PRINCIPLES OF DISASTER MANAGEMENT

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Take home messages

- Act but with perspective
- Understand the concepts and principles
- Take a practical strategic approach

You have enough to do so keep it simple and manageable or nothing will get done.
Perspective

- Each day 16,000 Australians are treated at hospital Emergency Departments and 6,000 are transported by ambulance.

“We have never had an event with 16,000 casualties in Australia.

Except every day!”

- So what do we need to do that is different in disasters?
OUTLINE

- Definitions.
- History and epidemiology
- Risk assessment and management
- Disaster Management Principles.
- Response Management Framework
- Issues, Myths and Problems
- Questions
DISASTER DEFINITIONS
Terminology

- Disaster
- Emergency
- Multi-casualty incident
- Major incident
- Mass-crowd event
- Pandemic/epidemic
- Hazard/risk

*Take them all at face value!*
There is no generally accepted definition of disasters.

- Everyday use
  “I had a disaster of a day”

- Dictionary definition
  “A sudden calamitous event producing great material damage, loss and distress”

Study by Debacker found > 100 definitions.

Variations occurred with professional role

Commonalities in definitions
- demand > supply
- outside help needed
- disruption of infrastructure
- extraordinary event

The commonalities & ideas are more important than strict wording.
EMA DEFINITION “DISASTER”

“A serious disruption to community life which threatens or causes death or injury in that community, and 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.”
TYPES OF DISASTER

- All disasters are related to specific hazards and the hazards may be categorised.
  - (1) Natural
  - (2) Mixed (Natural + Man Made)
  - (3) Man Made
Natural disasters
(Guidelines for evaluation and research in the Utstein Style)

- **Seismic**
  - Earthquake
  - Volcanic eruption
  - Tsunami
  - Celestial collision

- **Climatic**
  - High winds (Gale, Storm, Cyclones, Tornado)
  - Precipitation (Rain, snow, Ice)
  - Lightning (fire)
  - Temperature extremes (Hot and cold)
  - Erosion
  - Drought
  - Desertification
  - Floods
  - Avalanches
Mixed Natural + human caused
(Guidelines for evaluation and research in the Utstein Style)

- Drought
- Desertification
- Floods
- Erosion
- Landslides/mudslides
- Fire
- Health related
  - Infectious disease
  - Genetic
  - Other
Man-made (Human caused)
(Guidelines for evaluation and research in the Utstein Style)

- **Technological**
  - Release of substances (Chemicals, Biological, Nuclear)
  - Transport
  - Structural failure
  - Explosions
  - Fire
  - Environmental interference
  - Other

- **Conflict**
  - Armed conflict
    - Conventional war
    - Armed conflict/Civil conflict
    - Complex human emergency
    - Terrorism
    - Other
  - Unarmed conflict (Sanctions, embargos)
In the past 50 years
- more than 10,000 disasters reported.
- more than 5 billion people affected.
- more than 12 million persons killed.
- economic costs > $ 4 trillion USD.
(Note: By comparison Australia’s GDP in 2006 was US$ 0.75 trillion)
DISASTERS IN HISTORY

- It won’t happen again will it?

- 1918 - Flu pandemic killed between 20 and 40 million (more than WW1)
- 1912 - Titanic sank killing 1400.
- 1887 - Yellow River in China flooded killing 900,000 with another million dying from famine and disease.
- 1666 - Great Fire of London lasted 4 days and destroyed 80% of London’s buildings.
- AD 79 - Vesuvius erupts killing 20,000 in Pompeii.
- The Great Flood in the Bible (Genesis)
DISASTERS IN HISTORY
- It won't happen again will it?

January 2006
- Jan. 2, Sago, W.Va.: thirteen coal miners were trapped in the Sago Mine, 12 died and 1 survived.
- Jan. 2, Bad Reichenhall, Germany: a heavy snowfall caused the roof of an ice skating rink to collapse, killing 15.
- Jan. 4, Cijeruk, Indonesia: a mudslide buried 200 homes and killed at least 200 people.
- Jan. 5, Mecca, Saudi Arabia: a hotel collapsed in Mecca, killing at least 76 pilgrims on the annual hajj.
- Jan. 12, Mecca, Saudi Arabia: a stampede by pilgrims on the annual hajj killed at least 360.
- Jan. 20, Northern Hungary: a Slovak military plane, AN-24, en route to Slovakia from Kosovo, crashed soon after taking off, killing 43, most of them Slovak soldiers.
- Jan. 23, Bioce, Montenegro: a train derailed and plunged into the Moraca canyon, killing 46 and injuring 19.
- Jan. 28, Katowice, Poland: 67 people died from the collapse of the roof of the International Exhibition Hall. There had been 500 people inside at the time.
DISASTERS IN HISTORY
- It won’t happen again will it?

2.7m die each year of HIV/AIDS

*We don’t need to wait for bird flu.*
DISASTER FREQUENCY

ARE DISASTERS INCREASING?

**Improved reporting**
- CNN as first responder

**Increased population and density**
- 3m people now live in the vicinity of Vesuvius

**Cities in high risk areas.**
- 64 of the largest cities in the world in seismic zones for flood plains.

**Global warming**
- Increased storm activity

**Increased technologies**
- Mass transport
- Chemical industrialisation
- Transport of dangerous goods

**Economic stress**
- Urban slums in dangerous environments

**Armed conflict**
- Terrorism
COST OF DISASTERS

- **Human Costs**
  - Deaths
  - Injuries and illness
  - Loss and grief

- **Economic Costs**
  - Actual Costs
  - Intangible Costs
HUMAN COST: “The pyramid of injury”

- 3,800 other injuries
- 760 doctor consultations
- 40 hospital admissions
- 1 death
HUMAN COST: Direct and indirect

(1) Medical
(2) Public Health
(3) Sanitation / H2O
(4) Shelter / Clothing
(5) Food
(6) Energy Supplies
(7) Search & Rescue
(8) Public Works & Engineering
(9) Environment
(10) Logistics / Transport
(11) Security
(12) Communication
(13) Economy
(14) Education
COMMUNITY EXPECTATIONS:

- Community expectations are increasing
- There is an expectation that we will cope with any event to a level and standard we expect in daily emergencies.
- Plenty of opinions; loudly expressed with little knowledge
- Managing the subsequent “Enquiry”.
Disaster Management

- Disaster concepts
- A prepared community
- Risk management approach
- All agencies approach
- All hazards approach
- Comprehensive approach
  - Preparedness, Planning, Response, Recovery
Conceptual model of Disaster Medicine (Bradt, Abraham, Franks)
The response to major events should be consistent with normal arrangements wherever possible to avoid confusion and lack of knowledge.

“This is not the time to learn something different”
WHY DISASTERS ARE DIFFERENT

- Number and variety of casualties.
- Initial disorder.
- Initial lack of resources.
- Effects on health system / community.
- Loss of infrastructure
- Need for multidisciplinary teams.
- Multiplicity of tasks.

It is not just an increase in medical effort that is needed but a different medical approach also.
A PARADIGM SHIFT

“ALL FOR ONE” vs “ONE FOR ALL”
DUAL WAVE

Casualties arrive in a dual wave

Early victims 30 minutes with less severe injuries

Self extricate

Bystanders

More seriously injured in second wave (60 – 90 minutes) by which time beds occupied

Bystanders

Emergency Services
PREPARED COMMUNITY

“A prepared community is one which has developed effective emergency and disaster management arrangements at the local level, resulting in:
- Alert, informed and active community which supports its voluntary organisations.
- Active and involved local government.
- Agreed and coordinated arrangement for PPRR.”

EMA – Australian Emergency Manuals Series.
PREPARED COMMUNITY

- Individual and community self help often provide the most effective and decisive immediate relief.

- Affected communities turn first to local agencies for advice, assistance, support.

- Local government and organisations provide basis for organising self help.

Bhuj, Gujarat State, India
25 January 2001
RISK MANAGEMENT

- A structured and logical approach to the identification and management of risks will assist communities to minimise the likelihood or impact of disasters.

- **ANZ Standard on Risk Management**
  - Identify Risk
  - Analyse and Evaluate Risk
  - Treat Risk
  - Monitor Risk

- Hazards are sources of risk.

- Community as the element at risk.

- Risk as the interactions between them and their environment.
Risk management:

Options for dealing with risk:

- Avoid the risk
- Reduce the likelihood of the occurrence.
- Reduce the consequences.
- Transfer the risk
- Accept/Rretain the risk.
Risks identification and evaluation

- Identify realistic risks to your community
- Evaluate according to
  - Likelihood
  - Severity
  - Impact
- Identify management strategies according to Haddon matrix
## Managing risk

### Haddon Matrix

<table>
<thead>
<tr>
<th>Phase</th>
<th>Human</th>
<th>Structure</th>
<th>Physical</th>
<th>Socio econom</th>
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<tbody>
<tr>
<td>Pre – event</td>
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<tr>
<td>Event</td>
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<td>Post- event</td>
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Integrated “All Agencies” approach

- Disaster Management needs a multidisciplinary approach.
- All agencies likely to be involved in a disaster work together in both planning and response and recovery.
  - Common rules
  - Role clarity

“PLAYS WELL WITH OTHERS”

EMA – Australian Emergency Manuals Series.
“ALL HAZARDS” APPROACH

- Recognises that different hazards cause similar problems.
- Requires the identification of all hazards likely to be faced by a community followed by the application of simple arrangements which, to the maximum extent possible, will cater for all events.
- Many hazards will also require specific PPRR measures.

EMA – Australian Emergency Manuals Series.
COMPREHENSIVE APPROACH

- Prevention / Mitigation
- Preparedness and planning
- Response
- Recovery
COMPREHENSIVE APPROACH - PREVENTION / MITIGATION

- “Regulatory and physical measures to ensure that emergencies are prevented, or their effects mitigated”.

  EMA – Australian Emergency Manuals Series.

- Activities which eliminate or reduce the likelihood or impact of a disaster.

- Includes long term activities which reduce the effects of unavoidable disasters. e.g. building standards

- Cost effective mitigation measures are the key to reducing disaster losses in the long term.
COMPREHENSIVE APPROACH
- PREVENTION / MITIGATION

- Can we prevent this from happening?
- If not, can we reduce the damage that will be caused?
- What is the cost of this?

The economic cost of safety.
PREVENTION / MITIGATION - Examples

- Zoning / land use management
- Building codes
- Building use regulations
- Relocation
- Safety improvements
- Legislation
- Public Information
- Community awareness and education
- Tax, insurance incentives or disincentives

Leninakan, Armenia 1988
COMPREHENSIVE APPROACH - PREPAREDNESS

- “Arrangements to ensure that, should a disaster occur, all those resources and services which may be needed to cope with the effects can be rapidly mobilised and deployed.”

EMA – Australian Emergency Manuals Series.

- Activities to anticipate what problems are likely to emerge in future disaster situations and to devise ways to address these problems and enhance ability to respond when a disaster occurs.
- Key element is developing plans
- Must have plan to respond, trained personnel to respond and resources with which to respond.
PREPAREDNESS - Examples

- Community awareness and education
- Disaster Plans
- Training and test exercises
- Disaster communications
- Mutual aid agreements
- Warning systems
- Resource inventories
- Provision of special resources
- Evacuation plans

“Great Wave”
PREPAREDNESS: Planning

- “Failure to plan is planning to fail”.

- Planning provides the opportunity to network and engage participants prior to the event.

- Planning provides the opportunity to resolve issues outside of the “heat of battle”.
PREPAREDNESS: Planning

A Planning Framework

Core plan

Operational plans
- Hospital plans
- District plans

Special plans
- Pandemics
- CBR
- Burns
- Mass Crowd event

Sub-plans
- Public health
- Media and communications
- Victim identification and management
- Transport
Preparedness: Surveillance

- Mechanisms to identify disease trends
- Mechanisms to monitor risks including monitoring vector disease e.g. Avian Influenza in birds
- Diagnostic capability
  - Laboratories
- Reporting of infectious diseases

MICRO vs MACRO
TRAINING

- There is a need to do this better.
- Key area is decision making
- Trained staff will make better decisions
- Training improved team efficiency especially in a crisis (*DeVita 2004*)
- Leadership training needed (*Cuny 2000*)

“Well trained professional vs the well intentioned amateur”

(*Birnbaum 2005*)
RESEARCH

- Often difficult
- Ability to compare data without standard definitions.
- “Weighting” of quantitative data vs qualitative data
- Ability to have a randomised trial in disaster.

“Sorry, I can’t treat you – but as an even number you have been randomised to expectant care only ….”
COMPREHENSIVE APPROACH - RESPONSE

- “Actions taken in anticipation of, during and immediately after impact to ensure that its effects are minimised and that people are given immediate relief and support”.

*EMA – Australian Emergency Manuals Series.*
RESPONSE - Examples

Implementing plans
Implementing disaster legislation or declarations
Issuing warnings
Activating disaster operations centres
Mobilizing resources
Notifying public authorities
Providing medical assistance
Providing immediate relief
Search and rescue

UrBot
WTC Tower Two
13 September 2001
The Response Management Framework

- A set of *principles* which provide a framework for managing any event.

- Command
- Control
- Coordination
- Communication
- Clinical Management
- Containment
- Continuity
- Capability
COMMAND, CONTROL & COORDINATION

- **COMMAND**: The direction of members of an organisation in the performance of roles and tasks.
  
  *Operate vertically within an organisation.*

- **CONTROL**: Overall direction of emergency management activities in an emergency situation.
  
  *Operates horizontally across organisations.*

- **COORDINATION**: The bringing together of organisations and elements to ensure an effective response, mainly concerned with systematic acquisition and application of resources in accordance with threat or impact.
  
  *Operates both vertically and horizontally as functions of authority to command and control.*
Communication

- The message
  - Clarity of message (pre-considered)

- The means
  - Consider the vulnerability of normal channels (e.g. mobile phones)
  - Remember “the runner”

- The manner
  - Pathways of communication
Babel Effect

Most common problem in any disaster is a failure in communication

Radio not compatible
Telephone circuits overloaded
Most problems are still people based rather than technology.
Lack of clear speaking
Different radio codes

1995 Oklahoma City Bombing
Hospital called in “code black” their disaster active code
EMS understood this as code for overloaded and sent them no patients resulting in overload of nearby hospital
CLINICAL MANAGEMENT: Principles

- Triage: Continuous and at critical points
- Diagnosis
- Essential care
  - Individual care based on normal practice
  - Minimal care to ensure safety
  - Priority for life and limb protection
  - Clinical standards
  - Respiratory support
  - Circulatory support
- Documentation
- Family and contacts
- Decontamination
- Isolation
CONTINUITY OF BUSINESS

Maintenance of essential services

- Workforce protection with enhanced infection control, PPE, isolation of patients and anti-virals
- Access to business
- Maintenance of the food supply
- Creating capacity
- Protecting essential services
CONTAINMENT

Containing the disease and reducing its spread

- Vector control
- Isolation and Quarantine
- Vaccination and antiviral prophylaxis
- Border control
- Social isolation
- Equipment including PPE
CAPABILITY

*Increasing the capability of the system to manage by preparation*

- Information and awareness of personnel through education
- Vaccination
- Preparation and possible stockpiling of equipment and consumables.

Can we prevent imbalance between supply and demand by increasing capability?
HEALTH CAPABILITY

*Develop and preserve the health management capability*

- **Level 1** concentrate expertise utilising existing infrastructure
- **Level 2** Preserve infrastructure for the event by early discharge, limiting non-urgent activity
- **Level 3** Expand health infrastructure through system wide management, growing capacity and importing capacity
- **Level 4** Ration access to health infrastructure through triage of patients
“The coordinated process of supporting disaster affected communities in reconstructing their physical infrastructure and restoration of emotional, social, economic and physical well being”

• Restore infrastructure and the social and economic life of a community to normal
• Restore vital life support systems to minimum operating standards.
• Long term recovery to restore economic activity and rebuilding infrastructure.
• It should include mitigation as a goal
RECOVERY

Myth that “things go back to normal in a couple of weeks”

- Psychological effects may last a lifetime
- Cost of recovery means loss of opportunity for development.
- Most need for financial and material assistance is the months after a disaster but forgotten by then ....
RECOVERY - Examples

Restore essential services
Community rehabilitation
Counselling
Temporary housing
Financial support or assistance
Health and safety information
Long-term medical care
Physical restoration/re-construction
Public information
Conducting economic impact studies
AFTER THE DISASTER

- Equipment Review
- Debriefing
- Review of Plans
- Documentation
- Education and Training
- Research
- Rehabilitation
- Restoration Function
- Safety Assessment
- Emotional Impact
- Recovery Process
- Research Opportunities

We need to ensure that we learn from our experiences as well as ensuring the well being and recovery of our community.

HOW DO WE DO THIS?
ISSUES, MYTHS AND COMMON PROBLEMS
DISASTER SCENE MANAGEMENT

- Scene safety (self and casualties)
- Effective medical control
- Efficient inter-agency coordination & communication
- Accurate triage
- Selective clinical management
- Transport resource maximisation
- Appropriate patient distribution
TRANSPORT PRINCIPLES

- Right patient, right place, right time, by right means
- Patient transport requires regulation and distribution: where & when
- Distribute patients widely to prevent single institutions from becoming overwhelmed whilst others underutilised (if able to)
- Transport patients by those services which normally do so
- Quality of patient care during transport is usually more important than mode of transport
- May require improvisation
Much of the response to emergencies is poorly evaluated. (Sondorp 2001).

Little has been done to study the cost effectiveness of various disaster relief activities (VanRooyen 2001).

WHAT STANDARDS ARE THERE?

WHO / PAHO Field Hospitals Guide
Minimum Essential Data Sets
“People in Aid”
Quality Compass
Ombudsman project
Active Learning Network for Accountability and Performance (ALNAP)

SPHERE
ACTIVATION

Failure to activate the disaster plan ……..

- Not appreciate significance of incident
- Failure to communicate from scene
- Message taken by junior staff
- No plan
- No activation mechanism
- Communication failure

Clapham Junction Train Crash Message from scene taken by junior nurse in ED as normal call line busy. They assumed normal activation had occurred.
Victims will go or be taken to the closest health facility which may become overwhelmed.
VOLUNTEERS

People will help each other ("Federation effect")
- Laypersons at scene
- Volunteer health workers
How do you deal with them?

2 myths about this

“disasters bring out the worst in human behaviour”

“affected population is too shocked and helpless to take responsibility for their own survival”
DONATIONS

Donations will arrive > 24 hours
Not all will be helpful
May cause another disaster

Armenia Earthquake 1988

>5,000 tons drugs donated
Used > 32 warehouses
8 % expired
Only 30% relevant and useful
50 people worked for 6 months
to sort these donations

Donations for Dili
DEAD BODIES

Myth that “dead bodies are a major cause of disease”

- Diseases that are not present normally in the affected area will not suddenly occur because of dead bodies.
- Even if dead are carriers of disease they are probably less risk dead than alive.
- Results in rapid and unceremonious disposal of corpses often without proper ID or burial.
- Adds to suffering of survivors
- Uses resources that could be used for the survivors
SELF SUFFICIENCY

- Teams must be self sufficient
- If not then may be a “second disaster”
  - victim country forced to feed and shelter extra people from already limited resources
  - limited usefulness if no supplies / power
    e.g. Bam earthquake no power for 2 days
- Should include base camp equipment, field hospital, medical supplies, water, food, sanitation, power.
“Human history becomes more and more a race between education and catastrophe.”

HG Wells
The Outline of History, Ch 15