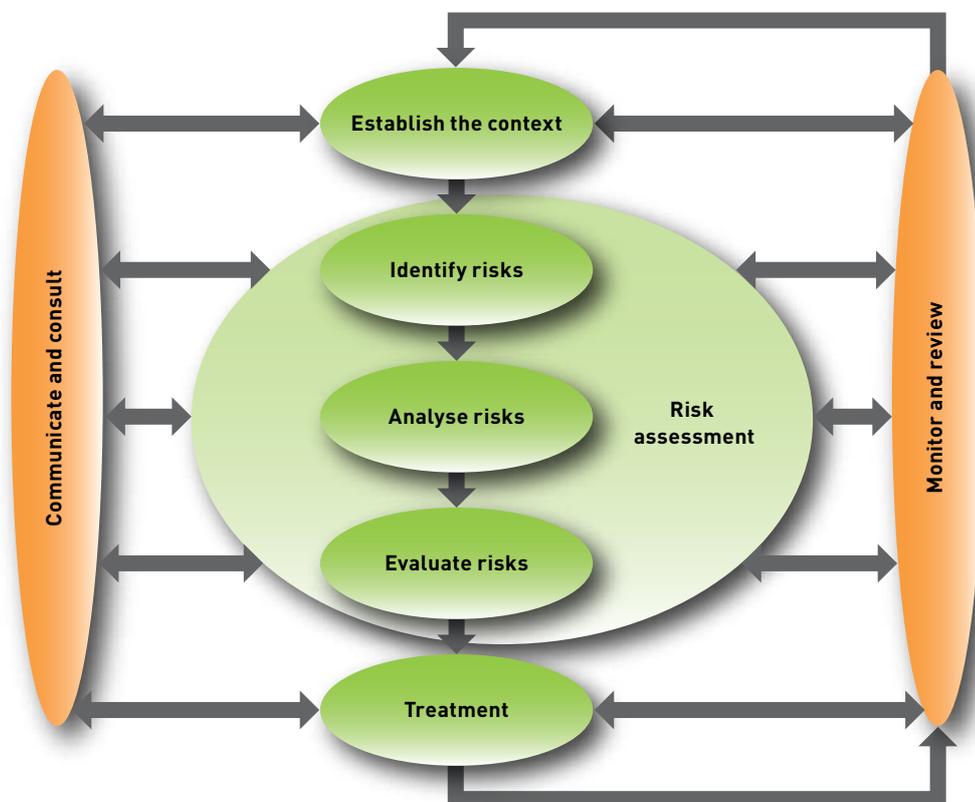
Figure 5.1:   The risk management process

important to consider involving adversarial groups or stakeholders in this process from the outset to minimise any ongoing unhelpful criticism. This will enhance the management of risks, because stakeholders may tend to make judgments about risk based on their perceptions. These perceptions can vary due to differences in values, needs, assumptions, concepts and concerns. Because stakeholders' views can have a significant impact on the decisions made, differences in their perceptions of risk should be identified, recorded and addressed early in the risk management process.

Further information on risk management can be found in Australian Standard AS/NZS 4360:2004 *Risk management*, ISO 31000:2009 *Risk management – principles and guidelines*, Handbook HB 327: 2010 *Communicating and consulting about risk* and the *Australian Emergency Manuals Series: Manual 5 – emergency risk management applications guide* and *Manual 6 – implementing emergency risk management: a facilitator's guide to working with committees and communities*.

Business continuity

All organisations including those in the health sector must deal with situations where significant disruptions to their operations occur. A health facility or system is of little value to the community it serves if it cannot function after a shock. To maintain business continuity, which is a core obligation of good governance, organisations must anticipate and adapt to such changes to avoid either abrupt or progressive failure.

However, ensuring business continuity (of services and products) also requires effective management of the organisation's risks, including the risks that arise from the possibility of disruptive events. Managing these risks to business continuity is the focus of this section of the manual.

Some potentially disruptive events may exceed, for some time anyway, the capacity of routine management methods and structures in an organisation. It is important to prepare for this by building contingent capacity into the management framework and preparing contingency capability including plans.

This allows the organisation to quickly change its mode of operation to help ensure business continuity despite the occurrence of a potentially disruptive event. Such contingent capacity and planning enable management to quickly focus on stabilising the situation and maintaining or resuming the most critical functions while still working in a planned way towards eventual restoration of routine operations and full achievement of objectives.

The wellbeing of our society depends heavily on the performance of the health sector and so managing disruption-related risk is critically important.

For further information on business continuity, see Australian Standard AS/NZS 5050:2010 *Business continuity: managing disruption related risk*, as well as handbooks HB 292-2006 *A practitioner's guide to business continuity management* and HB 293-2006 *Executive guide to business continuity management*.

Other references/resources:

Arnold, JL 2005, 'Risk and risk assessment in health emergency management'. *Prehospital & Disaster Medicine*, 20(3), 143-154

Australian Standard 2009, AS/NZS ISO 31000:2009 *Risk management – principles and guidelines*. NSW: SAI Global Ltd

Australia Standards 2010, AS/NZS 5050:2010 *Business continuity: managing disruption related risk*. NSW: SAI Global Ltd

Commonwealth of Australia 1998, *Australian Emergency Manuals Series: Manual 3 – Australian emergency management glossary*. ACT: Emergency Management Australia

Commonwealth of Australia 2004, *Australian Emergency Manuals Series: Manual 5 – emergency risk management applications guide*. ACT: Emergency Management Australia

Commonwealth of Australia 2004, *Australian Emergency Manuals Series: Manual 6 – implementing emergency risk management: a facilitator's guide to working with committees and communities*. ACT: Emergency Management Australia

de Sa, J, Mounier-Jack, S & Coker, R 2009, 'Risk communication and management in public health crises'. *Public Health*, 123(10), 643-644

Geelen-Baass, BN & Johnstone, JM 2008, 'Building resiliency: ensuring business continuity is on the health care agenda'. *Australian Health Review*, 32(1), 161-173

Glik, DC 2007, 'Risk communication for public health emergencies'. *Annual Review Public Health*, 28, 33-54

National Emergency Management Committee 2010, *National emergency risk assessment guidelines*, Tasmanian Emergency Services, Hobart

CHAPTER 6
Vulnerable groups

Key points
- **Vulnerable groups during a disaster are essentially the same groups that are vulnerable in any context**
- **It is essential that planning is with communities and not for them**
- **Children, women, the elderly, Aboriginal and Torres Strait Islander people, and culturally and linguistically diverse groups are all potentially vulnerable during disasters**
- **Risk communication is a vital part of effective risk management**
- **Business continuity is a special case of risk management**

'It is considered that vulnerable groups during a disaster are essentially the same groups that are vulnerable in any context:

> 'Any individual, group, or community whose circumstances create barriers to obtaining or understanding information, or the ability to react as the general population.'

> Nick et al. (2009)

By enhancing resilience and partnering with planners, these marginalised groups can contribute to their own strengthening. Emergency managers cannot eliminate factors that make people vulnerable. It is their role to identify appropriate risks so that those who may be more vulnerable can *prepare* for, *respond* to and ultimately *recover* from a disaster. It is essential that planning is *with* communities and not for them. Attention should be paid to the differences between vulnerable groups and they should not be lumped together for convenience. Each group's strengths and specific needs should be the primary focus. And rather than relying on generic written materials to prepare individuals, a participatory approach should be taken to engage with the community.

Circumstances that may lead to vulnerability include (but are not limited to):

- age (children and the elderly)

- gender

- physical, mental, emotional or cognitive state

- culture and ethnicity

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- religion

- language

- citizenship

- geography

- socioeconomic status.

Coming from one of these groups does not make any one individual vulnerable per se. Rather there are many factors associated with each of these groups that lead to vulnerability. Some of the key issues for vulnerable groups following a disaster are:

- evacuation

- risk communication

- continuity of services.

Children

Anatomy, physiology, immune system and developmental stage all make children vulnerable. Children form a significant proportion of encounters following disasters, yet medical assistance teams and emergency departments often lack paediatric equipment and skills. After Hurricane Katrina many camps lacked adequate supplies of nappies and formula, thus posing a significant public health risk. It is important to ensure families are kept together after a disaster and that children are not separated from their parents.

Women

Women have been particularly affected by a number of high-profile disasters overseas, including the 2004 Indian Ocean tsunami which saw higher rates of mortality in women. Cultural sensitivities may require special consideration – mixing with men may cause discomfort and there will be a need for privacy. Obstetric care following a disaster is of particular importance. There is also a need to ensure that women feel safe in the aftermath of a disaster. Health care after a disaster begins with the needs assessment process and teams involved in this process must include women if all appropriate issues are to be identified.

Elderly

It is not necessarily being elderly that makes people vulnerable, rather it is decreased sensory awareness, chronic medical conditions, decreased mobility and socioeconomic disadvantage associated both with being old and being vulnerable. This is compounded by stigma, lack of ability to deal with bureaucracy, poor literacy and unfamiliarity with online processes.

There is some evidence to suggest that older people are less likely to have post traumatic stress disorder. Conversely however, there is evidence to suggest that cognitive function in older people may deteriorate after a disaster. Frail elderly and dementia patients should be considered at particularly high risk.

Recommendations include:

• education of the elderly, including maintaining a two-week supply of medications and use of dosette boxes

• preparedness information and warnings should take into account sensory deficits

• transportation for evacuation should be tried and tested

• lists of those with special needs should be maintained

• those with dementia should have ID bracelets

• first responders should be trained to deal with the elderly

• links should be made with services accustomed to dealing with the elderly

• shelters appropriate for elderly needs should be available.

People with chronic illness

Many people with chronic illnesses receive care in their homes from community-based services and may depend on complicated medical machinery. A disaster may interrupt the care they receive due to a breakdown in carer services. Interruption to power supplies can adversely affect their ability to use medical equipment and supplies of essential medications may run out with little opportunity to obtain repeat prescriptions. There is a temptation for these people to converge on hospitals at a time of disaster.

Unfortunately this approach only serves to impede the hospital's ability to manage acutely unwell patients from the disaster itself. Similar strategies to those described above for elderly populations can be employed to help plan the care of people with chronic illnesses during an emergency.

Aboriginal and Torres Strait Islander people

Aboriginal and Torres Strait Islander people may be more vulnerable to the effects of disasters due to a multitude of factors. Levels of education among Indigenous groups lag behind non-Indigenous Australians, with fewer completing year 12 or going onto post-secondary education. This lower level of education means that messages about disaster *preparedness* and actions necessary in *response* to an emergency will be more difficult to communicate. This communication barrier will be further compounded by the vast array of languages that this culturally diverse group of people speak.

Both employment and income in the Indigenous population are below that of non-Indigenous Australians and the financial pressures this creates can have a negative impact on disaster preparedness activities.

Overall there is a gap between the health of Indigenous and non-Indigenous Australians. Life expectancy, childhood mortality and chronic disease data all demonstrate this gap. Starting from a lower base level means the health of Indigenous Australians is more likely to be adversely affected during a disaster. Overcrowding is also an issue, with more than a quarter of Indigenous families living in overcrowded houses. This further affects levels of education, household income and healthy lives.

The Australian Government and the Council of Australian Governments are committed to closing this gap between Aboriginal and Torres Strait Islander people and the broader Australian population. This ongoing work will help to improve the resilience of Indigenous groups, making them less vulnerable to the health effects of disasters. In the meantime provisions must be made when planning for Indigenous groups to ensure that these issues are accounted for.

Culturally and linguistically diverse groups

Consideration must be given to the culturally diverse nature of populations affected by

disasters. At all stages of disaster management (prevention, preparedness, response and recovery), thought must be given to the needs of people with various cultural backgrounds. Information should be available in a range of languages and links should be made with community groups to ensure their involvement in planning. Contact details for interpreters, religious leaders and healthcare workers from culturally diverse groups should be maintained so they can assist when an emergency occurs. Women, children and the elderly from different cultural backgrounds will be particularly at risk. It is not always appropriate to use children as translators.

Other references/resources:

Aldrich, N & Benson, WF 2008, 'Disaster preparedness and the chronic disease needs of vulnerable older adults'. *Preventing Chronic Disease*, 5(1), A27

Gausche-Hill, M 2009, 'Pediatric disaster preparedness: are we really prepared?' *Journal of Trauma*, 67(2 Suppl), S73-76

Hutton, D 2009, 'Putting the puzzle together: reducing vulnerability through people-focused planning'. *Radiation Protection Dosimetry*, 134(3-4), 193-196

Miller, AC & Arquilla, B 2007, 'Disasters, women's health, and conservative society: working in Pakistan with the Turkish Red Crescent following the South Asian Earthquake'. *Prehospital & Disaster Medicine*, 22(4), 269-273

The National Emergency Management Committee 2010, *National strategy for disaster resilience: building our nation's resilience to disaster*. ACT

Nick, GA, Savoia, E, Elqura, L, Crowther, MS, Cohen, B & Leary, M 2009, 'Emergency preparedness for vulnerable populations: people with special health-care needs'. *Public Health Reports*, 124(2), 338-343

Nishikiori, N, Abe, T, Costa, DG, Dharmaratne, SD, Kunii, O & Moji, K 2006, 'Who died as a result of the tsunami? Risk factors of mortality among internally displaced persons in Sri Lanka: a retrospective cohort analysis'. *BMC Public Health*, 6, 73

Other references/resources (continued):

Norris, FH, Stevens, SP, Pfefferbaum, B, Wyche, KF & Pfefferbaum, RL 2008, 'Community resilience as a metaphor, theory, set of capacities, and strategy for disaster readiness'. *American Journal of Community Psychology*, 41(1-2), 127-150

Sakauye, KM, Streim, JE, Kennedy, GJ, Kirwin, PD, Llorente, MD & Schultz, SK 2009, 'AAGP position statement: disaster preparedness for older Americans: critical issues for the preservation of mental health'. *American Journal of Geriatric Psychiatry*, 17(11), 916-924

Steering Committee for the Review of Government Service Provision 2009, *Overcoming Indigenous disadvantage: key indicators 2009*. Canberra: Productivity Commission

CHAPTER 7
Surge

> **Key points**
> - **Surge is linked to all aspects of disaster health**
> - **Surge can impact on public health, health care facilities and the community**
> - **Staff, stuff, structure and space are all important components of surge**
> - **The surge concept is specific to emergencies and should not be applied to daily strains experienced by healthcare systems**

'In the context of disaster health 'surge' can be defined in a broad sense as:

'Health care systems' ability to rapidly expand normal services to meet the increased demand for qualified personnel, medical care, and public health, in the event of bio-terrorism or other large-scale public health emergencies or disaster.'

Nager and Khanna (2009)

Some of the settings for surge in relation to disaster health include:

- public health – including increased capacity for epidemiological investigations, risk communication, mass prophylaxis and other measures

- facility-based surge – increasing the capacity of hospitals by decanting patients and using available flat space (i.e. corridors)

- community-based surge – incorporating the wider community and may be staged from local to regional to national using an intrinsic (local) or extrinsic (external) model.

It is also important to use the correct terminology when discussing surge:

- surge – the event, its size, its duration and the consumption and degradation of resources (i.e. a sizeable increase in the demand for resources)

- surge capacity – the available resources

- surge response capacity – the ability to use resources to accommodate the surge

- surge capability – the ability to address specific health response needs.

Surge planning in general should be coordinated at a state or territory health department level, because actions taken by one hospital can have important flow-on effects to other hospitals in the area.

The surge template needs to account for the 'four Ss':

- **staff –** the available personnel and their level of training

- **stuff –** equipment, drugs and supplies

- **structure –** incorporating both physical and management structures

- **space –** setting up and creating new areas for surge management.

The surge response is most commonly associated with hospital care. The Australian Surge Strategy Working Group of the Australasian College for Emergency Medicine Disaster Subcommittee highlights the following key issues in responding to surge in Australian emergency departments:

1. Recognising surge – this includes recognition that basic surge may require modification for all hazards including CBRN.

2. Initiating action – emergency department must initiate surge, although it will involve the whole institution.

3. Maintaining patient flow – divert, decant and discharge as necessary.

4. Setting clinical goals – reorient to a policy of 'do the most for the most' instead of individual patient satisfaction. Priorities ranked as: life saving, limb saving, urgent bedside procedures (analgesia, splints), disposition decision, diagnosis decision, patient comfort, privacy.

5. Develop surge team for advance triage – triage is essential to manage flow and senior clinicians (medical and nursing) are needed for this to be most effective.. Security is an important issue.

6. Providing clinical care – diagnosis is not essential. Making decisions is key. Senior clinicians should review patients to ensure decisions are made. Limit unnecessary investigations and radiology. Junior doctors can care for stable patients.

7.   Using external and ancillary staff – medical/nursing students and allied health staff may be used.

The components of an effective surge effort in hospitals can be described as:

1.   Secure the external environment – secure hospital, direct staff, control media.

2.   Activate hospital command structures – establish chain of command, use common language etc.

3.   Logistics and supplies – coordinate supplies and maintain inventory.

4.   Alternative care sites – designate areas and build relationships with schools, hotels etc.

5.   Credentialing and regulations – consider the credentials volunteers may require.

6.   Patient tracking and identification – keep records and develop a patient reunification process.

7.   Community support and relationships – maintain relationships and develop communication strategies.

8.   Exercise – regular drills, educate and identify gaps.

It is also necessary to identify the decision point; that is, the time at which surge arrangements will come into play.

There is ongoing discussion as to the relevance of daily surge. Daily surge can be considered as the response to regular strain placed on healthcare facilities in attempting to meet the routine management of patients. Many believe the predictable nature of this strain on services and its almost daily occurrence means it cannot truly be considered as surge. In the context of this disaster health manual, the surge response will refer only to the unpredictable pressures placed on healthcare that are seen at times of emergency.

The Australian Health Protection Committee has to date conducted three national capability audits. The most recent, the *National health disaster management capability audit 2008*, provided a snapshot of Australia's public health disaster response assets and surge capacity over the audit window of April to June 2008. While the overall realistic institutional capacity (the ability to provide 20 per cent of the total acute care beds within

three hours) in public hospitals provides an appropriate level of surge capacity, specific areas such as specialist burns care and aeromedical evacuation assets are still lacking in capacity.

Surge has implications for many aspects of disaster health including the rationing of resources and the standard of care that can be provided. Further issues relating to surge will be covered in the following chapters:

• Chapter 9 – Triage

• Chapter 11 – Hospital disaster planning

• Chapter 15 – CBRN, decontamination and PPE

• Chapter 20 – Ethics and resource allocation

Other references/resources:

Australian Health Protection Committee 2010, *National health disaster management capability audit 2008*, Canberra: Australian Government Department of Health and Ageing

Bonnett, C J, Peery, BN, Cantrill, SV, Pons, PT, Haukoos, JS & McVaney, KE 2007, 'Surge capacity: a proposed conceptual framework'. *American Journal of Emergency Medicine*, 25(3), 297-306

Bradt, DA, Aitken, P, Fitzgerald, G, Swift, R, O'Reilly, G & Bartley, B 2009, 'Emergency department surge capacity: recommendations of the Australasian Surge Strategy Working Group'. *Academic Emergency Medicine*, 16(12), 1350-1358

Kelen, GD & McCarthy, ML 2006, 'The science of surge'. *Academic Emergency Medicine*, 13(11), 1089-1094

Nager, AL & Khanna, K 2009, 'Emergency department surge: models and practical implications'. *Journal of Trauma*, 67(2 Suppl), S96-99

SECTION C: DISASTER HEALTH PRACTICE

CHAPTER 8
Triage

> **Key points**
> - **Disaster triage categorises patient management in order of priority**
> - **There are a number of triage protocols available with slight variations in patient categorisation**
> - **Australia uses the triage sieve and sort method and the SMART Tag™ system**
> - **Both overtriage and undertriage can cause problems affecting the critical mortality rate**

The word triage comes from the French word 'trier', meaning to sort. The process of 'sorting' large numbers of casualties has its roots in military operations but has now been adapted to many settings in health care. Triage in the context of day-to-day delivery of healthcare services where resources are abundant is very different to the triage necessary at a time of a disaster when the number of casualties may overwhelm the health system.

Triage protocols

A number of triage tools have been developed to help first responders categorise patients into those that will need immediate attention and those that can wait. Most protocols include an initial 'primary triage' that very quickly categorises patients. These include Simple Triage and Rapid Treatment (START – commonly used in the United States), triage sieve and the Careflight algorithm. There then follows a slightly more detailed assessment as part of the 'secondary triage' process. Such tools include Secondary Assessment of Victim Endpoint (SAVE) and triage sort. It is important to remember that these tools are designed for use with adults and that most disasters involve significant numbers of children. Using triage tools that have been developed for use with adults will lead to overtriaging of children and may unnecessarily draw resources away from where they are really needed. JumpSTART™ and the paediatric triage tape have been specifically designed for use with children and healthcare workers who respond to disasters should be trained in paediatric triage.

In all cases triage is a dynamic process as any patient's condition may change rapidly. It is important to continually reassess patients and re-categorise them as appropriate.

Triage categories

Regardless of the tool used, patients are invariably allocated to a particular triage category. While there is some variation across the protocols, the following categories are most commonly used.

Table 8.1: **Commonly used primary triage categories**

Immediate	P1	Red	Life-threatening injuries requiring immediate care
Urgent	P2	Yellow	Significant injury but condition stable
Delayed	P3	Green	Treatment can be delayed
Dead		Black	Not breathing after airway manoeuvres
Expectant	*P4*	*Blue*	*Injuries are so severe that the patient will not survive*

It is important to note that the expectant category is very rarely used. The decision to use this category should only be made by a senior medical practitioner. This responsibility is often defined in local health emergency response plans.

Disaster triage in Australia

It is beneficial for disaster health responders to be familiar with a range of triage protocols and categorising conventions because they may find themselves working with colleagues from other regions who are familiar with different triage tools. Recently, however, consensus has been achieved in Australia with all ambulance and health services agreeing to use the triage sieve and sort protocol. In the event of a disaster in Australia it is this protocol and tagging system that all responders should use.

SECTION C:
Disaster health practice

Figure 8.1 and Table 8.2 detail the triage sieve and sort methods. It should be noted that the triage sieve is used to prioritise casualties for evacuation from the site of immediate danger, while the aim of the triage sort is to prioritise casualties for treatment and transportation. These triage protocols are very different to systems that would ordinarily be used in hospital emergency departments and appropriate training is necessary for those healthcare workers who are not familiar with pre-hospital triage.
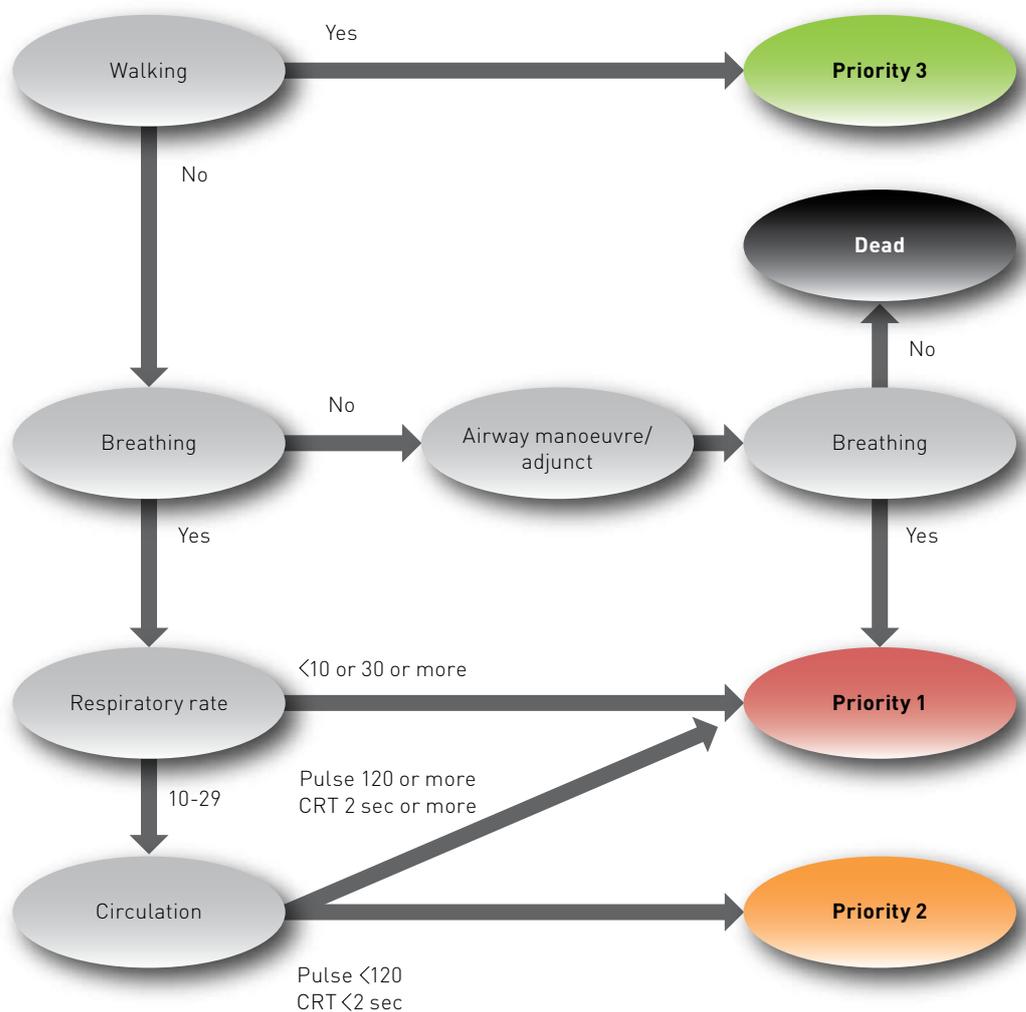
Figure 8.1:   Triage sieve (adapted from TSG Associates)

Table 8.2:   Triage sort (adapted from TSG Associates)

GCS	
13–15	4
9–12	3
6–8	2
4–5	1
3	0
Respiratory rate	
13–29	4
>29	3
6–9	2
1–5	1
0	0
Systolic BP	
>89	4
76–89	3
50–75	2
1–49	1
0	0

12 = Priority 3

11 = Priority 2

10 or less = Priority 1

Critical mortality

Both undertriage (the failure to recognise important injuries) and overtriage (overestimating the degree of injury) can be problematic. While undertriage may cause harm by missing some patients with significant injury, overtriage can place additional strains on already stretched resources. It has been recognised that most deaths following a disaster come from those patients who are most critically injured. When determining the effectiveness of triage it is therefore more appropriate to consider deaths as a proportion of those who are critically injured rather than as a proportion of all those affected. This is termed the critical mortality. Data from a number of mass casualty incidents in recent decades show that the critical mortality is often proportional to the overtriage rate (Figure 8.2). This is probably due to the increased strain placed on already stretched healthcare services. While extreme overtriage can be detrimental, many organisations recommend that some overtriage is acceptable to avoid missing those patients who require immediate treatment.
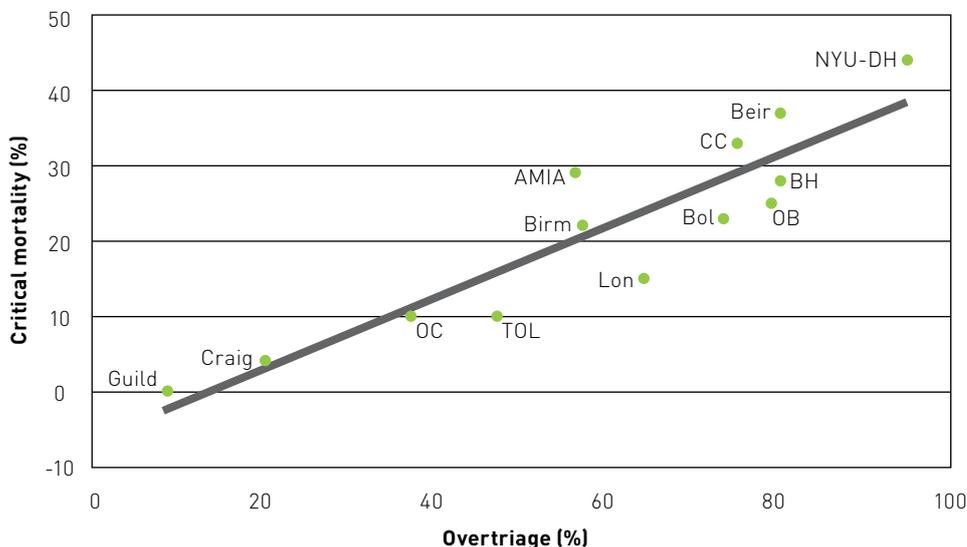
Linear correlation coefficient (r) = 0.91. Guild: Guildford bombing 1974; Craig: Craigavon 1970s bombing; OC: Oklahoma City 1995 bombing; TOL: Tower of London 1974 bombing; Birm: Birmingham 1974 bombing; AMIA: Argentine Jewish Community Institution 1994 bombing; Lon: London 2004 bombing; Bol: Bologna 1980 bombing; CC: Cu Chi 1969 bombing; OB: Old Bailey 1973 bombing; BH: Bellevue hospital 2001 World Trade Center; Beir: Beirut 1980 bombing; NYU-DH: New York University Downtown Hospital 2001 World Trade Center.
Data from Frykberg 2002, Roccaforte & Cushman 2007, Aylwin et al. 2005).

Figure 8.2:　　**Linear relationship between overtriage and critical mortality**

Conclusions

Disaster triage is a dynamic process that plays an important role in prioritising patient treatment and transport. There are many protocols to assist in triage but all can lead to both undertriage and overtriage. In Australia the preferred triage protocols are the triage sieve and sort. Excessive overtriage may increase the critical mortality rate following a disaster. In general, however, the aim of disaster triage is to achieve the greatest good for the greatest number of people.

> Other references/resources:
> Aylwin, CJ, Konig, TC, Brennan, NW, Shirley, PJ, Davies, G & Walsh, MS 2006, 'Reduction in critical mortality in urban mass casualty incidents: analysis of triage, surge, and resource use after the London bombings on July 7, 2005'. *Lancet*, 368(9554), 2219-2225

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Frykberg, ER 2002, 'Medical management of disasters and mass casualties from terrorist bombings: how can we cope?' *Journal of Trauma,* 53(2), 201-12

Jenkins, JL, McCarthy, ML, Sauer, LM, Green, GB, Stuart, S & Thomas, TL 2008, 'Mass-casualty triage: time for an evidence-based approach'. *Prehospital & Disaster Medicine*, 23(1), 3-8

Pelaccia, T, Delplancq, H, Triby, E, Bartier, JC, Leman, C & Hadef, H et al. 2009, 'Can teaching methods based on pattern recognition skill development optimise triage in mass-casualty incidents?' *Emergency Medicine Journal*, 26(12), 899-902

Roccaforte, JD & Cushman, JG 2007, 'Disaster preparedness, triage, and surge capacity for hospital definitive care areas: optimizing outcomes when demands exceed resources'. *Anesthesiology Clinics*, 25(1), 161-177, xi

SECTION C:
Disaster health practice

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CHAPTER 9
Transport

Transport considerations

Prompt transportation of all patients is an essential part of the health response to disasters. The type of disaster, its location and the available resources will all affect the transport process. Usual medical transport services may themselves be affected by the disaster, which will impact on their normal maximum capacity to distribute patients.

Patients are initially moved to clearing areas and treatment posts based on triage categorisation. Once further triage and basic management has occurred patients can then be transported to definitive treatment locations such as regional or major teaching hospitals.

The main reasons for patient transport are to remove them from danger and environmental exposure, and to allow definitive diagnosis and treatment. While it may be possible to discharge some uninjured patients directly from the disaster site, care must be taken as it is easy to miss injuries in these less optimal conditions. Records must be kept if any discharges occur so that these patients can be followed-up, both medically and by the police if required. Likewise care must be taken with the rapid dispatch of those patients with minimal injuries so as not to flood local facilities with low-priority cases. Many of these patients will self-present, having travelled by private car, and local hospitals may quickly become overwhelmed.

Priority for ambulance transport is usually based on triage category, with those patients

with serious but treatable injuries being transported first. The appropriate medical officer and ambulance commander or transport officer make these decisions jointly.

Effective patient distribution includes:

- transferring patients to appropriate treatment facilities

- distributing patients evenly between facilities when possible

- preventing one facility from becoming overwhelmed

- decreasing the number of times a patient is handled between time of injury and place of definitive care

- preventing unnecessary transfer of patients between hospitals

- preventing unnecessary delay in ambulance turnaround time.

To achieve the best outcomes, lesser priority patients can be transported to appropriate institutions further away so the impact on local hospitals is minimised. However all transport must be appropriate for the clinical condition of the patients. Members of the medical and ambulance teams onsite should make decisions about patient destination in consultation with the proposed receiving hospitals. This would be coordinated through a central control centre, if one has been activated, to ensure a unified response.

The ambulance service should usually be in overall control of the total medical transport effort. This would include the coordination of any seconded forms of transport. Where possible, patients should be transported by those services that would normally do so to ensure optimal patient care and to maintain the overall control and coordination of transportation.

Documentation should accompany all patients to assist the receiving institution. This information should include: triage category; how the injury occurred; clinical assessment; treatment given; and personal details. This information is usually available on the triage tag.

Ashmore Reef

On 16 April 2009 there was an explosion and fire onboard a suspected illegal-entry vessel at Ashmore Reef, 600 km north of Broome in Western Australia. Forty-four people were injured and five people died. The Royal Australian

🔍 **Ashmore Reef (continued)**

Navy (RAN) patrol boats HMAS Childers and HMAS Albany were present at the time. Many casualties sustained severe burns, thus safe and expedient transportation to a point of definitive care was essential.

Initial transportation was by RAN patrol boat to the floating production storage and offloading ship Front Puffin. Initial triage and stabilisation was performed by RAN medical personnel with further life-saving emergency care provided by a forward medical team positioned onboard Front Puffin. This team consisted of personnel from the Royal Flying Doctors Service, Kimberley Health Service, Northern Territory Health Service and the Australian Defence Force (ADF). From Front Puffin the 31 most seriously injured patients were transported by private helicopter services (CHC and Bristow) to Truscott Airbase, a remote airfield run by the ShoreLands Group. Following further triage and stabilisation at Truscott, patients were distributed for definitive treatment either by aeromedical aircraft (Careflight, Royal Flying Doctors Service or Northern Territory Aerial Medical Service) to Broome, Perth and Darwin or by Royal Australian Air Force C130 aircraft to Perth. As there was no ambulance vehicle at Truscott, patients were transported to the aircraft on the tray of a utility vehicle with appropriate health staff support. The C130 aircraft was met in Perth by eight St John's Ambulance crews to transfer all priority-one patients to the Royal Perth Hospital. A further 13 patients with less severe injuries were transferred by patrol boat to Darwin. Some patients from Darwin and Broome required secondary transfer to burns centres in Brisbane and Perth after stabilisation in a hospital setting.

This case shows the diverse range of transportation methods able to be employed across multiple jurisdictions during a disaster. It is apparent that clear command and control structures are necessary to manage such a response and that good communication is vital. The successful outcome of this response was demonstrated by the fact that none of the patients died before reaching a site of definitive treatment.

Modes of transport

An important geographical consideration for Australian disasters is the potential need to transport patients over large distances. This might affect which mode of transport is chosen. General considerations in choosing the mode of transport include:

- the ability of the vehicle to traverse the necessary terrain

- it being be equipped with at least basic resuscitation equipment including oxygen, suction and airway aids

- adequate lighting and temperature control

- suitable stretchers and restraint systems

- reasonable comfort for passengers and attendants

- an appropriate means of communication.

At times it may be appropriate to improvise. For example, buses can be used to move large numbers of patients with very minor injuries. It is not usually appropriate to take untrained staff out of hospital, instead designated trained retrieval teams should be used whenever possible.

It is important to take appropriate precautions in situations that may involve infectious diseases or hazardous materials. Expert advice may be required on the type of protection and decontamination that is necessary.

Road ambulances

Road ambulances are the most appropriate method of transportation in most instances for patients with serious injuries. The ambulance service is experienced at providing the appropriate equipment and level of care. Coordination of road ambulance vehicles is important. Designated marshalling, parking and loading areas are necessary at any disaster site to ensure the smooth flow of ambulances. Whatever methods of transportation are considered, almost all seriously injured patients will require road transportation at some point. In some disasters overseas (notably the London bombings in 2005) immediate access to sites was delayed for some road ambulances and other means of transport were required in the early stages.

Rotary-wing aircraft

Helicopters have a role in some difficult terrains and can potentially provide rapid transport over intermediate distances. They are however limited to a range of about 150 km. They can only carry a small number of patients and have problems associated with noisy, confined working areas. If helicopters are to be used then there should be designated, controlled landing points at the disaster site.

Fixed-wing aircraft

Fixed-wing aircraft form part of the initial response in very remote regions, however they are more likely to be used for secondary transportation between hospitals. Because landing areas of a suitable length are required, patients often need to be transported over some distance for loading and unloading from the aircraft. (This will usually require the use of road ambulances.) Their main advantage is that of speed and range, making them best suited to the transportation of patients over large distances. When possible, personnel with aviation medicine expertise should be consulted before transportation. The clinical effects of flight, including those related to changes in barometric pressure, need to be considered. In Australia a number of existing dedicated fixed-wing patient transport assets and the Aeromedical Transport Coordination Group (AMTCG) would usually be involved in coordinating this response.

Military transport

On request from the Australian Government the Australian Defence Force (ADF) may be able to help transport patients during an emergency.

This would be arranged under the Defence Assistance to the Civil Community (DACC) policy; Although the ADF's first priority is toward its operationally active assets, it is able to assist the Australian Government when resources allow, as was seen in the Ashmore Reef case study.

Civilian vehicles

In some situations it may be appropriate to use civilian vehicles to improve transportation capacity or when other appropriate modes of transport are unavailable. Buses, for example, can be used to assist in the rapid transportation of large numbers of patients

with minimal injuries. It is important to send appropriate medical escorts whenever civilian transportation methods are being employed.

For more information on the clinical aspects of patient transport, see the College of Intensive Care Medicine and the Australia and New Zealand College of Anaesthetists and the Australasian College of Emergency Medicine joint policy paper: *Minimum standards for transport of critically ill patients* (2003).

Other references/resources:

Ambulance Victoria 2009, *Emergency response plan.* Vic: Ambulance Victoria

The College of Intensive Care Medicine, the Australia and New Zealand College of Anaesthetists and the Australasian College of Emergency Medicine 2003, *Minimum standards for transport of critically ill patients* (ACEM policy document PO3, CICM policy document IC-10)

Norton, I. and Trewin A, (2011)-Eds. *Australasian health disaster response An Operational guide incorporating MIMMS* Wiley and Blackwell

Redhead, J, Ward, P & Batrick, N 2005, 'The London attacks – response: prehospital and hospital care'. *The New England Journal of Medicine* 353(6), 546-547

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Winn, L 2010, *Exercise Mercury 2010 Emergo Train System transport component evaluation report.* NSW: Emergo Train System Australia

CHAPTER 10
Hospital disaster planning

Key points

- **Hospitals must plan for both internal and external disasters**
- **Effective planning is essential for an optimal response by hospitals to disasters**
- **An incident command system will integrate activities and resources to guide healthcare facilities' response to disasters**
- **All hospitals should have an emergency coordinator to oversee hospital disaster response, training and implementation**

When there is a significant health impact from a disaster, hospitals may face demands that place enormous strains on their capacity. It is therefore essential that all hospitals have plans in place to cope with an unexpected influx of patients.

The recently revised Australian Standard 4083-2010 *Planning for emergencies – health care facilities* helps facilities to plan for both internal and external emergencies. It uses the all hazards, all agencies, and comprehensive approaches and stresses the importance of careful planning (see Chapter 5). For an internal emergency the colour code 'yellow' should be used. This would include any event, either internal or external, that adversely affects the delivery of services. External emergencies, code colour 'brown', are declared when the resources of the facility are required in response to an emergency that has occurred outside the facility. This response may include receiving patients directly from the disaster, receiving patients from other facilities or sending medical teams into the field. Hospitals that may be required to send teams to a disaster should be identified by state/territory health departments.

An external emergency should be declared in the following situations:

- on request of the relevant state/territory health department

- when a large number of patients present to the facility unannounced

- on receipt of information from a credible source.

Incident command system

The incident command system (ICS) was developed to integrate personnel, policies,

procedures, facilities and equipment into a common organisational structure for responding effectively to all hazards. The key components of the ICS are:

1. Incident commander – has overall responsibility

2. Operations – directs resources

3. Planning – develops action plans and evaluates information

4. Logistics – provides resources and personnel

5. Finance/administration – monitors costs

In Australia the ICS has been modified with many facilities now using the Australasian Inter-service Incident Management System (AIIMS). AIIMS is based on three key principles: management by objective, functional management, and span of control. The functional structure is summarised in Figure 10.1.

AIIMS can also be applied to the out-of-hospital response and is designed so that different agencies can work together effectively through similar command structures. While AIIMS is designed to integrate activities and resources in response to any hazard, it is necessary in some situations for facilities to develop specific plans for particular hazards. These hazards should be identified by risk analysis and might include bushfires, cyclones or hazardous materials (see Chapter 6).

It should be noted that not all jurisdictions have adopted AIIMS. Other incident command systems, including the Gold, Silver and Bronze command structure from the United Kingdom, are in use in Australia. All these systems share a similar three-level approach that considers the strategic, tactical and operational aspects of a disaster. Incident command systems are covered in detail in Australasian health disaster response An Operational guide incorporating MIMMS

Planning

When planning for emergencies each of the following phases should be given consideration:

Alert: emergency possible – increase preparedness

Standby: emergency imminent – prepare for implementation of the response

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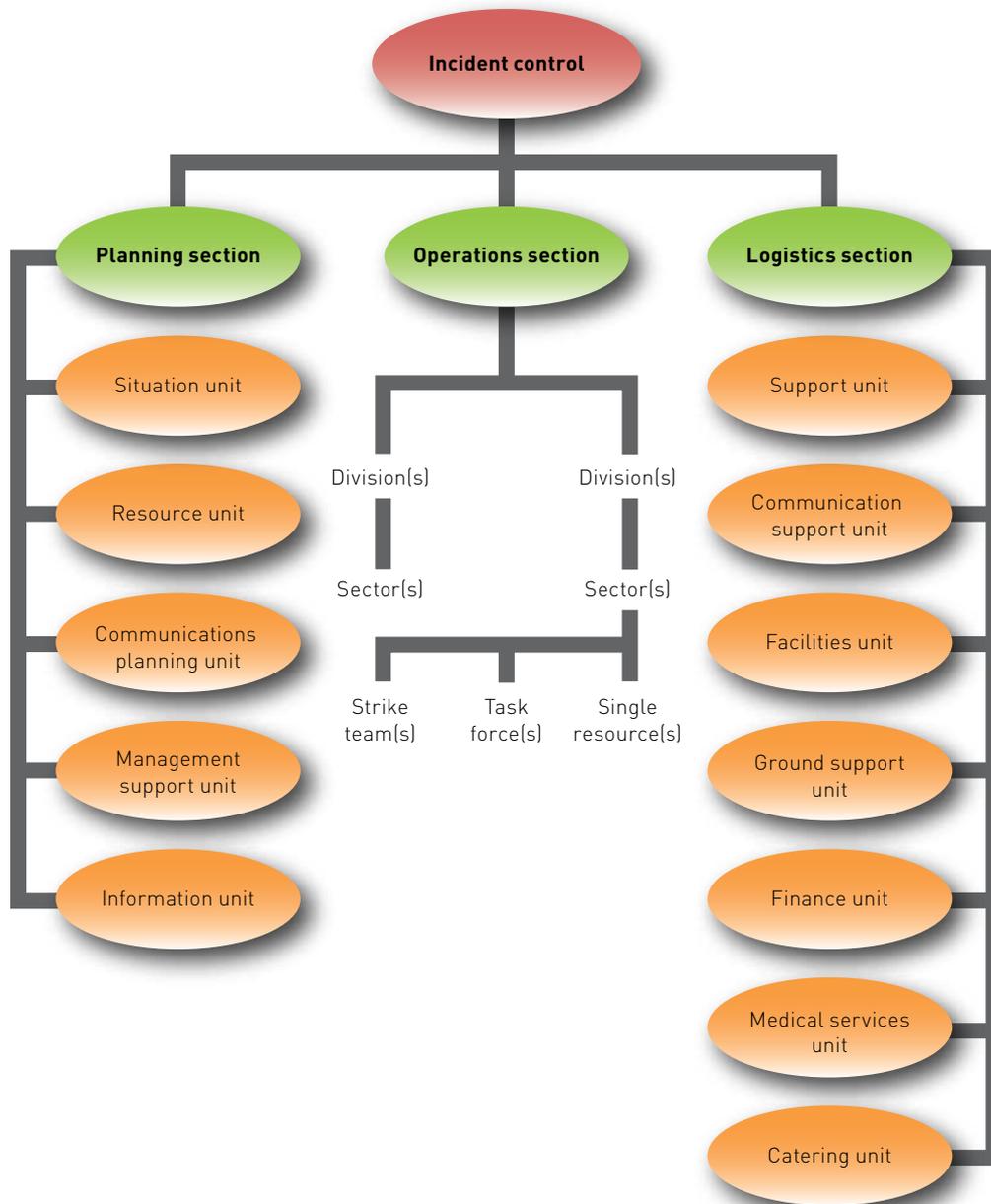
Figure 10.1:   The AIIMS structure (adapted from AIIMS)

Response: emergency exists – implement response in accordance to plans and in collaboration with other agencies if necessary

Stand down: emergency abated – return to normal business.

Each facility should establish a planning committee with the appropriate authority to develop emergency plans. In addition, an emergency coordinator should be responsible for the documentation, distribution and exercising of plans. When an emergency is declared they should also activate the emergency operations centre and manage the emergency response. Designated emergency officers with defined responsibilities will function under the emergency coordinator.

Other important components of healthcare facility planning include surge capacity (Chapter 6), communication strategies, documentation, decontamination and personal protective equipment, pharmaceutical supplies and rostering issues.

It is important for hospital emergency plans to be exercised at least once every two years. Exercise tools such as the Emergo Train System are appropriate for this purpose and are often used by state and territory health departments.

For more information on hospital disaster planning see AS 4083-2010 and the associated AS 3745 *Emergency control organisation and procedures for buildings, structures and workplaces*, AS/NZS/ISO 31000 *Risk management – principles and guidelines*, and the relevant state/territory health emergency response plans.

SECTION C:
Disaster health practice

Other references/resources:

Australasian Fire Authorities Council 2005, *The Australasian Inter-service Incident Management System: a management system for any emergency* (3rd ed). East Melbourne

Australian Standards 2010, 4083:2010 *Planning for emergencies – health care facilities.* NSW: SAI Global Ltd

Briggs, SM 2005, 'Disaster management teams'. *Current Opinion in Critical Care*, 11(6), 585-589

Norton, I. and Trewin A, (2011)-Eds. Australasian health disaster response An Operational guide incorporating MIMMS Wiley and Blackwell

CHAPTER 11
Australian Medical Assistance Teams (AUSMATs)

Key points

• **Australian Medical Assistance Teams (AUSMATs) provide medical assistance for disasters both domestically and overseas**

• **AUSMATs should integrate into the local community to provide appropriate services following a disaster**

• **The Disaster Medical Supply List (DSML) aims to itemise appropriate equipment for an AUSMAT deployment**

• **AUSMATs should be flexible, work well with other government and non-government organisations and plan for a smooth transition on withdrawal**

In Australia civilian-based disaster medical assistant teams are termed AUSMATs. They comprise medical professionals and allied staff and include doctors, nurses, paramedics, allied health and non-medical members such as logisticians. At short notice they can be deployed to the site of a disaster to provide a range of medical supports. These teams are formed by each jurisdiction and are able to be deployed both domestically and internationally to provide medical assistance at a time of disaster and are expected to be self-sufficient for up to three days. To achieve this the team must bring its own shelters, power, food, water, medical supplies and communications equipment. AUSMATs are a jurisdictional asset and as such have a primary responsibility for responding to disasters within their own state or territory.

The Australian Health Protection Committee (AHPC), under the national health emergency response arrangements, currently has the role of authorising the deployment of AUSMATs internationally, following a request from AusAID. International deployment will only occur at the request of the affected country's government. In recent years AUSMATs have been sent to Banda Aceh and the Maldives (2004), Yogyakarta (2006), Samoa (2009) and Pakistan (2010). Teams from two or more jurisdictions may be combined when being deployed internationally.

AUSMATs provide medical support to the local population by integrating with and engaging with local structures. It is important that the local community can sustain the necessary services when the AUSMAT withdraws. AUSMAT members often have

Samoan Tsunami

In October 2009 a tsunami hit the Pacific island nation of Samoa causing significant damage to infrastructure and affecting around 20,000 people. Following a request for assistance from the Samoan Government, medical assistance teams were provided by both Australia and New Zealand.

The resulting AUSMAT consisted of 74 people from SA, Queensland, NSW and Victoria, and included team leaders (from government, medical and nursing backgrounds), emergency physicians, public health clinicians, surgeons (general, trauma, plastics and orthopaedics), anaesthetists, about 23 nurses and a number of intensive care paramedics. Initial assessment identified medical needs in four key areas:

- surgical support for injured victims

- emergency department support for ongoing new presentations

- aeromedical evacuation support

- field support and assessment.

By the end of the nine-day deployment the emergency department had treated 1060 presentations, theatre had completed 101 surgical procedures, and 33 separate village assessments had been undertaken. Transition planning was done early to allow a smooth handover to the medical teams from New Zealand that followed and to ensure the right skill mix and specialty was provided.

numerous skills and are able to work in a variety of settings – such as emergency department nurses who can help in theatre or paramedics with a nursing background. All members of the AUSMAT will have undergone appropriate training such as the Major Incident Medical Management and Support (MIMMS) course as well as other specific AUSMAT training. As well as this more general training, team members will also usually receive mission-specific training, administrative preparation for all team members (including reserve members), and should be equipped with a clear understanding of the command and control environment in which they will be functioning.

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Depending on the emergency scenario the AUSMAT mission objectives may be:

• casualty clearing

• emergency responder support

• medical staging

• field surgical intervention

• humanitarian care

• post-disaster public health interventions

• primary care.

The successful deployment of an AUSMAT depends on the team members' ability to work together and be flexible in their roles. Potential AUSMAT staff face rigorous selection criteria before being accepted. This might include physical and psychological fitness, the ability to work within a team, appropriate skill sets, and the ability to multi-task. The team must also work well with other agencies, such as the Australian Defence Force, who play an important role in the repatriation of foreign nationals. AUSMAT volunteers are often also reservists in the ADF and this can help with the coordination of medical efforts, but care must be taken not to place too much strain on these individuals. Finally it is important that careful transition planning is undertaken to ensure a smooth handover of operations either to other teams or back to local authorities.

It should be noted that this national approach to AUSMATs is a relatively recent occurrence and a number of new processes are still being implemented. This may include national databases, rostering of states, twinning of team leaders, and various protocols to ensure a coordinated national response.

Disaster medical supply list

To support AUSMATs the Australian Government has produced a recommended list of medical supplies necessary for an AUSMAT deployment. Known as the Disaster Medical Supply List (DMSL) this list includes medications, surgical equipment, medical equipment, dressings, public health supplies and other relevant materials. It is intended

primarily as a list of equipment for the domestic deployment of AUSMATs but can be adapted to an international setting. The DMSL is constantly reassessed and is under review to ensure better application to the humanitarian needs seen in many international deployments. It is currently split into functional modules which are intended to be packed separately for ease of use. These modules include acute care, intensive care unit, emergency department, paediatrics, surgery, ward, public health and humanitarian care, among others. To enable them to be self-sustaining, AUSMATs will also require logistical equipment such as tents, fuel, food and generators in addition to the equipment listed in the DMSL.

> Other references/resources:
>
> Aitken, P. Leggat, P.a, Robertson, A,Harley, H. Speare. R, Leclercq, (2009) . *Pre- and post-deployment health support provided to Australian Disaster Medical Assistance Team members: Results of a national survey.* Travel Medicine and Infectious Disease 7, 305-311
>
> Aitken, P. Leggat, P.a, Robertson, A,Harley, H. Speare. R, Leclercq, (2009) *Health and safety aspects of deployment of Australian Disaster Medical Assistance Team members: Results of a national survey.* Travel Medicine and Infectious Disease 7, 284-290
>
> Norton, I. & Trewin, A. 2011 Australian Medical Assistance Team Training NCCTRC

CHAPTER 12
Public health

Almost all disasters will have some impact on public health. This may range from maintaining basic environmental health standards to a disaster that is primarily of public health concern.

Common areas requiring public health or environmental health consideration include:

Control of communicable disease

The spread of communicable diseases after a disaster depends on the type of disaster, the endemicity of particular diseases, the background population health measures already in place (such as immunisations), compromised personal hygiene and contaminated food and water supplies. Diarrhoeal and respiratory infections are often the most commonly seen with outbreaks of measles possible. Vector-borne diseases such as malaria and dengue fever will only occur in regions where disease is already present but presentations with these conditions can be delayed.

Water supply safety

The availability of clean water is essential in any emergency situation. Contamination, both microbial and chemical, must be detected and managed. Decisions may need to be made about balancing the short- and long-term risks, particularly in the case of chemical contamination. The Sphere project has published guidelines on both the quantity and quality of water required after a disaster (Table 12.1). Water quality may depend on appropriate advice about boiling water or chlorination of water supplies.

Table 12.1:   Simplified table of basic water requirements per person

Survival needs (drinking)	2.5–3 L/day
Basic hygiene	2–6 L/day
Basic cooking needs	3–6 L/day
Total basic water needs	**7.5–15 L/day**

Faecal disposal

Safe disposal of human waste is a key component in preventing the spread of communicable enteric diseases. If wastewater systems are disrupted by a disaster then onsite wastewater disposal will be required. A traditional septic tank may be the best method to achieve this.

Re-establishment of licensed premises relevant to public/environmental health

Many businesses may be compromised following a disaster and it is necessary to establish that they do not pose a public health threat to the community. This is particularly the case for premises that provide food.

Emergency food distribution

In the Australian context the most likely disruption to food distribution will be short-term interruption to transportation, storage and retail systems. Consideration must be given to alternative food storage and preparation processes to ensure that contamination is avoided. A particular focus may be required on those who have become isolated and vulnerable groups.

Emergency shelter and evacuation centres

It may be necessary for people to be evacuated either when a disaster is imminent, or in the immediate aftermath. Emergency shelters are intended for short-term use and should take into account suitable water and waste provisions when being located. The Sphere project recommends a minimum floor area of 3.5 m^2 per person. Evacuation centres are a longer-term solution and may require the provision of tents. Clear guidelines on the layout of camps, including the number and location of sanitation facilities, are available from Sphere. It is important to consider basic requirements such as nappies and formula for babies, medication for people with chronic diseases and cultural necessities.

Re-establishment of housing and communities

It is important to ensure that communities are safe and that all services are functioning during the recovery following a disaster. Water supply, sewerage and landfill are just some of the issues that must be considered as well as the structural integrity of buildings. Any potential health hazards such as exposed asbestos or damaged septic tanks must be dealt with.

Solid waste management

Waste management needs can escalate after a disaster and prior planning is paramount. There are many restrictions on the use of landfill and thus waste segregation following a disaster may be essential to ensure these sites do not become inundated. Removal of putrescible matter should be prioritised given the public health risks.

Hazardous waste management

Special care must be taken in the transportation and storage of hazardous waste. Potentially hazardous materials should be stored safely during the initial response to a disaster and then be retrieved, identified and disposed of appropriately at a later date.

Vector and vermin control

While malaria is not endemic to Australia there are a number of mosquito-borne diseases (Ross River virus, Barmah Forest virus, Murray Valley encephalitis, Japanese encephalitis). Occasional outbreaks of dengue fever also occur. Surveillance should be carried out in endemic areas, but vector eradication is a better prevention strategy.

Deceased persons

The health impact of dead bodies understandably causes much concern after a disaster. This issue is addressed in Chapter 18.

Disposal of dead stock

In Australia large numbers of livestock are usually lost during floods or bushfires. The most common disposal method is burial, however incineration may be considered appropriate. Dead livestock in rural areas only present a public health risk when they are located in a drinking water catchment or near a populated area.

Pandemic

Throughout history infectious disease pandemics have had a devastating effect on the world's population. The best known of these, and most costly in terms of lives lost, were the influenza pandemics of the early 1900s. With the emergence of new and particularly virulent strains of viruses in recent decades (including avian influenza and severe acute respiratory syndrome – SARS) many health organisations developed plans to prepare for future pandemics. The Australian Government Department of Health and Ageing has produced a management plan for pandemic influenza with the most recent edition being published in 2008. This document describes the phases in the health response to a pandemic (Table 12.2).

During the influenza A H1N1 pandemic 2009, a further phase called PROTECT was introduced (see case study). This demonstrates the need for pandemic plans (like all disaster health plans) to be adaptable depending on the pandemic's specific characteristics.

Table 12.2: **The phases in the health response to a pandemic**

ALERT	Being alert to the risk of a pandemic and preparing for it
DELAY	Once a pandemic virus emerges overseas, keep it out of Australia
CONTAIN	Once a pandemic virus arrives in Australia, limit its spread
SUSTAIN	Sustain the response while a vaccine is developed
CONTROL	Control the spread with a vaccine
RECOVER	Once the pandemic is under control, return to normal and remain vigilant

H1N1 2009

When the *Australian health management plan for pandemic influenza* (AHMPPI) was written, it was not possible to predict the nature of future pandemics. Unlike seasonal influenza, pandemic H1N1 2009 did not see a predominance of deaths in the frail elderly population. It is a disease that is mild in most but severe in some vulnerable groups including pregnant women, people with underlying chronic conditions, Aboriginal and Torres Strait Islander people, and young children.

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🔍 **H1N1 2009 (continued)**

The World Health Organization encouraged countries to undertake 'course adjustments' to their pandemic plans to tailor their response to local circumstances. In Australia this led to the development of the PROTECT phase annex which sits within the framework of the AHMPPI alongside CONTAIN and SUSTAIN. It is specifically designed for a disease that is mild in most but severe in some and allows for some measures from the CONTAIN and SUSTAIN phases to be continued where locally appropriate. PROTECT also impacts on vaccination delivery in the CONTROL phase to allow support of the PROTECT measures.

The development of the PROTECT phase allowed the AHMPPI to adapt to the specific characteristics of pandemic H1N1 2009 and focus treatment and CONTROL activities on the vulnerable populations that were adversely affected by this new strain of the influenza virus.

Key components of a pandemic response include:

- surveillance

- communication

- minimise disease spread

- optimise health system capacity

- vaccination.

Each state and territory, the World Health Organization and others have produced plans for the response to pandemics. Some of these are referenced at the end of this chapter and will provide extensive information on the response to newly emerging pandemics.

Other references/resources:

Australian Government Department of Health and Ageing 2009, *PROTECT phase annex to the Australian health management plan for pandemic influenza.* ACT

Australian Government Department of Health and Ageing 2008, *Australian health management plan for pandemic influenza.* ACT

Environmental Health Australia (Vic Branch) 2009, *Emergency public health.* Vic

Ivers, LC & Ryan, ET 2006, 'Infectious diseases of severe weather-related and flood-related natural disasters'. *Current Opinion in Infectious Disease*, 19(5), 408-414

Ligon, B L 2006, 'Infectious diseases that pose specific challenges after natural disasters: a review'. *Seminars in Pediatric Infectious Diseases,* 17(1), 36-45

The Sphere Project 2011, *Humanitarian charter and minimum standards in disaster response.* Oxford: Oxfam Publishing

The World Health Organization 2009, *Pandemic influenza preparedness and response: a WHO guidance document.* Geneva, Switzerland

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CHAPTER 13
Mental health

Key points

- **Supporting resilience through the *comprehensive approach* helps to reduce the psychological impact of disasters**
- **Critical incident stress debriefing is inappropriate following a disaster**
- **Acute stress disorder, post traumatic stress disorder, depression, traumatic bereavement and anxiety are all potential mental health consequences of disasters**
- **There is a normal psychological response to disasters**
- **Mental health triage is an important component of early management**
- **Psychological First Aid is the most appropriate initial management tool in the immediate aftermath of a disaster**
- **SAFE strategies can help optimise emergency responder mental health**

The destruction caused by disasters can have a dramatic effect on the mental health of all those involved. Both the community affected by the disaster and those involved in the response may experience a degree of trauma that can have a profound psychological impact. The majority of the population is resilient but a small proportion may develop mental health problems depending on the nature of the disaster and their exposure to stressors. The risk of mental health problems is heightened in the case of terrorism, where fear and dread play a key role. By recognising and supporting community resilience at all stages of the comprehensive approach (PPRR) it is possible to make plans to minimise the mental health impact of a disaster (see Chapter 7).

Some of the most commonly researched mental health and psychosocial consequences of disasters are trauma syndromes such as acute stress disorder (ASD) and post traumatic stress disorder (PTSD). These conditions are associated with heightened distress and ongoing arousal associated with memories or reminders of the events. Other common mental health conditions that may result from or be enhanced by disasters include major depression, anxiety conditions and traumatic bereavement.

There is also some evidence to suggest that an increase in alcohol or drug use may result. Furthermore, stressor effects may impact on health behaviours with evidence showing increased physiological consequences such as myocardial infarctions after some disasters.

Some normal responses from people affected by a disaster might include:

• seeking help or offering help to others (coming together)

• talking about experiences

• trying to stay safe

• seeking information about loved ones.

It is necessary to determine when more assistance is required and how to offer that assistance. Pre-event risk factors or within-event stressors may suggest those who are at high risk of psychological complications. A simple ABC triage process can be used to help identify those who require further assistance:

• **A**rousal – calm, relax, breathing or emergency care and sedation

• **B**ehaviours – monitor, calm, contain for safety, mental health assessment

• **C**ognitions – advice, reality/protection; monitor for organic impairment.

When arousal cannot be managed, behaviour places the individual or others at risk, or cognitive impairment impacts on function – the triage tool would suggest that further assessment and management would be required.

Management strategies in the immediate aftermath of a disaster have traditionally included prescriptive strategies such as critical incident stress debriefing (CISD). There is now much evidence to suggest CISD is not beneficial and some evidence to suggest it may even be detrimental. It is now considered appropriate to adopt a three-level approach to psychological support following a disaster:

🔍 **Black Saturday bushfires**

Following the devastating losses of the 2009 Black Saturday bushfires, many people showed great courage and resilience. But for some people the profound and shocking events they experienced will have a long-lasting impact on their mental health. Devastating stressors in the acute setting, such as near-escapes from burning properties or the inability to save neighbours trapped in their homes, will have left some people very vulnerable to enduring psychological consequences. In the early stages the difficult task of dealing with the practical aspects of daily life may mask any mental health issues. PTSD and depression can emerge many months later, placing further strains on relationships and leading to family conflicts, particularly due to the additional stress of living in temporary and crowded accommodation. This is compounded by being dislocated from local communities and a breakdown in normal support networks. For those who have remained in the affected communities, one of the more difficult aspects of everyday life is the constant reminder of the devastating losses. Burnt tree stumps encircling empty blocks of land where friends or family once lived, and perhaps died, make the task of moving on incredibly difficult.

Early interventions and ongoing psychological support are important factors in ensuring that those communities affected on Black Saturday have the psychological resources to prevent mental health problems and mental disorders whenever possible.

LEVEL 1   Psychological First Aid (PFA)
(immediate aftermath)

LEVEL 2   Skills for Psychological Recovery (SPR)
(weeks to months)

LEVEL 3   Specialised mental health interventions
(from about four weeks onwards or as appropriate)

Other resources are available that describe LEVEL 2 and LEVEL 3 in some detail.

Psychological First Aid

Psychological First Aid (PFA) is a commonsense approach that draws on human compassion and kindness. It is about practical strategies for survival and provides a calm, caring and supportive environment to promote psychological recovery. PFA is consistent with research evidence on risk and resilience. It is applicable and practical in field settings, is appropriate for all ages, and is culturally sensitive and flexible. It can also be delivered by any appropriately trained disaster responders and does not necessarily require mental health personnel to be involved. It has been recognised internationally as the appropriate strategy for mass violence.

Some of the psychological principles that apply to mental health responses generally, and to PFA specifically, include:

1. Promoting a sense of safety

2. Promoting calming

3. Promoting the sense of self and collective/community efficacy

4. Promoting connectedness

5. Promoting hope

In describing key action principles for PFA, the World Health Organization has identified the following acronym as a guide:

Assess – for urgent physical needs and for persons with serious reactions

Be – attentive, respectful and aware

Comfort – through your presence and good communication, helping people to cope

Do – address practical needs, help problem solve and link people with loved ones

End – your assistance and for yourself. Refer when necessary.

While PFA is appropriate for all ages and is flexible enough for all cultures, it is important to take into account cultural sensitivities. In some settings it may be appropriate to comfort someone by touching their hand. For some cultures this may be offensive. It may also be necessary that PFA is provided by women for women in certain situations. Clear

and simple principles of PFA for children have been developed by the National Child Traumatic Stress Network (NCTSN) in the United States and include the concepts of listen, protect and connect.

The core actions of PFA can be seen in Appendix 6.

Emergency responders

It is always important to consider the mental health of emergency responders. Many of the stressful components in responding to a disaster may potentially have adverse psychological consequences for those involved in the response and recovery phases. A number of strategies are available to prepare for this role. Facilitating a good knowledge base about disasters and generally improving responder preparedness will help to eliminate some of the uncertainties associated with disaster response. Overall stress management, including decreased exposure to secondary stressors at work and teaching physical stress management techniques such as breathing exercises, is also beneficial. Psychological approaches, such as positive thinking, and family and social supports are also key in avoiding some of the negative mental health impacts of disasters for responders. Individual responders, and entire teams, can adopt SAFE strategies to maintain optimal psychological wellbeing:

Survival strengths	Strong commitment to self-survival through resilience strategies and coping styles
Arousal/hype	Manage hype and use the energy constructively
Fear, excitement, anger, dread	Dampen the dread and use this energy to drive response
Experience	Use previous experiences to assist in achieving successful outcomes

Other references/resources:

Alexander, DA & Klein, S 2009, 'First responders after disasters: a review of stress reactions, at-risk, vulnerability, and resilience factors'. *Prehospital & Disaster Medicine*, 24(2), 87-94

Other references/resources (continued):

The Australian Centre for Posttraumatic Mental Health

www.acpmh.unimelb.edu.au

Commonwealth of Australia 2002, *Australian Emergency Manuals Series: Manual 25 – guidelines for psychological services: emergency managers' guide.* ACT: Emergency Management Australia

Commonwealth of Australia 2002, *Australian Emergency Manuals Series: Manual 26 – guidelines for psychological services: mental health practitioners' guide.* ACT: Emergency Management Australia

Garakani, A, Hirschowitz, J & Katz, CL 2004, 'General disaster psychiatry'. The *Psychiatric Clinics of North America,* 27(3), 391-406

The National Child Traumatic Stress Network

www.ntscn.org

The National Institute of Mental Health 2002, *Evidence-based early psychological intervention for victims/survivors of mass violence.* A workshop to reach consensus on best practices. NIH publication no. 02-5013, Washington, DC: US Government Printing Office.

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Ursano, R, Fullerton, C, Weisaeth, L & Raphael, B. (eds.) 2007, *Textbook of disaster psychiatry.* New York: Cambridge University Press

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CHAPTER 14
CBRN, decontamination and PPE

> **Key points**
> - **CBRN agents can be widely distributed and cause many different, and severe, health concerns**
> - **On-scene decontamination is preferred but healthcare facilities must have decontamination plans in place**
> - **Removing clothing is the most effective initial step in decontamination**
> - **The choice of PPE to be used depends on the contamination agent**
> - **In all cases universal precautions should be used**

Chemical, biological, radiological and nuclear (CBRN) substances can cause significant health impacts when released either accidentally or intentionally. The accidental release of methyl-isocyanate gas in Bhopal in 1986 led to more than 8000 deaths in the first 72 hours and thousands more over the following years. More than 120,000 people have chronic medical conditions as a result. In Japan in 1995 the nerve agent sarin was released on the subway in Tokyo. Twelve people died and over 5000 more were injured. Fortunately there has not been a large-scale CBRN incident in Australia but these two examples demonstrate how such disasters can have a profound health impact, both physically and psychologically.

Australian Emergency Manuals Series: Manual 13 – health aspects of chemical, biological and radiological hazards covers this subject in detail and this chapter will present a brief overview of the topic.

The medical response to CBRN incidents consists of:

- prevention and protection
- detection and identification
- decontamination
- triage
- treatment and evacuation.

Chemical

A vast number of chemical substances can cause harm, ranging from everyday chemicals used in homes and by industry to chemical agents specifically designed for warfare. Both the physical state and route of absorption will impact on the degree to which a chemical agent may have an effect. Substances in gaseous form will disperse over a larger area and therefore affect many more people. Absorption can be through inhalation, dermal contact or ingestion. The main groups of chemical agents are:

- nerve agents – e.g. sarin (GB), tabun (GA), soman (GD) and VX

- vesicants (blistering agents) – e.g. sulphur mustard (HD), nitrogen mustard (HN), lewisite (L) and phosgene oxime (CX)

- cyanides – e.g. hydrogen cyanide (AC) and cyanogen chloride (CK)

- pulmonary/choking agents – e.g. phosgene (CG), diphosgene (DP), chlorine (CL) and chloropicrin (PS).

Recent evidence suggests that evacuation is the best pre-hospital care following the release of hazardous chemicals.

Biological

Biological agents include bacteria, viruses, rikettsiae, fungi, toxins and venoms. Again absorption can be through a variety of routes such as inhalation, ingestion and dermal. Aerosolised agents can be particularly effective, causing rapid spread and onset of the disease. Detection of the intentional release of biological agents is hindered due to the delayed onset of symptoms. Further complications arise from the ability for person-to-person spread with many biological agents. The six class-A agents, as classified by the US Centers for Disease Control and Prevention (CDC) are:

- anthrax

- plague (*Yersinia pestis*)

- tularemia

- smallpox

- viral haemorrhagic fevers

- botulism.

Initial detection of a biological attack may come from an astute physician identifying a clinical picture and requesting the relevant investigations. The key elements of management in a biological incident are quarantine, broad spectrum antibiotics, supportive care and good communication.

Radiological and nuclear

There are three main methods through which radiation may be dispersed: an improvised nuclear device, a radiation dispersal device (most likely) and a radiological exposure device. In many cases dispersal is associated with an explosive device and injury from the blast may be more significant than the radiation. The differing types of ionising radiation (alpha, beta, gamma, X-rays and neutrons) have different physical characteristics and biological effects. Penetration may be through direct absorption into the body, leaving no further contamination, or through the presence of radioactive material on the skin or clothes. Acute radiation sickness may result due to the effect that the radiation has on rapidly dividing cells. There may also be chronic effects caused by ionising radiation.

Fear, dread and a lack of control are all factors associated with acts of terror and can have a significant psychological impact on both those affected by CBRN events and the health professionals involved in the response. Chapter 14 covers these issues in more detail.

Decontamination

On-scene decontamination of patients, usually performed by the fire service, is preferred but not always possible. An all hazards management plan for receiving and dealing with contaminated patients arriving at healthcare facilities should be in place, including pre-arranged decontamination areas. Overflow capacity should also be considered and security needs taken into account.

Chemical agents can spread rapidly and cause much damage, external evidence of contamination is likely, and people will probably present en masse. *Biological* agents may go undetected and patients may present later. Basic decontamination is all that is

> **Royal Adelaide Hospital contamination exercise**
>
> One of the largest mass casualty exercises involving contaminated patients in Australia was undertaken at the Royal Adelaide Hospital in 2003. The main lessons learned during this exercise included:
>
> 1. Crowd control – many casualties bypassed control efforts onsite and self-presented to the hospital. Crowd control at the hospital required significant personnel resources and impacted on the decontamination process.
>
> 2. Security – security breaches at the hospital were common, largely due to staff not being aware of the importance of hospital lockdown. Staff education is necessary to maintain appropriate lockdown.
>
> 3. Decontamination – due to delays in the ability of the fire service to begin decontamination it was felt that remote activation of the decontamination facility would allow self-decontamination to progress in the meantime. Further consideration of the management of runoff was also necessary.

required (strip and shower) and simple infection control may be suitable. People are more likely to present as individuals or in small groups. Victims of *radiological* exposure can be divided into two groups:

*   exposed but not contaminated – thus not requiring decontamination but may need significant medical management

*   those that have direct radiological contamination – these patients would likely be easy to recognise because as well as the radioisotope contamination, it is likely they will have been exposed to a radiological dispersal device and therefore have evidence of blast injury.

Key factors that affect contamination are:

*   contact time

*   concentration

- temperature (higher temps worse)

- physical state (gases, vapours, low viscosity liquids are likely to be more permeable).

There are five stages to decontamination:

1. Crowd control – patients should be moved through a corridor.

2. Triage – identify contaminant, degree of contamination and degree of patient distress. Toxidromes can be used to help determine the type of contaminant. Smell, sight and information from victims can help indicate contamination. Emergency resuscitation can be performed in the decontamination area but remember all equipment is then contaminated.

3. Remove clothes – this will remove 70 to 85 per cent of the contaminant. Keep clothes as they may be required by law enforcement personnel.

4. Cleaning body – the best method is with lots of tepid water (and perhaps mild soap). People should be encouraged to self-decontaminate. There are some substances available for use with specific decontaminants, but if unknown water is best. Some contaminants react with water and care should be taken if these may be present.

5. Management of contaminated materials and equipment – including runoff.

Special consideration must be given to children as they are at higher risk of hypothermia. If possible gender mixing should be avoided during decontamination due to potential cultural sensitivities. Because decontamination is very rarely undertaken it is important to perform routine exercises to test plans and procedures.

Personal protective equipment

Personal protective equipment (PPE) refers to any items used to reduce the risks present when working with hazards. In general PPE should:

- be well maintained and easily accessible

- be appropriate for the type of work and give appropriate protection for the risk

- give adequate protection to the user

- not create additional health or safety risks

- be compatible with other PPE being used

- fit properly

- not interfere with any medical conditions of the user

- be easy to use

- be comfortable

- comply with relevant Australian Standards.

In some situations the degree of PPE required will impair performance and place increased physiological stress on working conditions, such as due to increased heat.

When unknown contaminants are present, no single combination of PPE can protect healthcare workers from all hazards. First responders to incidents that involve HAZMATs should use level-A PPE in the 'hot zone'. This includes a self-contained breathing apparatus (SCBA) and a totally encapsulating chemical-protective suit (TECP). However it is very rare that medical personnel would be required to enter the 'hot zone'. Once patients arrive at treatment facilities, healthcare workers handling those patients should consider the following PPE:

- For known **chemical** agents patients exposed to a gas pose no additional contamination threat and no extra PPE is required. For patients exposed to a volatile liquid, then level-C PPE (non-encapsulated chemical-resistant clothing, gloves and boots) with a powered air purifying respirator (PAPR) and chemical cartridge should be employed.

- For known **biological** agents level-D protection is usually adequate as absorption through the skin is unlikely (except in the case of mycotoxins). This would include a surgical gown, mask and latex gloves. If there is a risk that agents may be aerosolised then a PAPR with a high-efficiency particulate air filter capable of blocking particles 0.3 to 15 μm should be used.

- For known **radiological** agents no additional PPE is required if the patient has

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been exposed but not contaminated. For contaminated patients level-D PPE is sufficient until decontamination is complete. Lead aprons are cumbersome and do not protect against gamma or neutron radiation and therefore their use is questionable. Radiological dosimeters should be worn.

- For unknown agents some organisations recommend that hospital staff should use level-B PPE (non-encapsulated chemical-resistant garments, gloves and boots) with a supplied air respirator while others consider level-C with PAPR to be sufficient. Individuals should follow their local hospital guidelines.

In all cases it is important that personnel likely to be using PPE receive adequate training in its use. High-level PPE is often scarce and training is rarely conducted. A recent Australian review has suggested that for front-line primary triage staff adequate protection will be provided by a P2 (N95) mask, a disposable fluid-repellent gown, double gloves, eye protection, cap, and shoe covers (Sansom 2007). At all times universal medical precautions against blood and body fluids should be maintained.

> Other references/resources:
>
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> Daly, F, Inglis, T, Robertson, A & Mark, P 2009, *Protocols for hospital management of chemical, biological, radiological and explosive incidents.* WA: Government of Western Australia
>
> Edwards, NA, Caldicott, DG, Eliseo, T & Pearce, A 2006, 'Truth hurts – hard lessons from Australia's largest mass casualty exercise with contaminated patients'. *Emergency Medicine Australasia*, 18(2), 185-195
>
> Freyberg, CW, Arquilla, B, Fertel, BS, Tunik, MG, Cooper, A & Heon, D 2008, 'Disaster preparedness: hospital decontamination and the pediatric patient – guidelines for hospitals and emergency planners'. *Prehospital & Disaster Medicine,* 23(2), 166-173

Other references/resources (continued):

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Koenig, KL, Boatright, CJ, Hancock, JA, Denny, FJ, Teeter, DS & Kahn, CA 2008, 'Health care facility-based decontamination of victims exposed to chemical, biological, and radiological materials'. *American Journal of Emergency Medicine*, *26*(1), 71-80

Okumura, T, Suzuki, K, Fukuda, A, Kohama, A, Takasu, N & Ishimatsu, S 1998, 'The Tokyo subway sarin attach: disaster management, Part 2: Hospital response'. *Academic Emergency Medicine. 5*(6), 618-24

Sansom, GW 2007, 'Emergency department personal protective equipment requirements following out-of-hospital chemical, biological or radiological events in Australasia'. *Emergency Medicine Australasia.* 19, 86-95

Stevenes, G & Raphael B 2008, CBRN SAFE: *Psychosocial guidance for emergency workers during chemical, biological, radiological and nuclear incidents.* NSW: University of Western Sydney

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CHAPTER 15
Mass gatherings

> **Key points**
> - **Careful planning is essential for safe and healthy mass gatherings**
> - **Drugs and alcohol have a significant health impact on gatherings that involve young people**
> - **Definitions of mass gatherings should recognise the difficulties associated with emergency service access**

Safe and healthy mass gatherings are covered in some detail in Manual 12 of the Australian Emergency Manuals Series. This chapter briefly outlines some of the key issues that have appeared in recent literature.

Careful planning is essential for all mass gatherings and should begin some time before the event. Some of the main components that require consideration when planning health care for mass gatherings include:

- the weather

- duration of the event

- indoor verses outdoor

- seated or mobile crowd

- fenced venue

- mood of the crowd

- type of event

- crowd density and geography

- age of crowd

- history of the event

- security

- health support arrangements.

The interaction of these factors (and others, including drug and alcohol use) has an impact on the expected number of patients that may require treatment. It has been

argued that there are three domains that interact to determine the health impacts of a mass gathering: biomedical, environmental and psychosocial.

Often mass gatherings are defined by the number of people attending (i.e. >1000 people or >25,000 people) although this can be a little simplistic. Some feel that a better definition would reflect the difficulty of emergency service access. This helps to recognise some of complexities of non-traditional gatherings.

The main goals of mass-gathering medical care are:

- rapid access to injured patients and their effective triage

- stabilisation and transportation

- onsite care for minor illness.

Research is in its early stages and is mainly descriptive of single events, but sharing of information (such as transport to hospital rate and patient presentation rate) would help develop further research. Recent evidence highlights a number of issues:

- that respiratory illness, minor injuries, heat-related injury and minor problems make up 80 per cent of presentations

- when young people are involved drugs and alcohol are a problem

- myocardial infarctions are relatively rare but early resuscitation and defibrillation is important because it significantly improves outcomes

- there are models to help predict the number of patients but there is still a lot of variability and little to assist in predicting the severity of cases that present.

Other considerations for mass gatherings include public health concerns, the management of VIPs, the cultural significance of an event and the potential for a mass casualty incident. There has been relatively little written on the specific management of mass casualty incidents at mass gatherings. It is essential that risk management strategies are employed to prevent this outcome. Medical Risk Classification and Public Health Event Risk Classification tools are available to assist in this process.

For further information on safe and healthy mass gatherings see Manual 12 of the Australian Emergency Manuals Series and the relevant state or territory resources.

Other references/resources:

Arbon, P 2007, 'Mass-gathering medicine: a review of the evidence and future directions for research'. *Prehospital & Disaster Medicine,* 22(2), 131-135

Commonwealth of Australia 1999, *Australian Emergency Manuals Series: Manual 12 – safe and healthy mass gatherings*. ACT: Emergency Management Australia

Malloy, MS, Sherif, Z, Natin, S & McDonnell, J 2010, 'Management of mass gatherings'. In Koenig, KL & Schultz, CH (eds.), *Disaster Medicine* (pp. 228-52) New York: Cambridge University Press

Western Australia Department of Health 2009, *Guidelines for concerts, events and organised gatherings.* WA: Department of Health

CHAPTER 16
Legal issues, documentation and occupational health

> **Key points**
> - **Declaring a state of emergency will often provide jurisdictions with additional legal powers**
> - **Accurate documentation is essential to ensure continuity of patient care**
> - **Good documentation can help to prepare for future disasters**
> - **Awareness of appropriate occupational health and safety issues will prevent injury to health care workers**

Legal aspects of disaster health

Legislation around disasters in Australia is generally at the state and territory level with very little applicable national legislation.

International and national legislation focuses on the control of infectious disease outbreaks and includes the International Health Regulations 2005, the *National Health Security Act 2007* and the *Quarantine Act 1908*. The registration of health professionals has also changed recently, with 10 professions now being registered nationally. This will make it much more straightforward for health professionals to assist in other states and territories during an emergency. Medical indemnity cover for individuals may be supplied by their employer if their role in a disaster response is a recognised part of their position. Common law will generally apply to 'reasonable care' and issues surrounding consent.

At a jurisdictional level each state and territory has specific legislation relating to disasters and emergencies. Declaring a state of emergency will usually provide the relevant parts of government with additional powers for particular individuals. States and territories also have public health legislation that may come into effect depending on the type of disaster. Finally most jurisdictions have some sort of legislation to protect 'Good Samaritans' from liability.

Documentation

While documentation might play an important role in the medico-legal aspects of disaster health, it is also important to ensure continuity of patient care and to help with

future planning and research.

The first step in the documentation process is through triage tags. The SMART Tags™ used throughout Australia record a number of clinical aspects of a patient's condition. It is also essential to track the movement of patients, first at the disaster site and then at the treating facility. Bar codes on newer triage tags are a useful way to record and monitor patient movement.

Ambulance services will use a range of documentation processes including casualty movement logs, communications logs, patient care records and situation reports.

Healthcare facilities might be overwhelmed during a disaster but it is still important to keep records. Hospitals should prepare disaster documentation to assist with the rapid registration and processing of patients as well as fast and easy record keeping.

Occupational health and safety

All healthcare workers involved in a disaster response should, where possible, be trained to practice safely in a variety of environments. This would include knowledge of safe lifting practices, patient handling and the use of all relevant personal protective equipment (PPE). As well as the specialised PPE discussed in Chapter 15, the following general protective equipment may be necessary:

- overalls

- reflective vests

- appropriate footwear

- latex gloves

- leather gloves

- helmets

- eye wear

- ear plugs.

All items of PPE should meet the appropriate Australian Standards.

Sharps disposal containers should be available and all personnel involved in the disaster response should be aware of universal precautions against blood and body fluids.

It is preferred that healthcare workers only be engaged in tasks in areas that have been cleared of hazards. Familiarity with all equipment and machinery is essential to ensure safe working practices. With the diversity of climate in Australia, responders should also be aware of environmental conditions and have the appropriate protection for extremes of both heat and cold. Despite the often overwhelming nature of disasters it is important that healthcare workers only work for appropriate periods of time and take regular breaks to avoid fatigue.

Other references/resources:

Bird, S 2008, 'Good Samaritans'. *Australian Family Physician.* 37(7), 570-1

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CHAPTER 17
Management of the deceased

> **Key points**
> - **Management of the deceased is the responsibility of the coronial service**
> - **Mass fatalities do not pose a significant public health risk**
> - **Standard universal precautions should be taken when handling dead bodies**
> - **Disasters should be treated as a crime scene and bodies should only be moved under the direction of the relevant authority**

Management of the deceased following a disaster is the responsibility of the coronial service in each state and territory. This may include the police, forensic scientists and medical experts. It is important, however, that all those involved in the health response to a disaster are aware of some basic principles when dealing with the dead.

It is a common misconception that large numbers of fatalities following a disaster pose a significant public health threat. There is little evidence that water- or insect-borne diseases will be transferred from the deceased to the living. For those handling the deceased there is a risk of infection from chronic diseases such as hepatitis B, hepatitis C, HIV and tuberculosis. This risk is minimised when universal precautions for blood and body fluids are taken. The following recommendations have been made for those dealing with the deceased to prevent the potential spread of infection:

- universal precautions for blood and body fluids

- disposal of used gloves

- avoid cross-contamination of personal items

- wash hands after handling bodies and before eating

- disinfection of vehicles and equipment

- use of body bags, especially for badly damaged bodies

- hepatitis B vaccination

Disaster Victim Identification (DVI)

DVI plays an important role in the response to disasters. It entails a collaborative response by the police and forensic scientists, including medical experts. Dental examination, medical examination, DNA examination and fingerprint examination are all key components of the DVI process. Psychosocial and mental health support are also vital components of the process and help families deal with their traumatic loss. When conducted appropriately this support can lessen the risk of adverse mental health impacts.

After the 2002 Bali bombing an Australian DVI team helped establish the blast's characteristics by examining the condition of remains. In the aftermath of the Victorian bushfires in 2009 the DVI process was essential to identify the deceased due to the extent to which the fires had damaged the necessary evidence.

Any disaster that involves fatalities will be treated as a crime scene. As such the area should be secured. Accurate documentation and clear labelling of the deceased is important both legally and for the benefit of grieving family members. Bodies should only be moved at the direction of the coroner's representative and all efforts should be made to prevent further deterioration of the remains. It is only acceptable to move a body without the coroner's direction when this will prevent further morbidity or mortality to other affected persons or when there is an immediate risk of destruction to the body. If a body must be moved, care should be taken to avoid contamination and destruction of evidence. It is important to keep all personal belongings with the remains at all times.

When bodies are moved they should be taken to an onsite body-holding area that takes into account security, size, access and screening from the public. Ventilation, power, refrigeration, lighting, suitable flooring and occupational health and safety issues should all be considered.

Mass destruction or disposal of remains is only appropriate when civil infrastructure has been disrupted to such an extent that this is the only viable option. Cremation is rarely

recommended when there are large numbers of casualties as a high temperature is required for an extended period of time and it makes further identification impossible. If mass burial is considered, then new burial areas should be sited at least 250 m away from drinking water sources, and with at least 0.7 m of distance above the saturated zone.

The psychological impact of dealing with death and human remains should never be underestimated. Exposure to mass death and mutilated bodies can increase the risk of adverse mental health outcomes. Chapter 14 contains more information on this subject. It is also important to respect the cultural and religious needs of those affected by disaster and the impact this may have on dealing with the deceased.

Other references/resources:

Coroners Court of Victoria 2009, *Disaster Victim Identification.* Available at www.coronerscourt.vic.gov.au/wps/wcm/connect/justlib/Coroners+Court/ Home/Bushfire+Assistance/Disaster+Victim+Identification/ [accessed 28 September 2010]

Morgan, O 2004, 'Infectious disease risks from dead bodies following natural disasters'. *Revista Panamericana Salud Pública,* 15(5), 307-312

Morgan, O, Tidball-Binz, M & van Alphen, D 2009, *Management of dead bodies after disaster: a field manual for first responders*. Washington, DC: PAHO, WHO and ICRC

Sledzik, PS & Bryson, SW 2010, 'Mass fatality management'. In Koenig, KL & Schultz, CH (eds.), *Disaster Medicine* (pp. 312-25) New York: Cambridge University Press

CHAPTER 18
Recovery

Disaster recovery and emergency management

The health sector has an important role in supporting community recovery. Disaster recovery is a vital part of the comprehensive approach to emergency management, which also includes the broader components of prevention, preparedness and response. Figure 18.1 illustrates the non-linear nature of the prevention (mitigation), preparedness, response and recovery (PPRR) comprehensive approach to emergency management.

Plans for *recovery* activities should be made as part of *preparedness*, and the *recovery* process itself should include *prevention* strategies. Bearing this in mind disaster recovery can be defined as:

'The coordinated process of supporting disaster affected communities in the reconstruction of the physical infrastructure and restoration of emotional, social, economic and physical well-being.'

The Australian Emergency Management Handbook Series: Handbook 2 Recovery

Considerations include *'community, psychosocial, infrastructure, economic and environmental recovery'.*

Community Services Ministers Advisory Council (2004)

The recovery manual cited above is an excellent reference for those interested in community disaster recovery.

**Preparation &
mitigation activities**
Risk management
Legislation
Regulation
Land use controls
Enforcement
Community development

**Preparedness,
mitigation &
response**
Warnings
Fuel reduction burns
Community action

Response activities
Firefighting
Rescue
Sandbagging
Searches
Decontamination
Community safety
Community action

**Preparedness,
mitigation,
response
& recovery**
Planning
Preparedness
Community awareness
Training
Exercising
Finance

**Recovery
& mitigation**
Rebuilding
Restoration
Community action
Advocacy
Individual and community
resilience

**Response
& recovery**
Evacuation
Relief centres
Temporary
accommodation
Psychological first aid
Registration

Recovery activities
Whole-of-community short, medium and
long-term for four environments:
• Social: individual
& community
• Built
• Economic
& financial
• Natural

Figure 18.1: **Programs and activities supporting disaster prevention, preparedness, response and
recovery (some terminology may differ across states/territories and nationally)
Source: Community Recovery Handbook 2011**

The purpose of providing recovery services is to assist the affected community towards
management of its own recovery. It is recognition that where a community experiences a
significant emergency or disaster there is a need to supplement the personal, family and
community structures that have been disrupted.

Planning for recovery is integral to preparing for emergencies, and is not simply a
post-emergency consideration. Recovery starts with pre-event planning and the
development and implementation of plans to enable a coordinated approach to
community recovery.

Principles that describe the application of recovery are an effective means for sharing goals in a field that involves many entities and perspectives including health. These principles are reflected in a variety of manuals and plans to help support effective recovery outcomes.

National Principles for Disaster Recovery

These principles comprise a series of six key concepts, each with some key considerations. They represent a range of aspects that are considered central to successful recovery.

Successful recovery relies on:

- understanding the context

- recognising complexity

- using community-led approaches

- ensuring coordination of all activities

- employing effective communication

- acknowledging and building capacity.

It is clear from these principles that the early and ongoing involvement of healthcare services is essential to ensure that health needs are effectively incorporated into the *recovery* activities. All services should be accessible and sustainable even after the profile of the disaster has diminished.

Depending on the type of disaster a number of public health strategies may be required to ensure the ongoing health and wellbeing of the affected community. Many of these issues are covered in Chapter 13, which covers both public and environmental health.

An important component of post-disaster activities is the involvement of mental health services. While all disasters generate the need for mental health services, some situations generate larger numbers with symptoms that require a clinical intervention.

For example, release of highly toxic material into the environment, terrorist incidents and mass shootings such as Port Arthur tend to generate higher levels of individual and collective stress. Effective community-based recovery processes and mental health

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Figure 18.2: **The national principles for disaster recovery (CDSMAC 2009)**

interventions can be very effective. The emotional toll of disasters can have a dramatic impact on both those who are directly affected by the disaster as well as all those involved in the *response* and *recovery* activities. Following the initial efforts of Psychological First Aid, mental health services should have ongoing input into the whole *recovery* process to support both the community and the health professionals. Further information on disaster mental health can be found in Chapter 14.

Social and economic and community networks, which ordinarily support the functioning of a community, can be significantly damaged as a result of a disaster. Just as individuals and family units need to be supported, so too does the social capital and community connectedness (social infrastructure) in regaining **healthy** functioning for a sustainable recovery. This assistance may be through community support programs (often called

community development or community resilience programs). Whatever type of program model is implemented it is important that individualised support programs are integrated and coordinated with community support programs.

In Australia many organisations are involved in the *recovery* process. They include local governments, state and territory governments, the Australian Government, and many non-government organisations such as the Australian Red Cross and the Salvation Army. Increasingly private sector and philanthropic organisations are contributing to community recovery. It is important to remember that the *recovery* process will often continue long after the resolution of the disaster.

Other references/resources:

Commonwealth of Australia 2011, *Australian Emergency Management Handbook Series: Handbook 2 – Community Recovery.* ACT: Emergency Management Australia

CSMAC (Community Services Ministers Advisory Council) 2004, *Review of community support and recovery arrangements following disaster*, Australian Government Department of Family and Community Services, Commonwealth of Australia, Canberra.

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SECTION D: OTHER ASPECTS OF DISASTER HEALTH

CHAPTER 19
Ethics and resource allocation

> **Key points**
> - **Community consultation can help plan allocation decisions during disasters**
> - **Conflicts may arise when balancing personal autonomy and population health**
> - **Duty of care can be tested during a disaster but everyone is entitled to the level of care that resources allow**
> - **Resource allocation should be based primarily on prognosis**

The overwhelming nature of disasters can place strain on medical resources that inevitably leads to ethical conflicts not encountered in everyday health care provision. As discussed in Chapter 8, planning for surge capacity can help to prepare for a scarcity of resources, but when the system reaches its breaking point the question of resource allocation remains.

One strategy builds on three key practices to develop principles for allocating resources at a time of disaster:

- Obligations to community – a transparent decision-making process and public health education to ensure community participation in planned allocation decisions.

- Balancing personal autonomy and community wellbeing/benefit – maximising public health benefits while respecting individual rights and ignoring such characteristics as race, nationality, religious beliefs and sexual orientation.

- Good preparedness practice – develop and adhere to standard-of-care guidelines; identify evidence-based public health priorities; implement initiatives in a prioritised manner; assess public health outcomes and adapt to them; and ensure accountability through documentation of duties and liabilities.

During an emergency it may be necessary to shift from the usual practice of doing the best for an individual patient to doing the best for the whole population – this may include infringements on an individual's rights, such as enforced quarantine. As mentioned above, rationing should be based on prognosis alone using appropriate tools to help

determine the prognostic outcome. The recent influenza pandemic (H1N1 2009) placed enormous strain on the use of a very limited supply of extracorporeal membrane oxygenation devices, requiring difficult decisions about how and when to use them. For those deemed unsuitable for aggressive treatment, appropriate palliative care should be offered, with regular reassessment to determine if their condition has changed.

Staff to patient ratios may need to change during a disaster but there remains a duty to provide care to all, even if it is non-standard care due to limited resources. This might include telephone counselling for those deemed not suitable for hospital care. This duty of care can be particularly tested when infectious diseases form the main component of a disaster. When healthcare workers witness cases such as that of Carlo Urbani, the World Health Organization physician who alerted the world to SARS and then subsequently died from the disease, it places enormous strain on their moral duty to continue to provide care.

Reverse triage may be employed to treat as many people as possible with limited resources. A transition in effort towards doing the greatest good for the greatest number is in contrast to typical emergency department triage where the most unwell patients have all possible resources thrown at them regardless of cost. Altered standards of care should be pre-planned and have the input of relevant ethics committees.

Other references/resources:

Barnett, DJ, Taylor, HA, Hodge, JG Jr & Links, JM 2009, 'Resource allocation on the frontlines of public health preparedness and response: report of a summit on legal and ethical issues'. *Public Health Reports*, 124(2), 295-303

Iserson, KV, Heine, CE, Larkin, GL, Moskop, JC, Baruch, J & Aswegan, AL 2008, 'Fight or flight: the ethics of emergency physician disaster response'. *Annals of Emergency Medicine*, 51(4), 345-353

Kuschner, WG, Pollard, JB & Ezeji-Okoye, SC 2007, 'Ethical triage and scarce resource allocation during public health emergencies: tenets and procedures'. *Hospital Topics, 85*(3), 16-25

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Other references/resources (continued):

Okie, S 2008, 'Dr. Pou and the hurricane – implications for patient care during disasters'. *The New England Journal of Medicine*, 358(1), 1-5

Pou, AM 2008, Hurricane Katrina and disaster preparedness. *The New England Journal of Medicine*, 358(14), 1524

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CHAPTER 20
Education and training

> **Key points**
> - **Up-to-date training is essential for all involved in disaster health**
> - **Exercises and simulations can provide important lessons for disaster planning**
> - **Individuals are responsible for maintaining their clinical skills at an appropriate level**
> - **Experiences from real disasters provide valuable information that cannot be obtained from exercises and simulations**

Everyone involved in the *prevention, preparedness, response* and *recovery* of disaster health should undergo education and training to ensure up-to-date knowledge and to maintain their skills at an appropriate level. A number of national exercises have had a bearing on disaster health, including Exercise Cumpston 06 that tested the capacity and capability of the Australian health system to prevent, detect and respond to an influenza pandemic and the Mercury series of national counter-terrorism exercises. It should be noted, however, that although important lessons can be learned from these exercises the resulting plans may still need to be adapted when an actual event occurs, as was seen with the development of the PROTECT phase during the H1N1 2009 influenza pandemic (see Chapter 13).

Education and training can come in many forms, from lectures and table-top exercises to simulations and a whole range of other activities. It has been suggested that Australia currently lacks consistent and accessible training in disaster health management. The World Association for Disaster and Emergency Medicine is developing a standard approach to education in disaster medicine, with a focus on all health aspects of disasters and not just general disaster management arrangements (although an understanding of this is essential). It proposes a seven-tiered scheme depending on an individual's involvement in the disaster health process:

Level 1 – Community information

Level 2 – Health worker awareness

Level 3 – Basic knowledge (e.g. certificate)

Level 4 – Advanced knowledge (e.g. undergraduate)

Level 5 – Expert knowledge (e.g. postgraduate/diploma)

Level 6 – Specialist level (e.g. masters)

Level 7 – Innovation level (e.g. PhD/doctorate)

As suggested by this scheme education begins with the community. A number of authors feel that *preparedness* activities can be enhanced by teaching the general public life-saving first aid and disaster survival skills. Doing this will lead to increased community resilience and form an important component of disaster health education.

There have been many reviews of the literature about disaster health training. Some studies have focused on hospital-based drills while others have considered the benefits of lectures and computer-based sessions. There is little evidence to support one method over another, although it is recognised that valuable lessons can be learnt from drills that can be fed into disaster plans. It should be noted that simulations will not exactly reflect a true disaster and lessons learned during disasters are just as valuable.

The Australian Emergency Management Institute (AEMI) is a centre of excellence for knowledge and skills development in the national emergency management sector. As part of the Attorney-General's Department, AEMI provides a range of education, training, professional development, information, research and community awareness services to the nation and our region.

The National Critical Care and Trauma Response Centre in Darwin was established after the 2002 Bali bombings. It provides clinical and academic leadership for disasters and trauma care and runs courses and exercises for those involved in all aspects of disaster health. Most states and territories also run activities such as the Major Incident and Medical Management and Support (MIMMS) course, EMERGO Train exercises and Australasian Inter-service Incident Management System (AIIMS) training.

It has been suggested that junior healthcare workers and medical students should be educated in disaster management to supplement capacity during a disaster. Finally, it is the responsibility of all healthcare workers who may be involved in the disaster response to maintain their clinical skills at a level appropriate for their specialty.

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Other references/resources:

Crippen, D 2001, 'The World Trade Center attack. Similarities to the 1988 earthquake in Armenia: time to teach the public life-supporting first aid?' *Critical Care, 5*(6), 312-314

Hsu, EB, Jenckes, MW, Catlett, CL, Robinson, KA, Feuerstein, C & Cosgrove, SE 2004, 'Effectiveness of hospital staff mass-casualty incident training methods: a systematic literature review'. *Prehospital & Disaster Medicine, 19*(3), 191-199

FitzGerald, GJ, Aitken, P, Arbon, P, Archer, F, Cooper, D & Leggat, P 2010, 'A national framework for disaster health education in Australia'. *Prehospital & Disaster Medicine, 25*(1), 4-11

Rosenfeld, JV, Fitzgerald, M, Kossmann, T, Pearce, A, Joseph, A & Tan, G 2005, 'Is the Australian hospital system adequately prepared for terrorism? *The Medical Journal of Australia, 183*(11-12), 567-570

Williams, J, Nocera, M & Casteel, C 2008, 'The effectiveness of disaster training for health care workers: a systematic review'. *Annals of Emergency Medicine, 52*(3), 211-222, 222 e211-212.

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CHAPTER 21
Media and public relations

> **Key points**
> - **Electronic media allows instantaneous reporting of disasters**
> - **Effective partnerships with the media should be established when planning for disasters**
> - **Media outlets can provide numerous benefits for the dissemination of information at a time of disaster**
> - **Good public relations is essential after a disaster to help foster goodwill and manage offers of assistance**

Media

With the advent of a society that can disseminate news instantaneously through electronic media, information about an evolving disaster can reach those involved in the response more rapidly than ever before. Likewise the media can contemporaneously report the developments as they happen, often bypassing the appropriate authorities and giving the news their own focus.

It is important for the public to have accurate, clear information in a format that can be accessed, understood and acted on, and from a source that is considered authoritative and reliable. By working with media outlets throughout the planning stage and into the response phase of a disaster, it is possible to form a partnership that can help keep the public appropriately informed.

Some of the benefits of a successful collaboration with the media include:

- warning of impending disasters
- alerting of response personnel
- providing instructions on ways to minimise the effects of a disaster
- advising on the psychosocial effects of disaster
- acting as a medium for urgent communication
- directing of enquiries to the appropriate agencies
- stimulating and directing appropriate donations to support aid efforts.

Black Saturday

After Black Saturday (2009) attempts were made to exclude members of the media from affected communities by roadblocks. They were told this was due to safety concerns and to protect the integrity of the crime scene. This information was in conflict with practices on the ground given that media personnel witnessed politicians and celebrities being allowed through the roadblocks. Members of the media often believe their duty to inform the public overrides any ethical obligations to respect the law and given the inconsistent messages they were receiving, attempts were often made to bypass the roadblocks.

Radio stations in particular rely on official sources of information such as the Country Fire Authority and State Emergency Services to keep them up to date as emergency situations progress. Yet on Black Saturday events overwhelmed the emergency services and information was slow in its dissemination. Unofficial information from the public in the form of telephone calls, text messages and social media such as Twitter was abundant and decisions had to be made as to how reliable this information was and what should be used.

These two examples demonstrate both the importance of a consistent approach when dealing with the media and the need for carefully planned, efficient methods of disseminating information to news outlets.

In modern disaster management, trained media liaison personnel are responsible for coordinating the flow of information between the relevant authorities and media outlets. Individuals involved in any stage of the disaster management process should direct all enquiries from the media to the relevant media liaison officer.

Public relations

Although it is often believed that people will flee from the site of a disaster, it is more common to see the phenomenon of convergence. This includes the arrival of unsolicited assistance from support organisations, an over-abundance of donations, the arrival of

loved ones seeking information, an inundation of telephone calls, and bystander assistance in search and rescue/patient transport. This inundation may be more a hindrance than a help but these offers of support must be managed appropriately so as not to cause offence to well-meaning individuals.

It has been suggested that volunteer responders should not attend until requested to do so. Furthermore, plans should be in place to notify when help is needed; identify and credential volunteers; aid volunteers with patient documentation and tracking; and educate volunteer physicians. All volunteers should be registered, but only in numbers that can be managed effectively. The new national registration for healthcare workers will hopefully make accepting offers of assistance more straightforward.

VIPs often appear after a disaster and come from many areas of public life and with a variety of motives. It is important for these visits to be arranged with due consideration for the work in progress and for those who have been affected by the disaster.

Relatives are the other main group that present aftermath of a disaster. They will often be distressed and may require support. Disaster preparedness should include plans for managing relatives with a designated reception area set aside. Continued, clear communication with relatives will help relieve some of the stress and help avoid uncertainties.

Other references/resources:

Asaeda, G, Cherson, A, Richmond, N, Clair, J & Guttenberg, M 2003, 'Unsolicited medical personnel volunteering at disaster scenes: a joint position paper from the National Association of EMS Physicians and the American College of Emergency Physicians'. *Prehospital Emergency Care, 7*(1), 147-148.

Auf der Heide, E 2003, 'Convergence behavior in disasters'. *Annals of Emergency Medicine, 41*(4), 463-466

Muller, D 2010, 'Ethics and trauma: lessons from media coverage of Black Saturday'. *Australian Journal of Rural Health, 18*(1), 5-10.

SECTION E: APPENDICES

APPENDIX 1
Glossary

All agencies approach	The involvement of all organisations relevant to emergency management at all stages of the process. An integrated approach.
All hazards approach	An approach to emergency management that encompasses all relevant possible hazards.
Business continuity	A process aimed at minimising business or organisational loss and maximising recovery following a disruption.
Command	The direction of members and resources of an organisation in performing that organisation's role. Command operates vertically within an organisation.
Community resilience	A process linking a set of networked adaptive capacities (or resources) to a positive trajectory of functioning and adaptation in constituent populations after a disturbance.
Comprehensive approach	The *prevention* of, *preparedness* for, *response* to and *recovery* from a disaster.
Conservation of resources	Striving to obtain, retain, protect and foster valued resources.
Control	The overall direction of emergency management activities in an emergency response situation. Control operates horizontally across organisations.
Coordination	The bringing together of organisations and elements to ensure an effective response. It is generally concerned with the acquisition and application of resources. Coordination relates primarily to resources (organisations, personnel or equipment) and may operate vertically within an organisation as a function of the command process or horizontally across organisations as a function of control.
Critical mortality	The number of deaths following a disaster as a proportion of those who were critically injured.

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Decontamination	The removal of biological, chemical or radiological agents from affected persons following a disaster.
Disaster	A condition or situation of significant destruction, disruption and/or distress to a community.
Disaster epidemiology	The study of biological and social factors on the incidence and distribution of disease in relation to disasters.
Disaster health	The study and collaborative application of various health disciplines to the *prevention* of, *preparedness* for, *response* to and *recovery* from the health problems arising from a disaster.
Disaster recovery	The coordinated process of supporting disaster-affected communities in the reconstruction of the physical infrastructure and restoration of emotional, social, economic and physical wellbeing.
Emergency	An event, actual or imminent, which endangers or threatens to endanger life, property or the environment, and which requires a significant and coordinated response.
Emergency management	A range of measures taken to manage risks to the community or the environment.
Hazard	Source of potential harm
Incident command system	A method of coordinating the strategic, operational and tactical responses to a disaster that can be applied across all organisations.
Mass casualty incident	An incident where, in the first instance, casualties outnumber the trained responders, and where the local health infrastructure is unable to cope.
Natural disaster	A disaster caused by an environmental event.
Overtriage	The overestimation of the degree of injury during the triage process.

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Pandemic	The spread of an infectious disease across a large area such as a continent and often worldwide.
The prepared community	The application of emergency management concepts at a local level.
Putrescible waste	Waste that will decompose.
Rapid needs assessment	A fast and early epidemiological evaluation used to identify the extent of the health impact of a disaster and the resources that may be required.
Risk	The effect of uncertainty on objectives
Risk assessment	The overall process of risk identification, risk analysis and risk evaluation.
Surge	A sizeable increase in the demand for resources.
Surge capacity	The resources available to cope with a surge.
Surge response capacity	The ability to utilise resources to accommodate the surge.
Surge capability	The ability to address specific health-response needs.
Technological disaster	A disaster caused by the impact of humans on society. These disasters may **intentional** or **non-intentional**.
Triage	The sorting of patients by order of priority for further management.
Undertriage	The underestimation of the degree of injury during the triage process.
Universal precautions	Steps taken to prevent the contamination of healthcare workers from blood and body fluids.
Vulnerable groups	Any individual, group or community whose circumstances create barriers to obtaining or understanding information, or the ability to react as the general population would.

APPENDIX 2
Acronyms and abbreviations

ADF	Australian Defence Force
AEMI	Australian Emergency Management Institute
AHMAC	Australian Health Ministers' Advisory Committee
AHMC	Australian Health Ministers' Conference
AHMPPI	Australian Health Management Plan for Pandemic Influenza
AHPC	Australian Health Protection Committee
AIIMS	Australasian Inter-services Incident Management System
AMTCG	Aeromedical Transport Coordination Group
ASD	Acute Stress Disorder
AUSMAT	Australian Medical Assistance Team
BP	Blood Pressure
CBRN	Chemical, Biological, Radiological, Nuclear
COAG	Council of Australian Governments
CDC	Centers for Disease Control and Prevention (United States)
CDNA	Communicable Diseases Network Australia
CISD	Critical Incident Stress Debriefing
COR	Conservation of Resources
CRT	Capillary Refill Time
DMSL	Disaster Medical Supply List
DoHA	The Australian Government Department of Health and Ageing
DVI	Disaster Victim Identification
ED	Emergency Department
EMA	Emergency Management Australia
enHealth	Environmental Health Committee

EOC	Emergency Operations Centre
GCS	Glasgow Coma Score
HAHWG	Health All Hazards Working Group
ICS	Incident Command System
ICU	Intensive Care Unit
IHR	International Health Regulations
MIMMS	Major Incident Medical Management and Support
NCTSN	The National Child Traumatic Stress Network (United States)
NEMC	National Emergency Management Committee
NHERA	National Health Emergency Response Arrangements
NIR	National Incident Room
OHP	Office of Health Protection
PAPR	Powered Air Purifying Respirator
PFA	Psychological First Aid
PHLN	Public Health Laboratory Network
PPE	Personal Protective Equipment
PPRR	Prevention, Preparedness, Response, Recovery
PTSD	Post Traumatic Stress Disorder
RAN	Royal Australian Navy
SARS	Severe Acute Respiratory Syndrome
SAVE	Secondary Assessment of Victim Endpoint
SCBA	Self-Contained Breathing Apparatus
START	Simple Triage and Rapid Treatment
TECP	Totally Encapsulated Chemical Protective Suit

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WHO   The World Health Organization

APPENDIX 3
Australian Government emergency management plans

Australian Government disaster response plan (COMDISPLAN)

Describes the coordination arrangements for the provision of Australian Government physical assistance to states or territories or offshore territories in the event of a disaster.

National response plan for mass casualty incidents involving Australians overseas (OSMASSCASPLAN)

Provides an agreed framework for agencies in all Australian jurisdictions to assess, repatriate and provide care for Australians and other approved persons injured or killed overseas in numbers that exceed the capacity of normal day-to-day operations of relevant agencies in any incident and is declared a mass casualty event by Ministers.

The domestic response plan for Mass Casualty Incidents of National Consequence (AUSTRAUMAPLAN)

Details the arrangements for the coordinated response to a mass casualty incident. The AUSTRAUMAPLAN links in with the COMDISPLAN and OSMASSCASPLAN.

Australian Government plan for the reception of Australian citizens and approved foreign nationals evacuated from overseas (COMRECEPLAN)

Outlines the arrangements for the reception into Australia of Australian citizens, permanent residents, and their immediate dependents and approved foreign nationals evacuated from overseas.

Australian Government overseas disaster assistance plan (AUSASSISTPLAN)

Details the coordination arrangements for the provision of Australian emergency assistance, using Commonwealth physical and technical resources, following a disaster or emergency in another country.

Australian Government aviation disaster response plan (CAVDISPLAN)

Outlines how the Australian Government would assist states and territories in the event of a state or territory activating its applicable response plan to deal with a major aircraft accident.

Australian Government maritime radiological response plan (COMARRPLAN)

A contingency plan for the provision of Australian Government assistance in the event of a radiological incident involving ships carrying radiological material.

Australian Government contingency plan for space re-entry debris (AUSCONPLAN-SPRED)
Details the arrangements for the Australian Government to inform states and territories
of any risk posed to Australian interests by the re-entry of space debris. Also outlines
how the Australian Government will support states and territories in the event that space
debris should impact within their jurisdictions.

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APPENDIX 4
An example of a rapid epidemiological assessment tool for displaced populations

(from Bradt, DA & Drummond, CM 2003, 'Rapid epidemiological assessment of health status in displaced populations – an evolution toward standardized minimum, essential data sets'. *Prehospital & Disaster Medicine, 18*(1), 178-185).

Date _____		Assessor _____
Disaster Name _____		Disaster Type _____
Site Name _____		Location _____

Population

Registration Y N	Total Pop _____	# households _____
U1 _____(5%)	women (15-44) _____ (20%)	arrivals/wk _____
U5 _____(20%)	men (15-44) _____ (10%)	departures/wk _____
5-14 _____(35%)	45+ _____ (15%)	typical livelihood _____
Vulnerable groups _____		

Security   Officer in Charge _____   Camp Leader _____

   Indicators   incidents at site Y N type _____
   Issues   _____

Site Mgmt   **Lead Agency** _____ Contact _____ Ph/Fax _____

   Indicators   original site use_____ area (m^2) _____   area (m^2/p) _____ (>30)

road access	OK	not OK	problem
water access	OK	not OK	problem
drainage	OK	not OK	problem
building repair	OK	not OK	problem
electricity	OK	not OK	problem

   Issues   _____

Water   **Lead Agency** _____ Contact _____ Ph/Fax _____

   Indicators
H$_2$O source _____		litres/p/d _____ (>20)
#reservoirs _____	condition at base ____	m from home _____ (<100)
# taps _____	running hours/day ___	persons/tap _____ (<200)
home source _____	jerry cans Y N ____	
turbid Y N _____	color Y N _____	odor Y N
chlorination Y N ___	boiling Y N _____	coliforms/dl _____ (<10)

   Issues   _____

Sanitation   **Lead Agency** _____ Contact _____ Ph/Fax _____

   Indicators
# latrines _____	latrine type _____	persons/latrine _____ (<20)
squat plate Y N	water seal Y N	% blocked _____ (0)
	m from H$_2$O ____ (>100)	m from home _____ (<30)
water at latrines Y N	hot water Y N	soap gm/p/mo _____ (>500)
cleaning supplies Y N	maintenance teams Y N	printed health messages Y N
clean latrines Y N	vermin/vectors Y N	type _____ (none)
wash bucket Y N	showers Y N	persons/shower _____ (<20)
waste drums Y N	waste pits Y N	persons/pit _____ (<500)

   Issues   _____

Food Lead Agency_____Contact _____Ph/Fax _____

Indicators self-preparation Y N cooking equipment Y N cooking fuel Y N
communal kitchen Y N warehouse food storage Y N food distribution Y N
supp feeding Y N food security Y N
staples _____ kcals/p/d _____ (>2,100)

Issues _____

Non-Food Lead Agency_____Contact _____Ph/Fax _____

Indicators mats/mattresses Y N blankets Y N bed nets Y N
hygiene parcels Y N warehouse storage Y N

Issues _____

Shelter Lead Agency_____Contact _____Ph/Fax _____

Indicators # tents _____ # buildings _____ building materials
sheeting Y N space partitions Y N shelter m2/p _____ (>4)

Issues _____

Medical Lead Agency_____Contact _____Ph/Fax _____

Indicators clinic on site Y N distance from camp ____ hours open _____
structure OK Y N # doctors_____ # nurses ____ fees Y N
running water Y N toilet Y N electiricty Y N
exam tables _____ ORS corner Y N IVF Y N
dispensary Y N x-ray Y N overnight stay Y N
standard case definitions Y N treatment protocols Y N
total visits/wk _____ active case finding Y N % total pop/d _____ (<1)
total deaths/wk ____ active death finding Y N deaths/10k/p/d _____ (<1)
total referrals/wk_____ referral destination _____

Incidence watery darrhea_____ case definition_____
(past week) Tx for watery diarrhea _____ ORS prep demonstrated Y N
dysentery _____ visually confirmed Y N
ARI _____ Dx of pneumonia by x-ray Y N
measles _____ immunization campaign Y N cold chain intact Y N
malaria _____ microscopically confirmed Y N falciparum Y N
epidemics Y N type_____ epidemic control plan Y N
malnutrition type_____ therapeutic feeding Y N
trauma _____ type_____
psych _____ fear in population Y N reason _____
provider state needs_____

Issues _____

Issues summary _____
1. _____
2. _____
3. _____
4. _____

Y = yes; N = no; Pop = population; # = number; ph = telephone number; M = metres;

Kcal/p/d = kcal per person per day; /d = per day; wk = week; Tx = treatment.

APPENDIX 5
Psychological First Aid core actions

From Brymer, M, Jacobs, A, Layne, C, Ruzek, J, Steinberg, A & Vemberg, E 2006. *Psychological First Aid: field operations guide*. USA: National Child Traumatic Stress Network and National Centre for PTSD

1. **Contact and engagement**

   Goal: To respond to contacts initiated by survivors, or to initiate contacts in a non-intrusive, compassionate, and helpful manner.

2. **Safety and comfort**

   Goal: To enhance immediate and ongoing safety, and provide physical and emotional comfort.

3. **Stabilisation (if needed)**

   Goal: To calm and orient emotionally overwhelmed or disoriented survivors.

4. **Information gathering: current needs and concerns**

   Goal: To identify immediate needs and concerns, gather additional information, and tailor Psychological First Aid interventions.

5. **Practical assistance**

   Goal: To offer practical help to survivors in addressing immediate needs and concerns.

6. **Connection with social supports**

   Goal: To help establish brief or ongoing contacts with primary support persons and other sources of support, including family members, friends, and community helping resources.

7. **Information on coping**

   Goal: To provide information about stress reactions and coping to reduce distress and promote adaptive functioning.

8. **Linkage with collaborative services**

   Goal: To link survivors with available services needed at the time or in the future.

These core actions of Psychological First Aid constitute the basic objectives of providing early assistance within days or weeks following an event. Providers should be flexible,

and base the amount of time they spend on each core action on the survivors' specific needs and concerns.

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