Moving Towards Competency in Injury Prevention

Injury as a Significant Public Health Issue

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Lecture Objectives

On completion of this lecture, …
you as a reader and listener should be able to:

1. Identify the public health definition of injury and its classification
2. Describe how injury compares with other leading health issues
3. Identify how injury differs by population groups
4. Illustrate the different types of injury prevention

Core Competencies for Injury and Violence Prevention

www.injuryed.org

Core Competency #1:
Ability to describe and explain injury and/or violence as a major social and health problem.

I. How Injuries are Viewed

What comes to mind when you see or hear the term “injury”?

Common ways in which injuries are referred to:

- accident
- misfortune
- mishap
- medical injury
- casualty
- disaster
- misadventure

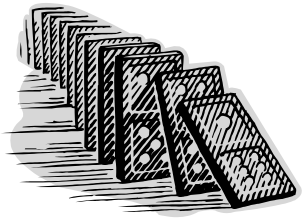
Fatalism as a global perception to injuries

"Accident Causation"

- Historically, efforts focused on accident prevention rather than injury prevention
- Shaped by early efforts to reduce industrial accidents
  - If you could understand what led to the accident, then you could intervene to that circumstance and reduce future events.

Domino Theory of Accidents

- HW Heinrich; "accidents are the result of a chain of sequential events"

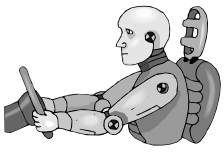


Personal responsibility as the primary event in the chain of accident causation

An event for which no one, except the victim, was responsible.

Current public health thinking about injuries differs markedly from the fatalistic or personal responsibility perspectives

Current thinking in public health about injuries was influenced by biomechanical research



- Hugh DeHaven
- John Stapp
- Cornell Automotive Crash Injury Research

What are Injuries?

How should we define them?

Injuries occur as the result of energy transfer that is delivered in excess of a threshold

- Add film here
- http://www.youtube.com/watch?v=XxfsmAWILjQ

Injuries and energy transfer

- Types of energy that can cause injury
  - –Electric
  - –Mechanical
  - –Radiation
  - - Chemical
  - - Thermal

Match the Type of Injury to the Energy Form Involved

1. Motor Vehicle Crash
2. Lacerations/Cut
3. Poisoning
4. Drowning
5. Falls
6. Gunshot Wound
7. Concussion
8. Burns from Fires
9. Electrocution

A. Electric
B. Mechanical
C. Radiation
D. Thermal
E. Chemical

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Comprehensive Definition

- Injury results either from an energy form in the environment that exceeds the body's threshold for tolerance (of that energy form)…….or
- Because normal body mechanisms for using energy elements are blocked by external means

JA Waller

II. Public Health Classification of Injury

Further Classification of Energy Transfer

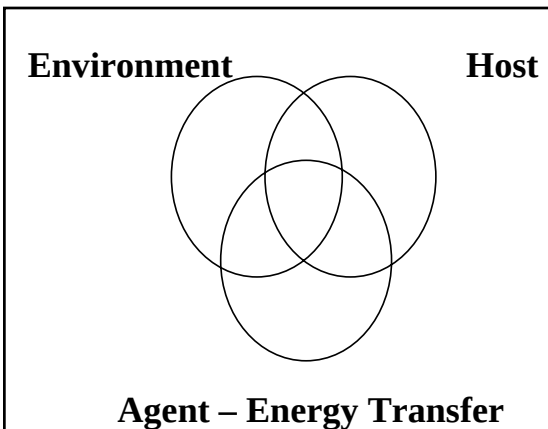
- Manner of Energy Transfer (intention underlying transfer)
  - Intentional
  - Unintentional
- Mechanism of Energy Transfer
  - What delivers the energy transfer

Basic Elements for Presenting Injury Data in Public Health

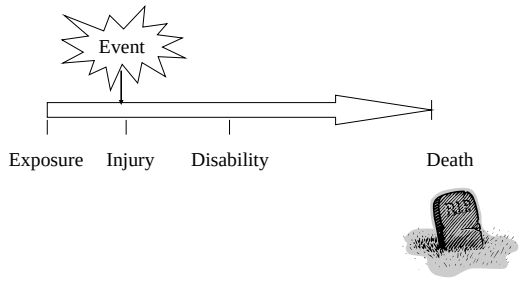
- Mechanism/Cause
  - Cut/Pierce
  - Drowning
  - Fall
  - Firearm
  - Motor Vehicle Crash
  - Poisoning
  - Other
  - Unspecified
- Manner/Intent
  - Unintentional
  - Intentional
    - Suicide
    - Homicide
    - Undetermined
    - Other

Injury Matrix for Data Presentation

	Intent of injury				
Mechanism	Unintentional	Suicide	Homicide	Undetermined	Other
Cut					
Firearm					
Poisoning					
Struck by/ against					
Suffocation Etc…..					

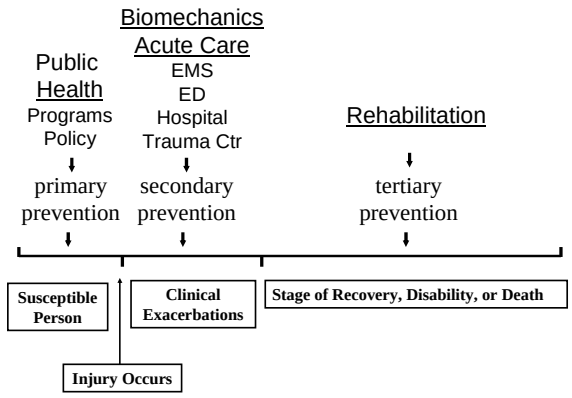


Injury Spectrum



Injury Prevention

- Primary Prevention
  - preventing injury/violence altogether
- Secondary Prevention
  - preventing the development of the complications of injury
- Tertiary Prevention
  - preventing the development of the late-stage factors in injury or preventing the loss of functional capacity



III. The Burden of Injuries

Death is the most common measure of health and injuries across the world

Leading Causes of Death, USA, 2004

(Based on number of deaths)

1. Heart Disease
2. All Cancers
3. Stroke
4. Lung Diseases
5. Unintentional Injuries
6. Diabetes
7. Alzheimer's Disease
8. Influenza/Pneumonia
9. Nephritis
10. Septicemia

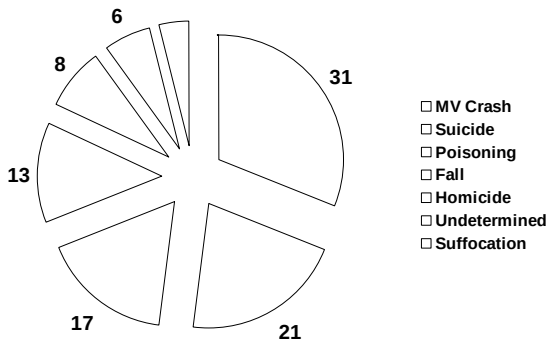
WISQARS

10 Leading Causes of Death by Age Group, United States – 2003

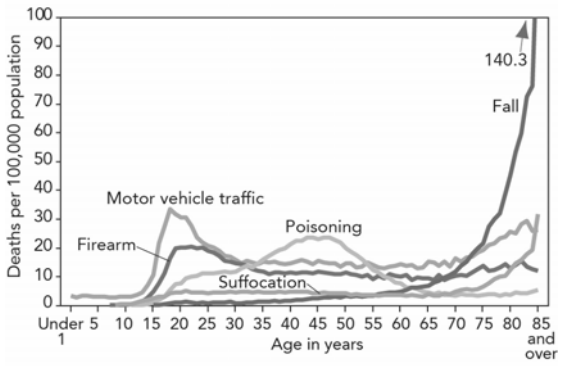
Rank	Age Groups										Total
	<1	1-4	5-9	10-14	15-24	25-34	35-44	45-54	55-64	65+	
1	Congenital Anomalies 5,821	Unintentional Injury 1,717	Unintentional Injury 1,096	Unintentional Injury 1,532	Unintentional Injury 14,873	Unintentional Injury 12,541	Unintentional Injury 14,796	Malignant Neoplasms 46,943	Malignant Neoplasms 95,862	Heart Disease 565,390	Heart Disease 685,089
2	Short Gestation 4,049	Congenital Anomalies 541	Malignant Neoplasms 516	Malignant Neoplasms 580	Homicide 6,368	Suicide 6,985	Malignant Neoplasms 15,509	Heart Disease 37,732	Heart Disease 65,060	Malignant Neoplasms 388,911	Malignant Neoplasms 556,902
3	SIDS 2,162	Malignant Neoplasms 362	Congenital Anomalies 190	Suicide 248	Suicide 3,909	Homicide 4,514	Heart Disease 13,800	Unintentional Injury 16,637	Chronic Low Respiratory Disease 13,077	Cerebro-vascular 136,134	Cerebro-vascular 157,689
4	Maternal Pregnancy Comp. 1,710	Homicide 376	Homicide 132	Congenital Anomalies 208	Malignant Neoplasms 1,851	Malignant Neoplasms 3,741	Suicide 6,602	Liver Disease 7,486	Diabetes Mellitus 10,731	Chronic Low Respiratory Disease 109,139	Chronic Low Respiratory Disease 126,360
5	Placenta Cord Membranes 1,099	Heart Disease 195	Heart Disease 104	Homicide 282	Heart Disease 1,139	Heart Disease 3,250	HIV 5,340	Suicide 6,491	Cerebro-vascular 9,048	Alzheimer's Disease 62,814	Unintentional Injury 104,277
6	Unintentional Injury 845	Influenza & Pneumonia 165	Influenza & Pneumonia 75	Heart Disease 160	Congenital Anomalies 461	HIV 1,598	Homicide 3,116	Cerebro-vascular 6,127	Unintentional Injury 8,173	Influenza & Pneumonia 57,670	Diabetes Mellitus 74,219
7	Respiratory Distress 631	Septicemia 65	Septicemia 39	Chronic Low Respiratory Disease 81	Influenza & Pneumonia 224	Diabetes Mellitus 857	Liver Disease 3,020	Diabetes Mellitus 5,556	Liver Disease 6,429	Diabetes Mellitus 54,910	Influenza & Pneumonia 65,163
8	Bacterial Sepsis 773	Perinatal Period 79	Benign Neoplasms 38	Influenza & Pneumonia 72	Cerebro-vascular 221	Cerebro-vascular 583	Cerebro-vascular 2,460	HIV 4,442	Suicide 5,843	Nephritis 36,264	Alzheimer's Disease 63,457
9	Neonatal Hemorrhage 649	Chronic Low Respiratory Disease 55	Chronic Low Respiratory Disease 27	Benign Neoplasms 41	Chronic Low Respiratory Disease 191	Congenital Anomalies 426	Diabetes Mellitus 2,049	Chronic Low Respiratory 5,537	Nephritis 3,806	Unintentional Injury 34,555	Nephritis 42,452
10	Circulatory System Disease 581	Benign Neoplasms 51	Cerebro-vascular 29	Cerebro-vascular 40	HIV 176	Influenza & Pneumonia 373	Influenza & Pneumonia 992	Viral Hepatitis 2,299	Septicemia 3,851	Septicemia 36,445	Septicemia 54,060

Source: National Vital Statistics System, National Center for Health Statistics, CDC.
Produced by: Office of Statistics and Programming, National Center for Injury Prevention and Control, CDC.

Breakdown of Injury Deaths

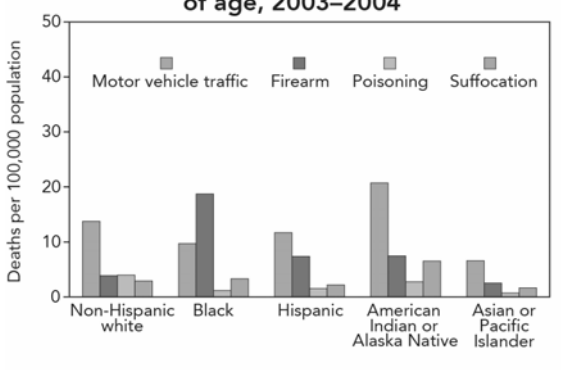


Injury death rates by age, 2003–2004



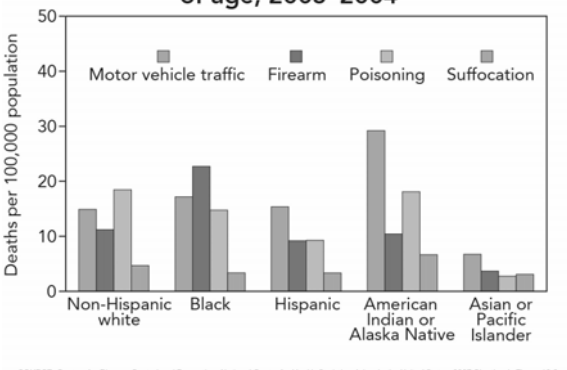
SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, *Injury in the United States: 2007 Chartbook*, Figure 7.

Injury death rates for persons under 25 years of age, 2003–2004



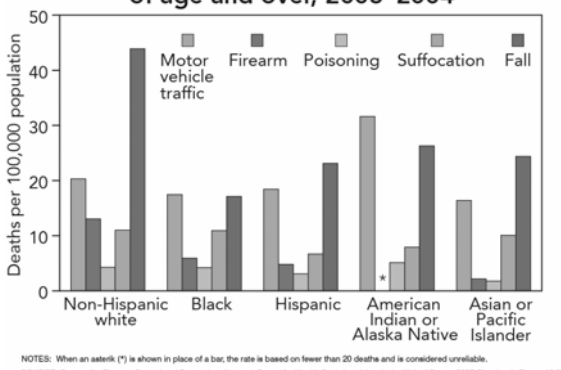
SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, *Injury in the United States: 2007 Chartbook*, Figure 10-1.

Injury death rates for persons under 25–64 years of age, 2003–2004



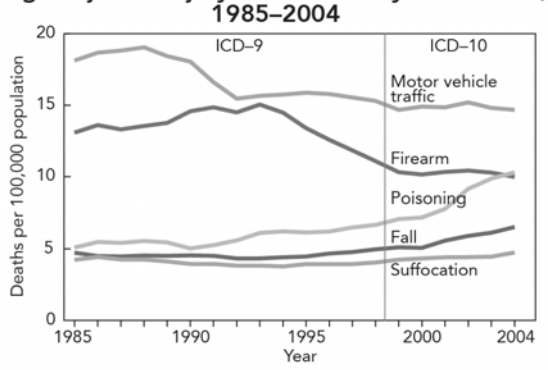
SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, *Injury in the United States: 2007 Chartbook*, Figure 10-2.

Injury death rates for persons 65 years of age and over, 2003–2004



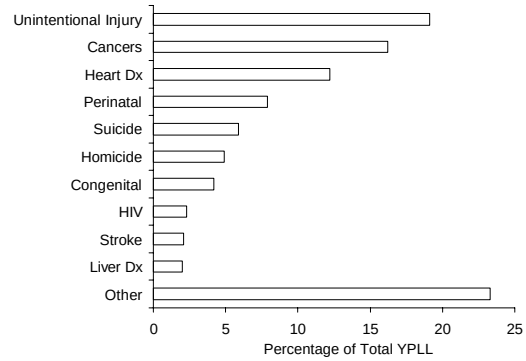
NOTES: When an asterik (*) is shown in place of a bar, the rate is based on fewer than 20 deaths and is considered unreliable.
SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, *Injury in the United States: 2007 Chartbook*, Figure 10-3.

Age-adjusted injury death rates by mechanism, 1985–2004



SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, *Injury in the United States: 2007 Chartbook*, Figure 6.

Years of Potential Life Lost, USA, 2004



Leading Causes of Death Worldwide, 2000

(Based on number of global deaths)

1. Ischemic Heart Disease
2. Cerebrovascular Disease
3. Lower Respiratory Infections
4. HIV/AIDS
5. COPD
6. Perinatal Conditions
7. Diarrhoeal Diseases
8. Tuberculosis
9. Road Traffic Injuries
10. Lung Cancers

WHR 2001

Leading Causes of Death, Worldwide

1998

Rank	0-4 years	4-14 years	15-44 years	45-59 years	60+ years	Total
1	perinatal conditions	lower respiratory infection	HIV/AIDS	heart disease	heart disease	heart disease
2	lower respiratory infection	malaria	road traffic injuries	stroke	stroke	stroke
3	diarrhoeal diseases	road traffic injuries	violence	tuberculosis	COPD	lower respiratory infection
4	measles	drowning	suicide	lung cancer	lower respiratory infection	HIV/AIDS
5	malaria	diarrhoeal diseases	tuberculosis	cirrhosis	lung cancer	COPD
6	congenital anomalies	war injuries	war injuries	HIV/AIDS	tuberculosis	diarrhoeal diseases
7	HIV/AIDS	nephritis	heart disease	liver cancer	stomach cancer	perinatal conditions
8	Pertussis	congenital anomalies	stroke	stomach cancer	diabetes mellitus	tuberculosis
9	Tetanus	inflammatory cardiac disease	cirrhosis	COPD	colo-rectal cancer	lung cancer
10	malnutrition	HIV/AIDS	drowning	suicide	cirrhosis	road traffic injuries

SOURCE: World Health Report 1999 Database

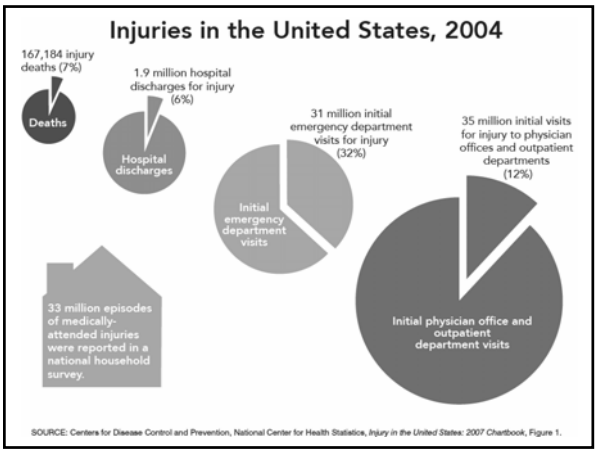
Leading Causes of Injury Death by Region, 1998

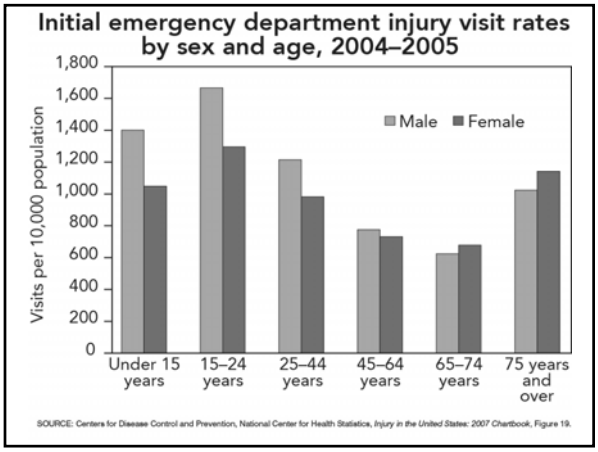
Region	Rank 1	Rank 2	Rank 3
Africa	War injuries	Assault/Homicide	Road accidents
Americas (high income)	Road accidents	Self-inflicted	Assault/Homicide
Americas (low income)	Assault/Homicide	Road accidents	
EMRO (high income)	War injuries	Road accidents	Self-inflicted
EMRO (low income)	War injuries	Road accidents	Assault/Homicide
Europe (high income)	Road accidents	Self-inflicted	
Europe (low income)	Road accidents	Self-inflicted	War injuries
India	Road accidents	Fires	Self-inflicted
SE Asia	Road accidents	Self-inflicted	
China	Self-inflicted	Road accidents	Drowning
W. Pacific (high income)	Road accidents	Self-inflicted	
W. Pacific (low income)	Road accidents	Drowning	Self-inflicted

WHO 1999

Do all injuries result in death?

Degrees of Injury Severity





Other Measures of the Impact of Injuries and Violence

- Morbidity
- Disease Burden
- Cost
- Quality of Life

Total Lifetime Cost of Injury

1988- $180 billion
2000 - $406 billion

Rice, 1989
Finkelstein, Corso, Miller, 2006

Key Lecture Points

- The public perception of injury is often fatalistic or the blame is placed on the victim.
- Injuries are due to energy transfer that exceeds a threshold.
- Injuries are classified by intent and mechanism of energy transfer.
- The burden of injury is large both in the US and globally.

Key Lecture Points

- Injuries disproportionately affect the young and the very old.
- Injuries are more frequent in males.
- Injuries differ by ethnic group to varying degrees depending upon the mechanism of injury.
- Injuries are costly to society.