



# MODULE I

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## Disasters and their Impacts on Public Health

# Presentation Learning Objectives

- Understand what makes a disaster
- Recognize the components of disaster response
- Understand the need for disaster preparedness and training
- Learn about the AAP/PAHO “Pediatrics in Disaster” training program

# Disaster

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## Disaster:

A disaster is an event that most often occurs suddenly and unexpectedly, causing trauma to people and/or severe damage to the environment, and exceeds or overwhelms the response capacity of the affected community.

**Risk = Hazard x Vulnerability/Capacity**



# SCIENCE OF DISASTER

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A disaster is the convergence, at a given moment and in a given place, of two factors: risk and vulnerability. ”

(by G. Vilches-Chaux)

# SOME KEY DEFINITIONS

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**Hazard**: any *potential* threat to public health and safety

**Emergency**: any *actual* threat to public health and safety

**Risk**: the *consequences of exposure* to a hazard

**Vulnerability**: *determinants* of risk

**Capacity**: way the community copes and responds

# TYPES OF HAZARDS

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## Slow Onset:

Flood

Drought

Famine

Chemical Spill

Epidemic

## Sudden Onset:

Earthquake

Cyclone

Flash Flood

Road Traffic Accident

Conflict



# SEVERITY OF A DISASTER

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- **Magnitude of the event**
- **Vulnerability of the population**
- **Number of affected people**
- **Rates of associated diseases**
- **Crude mortality rate (CMR)**



# HAZARDS AND EMERGENCIES

- 36 serious earthquakes occur every day around the world
- Only one of them needs an emergency response
- An earthquake which is labelled a disaster occurs once every 3 months

# PUBLIC HEALTH IMPACTS OF DISASTERS

- Increased numbers of **deaths** and injuries
- Population **displacements**
- New cases of **disease** and **disability**
- Exacerbation and increased numbers of cases of psychological and social behaviour **disorders**
- Possible food shortages and nutritional **deficiencies**
- **Disease** from environmental health hazards
- **Damage** to health facilities and other infrastructure
- **Diversion** of development resources to emergency relief

# TRIGGERING EVENTS

**NATURAL FORCES**

Climatic / Geological

**HUMAN ORIGIN**

**TECHNOLOGICAL**

- Industrial accidents

**MASSIVE REPRESSION OR TERRORISM**

- Massive destruction weapons
- Chemical or biological weapons
- Attacks on civilian population

**COMPLEX EMERGENCY**

- Conflict / Civil war
- Displaced population
- Severe infrastructure losses
- Significant security problems



# LEADING CAUSES OF DEATH

- Trauma
- Diarrheal diseases and dehydration
- Communicable diseases: Measles, Malaria, ARI
- Malnutrition

# POPULATION WITH MOST VULNERABILITIES

- Children
- Women
  - Pregnant
  - Lactating
  - Without spouse
- Elderly
- Disabled





# PEDIATRIC VULNERABILITIES

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Respiratory	Higher minute volume Smaller distance to the floor
Gastrointestinal	Higher risk of diarrhea and dehydration
Skin	Higher body surface area increases skin exposure risk; more susceptible skin
Endocrine	Increased risk of thyroid cancer from radiation exposure
Thermoregulation	Increased risk of hypothermia
Developmental	Less ability to escape environmental dangers or anticipate them
Psychological	More susceptible to separation anxiety and prolonged stress



# ADDED RISKS

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## Physical victimization

- Rape
- Torture
- Robbery

## Exploitation

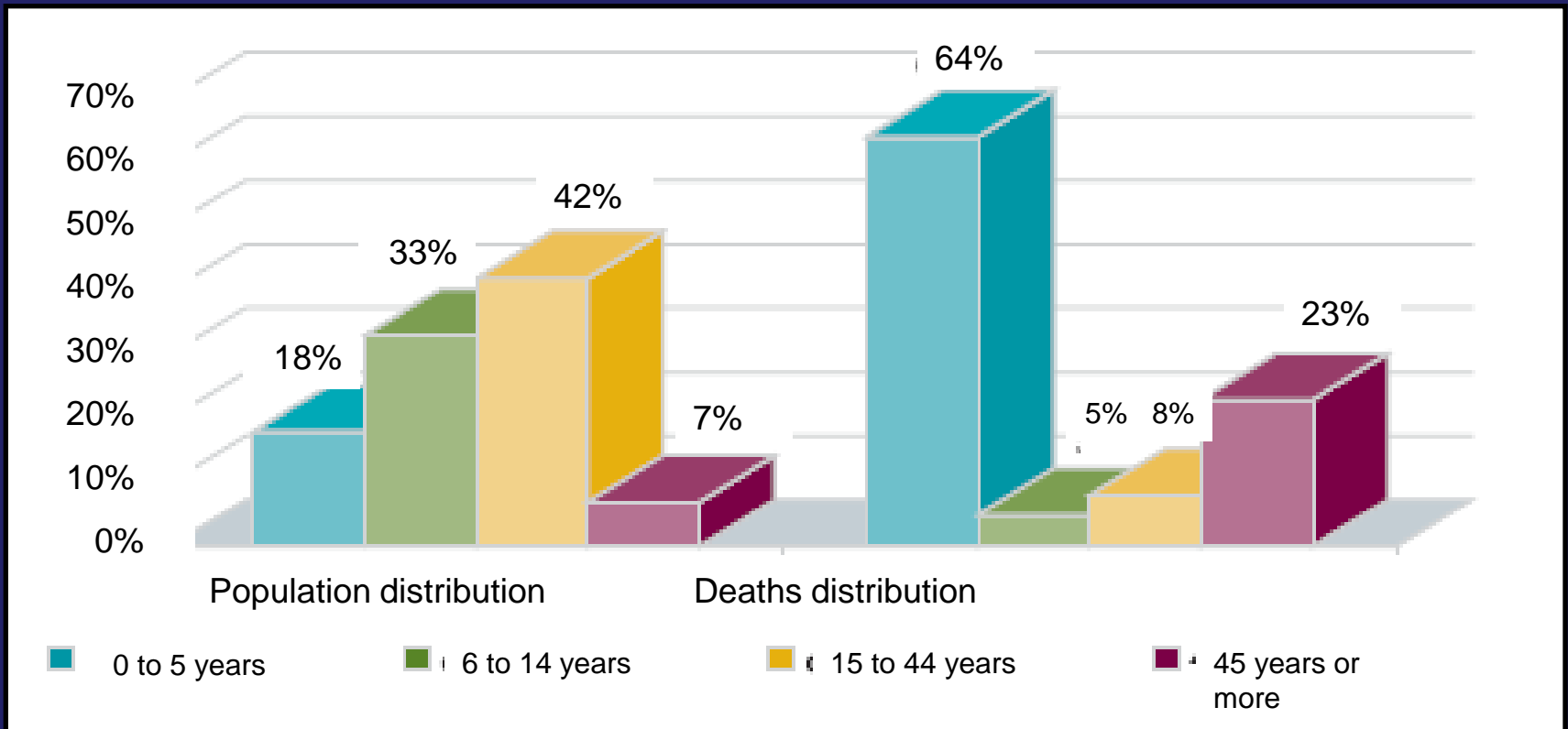
- Child labor
- Child trafficking / sexual trafficking
- Child soldiering

# Special Vulnerabilities of Children

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- The psychological and emotional needs of children are often neglected following disasters, particularly when parents and other adults in their lives are having trouble coping with the event themselves.

# AGE-SPECIFIC MORTALITY

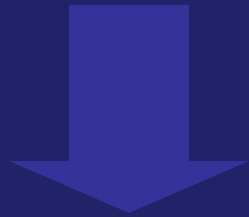


Adapted from Toole, MJ, "Mass Population Displacement- A Global Public Health Challenge," Infectious Disease Clinics of North America, vol. 9; June 1995.

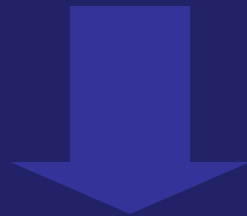
# WHAT DO WE DO?

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**Address vulnerabilities**



**Minimize risks**



**Manage disaster**



# PHASES OF DISASTER MANAGEMENT

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1. Prevention/ Mitigation
2. Preparedness
3. Emergency response
4. Recovery



# PREPAREDNESS

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- Risk assessment and vulnerability analysis
- Information management
- Policy and planning
- Resource mobilization
- Coordination and partnership
- Community involvement
- Training and simulation



# RESPONSE

- Notification
- Information management and communication
- Coordination among network
- Search and rescue
- Damage and need assessment
- Evacuation and sheltering
- Resource mobilization



# RECOVERY

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- Reestablish self-sufficiency
  - Community planning
  - Infrastructure rebuilding
  - Health recovery
  - Lesson learnt

# An earthquake occurs in your region

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- Destroyed roads, lack of electricity, inoperable telephone communications, difficult terrain, high altitudes and harsh weather make it difficult to know what is happening in the affected areas
- You serve as a consultant helping to organize and coordinate the emergency response
- *What is your first recommendation?*

# Mobilize a Rapid Assessment Team

- Within 48 hours rapid assessment teams are flown into the affected areas by military helicopter
- Doctors, nurses, surgeons, kidney specialists
- Psychologists
- Social workers
- Logisticians
- Water and sanitation experts
- Flight-transport specialists

# Rapid Assessment Report

- Tens of thousands of people are affected and are sleeping outside with little shelter from cold and rain
- Thousands have severe wounds including fractures, spinal cord injuries, crush injuries, lacerations, and infections
- Most hospitals have been destroyed
- *What do you recommend?*

# Rapid assessment response

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- Organize the transport of supplies to the affected areas by helicopter
- Shelter materials
  - blankets
  - sleeping mats
  - winterized tents
- Water Tanks and Pumps
- Food supplies

# Rapid assessment response

- Set up field hospitals and medical tents to relieve partially functioning hospitals
- Arrange transport of critical patients from affected areas to out of area hospitals
- Obtain additional dialysis machines to handle large numbers of patients with renal failure secondary to “crush” injuries
- Provide mental health services and counseling (psychologists)



# PHASES OF DISASTER MANAGEMENT

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# WHAT DO WE DO?

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**Minimize risks**



**Manage disaster**



# HURACÁN STAN OCTUBRE 2005

Durante la semana,  
fuertes lluvias causaron  
el desborde de varios  
ríos y una gran cantidad  
de aludes de tierra o lodo

5 12:52PM

A photograph showing the aftermath of Hurricane Stan in a rural area. In the foreground, two men stand on a dirt path. The man on the left wears a blue cap, sunglasses, a dark vest over a green shirt, and khaki pants. The man on the right wears a light blue button-down shirt and grey trousers. Behind them, a large, jagged rock formation sits on the ground. In the background, several houses are visible, some with damaged roofs and walls. A utility pole stands to the left. The scene is set against a backdrop of lush green trees and hills under a clear sky.

# HURACÁN STAN

**La combinación de viento, lluvia, aludes o inundación causaron cortes en la electricidad, la provisión de agua y líneas telefónicas, así como pérdida de hogares y vidas.**

# Report Card on 10 ESSENTIAL EMERGENCY RELIEF MEASURES (WHO): Hurricanes Katrina and Stan

Do a rapid assessment of the affected population	USA	Guatemala
1. Local assessment teams trained and in place	Fail	Fail
2. External assessment teams able to quickly respond	Fail	Fail
3. Secure communications system in place and used	Fail	Fail
4. Secure transportation system available and used	Fail	Fail

# Report Card on Essential Measures

	USA	Guatemala
2. Provide adequate shelter and clothing	Pass	Pass
3. Provide adequate food	Fail	Fail
4. Provide elementary sanitation and clean water	Fail	Fail
5. Institute a diarrhea control program	Pass	Pass

# Report Card on Essential Measures

	USA	Guatemala
6. Immunize against Measles when appropriate	Pass	Pass
7. Re-establish and improve primary care medical treatment	Fail	Fail
8. Establish disease surveillance and a health information system to monitor effectiveness of health interventions and realign priorities	Pass	Pass

# Report Card on Essential Measures

	USA	Guatemala
9. Organize human resources	Fail	Fail
10. Coordinate Activities	Fail	Fail
Overall	Fail	Fail

# Need for disaster preparedness and training

Disaster response training at the local level should be a community process involving the health sector (physicians, nurses, hospital, health clinics, private physicians), municipal agencies (fire department, police, sanitation and garbage), disaster response agencies (CONRED, red cross), schools, churches, and community groups such as the Rotary and Lions clubs).

# A FINAL WORD

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Risk reduction and preparedness are sets of strategies and actions for local communities to prevent *hazards* developing into *emergencies* and *emergencies* into *disasters*

*(from the 1997 Kobe Conference on Earthquakes and People's Health)*