From Reaction to Prevention

A Call to Action
A story of disaster risk reduction...
15 years later...

December 1981
Marion, where the afternoon twister cut its deadly path, going east parallel to Illinois 13 along Stockton and Boulevard avenues.
Before...

December 1981
All deaths occurred during the impact phase.¹


May 1982
No significant change in US disaster mortality rate, 1967-2016

Y = -0.0017 + 3.66

$R^2 = 0.03$

Source: CRED

Source: NHTSA 2018
Most disaster deaths are due to natural hazards

Disaster-related mortality worldwide, 1964-2013

- Geological: 50%
- Hydro-meteorological: 41%
- Biological: 4%
- Technological: 5%

6 Center for Research on the Epidemiology of Disasters (CRED)  http://www.emdat.net/index.htm
Natural history of disaster-related injuries

**EXEMPLARY BRIEF INCUBATION PERIOD**

- **Exposure**
- **Pathologic Changes**
- **Onset of Symptoms**

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**Stage of Susceptibility**
**Stage of Subclinical Disease**
**Stage of Clinical Disease**
**Stage of Recovery, Disability or Death**

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**Usual Time of Diagnosis**

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**Seconds to minutes**

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**“The Golden Hour”**
Epidemiology

Trimodal Distribution of Trauma Deaths

- Golden Hour = 80% of trauma deaths in first hour after injury
- Rapid trauma care has greatest level of impact in these patients
Evolution of “Golden Hour” after Combat Injury

PRE-2015
Location-based
Point of Time of Injury
Fixed Level or Echelon of Care

2015 & BEYOND
Physiology-based
Point of Time of Injury
Advanced Resuscitative Capability

60 minutes
<table>
<thead>
<tr>
<th>Extreme weather event</th>
<th>Main causes of death in the US</th>
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| Storm                 | Tornado – Head, chest, spine injury  
                          Cyclone – Drowning  
                          Falls, electrocutions, cuts and burns |
| Flood                 | Drowning                      |
| Landslide             | Asphyxiation, head, chest and spine injury |
| Heat                  | Heat illness and stroke       |
| Drought               | No direct deaths              |
| Wildfire              | Smoke inhalation, exacerbations of lung disease |
INJURIES HAVE AN EXTREMELY BRIEF INCUBATION PERIOD

“Seconds to minutes”

“The Golden Hour”
Prevention and the natural history of disease

**Primary**
- Health determinants
  - Environment
    - Natural
    - Built
  - Community
    - Cultural norms
    - Services
  - Society
    - Economics
    - Governance
    - Security
- Risk and protective factors
  - Intrinsic
    - Age
    - Gender
    - Ethnicity
    - Genetics
  - Acquired
    - Education
    - Occupation
    - Socio-economic status
    - Health status

**Secondary**
- Preclinical phase
  - Biological onset of disease

**Tertiary**
- Clinical phase
  - Symptoms
  - Diagnosis
  - Therapy
  - Initial outcome
- Post clinical phase
  - Recovery
  - Disability
  - Mortality
An Evolution in Approaches

Preparedness

Response

Risk Management (ISO 31000)
What is a hazard?

“A dangerous phenomenon, substance, human activity or condition that may cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage.”

Translation: “Dangerous stuff”
Examples of hazards

- Floods
- Earthquakes
- Radiation
- Typhoons
- Biologicals
- Tornadoes
Health hazards

“An agent or a situation that, when exposed to a human, has the inherent capability to cause an adverse health outcome (disease), resulting in morbidity and mortality”

WHO 2016

Environmental transfer of pathogenic organisms
- Bacteria
- Viruses
- Fungi
- Parasites

Environmental transfer of pathogenic energy
- Mechanical
- Chemical
- Thermal
- Radiological
- Nuclear

Environmental absence of essential life requirement
- Water
- Food
- Oxygen
- Temperature
- Healthcare
"The characteristics and circumstances of a (person) that make them susceptible to the damaging effect of a hazard"

Translation...

"Could get hurt"
What is exposure?

Exposure
Any condition which provides an opportunity for a hazard to contact the body

Translation: “Yuk”
Most disaster deaths can be prevented.
Reducing vulnerability

Health promotion
Health care
Poverty reduction
Community empowerment
Immunization
Education
Reducing exposures

Hazard avoidance
- Hazard control
- Substitution of hazardous materials
- Environmental impact analyses
- Hazard monitoring
- Health surveillance

Exposure avoidance
- Land use planning and regulation
- Release mitigation measures
- Building codes
- Buyouts
- Population protection measures
Tornado death rates are decreasing in the US

WHY?
LESS EXPOSURE
- Improved forecasting and early warning
- Improved communication
- Changes in construction

NOT because of the health sector

(Blasphemy!?)

Disaster risk reduction (DRR) for health

What is DRR?
• Preventing disaster-related adverse health impact before it happens
• Deals with the root cause

Why DRR?
• Majority of disaster deaths occur without access to healthcare
• More effective in reducing mortality
• 4-7 times more cost effective
Join us!

UNISDR
The United Nations Office for Disaster Risk Reduction

UN World Conference on Disaster Risk Reduction
2015 Sendai Japan

DISASTER DOC

World Health Organization

#switch2sendai
Sendai Framework for Disaster Risk Reduction 2015-2030
Thank you

For more info see
http://disasterdoc.org

See this presentation on YouTube