

# **Community-based Disaster Risk Reduction**

**Clinician Outreach and  
Communication Activity (COCA)  
Conference Call  
August 21, 2012**

# Objectives

**At the conclusion of this session, the participant will be able to accomplish the following:**

- ❑ State the basic principles of disaster risk reduction and management**
- ❑ Identify community hazards and vulnerability that contribute to disaster risk**
- ❑ Describe effective risk reduction principles for disaster planning**
- ❑ Describe the process for writing a community plan for disaster risk reduction**

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# TODAY'S PRESENTER



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# Community-based Disaster Risk Reduction

**Mark Keim, MD**  
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Agency for Toxic Substances and Disease Registry



# An Evolution in Approaches



# What is Disaster Risk Management?

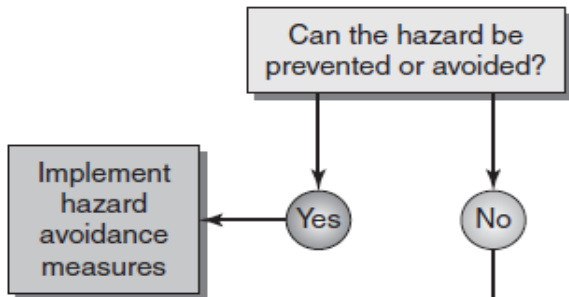
## *Definition*

- “The systematic process of using administrative directives, organizations, and operational skills and capacities to implement strategies, policies and improved coping capacities in order to...

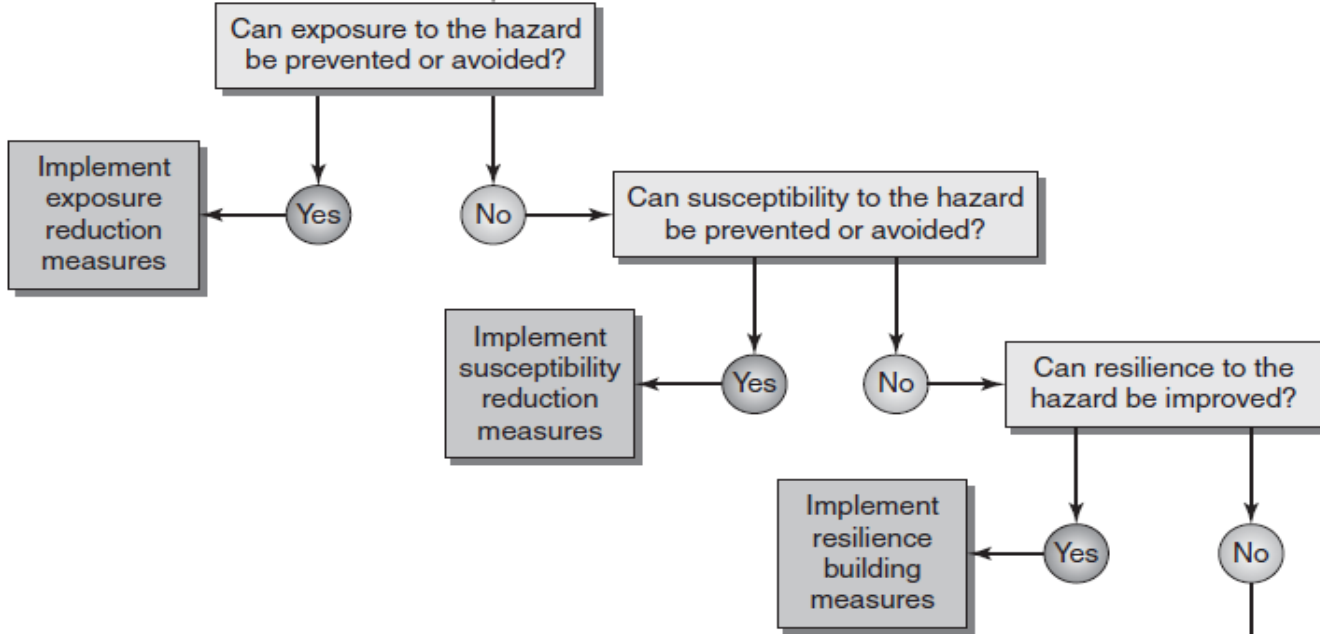
lessen the adverse **impacts** of hazards **and the possibility** of disaster”

# Prevention and disaster risk management

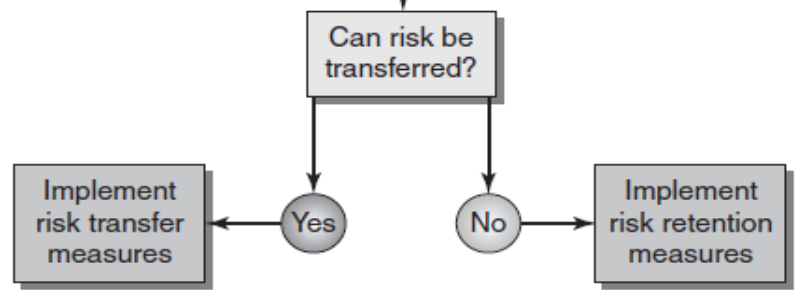
Primary prevention



Secondary prevention

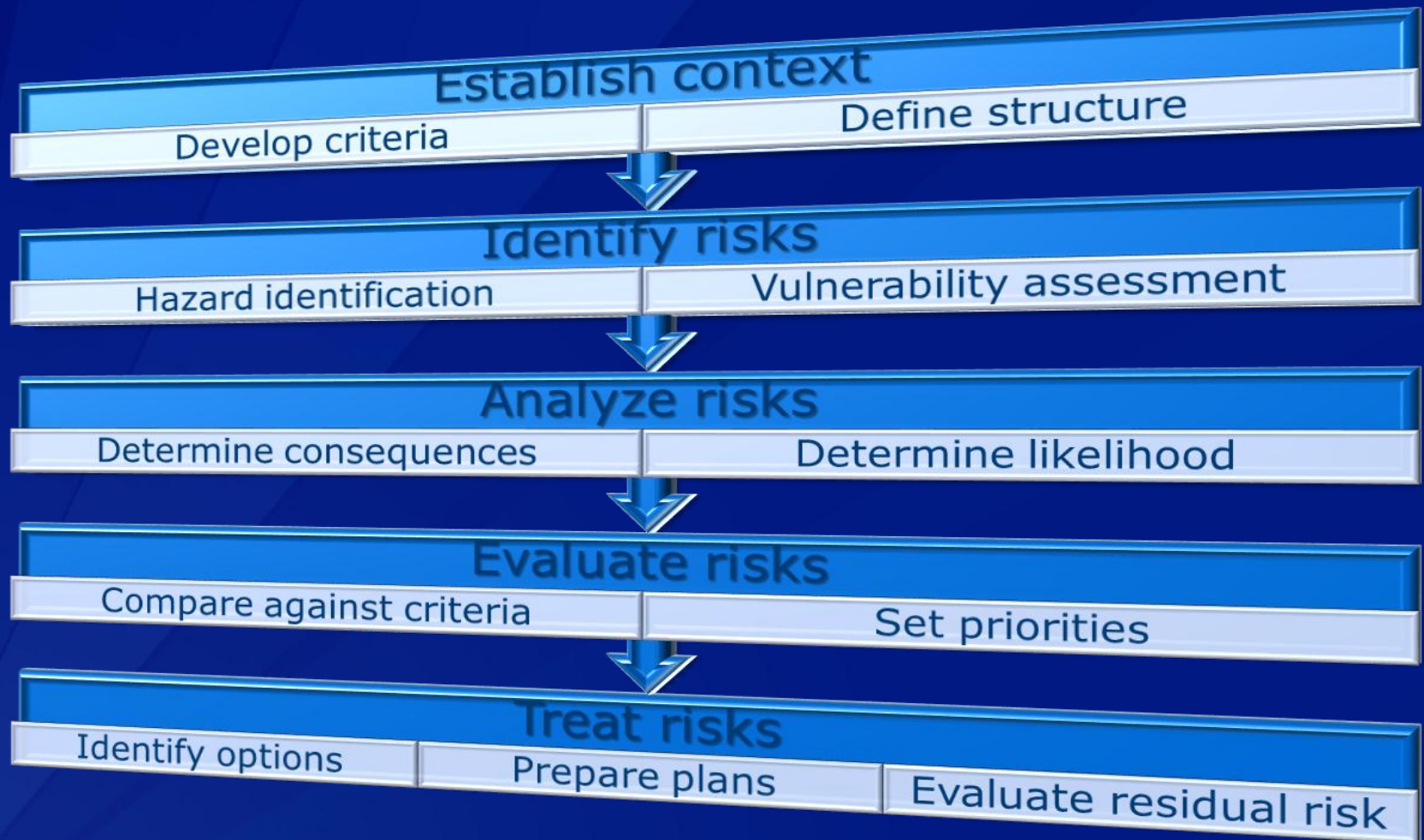


Tertiary prevention





# Process for Risk Management



From: Standards Australia Committee OB-007. AS/NZS 4360:2004 Risk Management. In. Sydney, Australia and Wellington, New Zealand: Standards Australia International Ltd., 2004.

# What is Disaster Risk Management?

## Definition

- “The systematic process of using administrative directives, organizations, and operational skills and capacities to implement strategies, policies and improved coping capacities in order to **lessen** the adverse **impacts** of hazards **and the possibility** of disaster”

## Components

- Risk assessment
- **Risk avoidance**
- **Risk reduction**
- Risk transfer
- Risk retention

# Risk Management vs. **Risk Reduction**

- ❑ Prevention

- ❑ Mitigation

- ❑ Preparedness

- ❑ Response

- ❑ Recovery

- ❑ Risk Reduction

  - Prevention

  - Mitigation

  - Preparedness

- ❑ Risk Reduction

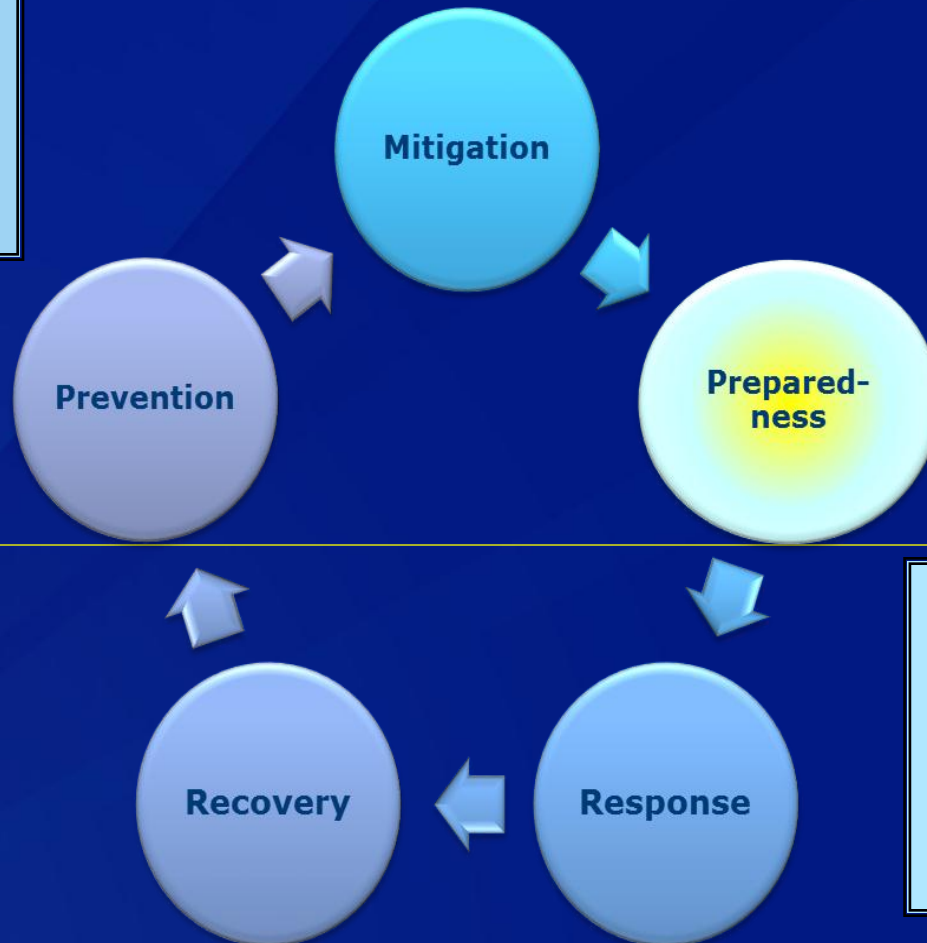
  - lessens the *likelihood* of disaster

# Disaster risk management and the emergency management cycle

## Risk reduction measures are

- Delivered pre-impact
- Most cost-effective
- Community based
- Sustainable

Pre-impact



Post-impact

## Risk retention measures are

- Delivered post-impact
- Least cost-effective
- Nationally and internationally based
- Non-sustainable

## A comparison among various techniques for prevention, emergency management and risk management as applied to disasters

Stage of Prevention	Phase of emergency management cycle		Risk management technique	Disaster risk management component
Primary prevention	Prevention		Risk avoidance	Hazard avoidance
Secondary prevention	Preparedness (susceptibility / resilience)		Risk reduction	Vulnerability reduction
	Mitigation	Structural (exposure)		
		Financial (susceptibility / resilience)	Risk transfer	
Tertiary prevention	Response		Risk retention	Residual risk
	Recovery			

# How Do We Estimate Disaster Risk?

$$D = H \times V, \text{ where } V = \frac{E \times S}{R}$$

- ❑ **D = Risk of disaster**
- ❑ **H = Hazard**
- ❑ **V = Vulnerability of population**
- ❑ **E = Exposure to the hazard**
- ❑ **S = Susceptibility to the hazard**
- ❑ **R = Resilience**

# Disaster Risk Assessment

## Hazard analysis

- Hazard identification
- Hazard likelihood of occurrence
- Hazard impact

## Vulnerability analysis

- Demographic
- Socio-political
- Economic
- Cultural
- Health
- Developmental

# Risk Assessment for 2010 World Exposition

<b>Hazard</b>	<b>Impact</b>	<b>Likelihood</b>	<b>Hazard</b>	<b>Vulnerability</b>	<b>Risk</b>
	<b>(I)</b>	<b>(L)</b>	<b>(H = I x L)</b>	<b>(V)</b>	<b>(R = H x V)</b>
Epidemic	2.3	4.4	10.1	1.5	15.2
Poisoning	1.8	4.1	7.4	1.4	10.4
Fire	1.5	4.8	7.2	1.2	8.6
Flood	1.7	3.8	6.5	1.3	8.5



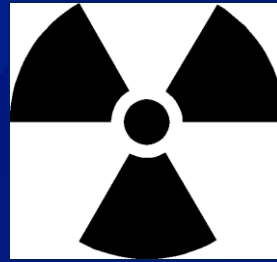
# What is a Hazard?

## □ Definition of 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”

# Examples of Hazards

Floods



Radiation

Earthquakes



Typhoons



Outbreaks



Tornadoes

# What is Vulnerability?

- ❑ **“The characteristics and circumstances of a community, system or asset that make it susceptible to the damaging effect of a hazard” UNISDR 2009**
- ❑ **Or simply put...**
- ❑ **Likely to incur physical or emotional illness or injury**

# Public Health Vulnerability

- ❑ **Certain populations are more vulnerable to disaster-related morbidity and mortality**

# Factors that Increase Public Health Vulnerability

- ❑ **Poverty**
- ❑ **Extremes of age**
- ❑ **Gender**
- ❑ **Disability**
- ❑ **Lack of information, education and communication**
- ❑ **Lack of experience and process**
- ❑ **Inadequate healthcare**
- ❑ **Geographical location / isolation**
- ❑ **Inadequate social and organizational integration / coordination**
- ❑ **Inadequate preparedness and mitigation**
- ❑ **Ethnicity**
- ❑ **Inappropriate developmental policies**
- ❑ **Food insecurity**
- ❑ **Societal stratification**
- ❑ **Poor water and food quality**
- ❑ **Limited state & local resources**
- ❑ **Political perceptions**
- ❑ **Negative social interactions: administrative graft / corruption, competition**
- ❑ **Lack of social order**
- ❑ **High burden of illness and/or injuries**

From: Clack Z, Keim M, MacIntyre A, Yeskey K. Emergency Health and Risk Management in Sub-Saharan Africa. Prehospital and Disaster Medicine 2002; 17(2): 59-66.

$$\text{Vulnerability} = (E \times S) / R$$

□ **Factors affecting vulnerability:**

- Exposure
- Susceptibility
- Resilience



# What is susceptibility?

## ❑ **Susceptibility**

- “The state of being at risk, if exposed to a hazard”

## ❑ **Example of susceptibility**

- Not being able to swim

# What is Resilience?

## □ Resilience

- “The ability of a system, community or society exposed to hazards to **resist, absorb, accommodate to and recover from** the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions”

## □ *Example of resilience*

- *Living among healthy people who can help you*



# **Vulnerability assessments consider key factors that affect public health vulnerability**

## **❑ Socio-economic status**

- Demographics
- Economic indicators
- Education
- Linguistic

## **❑ Health status**

- Health indicators
- Healthcare access

# Mapping Human Vulnerability

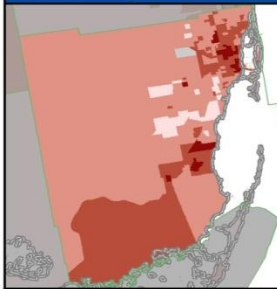
## Miami-Dade County, FL - Vulnerable Populations (Poverty and Elderly Combined)

Emergency Response Preparedness Map Series

GEOSPATIAL RESEARCH, ANALYSIS, AND SERVICES PROGRAM, DHS, ATSDR, CDC



Percent in Poverty - US Census 2000

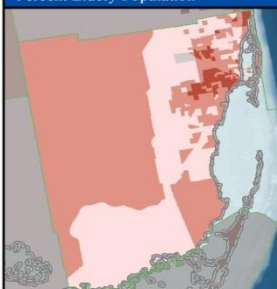


**US Census Tracts**

**Percent in Poverty**

- 0 - 5% in poverty
- 6% - 20%
- 21% - 40%
- > 40% in poverty

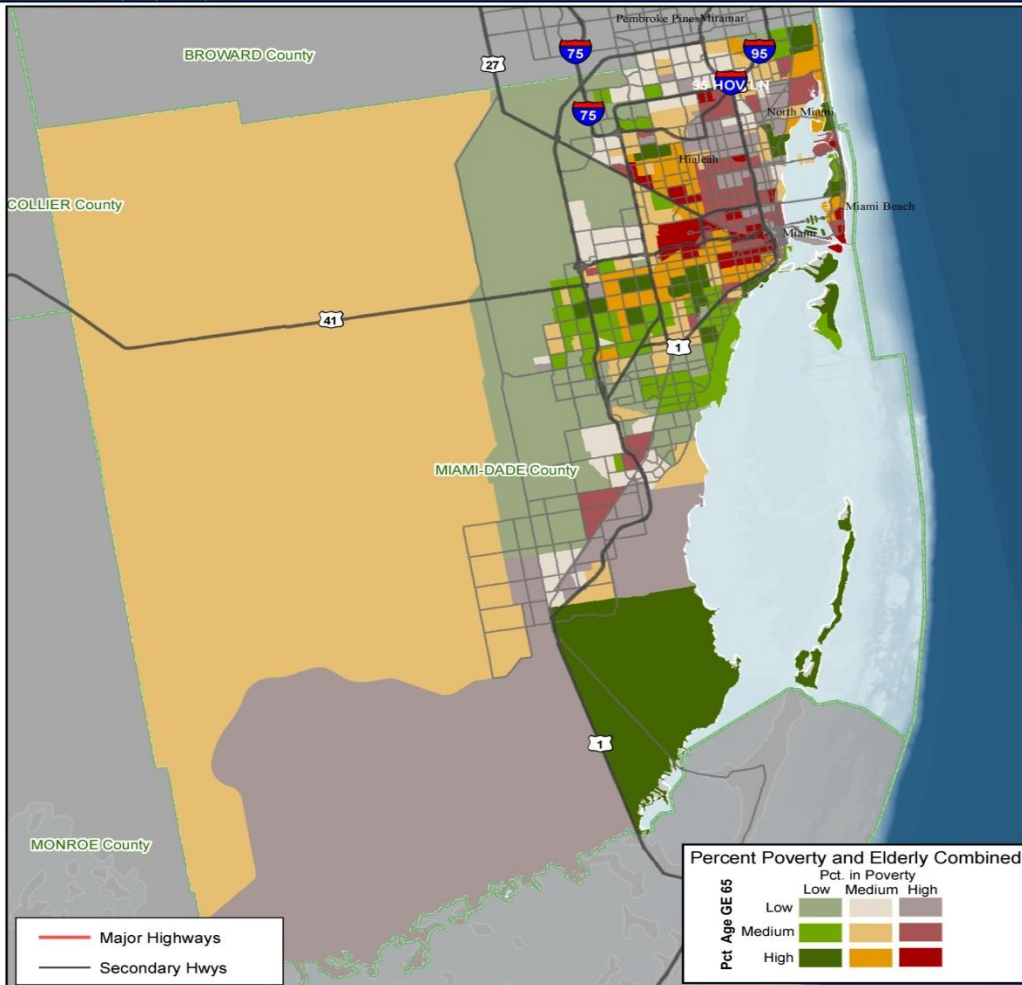
Percent Elderly Population



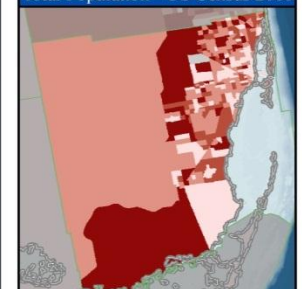
**US Census Tracts**

**Percent Aged 65 yrs or older**

- 0 - 10% Aged 65 yrs or older
- 11% - 20%
- 21% - 50%
- > 50% Aged 65 yrs or older



Total Population - US Census 2000



**US Census Tracts**

**Total Population**

- 0 - 1000 persons
- 1001 - 2000 persons
- 2001 - 5000 persons
- > 5000 persons



**Map Purpose:**  
This map portrays US Census Tract populations to determine areas that are most vulnerable during a disaster.

**Data Sources:**  
Transportation information provided by FEMA (HSIP GOLD, Q3 Data);  
Bathymetric Data provided by NOAA;  
Demographic data provided by the US Census Bureau

AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY | UNITED STATES DEPARTMENT OF HEALTH AND HUMAN SERVICES - FOR INTERNAL AND EXTERNAL RELEASE



# How can we reduce our vulnerability to disasters?

- ❑ **Disaster reduction occurs at the community level †**
- ❑ **Community health sectors can play an active role in reducing human vulnerability**
  - **Reducing susceptibility**
    - “Health people” ††
  - **Reducing exposure**
    - “Healthy homes” ††
  - **Increasing resilience**
    - “Healthy communities” ††

† Schipper L, Pelling M 2006, Disaster risk, climate change and international development. *Disasters*, vol. 30, no. 1, pp. 19-38.

†† Srinivasan S, Creating healthy communities, healthy homes and healthy people. *Am J Public Health* 2003;93:1446-50

# **Vulnerability Reduction: Reducing Exposures**

- ❑ **Floodplain management**
  - Dams, levees, weirs
- ❑ **Population protection measures**
  - Evacuation
  - Mass care
- ❑ **Land use planning and regulation**
- ❑ **PPE, sanitation/hygiene**

# **Vulnerability Reduction: Reducing Susceptibility**

- ❑ Health promotion**
- ❑ Health care**
- ❑ Poverty reduction**
- ❑ Community planning**
- ❑ Immunization**

# **National Prevention Strategy**

- ❑ Identifies goals, priorities, recommendations, and measures for improving health through prevention**
- ❑ Grounds recommendations in evidence-based practice**
- ❑ Aligns and focuses federal prevention and health promotion efforts, including existing national efforts**
- ❑ Healthy People 2020**
- ❑ National Quality Strategy**
- ❑ First Lady's "Let's Move!" campaign**
- ❑ America's Great Outdoor Initiative**

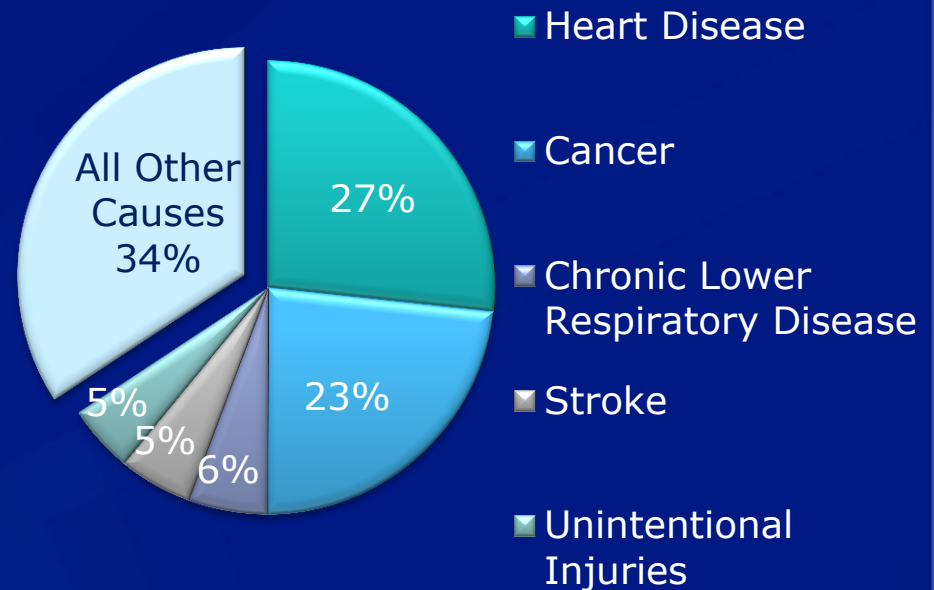
# National Prevention Strategy



# Priorities

- ❑ Tobacco Free Living
- ❑ Preventing Drug Abuse and Excessive Alcohol Use
- ❑ Healthy Eating
- ❑ Active Living
- ❑ Mental and Emotional Well-being
- ❑ Reproductive and Sexual Health
- ❑ Injury and Violence Free Living

## Five Causes Account For 66% of All Deaths



Source: National Vital Statistics Report, CDC, 2008



# Vulnerability Reduction: Increasing Resilience

## □ Six R's of resilience

- Readiness
- Robustness
- Redundancy
- Resourcefulness
- Rapid response
- Recovery

# Human resilience as a means for vulnerability reduction

## ❑ Resilience

- The ability to cope with and recover from disasters

## ❑ Resilience is comprised of:

- Adaptive capability
- Response capacity
- Recovery capacity

## ❑ Human behaviors that increase disaster resilience

- Preparedness
- Response
- Recovery

# 11 E's of Emergency Preparedness

- ❑ Evaluation and monitoring of hazard
- ❑ Early warning
- ❑ Evacuation
- ❑ Emergency operations planning
- ❑ Education and training
- ❑ Exercises and drills
- ❑ Engagement of the public
- ❑ Electronic media and communication
- ❑ Epidemiology
- ❑ Equipment and supplies
- ❑ Economic and political incentive

From: Keim M. *Environmental Disasters*. In Ed., Frumkin H. *Environmental Health* John Wiley and Sons, Inc. 2010.

# Exercise

How can MRC units reduce the risk of disasters in your own communities?

## □ Epidemics

- Reduce exposures?
- Reduce susceptibility?
- Increase resilience?

## □ Cyclone / flood

- Reduce exposures?
- Reduce susceptibility?
- Increase resilience?



## **Centers for Disease Control and Prevention Atlanta, Georgia**


# Accrediting Statements

**CME:** The Centers for Disease Control and Prevention is accredited by the Accreditation Council for Continuing Medical Education (ACCME®) to provide continuing medical education for physicians. The Centers for Disease Control and Prevention designates this electronic conference/web-on-demand educational activity for a maximum of 1 *AMA PRA Category 1 Credit™*. Physicians should only claim credit commensurate with the extent of their participation in the activity. Non-physicians will receive a certificate of participation.

**CNE:** The Centers for Disease Control and Prevention is accredited as a provider of Continuing Nursing Education by the American Nurses Credentialing Center's Commission on Accreditation. This activity provides 1 contact hour.

**CEU:** The CDC has been approved as an Authorized Provider by the International Association for Continuing Education and Training (IACET), 1760 Old Meadow Road, Suite 500, McLean, VA 22102. The CDC is authorized by IACET to offer 1 ANSI/IACET CEU for this program.

**CECH:** Sponsored by the *Centers for Disease Control and Prevention*, a designated provider of continuing education contact hours (CECH) in health education by the National Commission for Health Education Credentialing, Inc. This program is designed for Certified Health Education Specialists (CHES) to receive up to 1 Category I CECH in health education. CDC provider number GA0082.

**CPE:**  The Centers for Disease Control and Prevention is accredited by the Accreditation Council for Pharmacy Education as a provider of continuing pharmacy education. This program is a designated event for pharmacists to receive 1 Contact Hour in pharmacy education. The Universal Activity Number is 0387-0000-12-124-L04-P and enduring 0387-0000-12-124-H04-P. Course Category: This activity has been designated as knowledge based.

**AAVSB/RACE:** This program was reviewed and approved by the AAVSB RACE program for 1.2 hours of continuing education in the jurisdictions which recognize AAVSB RACE approval. Please contact the AAVSB Race Program at [race@aavsb.org](mailto:race@aavsb.org) if you have any comments/concerns regarding this program's validity or relevancy to the veterinary profession.

## Continuing Education Credit/Contact Hours for COCA Conference Calls

Continuing Education guidelines require that the attendance of all who participate in COCA Conference Calls be properly documented. All Continuing Education credits/contact hours (CME, CNE, CEU, CECH, and ACPE) for COCA Conference Calls are issued online through the CDC Training & Continuing Education Online system

<http://www2a.cdc.gov/TCEOnline/>

Those who participate in the COCA Conference Calls and who wish to receive CE credit/contact hours and will complete the online evaluation by **September 20, 2012** will use the course code **EC1648**. Those who wish to receive CE credits/contact hours and will complete the online evaluation between **Sep 21, 2012** and **Sep 20, 2013** will use course code **WD1648**. CE certificates can be printed immediately upon completion of your online evaluation. A cumulative transcript of all CDC/ATSDR CE's obtained through the CDC Training & Continuing Education Online System will be maintained for each user.

# Thank you for joining!

## Please email us questions at [coca@cdc.gov](mailto:coca@cdc.gov)

### Emergency Preparedness and Response

#### Emergency Preparedness & Response

Specific Hazards

Preparedness for All Hazards

What CDC Is Doing

What You Can Do

Blog: Public Health Matters


What's New

**A - Z Index**

### COCA and MRC Outreach Call Series

COCA has partnered with NCEH/ATSDR Office for Environmental Health Emergencies and the Medical Reserve Corps (MRC) on a conference call series related to Disaster Risk Reduction. The call series will provide MRC volunteers and clinicians with an accurate understanding of the public health and medical consequences of natural and man-made disasters (including terrorism); and the principles taught in the Disaster Risk Reduction curriculum will assist them in making decisions that support community public health resiliency. [Learn more about MRC](#)

### Community-based Disaster Risk Reduction

 = Free Continuing Education Credits

**Date:** Tuesday, August 21, 2012

**Time:** 2:00 - 3:00 pm (Eastern Time)

**Join By Phone:**

**Dial-in Number:** 1-800-619-2685

**Passcode:** COCA

**Join By Webinar:** <https://www.mymeetings.com/nc/join.php?i=PW8191467&p=COCA&t=c>

#### Presenter(s):



**Mark Keim, MD**

Senior Science Advisor  
Office for Environmental Health Emergencies  
National Center for Environmental Health  
Centers for Disease and Control and Prevention

<http://emergency.cdc.gov/coca>



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CDC Facebook page for Health Partners! “Like” our page today to receive COCA updates, guidance, and situational awareness about preparing for and responding to public health emergencies.



The screenshot shows the Facebook interface for the CDC Health Partners Outreach page. At the top, there is a navigation bar with the Facebook logo, a search bar, and login options for Email and Password. Below the navigation bar, there is a "Sign Up" button and the text "Facebook helps you connect and share with the people in your life." The main content area features the CDC Health Partners Outreach profile picture and cover photo. The profile information includes the name "CDC Health Partners Outreach", a "Like" button, and the location "Government Organization · Atlanta, Georgia". The "Wall" section displays a post from the CDC Health Partners Outreach page. The post text reads: "CDC Health Partners Outreach CDC is partnering with NPHIC to host a webinar July 21 (3:00pm ET) on Crisis and Emergency Risk Communication – Radiation. A subject matter expert from the Oak Ridge Institute for Science and Education (ORISE) will address key elements of communicating during a radiation disaster, share CDC research on messaging, and provide lessons learned from Japan's recent nuclear emergency. Register for this FREE webinar today!". The post includes a video player for the "Crisis and Emergency Risk Communication - Radiation Webinar" and a "Like" button. Below the post, there are two more posts: one for the "AVMA Convention" and another for the "CDC Emergency Preparedness and Response".

<http://www.facebook.com/CDCHealthPartnersOutreach>