# EMERGENCY MEDICINE IN DISASTER PLANNING

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# WHAT IS DISASTER :

# MASSIVE DESTRUCTION OUT OF CONTROL OF LOCAL GOVERNMENT

# DISASTERS

Natural : Earthquake
Flood
Land Slide
Tsunami
Hurricane

Man Made : World trade center hit by plane
: Terrorism war fair
: Weapon of mass destruction
: Chemical war

# Trimodal Distribution of Medical Problems in Large Scale Disaster

The Initial Phase : Seconds to minutes after disaster
high mortality due to injuries
incompatible with life
drowning, suffocation entrapped in
destroyed building

Second Phase : Minutes to hours after incidence
early trauma management, ATLS

First Responder Triage, Resuscitation, Stabilization
Transportation Definitive treatment, Air way care
Local Hospital hemorrhage control, Splint

**Third Phase** : Days → Weeks → Month or After

prevent and treat

complications sepsis, multiple organ failure

reconstructive surgery

psychological support

*Taylor PRP, et al Australian Defense Force For Tsunami, MJA 169:602-6 1998*

# EFFECTS OF DISASTER : ACUTE STAGE

Dead and injuries

Mass destruction of building, community

Destroy communication system : Telephone, Radio station

Major interruption in transportation, bridge

Destroy food supply and contamination of water supply

Famine and poverty

Psychological impact on survivors and relative

# FACTORS INDICATE INCREASE PROBABLY OF MASS CASUALTY

1. Increasing population in flood plain, seismic zone, hurricane
2. Production and transportation of toxic and hazardous material
3. Increase nuclear and chemical facilities
4. Terrorist activity
5. Catastrophic fires, explosions

# FACTS ABOUT DISASTERS WORLDWIDE (WHO)

In the past 20 Years

Claimed About 3 Millions Lives

Affected 800 Millions People

Exceeding $ 500 Billion Property Damage

# Reported deads after tsunami over 8 richter since 1990

| Date UTC | Region | Magnitude | Number Killed* |
|---|---|---|---|
| 1994 06 09 | Northern Bolivia | 8.2 | 10 |
| 1994 10 04 | Kuril Islands | 8.3 | 11 |
| 1995 07 30 | Near Coast of Northern Chile | 8.0 | 3 |
| 1995 10 09 | Near Coast of Jalisco, Mexico | 8.0 | 49 |
| 1996 02 17 | Irian Jaya Region, Indonesia | 8.2 | 166 |
| 1998 03 25 | Balleny Islands Region | 8.1 | 0 |
| 2000 11 16 | New Ireland Region, P.N.G. | 8.0 | 2 |
| 2001 06 23 | Near Coast of Peru | 8.4 | 138 |
| 2003 09 25 | Hokkaido, Japan Region | 8.3 | 0 |
| 2004 12 23 | North of Macquarie Island | 8.1 | 0 |
| 2004 12 26 | Off West Coast of Northern Sumatra | 9.0 | 283,543 |
| Total | | | 283,922 |

# 1984-1989

| Country | | Disaster | Injured | Deads |
|---|---|---|---|---|
| Ethiopia | 1984 | Cyclone | 5.8 | - |
| Mexico | 1985 | Earthquake | 40,000 | 7,000 |
| Columbia | 1985 | Volcanic Eruption | 170,000 | 24,000 |
| Solomon | 1986 | Cyclone | 90,000 | 138 |
| Cameroon | 1986 | Toxic Gas | 300 | 1,200 |
| Cook Island | 1986 | Cyclone | | 6,000 |
| Bangkdesh | 1988 | Flood | | 500 |
| USSR | 1988 | Earthquake | | 25,000 |

| | | | |
|---|---|---|---|
| San Francisco | 1989 | Earthquake | 3,800 | 63 |
| Flooding in Midwest USA | 1993 | | | |
| Earthquake in Northridge California USA | 1994 | | | |
| Earthquake Kobe Japan | 1995 | | | |
| Bombing of federal building Oklahoma | 1995 | | | |
| Bombing of Olympic Games in Atlanta | 1996 | | | |
| Servere EI Nino-Related Flooding | 1997 | | | |
| Hurricane Mitch | 1998 | | | |
| World Trade Building Plane Crash | 2001 | | | |
| Indian Ocean Tsunami | 2004 | | 20,000<br>1,000,000 | 6,000<br>300,000 |

# DISASTER PLANNING

SURVEY - Community hazards analysis

- Regional, Geographic, National

Prevention of possible disaster

Public education, organized disaster team

Health care resource management

EMS, Ambulance service, EMT

Hospital beds, critical care, ICU

Health personnels M.D, Nurses, AID

Blood bank, Drug stock, Water supply

Electrical supply, Communication systems

# PREVENTION OF POSSIBLE DISASTER

Survey of possible hazards and disaster

Public education - prevention, management

Warning system - with back up system

Disaster information management system (DIMS)

Seek international co-operation

UNDRO, JICA,

Prepared, Readiness, Training

# Opportunity for Successful Disaster Management

- Warning System Management Dims
- Resource
- Strategic Planning System
- Subgroup Distribution
- Regularity of Refreshing Knowledge and Action
- Training and Public Education

# Strategic Plans

- Responder and Commander
- Communicating System
- Traumatic Supportation Network
- Supportation Team
- Instruments and Equipment
- Traffic Control System

# Implementation of Emergency Medicine and Disaster Planning in Medical Curriculum

# Incidence of Terrorism

| | |
|---|---|
| 9 September 2001 | World Trade Building |
| In 2001 | 348 events |
| In 2003 | 175 events |
| In 2004 | 650 events |
| August 2005 | London Bomb |
| Form 2004 to 2005 | More than 1,500 events |

# EMERGENCY MEDICAL SERVICE FOR DISASTER

Well prepared and ready for possible disaster

Prehospital – EMS system protocol, disaster sconce

Incident command system, planning section

Logistics section, hospital facilities, resource

Comprehensive planning for hospital response in emergency

Review hospital and community disaster response

Disaster stress management plan

# FACTORS INFLUENCING GOOD EMS

การก่อการร้าย/การต่อสู้ IRELAND, ภาคใต้

DISEASES RPEVALENCE-CHD, PE

อุบัติเหตุ (TRAUMA),MASS CASUALTIES

DISASTER Earthquake,Tsunami PUBLIC AWAREENESS, ความรับผิดชอบของรัฐบาล

SOCIOECONOMIN CEED

# PATIENT CARE IN TRAUMA AND EMERGENCY

At Scence of the accident – Triage

Emergency medical service – EMS

Transfer and referring system

Care during transfer – air way, c-spine protection

Analgesic administration

Air transportation – helicopter, fixed wing

# Good EMS System in Developed Country
# USA, Japan, Singapore

Patient reach hospital in 3-5 minutes

Two way communication, Good ambulance service

Good prehospital care and resuscitation

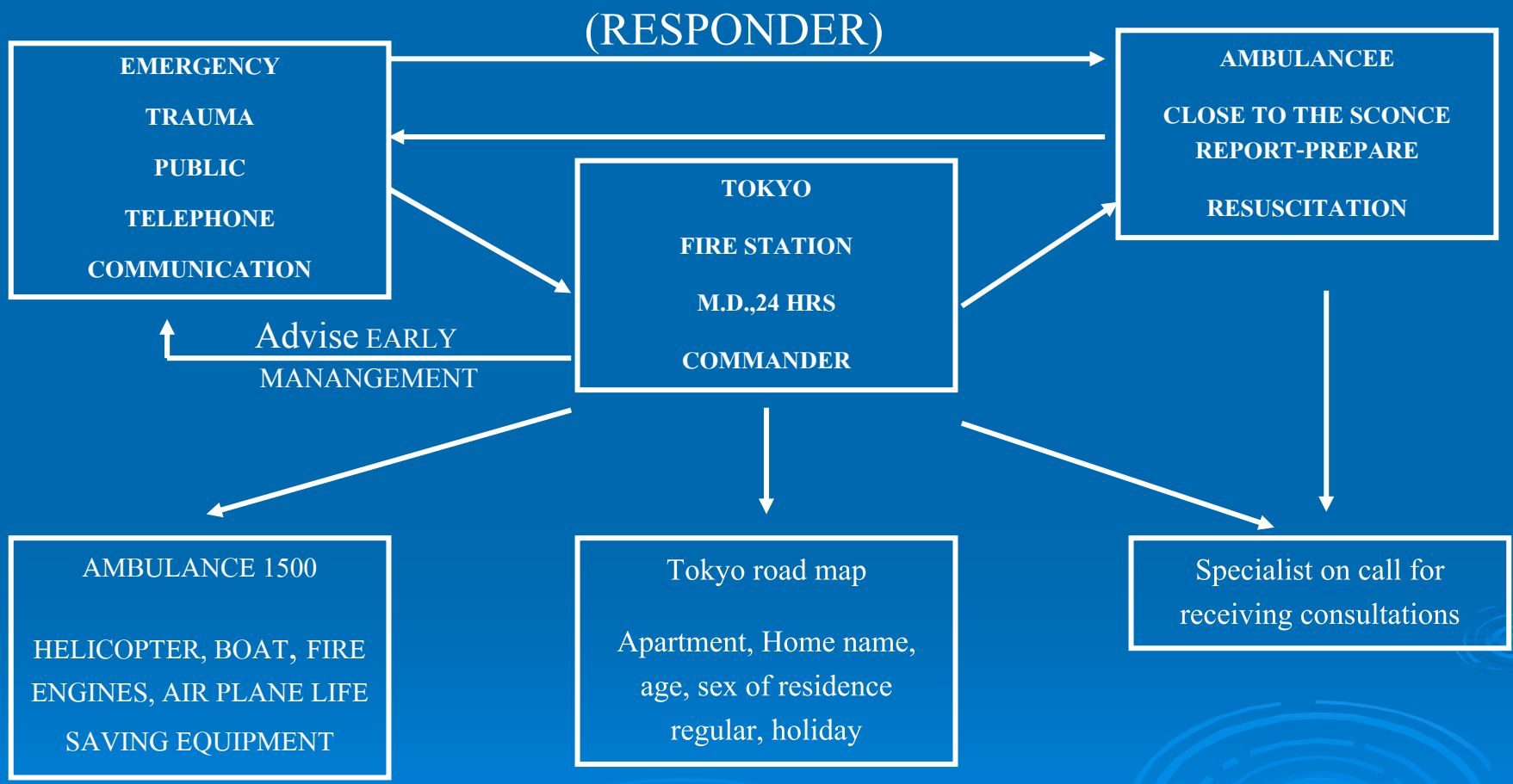
Specialist on duty 24 hours

Good co-ordinating system between hospital

Good referring and transfer system

Central office co-ordination 24 hours/day

# EMS System in Japan



# Emergency Medicine in Disaster Planning

Axiom : Planning for small scale simple disaster is possible in small hospital

For large scale and complex is impossible

Emergency medical care has inadequate personal

Appropriate critical care must available

First responder and prehospital care is important

Triage ⟶ Resuscitated ⟶ Transport

Command – Communication – Co-Ordination

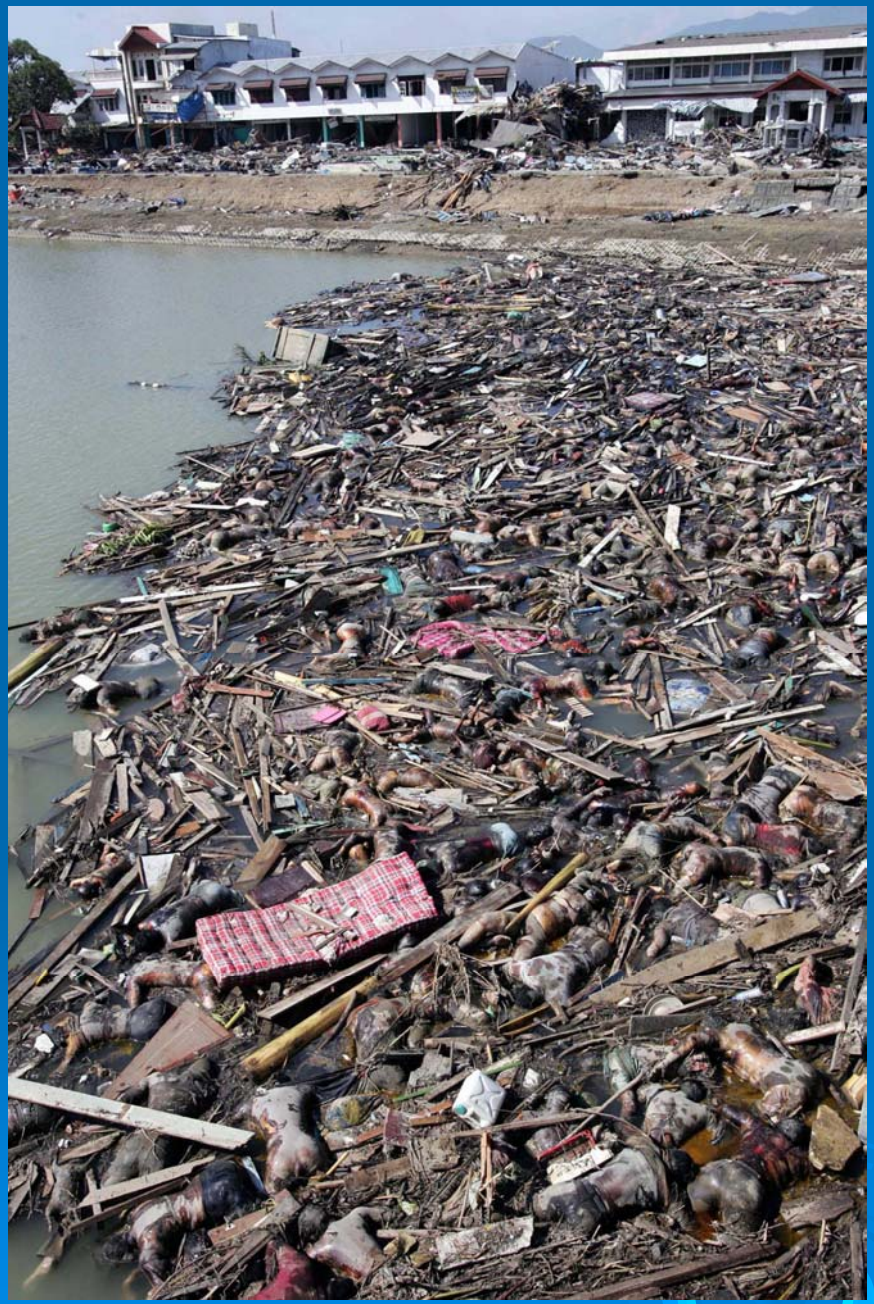
# Our Pitfalls in Management of Tsunami Disaster 24 December 2004

# What Happen in Disaster ?

Babu / Reuters



PATONG FRIENDSHIP



# Tsunami, December 26, 2004

Sumatra Earthquake 9.0 Richter's

Wave Height 7-15 Meters

Wave Speed 500 Km/Hr

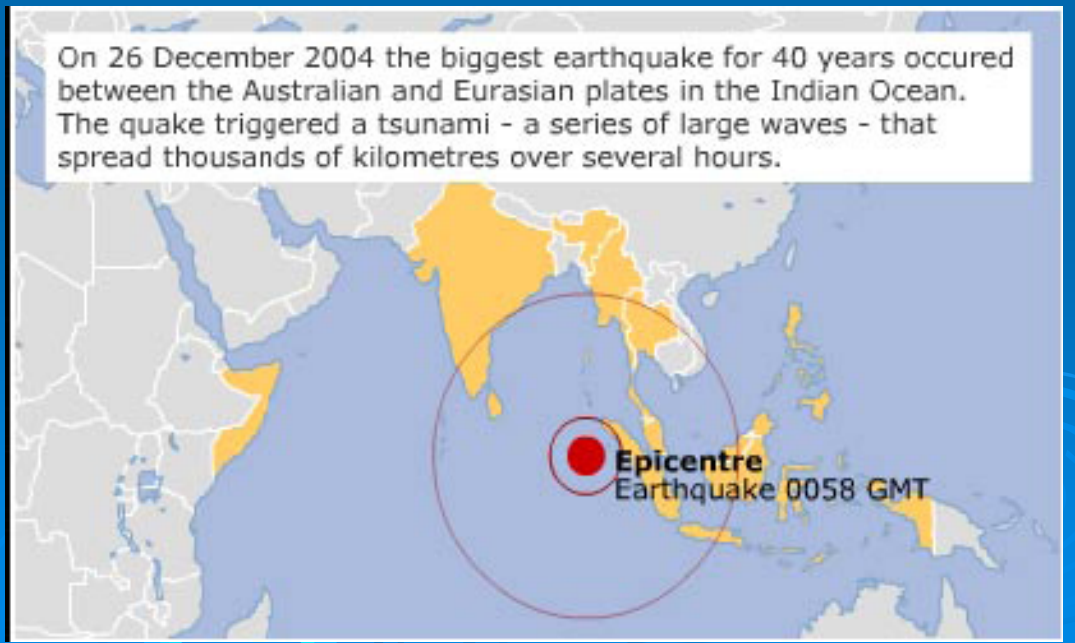
The most powerful wave in 40 years

310,000 Reported dead and loss

Million Injured

34,000 Severe Injured


Earthquakes happen when the plates that make up the Earth's surface suddenly move against each other.
Arabian
Indian
Philippine
African
Eurasian
Australian


On 26 December 2004 the biggest earthquake for 40 years occured between the Australian and Eurasian plates in the Indian Ocean. The quake triggered a tsunami - a series of large waves - that spread thousands of kilometres over several hours.
Epicentre
Earthquake 0058 GMT

# Causes

1. Lack of First Responder
    - Knowledge for Disaster Sequence
    - Experience
    - Communicating
    - Human Resource Team Supportation
    - Team Action
    - Team Management

2. Lack of Commander

- Who ? Suitable ?
- Commander Roles ?
- Commander Receiving Datas ?

3. Lack of work Cooperation

- Team Work
- Individualization
- Communicating
- Knowledge
- Experience

# Lack of Triage and Prehospital Care

- Place ?  Area ?
- Team Work
- Optimal Prehospital Care ?
- Experience
- Instrument for Primary Care
- Hospital Facility Inadequate

# Lack of In Hospital Cooperation

- Emergency Room
- Operating Theater
- Radiology Department
- Intensive Care Unit
- Ward
- Blood Bank
- Human Resource
- Strategic Plan for Mass Casualty

# Lack of Transferring Network System

- Doctor to Doctor Discussion
- Patients Details Information
- In Adequacy of ICU Care
- Infection esp. HIV

# Lack of Management System

- Human Resource
- Medical Instruments
- Food and water supply
- Prevention of secondary disaster

  epidemic, psychiatric problem
- Finance and budget

# Lack of Rehabilitation System and Protecting System for Repeated Events

# Problems of Evacuation and Transportation

Destruction of bridge and road

Failure of communication – telephone

Ambulance - inadequate number

- inadequate equipment

Traffic difficulty due to mass gathering

Traffic police not function properly

No commander, No organized system

# Long Distance Air Transportation : Requirement

Air bus 310 MRT Med Evac (Germany)

Full Equipped ICU Instrument 6 Stations

2 Pressure gas bottle – 100% oxygen, 8 hours

Ventilators, monitor, 25 highly train specialist

Able to carry another 38 PT. Less injuries

# PITFALLS IN WOUND MANAGEMENT


28 12 2003


28 12 2003


28 12 2003


28 12 2003


28 12 2003


28 12 2003

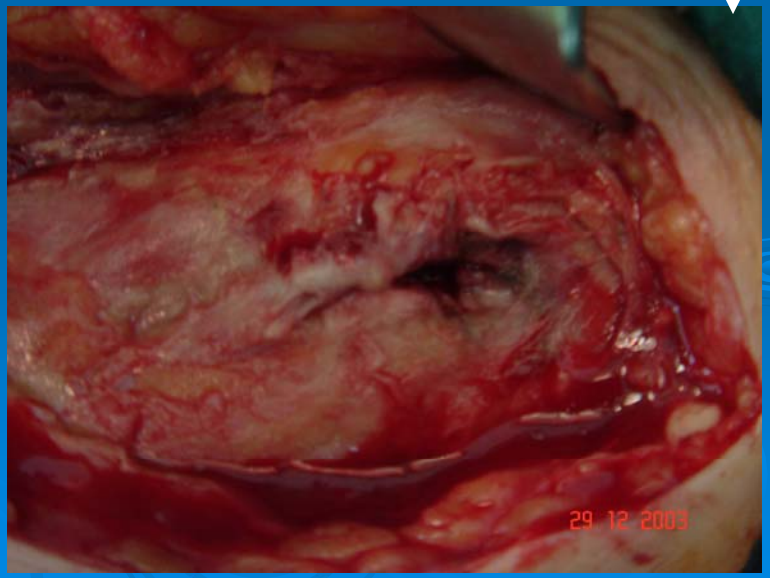

28 12 2003


28 12 2003


29 12 2003


29 12 2003


29 12 2003


29 12 2003

# Synopsis of injuries sustained

| Type of Injury | No. | % |
|---|---|---|
| Large-scale soft-tissue injury, lower extremity/hip | 15 | 88 |
| Thoracic trauma/ hemopneumothorax | 7/3 | 41/18 |
| Fractures (closed) | 6 | 35 |
| Large-scale soft-tissue injury, upper extremity | 5 | 29 |
| Fractures (open) | 4 | 24 |
| Head | 3 | 18 |
| Other | 3 | 18 |

*Some patients had more than one type of injury (n=17)*

A pattern of severe large-scale soft tissue damage including high-level contamination was common to all tsunami victims evacuated to this medical facility

Resistance patterns for isolates from wound swabs and respiratory tract specimens

| Antibiotic Agent | Isolates | | | | |
|---|---|---|---|---|---|
| | Acinetobacter baumanil | Pseudomonas aeruginosa | Stenotrophomonas maltophilia | Escherichia colin(ESBL+ | Klebsilella pneumoniae |
| Ampicillin | R | R | R | R | R |
| Piperacillin | R | R | R | R | R |
| Piperacillin/ tazobactam | R | R | R | R | R |
| Ampicillin/sulbactam | R | R | R | R | R |
| Cefazolin | R | R | R | R | R |
| Cefuroxim | R | R | R | R | R |
| Cefotaxim | R | R | R | R | R |
| Ceftazidim | R | R | R | R | R |
| Imipenem | R | S | R | S | S |
| Meropenem | R | S | R | S | S |
| Aztreonam | R | | | | |
| Gentamicin | R | R | R | R | R |
| Tobramycin | R | R | R | | |
| Amikacin | R | S | R | S | I |
| Netilmicin | R | | | | |
| Levofloxacin | R | R | S | S | R |
| Ciprofloxacin | R | S | I | S | R |
| Cotrimoxazol | S | R | S | R | R |
| Fosfomycin | R | | | | |
| Colistin | S | S | | | |

*ESBL, extended-spectrum B-lactamase; R, resistant; S, Sensitive; I, intermediate sensitive.*

# Definitions

- Emergency - Urgent Treat
- Mass Casualty - Large Number
- Multiple Casualty - Many Casualty
- Disaster - Out of Control

# Role of Doctors and Nurses
# In
# Disaster and Emergencies

# Confusing Busy

# The Roles of Doctors and Nurses

# In

# This Sequence Situations

# ขอบคุณ

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