“CURRENT ISSUES”

HEALTH ASPECTS OF DISASTERS

COLLOQUIUM

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ISSUES

- Definitions: When is a disaster not a disaster?
- Understanding our risks and preparing for these
- Providing care on an epidemiological basis
- Surge Capacity: More than just beds
- Agency Integration and collaboration
- Paradigm shifts in care
- Education and training
- Linking research and operations
- Linking planning and operations
- Standards and indicators of effectiveness
- .................
(1) WHEN IS A DISASTER NOT A DISASTER?

- No general accepted definition of a disaster.
- Widespread everyday use

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.
FREQUENCY OF DISASTERS

> 10,000 disasters reported.
> 5 billion people affected.
> 12 million persons killed.
> $4 trillion USD cost.

CHE

- Not necessarily trauma
  - More likely related to loss of access to food, water, sanitation and health infrastructure.
  - Most trauma deaths also occur in insecure sites where relief agencies have poor access

- Vulnerable groups may also be neglected (including women, children)

DCR war 10 million deaths in 22/12
(Brennan and Nandy 2001)

- 11.7% due trauma
- rest due to preventable infections such as measles, respiratory infections, malaria, diarrhoea and malnutrition

- Psychological disorders in about 50% of refugees

CHE should be included in definition of disasters
(2) UNDERSTANDING OUR RISKS

- Low rate of death associated with disaster.
  41 deaths / yr (1991-2000)

- Highest annual % age of people affected by disasters amongst highly developed countries.
  8.46% (1.5 million / yr)

- QLD cost > $1 Billion over past 20 years pre Cyclone Larry.

- Natural disasters > Man made disasters
OUR REGIONAL DISASTERS

- Commonest – windstorms, floods, transport. (IFRC Brennan 2004)

- Western Pacific (1991-2000)
  23% of natural disasters worldwide
  40,000 dead, 430,000 injured, 6 million homeless. (Asahi 1999)

- Oceania low level preparedness
  (Keim 2001)

  annually affect 4.5 million people, cost $1 billion USD.
## WHERE DISASTERS OCCUR


<table>
<thead>
<tr>
<th>Disaster Type</th>
<th>Asia</th>
<th>Americas</th>
<th>Africa</th>
<th>Europe</th>
<th>Oceania</th>
<th>Total</th>
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<tr>
<td>Transport incidents</td>
<td>668</td>
<td>233</td>
<td>437</td>
<td>186</td>
<td>11</td>
<td>1535</td>
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<tr>
<td>Floods</td>
<td>362</td>
<td>216</td>
<td>207</td>
<td>153</td>
<td>25</td>
<td>963</td>
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<td>Windstorms</td>
<td>322</td>
<td>283</td>
<td>49</td>
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<td>783</td>
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<td>Industrial incidents</td>
<td>225</td>
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<td>37</td>
<td>67</td>
<td>2</td>
<td>386</td>
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<tr>
<td>Miscellaneous accidents</td>
<td>178</td>
<td>45</td>
<td>57</td>
<td>53</td>
<td>5</td>
<td>338</td>
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<td>Droughts/famines</td>
<td>77</td>
<td>39</td>
<td>113</td>
<td>13</td>
<td>11</td>
<td>253</td>
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<tr>
<td>Earthquakes</td>
<td>112</td>
<td>48</td>
<td>10</td>
<td>37</td>
<td>8</td>
<td>215</td>
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<tr>
<td>Avalanches/landslides</td>
<td>101</td>
<td>40</td>
<td>12</td>
<td>25</td>
<td>5</td>
<td>183</td>
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<tr>
<td>Forest/bush fire</td>
<td>18</td>
<td>55</td>
<td>11</td>
<td>39</td>
<td>9</td>
<td>132</td>
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<td>Extreme temperatures</td>
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<td>30</td>
<td>6</td>
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<td>126</td>
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<td>Volcanic eruptions</td>
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<td>23</td>
<td>3</td>
<td>2</td>
<td>6</td>
<td>50</td>
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<td>Other national disasters</td>
<td>14</td>
<td>4</td>
<td>4</td>
<td>1</td>
<td>2</td>
<td>25</td>
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<tr>
<td><strong>Total</strong></td>
<td>2128</td>
<td>1071</td>
<td>946</td>
<td>698</td>
<td>146</td>
<td>4989</td>
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From Cameron et al “Textbook of Adult Emergency Medicine”. Ch 25.3 Medical Issues in Disasters. Brennan R, Bradt D, Abrahams J. Table 25.3.2
DISASTERS & DEVELOPING COUNTRIES

- Economic status is related to vulnerability \( (\text{McEntire 1998}) \)
  - 90% disaster deaths and injuries occur in countries with per capita income < $760 USD per year \( (\text{Haddow and Bullock 2003}) \)
  - means less capacity to cope, let alone prepare \( (\text{Keim 2001, Lennquist 2004, Leus 2000}) \)

**Hurricane Mitch in 1997** \( (\text{Lichtenstein 2001}) \)

9000 killed / > 3 million displaced (>75% pop)  
$8.5 billion USD (>GDP Honduras)  
Set development back by 20 years !!

Likely to be increased calls for disaster medical assistance from developing countries. \( (\text{McEntire 1998, Lennquist 2004, Burkle 2001}) \)

Aid increasingly seen as an obligation and can be a political tool.
THINKING ABOUT RISKS REGIONALLY

- RISK is the integration of probability of occurrence and the magnitude of the consequences of the disaster
- How likely is it?
- How bad will it be?

Should we think “outside the square” and include regional neighbours which may mean increased frequency
What are the implications for policy, budgets, local service delivery etc
(3) PROVIDING CARE BASED ON EPIDEMIOLOGY AND NEEDS

- Different disasters produce different injury patterns – helps estimate needs and timelines. (Milsten 2000, Noji 2000, Van Rooyen 2001)

- Often a defined timeline of morbidity patterns with a trimodal distribution medical issues post sudden onset disaster. (Maegele et al 2005, Taylor et al 1998)

- Disasters may also cause adverse effects on the usual health of a population with chronic disease.

- Must be based on understanding of risks and needs
TIME LINE OF HEALTH ISSUES
POST DISASTER


- Phase 1: Seconds to minutes - high mortality

  Phase 2: minutes to hours - medical care focus on trauma care

  Phase 3: days to weeks after - complications = sepsis, MOF, psych
  - displaced persons and lack resources
  - trauma from clean up & recovery

- Basis for PAHO / WHO standards for Foreign Field Hospitals
TIME LINE OF PATIENT LOAD AND SURVIVAL

Local emergency and health response is the critical variable in survival of trapped and trauma casualties.

CDC CASUALTY PREDICTOR

Total Expected Casualties = 2 x Number of Casualties in 1 Hour

Tangshan Earthquake 1976
Rescue 30 minutes = 99% survival
Rescue day 1 = 81% survival
Rescue day 2 = 34% survival
Rescue day 3 = 38% survival
Rescue day 4 = 19% survival
Rescue day 5 = 7% survival

In Australia how do we provide appropriate early care in regional areas?

Internationally DMATs are rarely on site soon enough to deal with the acutely injured

“MEDICAL” CARE IN DISASTERS

- **Need for medical care post disaster and impact of disasters on health**

  - **Turkey earthquake**: IDF field hospital (day 3-12), 2230 patients
    - 37% paed, 32% medicine, 21% non trauma surgery, 10% O&G.
    - 10% trauma with 39 needing surgery
    - Main issue: control spread of infection, exacerbation chronic disease, lack of medicines.

  - **Tropical Storm Allison** (Texas)
    - 1036 patients – 507 medical, 232 trauma.

  - **Hanshin earthquake**
    - Increased pneumonia, peptic ulcer, AMI
    - Worsened diabetic control

Remember women, children, usual health care needs
Women still have babies, Diabetics still need insulin, Dialysis needs continue
EXAMPLE : TSUNAMI

INJURY PATTERNS

• Drowning, orthopaedic, respiratory infections, infectious complications.

• 3 PHASES
  - First minutes incompatible with life
  - Next few hours complications such as blood loss, haemo/pneumothorax
  - Days to weeks late complications including infectious diseases

(Kongsengdao 2005)

• Peak ED numbers day 1 and return normal day 4

(Wattanawaitunehai 2005)

• Trauma case load less than Aitape

(Koido 2005)

ADF Response Aitape
(Taylor et al 1998)

Arrived day 3

209 operations on 251 patients related to wound management.

Hundreds of others seen.

Few infants and elderly had survived
Those with intracranial, intrathoracic, abdominal and spinal injuries had already died

Response needs to be consider
Epidemiology of disaster
Timeline of response
Needs of affected community
Resources of responding agency
(4) SURGE CAPACITY

- Questions raised about hospitals in developed countries ability to respond to disasters (Kizer 2000, Born et al 2004)

- “most hospitals in the USA are one industrial accident away from the tipping point for a disaster” (Dara 2005)

- “any large terrorist event in Australia would require a response from both Federal and State Governments, with most hospitals unlikely to cope with any more than small numbers of seriously injured patients” (Rosenfeld 2005)
WHAT SHOULD WE CONSIDER?

- **BEDS**
  - Occupancy rates?
  - Access block?
  - Overcrowding?
  - Impact of cancellation?

- **EQUIPMENT**
  - “Just in time” stock?
  - Stockpiles?
  - Adult vs Paeds?

- **STAFF**
  - Who?
  - How many?
  - How to activate?
  - Will ‘switchboard’ work?
  - How long for?
  - How will they get there?

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**PLANNING AND MoU**
- Expansion facilities nearby
- Transport options

**PLANNING AND DEVELOPMENT**
- Corridors
- Expansion planning in hospitals
- Access and parking
- Communication systems

**LATERAL THOUGHTS**
- Surgical assistants
- Communication systems
HOSPITALS MAY BE VICTIMS

- Structural damage
- Non structural damage
  power, water, waste, lighting etc

Consider Alternatives?

Mexico City Earthquake 1985
Juarez Hospital collapsed
536 beds lost, 561 people killed
(5) AGENCY INTEGRATION AND COLLABORATION

• “Silo System” in health care
• Compounded by
  - Efficiency architecture
  - Loss of hospital dining rooms
  - Email culture

Simple examples
- Reliance by health on fire for decontamination
- Transport of health staff to disasters

If healthcare finds it hard to integrate within a single hospital, how do we do this across different agencies and organisations?
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
Failure to activate the disaster plan ……..

Meetings in local pub !!!
INTEGRATED APPROACH

• If we assume that we will respond together why don’t we
  - Plan together?
  - Train together?

INTERNATIONAL RESPONSE ALSO

“Life didn’t start for anyone when you got off the plane”.
*Birch and Miller (2005)*

ALL AGENCIES APPROACH

“PLAYS WELL WITH OTHERS”
“Five minutes before the party is no time to learn how to dance”
* Snoopy

“Human history becomes more and more a race between education and catastrophe.”
* HG Wells, *The Outline of History*, Ch 15

“You’re never ready, but you might be prepared”
* Capt Al Haynes. United Flt 232 Souix City*