Tools, techniques and framework for the analysis of vital statistics data on external causes of injury death

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National Center for Health Statistics
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Our goals for the course

• Understand the nature and structure of U.S. mortality data, particularly for records involving injury-related deaths
• Gain knowledge on tools for classifying and analyzing deaths from external causes
  – EC mortality matrix
  – Injury Diagnoses matrix
• Review selected figures, charts and tables from currently trending topics in public health
• Learn about resources on the web and elsewhere that will help analysts be more productive in the area of injury mortality statistics
Data flow - mortality

Death certificate data from all U.S. registration areas

NCHS
CAUSE OF DEATH (See instructions and examples)

32. PART I. Enter the chain of events — diseases, injuries, or complications — that directly caused the death. DO NOT enter terminal events such as cardiac arrest, respiratory arrest, or ventricular fibrillation without showing the etiology. DO NOT ABBREVIATE. Enter only one cause on a line. Add additional lines if necessary.

IMMEDIATE CAUSE (Final disease or condition resulting in death)

a. Due to (or as a consequence of):

b. Due to (or as a consequence of):

c. Due to (or as a consequence of):

Underlying Cause (disease or injury that initiated the events resulting in death)

Last Due to (or as a consequence of):

d. Due to (or as a consequence of):

PART II. Enter other significant conditions contributing to death but not resulting in the underlying cause given in Part I.

33. WAS AN AUTOPSY PERFORMED?

Yes              No

34. WERE AUTOPSY FINDINGS AVAILABLE TO COMPLETE THE CAUSE OF DEATH?

Yes           No

35. DID TOBACCO USE CONTRIBUTE TO DEATH?

Yes              Probably

No              Unknown

36. IF FEMALE:

Not pregnant within past year

Pregnant at time of death

Not pregnant but pregnant within 42 days of death

Not pregnant but pregnant 43 days to 1 year before death

Unknown if pregnant within the past year

38. DATE OF INJURY

(Mo/Day/Yr)(Spell Month)

39. TIME OF INJURY

40. PLACE OF INJURY (e.g., Decedent’s home, construction site, restaurant, wooded area)

41. INJURY AT WORK?

Yes              No

42. LOCATION OF INJURY:

State:

Street & Number:

Apartment No.                                               Zip Code:

43. DESCRIBE HOW INJURY OCCURRED

To Be Completed By:

MEDICAL CERTIFIER

Box 43. How injury occurred

Generally determines external cause of deaths involving injuries.
Various concepts involved in defining injury-related mortality

• Cause of death
  – **Underlying cause**: “The disease or injury which initiated the train of morbid events leading directly to death, or the circumstances of the accident or violence which produced the fatal injury"
  – **Multiple causes**: causes of death including not only the underlying cause but also immediate cause of death and all other intermediate and contributory conditions entered by the certifying physician
Various concepts involved in defining injury-related mortality, cont.

• Cause of death
  – Injury death: Those caused by acute exposure to physical agents in amounts or at rates that exceed the threshold of human tolerance; may also be the result of a forcible deprivation of an essential substance (e.g., oxygen if drowning)
  – External causes of injury: Refer to the circumstances of the event that led to the injury / injuries that caused the death of the person. Includes intent – whether accident or intentional violence – mechanism and objects that might have played role and, sometimes, the activity involved.
Various concepts involved in defining injury-related mortality, cont.

- Elements of the “External Cause” of injury
  - **Intent**: Unintentional (accident), Intentional self-harm (suicide), Assault (homicide), Undetermined, Legal intervention / war
  - **Mechanism**: The vector that transfers the damaging energy to the body (e.g., fall, firearm, motor vehicle crash)
List of specified mechanisms of injury death

<table>
<thead>
<tr>
<th>Cut/pierce</th>
<th>All transport</th>
<th>Natural/environmental</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drowning</td>
<td>Motor vehicle traffic</td>
<td>Overexertion</td>
</tr>
<tr>
<td>Fall</td>
<td>Occupant</td>
<td>Poisoning</td>
</tr>
<tr>
<td>Fire/hot object or substance</td>
<td>Motorcyclist</td>
<td>Struck by or against</td>
</tr>
<tr>
<td>Fire/flame</td>
<td>Pedal cyclist</td>
<td>Suffocation</td>
</tr>
<tr>
<td>Hot object/substance</td>
<td>Pedestrian</td>
<td></td>
</tr>
<tr>
<td>Firearm</td>
<td>Other</td>
<td></td>
</tr>
<tr>
<td>Machinery</td>
<td>Unspecified</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pedal cyclist, other</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pedestrian, other</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Other land transport</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Other transport</td>
<td></td>
</tr>
</tbody>
</table>
Various concepts involved in defining injury-related mortality, cont.

• Elements of the injury diagnosis
  – Body region: Organized anatomically from head to foot, but may also allow for broad and system-wide values
  – Nature of the injury: Describes in more detail the type of damage visited on the body; examples include open wound, fracture, dislocation, crushing, burn, corrosion, poisoning, etc
The Tenth Revision of the International Classification of Diseases (ICD-10)

• Chapter XIX “Injury, poisoning and certain other consequences of external causes (S00-T98)”
  – These injury codes cannot be selected as an underlying cause of death – that role is reserved for the external cause of the injury
  – S00 – S99 organized by specified body region (from head to foot)
  – T00 – T98 reserved for injuries and toxic effects with a more generalized effect over the body (e.g., burns, corrosions, poisonings and complications of surgical and medical care, as well as unspecified effects and sequelae of injuries)
CHAPTER XIX

Injury, poisoning and certain other consequences of external causes (S00-T98)

Excludes:  
- birth trauma (P10-P15)  
- obstetric trauma (O70-O71)

This chapter contains the following blocks:

| S00-S09 | Injuries to the head |
| S10-S19 | Injuries to the neck |
| S20-S29 | Injuries to the thorax |
| S30-S39 | Injuries to the abdomen, lower back, lumbar spine and pelvis |
| S40-S49 | Injuries to the shoulder and upper arm |
| S50-S59 | Injuries to the elbow and forearm |
| S60-S69 | Injuries to the wrist and hand |
| S70-S79 | Injuries to the hip and thigh |
| S80-S89 | Injuries to the knee and lower leg |
| S90-S99 | Injuries to the ankle and foot |
Injury, poisoning and certain other consequences of external causes (S00-T98)

Excludes: birth trauma (P10-P15)
obstetric trauma (O70-O71)

This chapter contains the following blocks:

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>T00-T07</td>
<td>Injuries involving multiple body regions</td>
</tr>
<tr>
<td>T08-T14</td>
<td>Injuries to unspecified parts of trunk, limb or body region</td>
</tr>
<tr>
<td>T15-T19</td>
<td>Effects of foreign body entering through natural orifice</td>
</tr>
<tr>
<td>T20-T32</td>
<td>Burns and corrosions</td>
</tr>
<tr>
<td>T33-T35</td>
<td>Frostbite</td>
</tr>
<tr>
<td>T36-T50</td>
<td>Poisoning by drugs, medicaments and biological substances</td>
</tr>
<tr>
<td>T51-T65</td>
<td>Toxic effects of substances chiefly nonmedicinal as to source</td>
</tr>
<tr>
<td>T66-T78</td>
<td>Other and unspecified effects of external causes</td>
</tr>
<tr>
<td>T79</td>
<td>Certain early complications of trauma</td>
</tr>
<tr>
<td>T80-T88</td>
<td>Complications of surgical and medical care, not elsewhere classified</td>
</tr>
<tr>
<td>T90-T98</td>
<td>Sequelae of injuries, of poisoning and of other consequences of external causes</td>
</tr>
</tbody>
</table>
Open wound of neck

Excludes: decapitation (S18)

S11.0 Open wound involving larynx and trachea
Trachea:
- NOS
- cervical

Excludes: thoracic trachea (S27.5)

S11.1 Open wound involving thyroid gland

S11.2 Open wound involving pharynx and cervical oesophagus
Excludes: oesophagus NOS (S27.8)

S11.7 Multiple open wounds of neck

S11.8 Open wound of other parts of neck

S11.9 Open wound of neck, part unspecified
Poisoning by narcotics and psychodysleptics [hallucinogens]

Excludes: intoxication meaning inebriation (F10-F19)

T40.0  Opium
T40.1  Heroin
T40.2  Other opioids
  Codeine
  Morphine
T40.3  Methadone
T40.4  Other synthetic narcotics
  Pethidine
T40.5  Cocaine
T40.6  Other and unspecified narcotics
T40.7  Cannabis (derivatives)
T40.8  Lysergide [LSD]
T40.9  Other and unspecified psychodysleptics [hallucinogens]
  Mescaline
  Psilocin
  Psilocybine
The Tenth Revision of the International Classification of Diseases (ICD-10)

• Chapter XX “External causes of morbidity and mortality (V01-Y89)”
  – These codes can be selected as an underlying cause of death
  – Organized primarily by intent and then by mechanism; further axes of classification are added depending on complexity of event described (e.g., unintentional transport fatalities)
Chapter XX “External causes of morbidity and mortality (V01-Y89)”

- V01 – X59 Accidents (aka “unintentional injuries”)
  - V01-V99 Transport accidents
    - V01-V89 Land transport
    - V90-V94 Water transport
    - V95-V97 Air & space transport
    - V98-V99 Other & unspecified transport
  - W00-X59 Other external causes of accidental injury
    - W00-W19 Falls
    - W65-W74 Drowning and submersion
    - X00-X09 Exposure to smoke, fire, flames
    - X40-X49 Poisoning
Chapter XX “External causes of morbidity and mortality (V01-Y89)”

• X60 – X84 Intentional self-harm (aka “suicide”)
  – X60-X69 Self poisoning
  – X72-X74 Discharge of firearm

• X85 – Y09 Assault (aka “homicide”)
  – X93-X95 Discharge of firearm

• Y10 – Y34 Event of undetermined intent
Chapter XX “External causes of morbidity and mortality (V01-Y89)”

- Y35 – Y36 Legal intervention and operations of war
- Y40 – Y84 Complications of medical & surgical care
- Y85 – Y89 Sequelae of external causes of morbidity and mortality
Analyzing “unintentional motor vehicle traffic deaths”

• Accidents leading to death that involve at least one motorized vehicle and that occur on a public highway

• Under ICD-9 (1979-1998), these deaths were categorized as a continuous block E810-E819

• The comparable set of ICD-10 codes are interspersed among different rubrics of the “Land transport” category:

  V02-V04[.1,.9], V09.2, V12-V14 [.3-.9], V19[.4-.6], V20-V28 [.3-.9], V29-V79[.4-.9], V80[.3-.5], V81.1, V82.1, V83-V86[.0-.3], V87[.0-.8], V89.2
IF ('V30' <= DEATH <= 'V79' AND 4 <= C4 <= 9) OR
('V81' <= DEATH <= 'V82' AND C4 = 1) OR ('V83' <= DEATH <= 'V86'
AND 0 <= C4 <= 3) OR
(('V20' <= DEATH <= 'V28' AND 3 <= C4 <= 9) OR
(DEATH = 'V29' AND (4 <= C4 <= 9))) OR
(('V12' <= DEATH <= 'V14' AND 3 <= C4 <= 9) OR
(DEATH = 'V19' AND (4 <= C4 <= 6 ))) OR
(('V02' <= DEATH <= 'V04' AND C4 IN (1, 9)) OR
CDEATH = 'V092') OR
(DEATH = 'V80' AND 3 <= C4 <= 5) OR
((DEATH = 'V87' AND 0 <= C4 <= 8) OR CDEATH = 'V892') THEN CAUSEL = 07;
IF (DEATH IN ('V10', 'V11', 'V15', 'V16', 'V17', 'V18') OR
('V12' <= DEATH <= 'V14' AND 0 <= C4 <= 2) OR
(DEATH = 'V19' AND 0 <= C4 <= 3) OR CDEATH = 'V198'
OR CDEATH = 'V199') THEN CAUSEL = 08;
IF ((DEATH IN ('V01', 'V05', 'V06')) OR
('V02' <= DEATH <= 'V04' AND C4 = 0) OR (DEATH = 'V09'
AND C4 IN (0, 1, 3, 9)) ) THEN CAUSEL = 09;
IF ('V20' <= DEATH <= 'V28' AND 0 <= C4 <= 2) OR
(DEATH = 'V29' AND 0 <= C4 <= 3) OR
('V30' <= DEATH <= 'V79' AND 0 <= C4 <= 3) OR
(DEATH IN ('V80') AND C4 IN (0, 1, 2, 6, 7, 8, 9)) OR
(DEATH IN ('V81', 'V82') AND C4 IN (0, 2, 3, 4, 5, 6, 7, 8, 9)) OR
('V83' <= DEATH <= 'V86' AND 4 <= C4 <= 9) OR
(CDEATH IN ('V879')) OR

Analyzing “unintentional motor vehicle traffic deaths”

• These deaths can be further classified as:
  – Occupant (of cars, buses)
  – Motorcyclist
  – Pedal cyclist (bicycle)
  – Pedestrian
  – Other (e.g., riding an animal while hit by a car)
  – Unspecified
CDC WONDER – “Wide-ranging Online Data for Epidemiologic Research”

http://wonder.cdc.gov/
Analyzing “unintentional motor vehicle traffic deaths”

• What are the recent trends in numbers of deaths from unintentional MVT in the U.S.?

• How do trends compare according to decedent’s role (car occupant, biker, cyclist, pedestrian)?

• Which type of MVT decedent is likelier to suffer from a traumatic brain injury? Cyclists or pedestrians?
WONDER online databases utilize a rich ad-hoc query system for the analysis of public health data. Reports and other query systems are also available.

WONDER Online Databases

- AIDS Public Use Data
- Births
- Cancer Statistics

Environment
- Daily Air Temperatures
- Daily Fine Particulate Matter

Mortality
- Underlying Cause of Death
  - Detailed Mortality
  - Compressed Mortality
  - Multiple cause of death (Detailed Mortality)

Reports and References
- Prevention Guidelines (archive)
- Scientific Data and Documentation

Other Query Systems
- Healthy People 2010
- MMWR Morbidity Tables
- MMWR Mortality Tables
**Multiple Cause of Death, 1999-2009 Request Form**

### Request Form

Make all desired selections and then click any **Send** button one time to send your request.

#### 1. Organize table layout:

<table>
<thead>
<tr>
<th>Group Results By</th>
<th>Age Groups</th>
</tr>
</thead>
<tbody>
<tr>
<td>And By</td>
<td>None</td>
</tr>
<tr>
<td>And By</td>
<td>None</td>
</tr>
<tr>
<td>And By</td>
<td>None</td>
</tr>
</tbody>
</table>

**Note:**
See the Rate options section below to choose standard or non-standard age-adjusted rates, or to adjust the number rates are calculated for.

**Optional Measures**

- [ ] Crude Rate Standard Error
- [ ] Crude Rate 95% Confidence Interval
- [ ] Percent of Total

**Title**
### Multiple Cause of Death Data Request

**1. Organize table layout**

- **Group Results By**
  - None
  - Year
  - Month

- **And By**
  - None

- **Optional Measures**
  - Crude Rate Standard Error
  - Crude Rate 95% Confidence Interval
  - Percent of Total

- **Title**

**Multiple Cause of Death, 1999-2009 Request**

**Contact Us** Search

**How to Use WONDER**

*Note:*
See the Rate options section below to choose standard or non-standard age-adjusted rates, or to adjust the number rates are calculated for.
6. Select underlying cause of death:

Click a button to select ICD codes by Chapters or by Groups.

- UCD - ICD-10 Codes
- UCD - ICD-10 130 Cause List (Infectious)
- UCD - ICD-10 113 Cause List
- UCD - Injury Intent and Mechanism
- UCD - Drug/Alcohol Induced Causes

Browse or search to find items in the UCD - ICD-10 Codes Finder Tool, then highlight the items to use for this request. (The Currently selected box displays all current request items.)

Finder Tool Help  Advanced Finder Options

UCD - ICD-10 Codes

*All* (All Causes of Death)

- A00-B99 (Certain infectious and parasitic diseases)
- C00-D48 (Neoplasms)
- D50-D89 (Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism)
- E00-E88 (Endocrine, nutritional and metabolic diseases)
- F01-F99 (Mental and behavioural disorders)
- G00-G98 (Diseases of the nervous system)
- H00-H57 (Diseases of the eye and adnexa)
- H60-H93 (Diseases of the ear and mastoid process)
- I00-I99 (Diseases of the circulatory system)

Currently selected: *All* (All Causes of Death)

Browse the list by opening and closing items.
Use Ctrl+Click to multiple select, Shift+Click for a range.
6. Select underlying cause of death:

Click a button to select ICD codes by Chapters or by Groups.

- **UCD - ICD-10 Codes**
- **UCD - ICD-10 113 Cause List**
- **UCD - Injury Intent and Mechanism**

**UCD - Injury Intent**

- All Causes of Death
  - Unintentional
  - Suicide
  - Homicide
  - Undetermined
  - Legal Intervention / Operations of War
  - Non-Injury, no intent classified

**UCD - Injury Mechanism & All Other Leading Causes**

- All Causes of Death
  - Cut/Pierce
  - Drowning
  - Fall
  - Fire/Flame
  - Hot object/Substance
  - Firearm
  - Machinery
  - Motor Vehicle Traffic
  - Other Pedal cyclist
  - Other Pedestrian

*Hint: Use Ctrl + Click for multiple selections, or Shift + Click for a range.*

7. Select multiple cause of death:

Click a button to select ICD codes by Chapters or by Groups.

- **MCD - ICD-10 Codes**
- **MCD - ICD-10 113 Cause List**
- **MCD - Drug/Alcohol Induced Causes**
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- **UCD - ICD-10 Codes**
- **UCD - ICD-10 113 Cause List**
- **UCD - ICD-10 130 Cause List (Infants)**
- **UCD - Injury Intent and Mechanism**
- **UCD - Drug/Alcohol Induced Causes**

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- Firearm
- Machinery
- Motor Vehicle Traffic
- Other Pedal cyclist
- Other Pedestrian

Hint: Use Ctrl + Click for multiple selections, or Shift + Click for a range.

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Click a button to select ICD codes by Chapters or by Groups.

- **MCD - ICD-10 Codes**
- **MCD - ICD-10 113 Cause List**
- **MCD - ICD-10 130 Cause List (Infants)**
- **MCD - Drug/Alcohol Induced Causes**
Note: Use both selection boxes to select results that contain items from both the first AND second box. See the feature description for more information.

Note: Javascript must be enabled for the "Move" and "Clear" buttons to work. Enter or clear codes by hand if the buttons don't work.

8. Select rate options:

<table>
<thead>
<tr>
<th>Calculate Rates Per</th>
<th>Age-Adjusted Rate Options (only available for the ten-year age groups)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,000</td>
<td>No age-adjusted rates</td>
</tr>
<tr>
<td>10,000</td>
<td>Use standard age-adjusted rates</td>
</tr>
<tr>
<td>100,000</td>
<td>Use non-standard age-adjusted rates</td>
</tr>
<tr>
<td>1,000,000</td>
<td></td>
</tr>
</tbody>
</table>

9. Other options:

- Export Results [ ] (Check box to download results to a file)
- Show Totals [ ]
- Show Zero Values [ ]
- Show Suppressed Values [ ]
- Precision [ ] decimal places
- Data Access Timeout [ ] minutes

Send | Reset
## Multiple Cause of Death, 1999-2009 Results

### Quick Options

<table>
<thead>
<tr>
<th>Year</th>
<th>Deaths</th>
<th>Population</th>
<th>Crude Rate Per 100,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>1999</td>
<td>40,965</td>
<td>279,040,168</td>
<td>14.7</td>
</tr>
<tr>
<td>2000</td>
<td>41,994</td>
<td>281,421,906</td>
<td>14.9</td>
</tr>
<tr>
<td>2002</td>
<td>44,065</td>
<td>288,368,706</td>
<td>15.3</td>
</tr>
<tr>
<td>2003</td>
<td>43,340</td>
<td>290,810,789</td>
<td>14.9</td>
</tr>
<tr>
<td>2004</td>
<td>43,432</td>
<td>293,655,404</td>
<td>14.8</td>
</tr>
<tr>
<td>2005</td>
<td>43,667</td>
<td>296,410,404</td>
<td>14.7</td>
</tr>
<tr>
<td>2006</td>
<td>43,664</td>
<td>299,398,484</td>
<td>14.6</td>
</tr>
<tr>
<td>2007</td>
<td>42,031</td>
<td>301,621,157</td>
<td>13.9</td>
</tr>
<tr>
<td>2008</td>
<td>37,985</td>
<td>304,059,724</td>
<td>12.5</td>
</tr>
<tr>
<td>2009</td>
<td>34,485</td>
<td>307,006,550</td>
<td>11.2</td>
</tr>
<tr>
<td>Total</td>
<td>458,071</td>
<td>3,227,110,864</td>
<td>14.2</td>
</tr>
<tr>
<td>Year</td>
<td>Unintentional MVT deaths</td>
<td>Occupant</td>
<td>Motorcyclist</td>
</tr>
<tr>
<td>------</td>
<td>--------------------------</td>
<td>----------</td>
<td>--------------</td>
</tr>
<tr>
<td>1999</td>
<td>40,965</td>
<td>18,326</td>
<td>2,254</td>
</tr>
<tr>
<td>2000</td>
<td>41,994</td>
<td>18,646</td>
<td>2,704</td>
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<td>2001</td>
<td>42,443</td>
<td>19,270</td>
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<td>44,065</td>
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<td>43,340</td>
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<tr>
<td>2005</td>
<td>43,667</td>
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<tr>
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<td>43,664</td>
<td>18,277</td>
<td>4,703</td>
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<tr>
<td>2007</td>
<td>42,031</td>
<td>16,560</td>
<td>4,889</td>
</tr>
<tr>
<td>2008</td>
<td>37,985</td>
<td>13,677</td>
<td>5,037</td>
</tr>
<tr>
<td>2009</td>
<td>34,485</td>
<td>12,349</td>
<td>4,214</td>
</tr>
</tbody>
</table>
Analyzing “unintentional motor vehicle traffic deaths”

• What are the recent trends in numbers of deaths from unintentional MVT in the U.S.?

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• Which type of MVT decedent is likelier to suffer from a traumatic brain injury? Cyclists or pedestrians?
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Click a button to select ICD codes by Chapters or by Groups.

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- UCD - ICD-10 113 Cause List
- UCD - ICD-10 130 Cause List (Infants)
- UCD - Injury Intent and Mechanism
- UCD - Drug/Alcohol Induced Causes

Browse or search to find items in the UCD - ICD-10 Codes Finder Tool, then highlight the items to use for this request.
(The Currently selected box displays all current request items.)

Finder Tool Help  Advanced Finder Options

Browse  Search  Details

Currently selected:

V12.3 (Pedal cyclist)
V12.4 (Pedal cyclist)
V12.5 (Pedal cyclist)
V12.9 (Pedal cyclist)
V13.3 (Pedal cyclist)
V13.4 (Pedal cyclist)
V13.5 (Pedal cyclist)
V13.6 (Pedal cyclist)
V13.8 (Pedal cyclist)
V13.9 (Pedal cyclist)
V13.10 (Pedal cyclist)
V13.11 (Pedal cyclist)
V13.12 (Pedal cyclist)
V13.13 (Pedal cyclist)
V13.14 (Pedal cyclist)
V13.15 (Pedal cyclist)
V13.16 (Pedal cyclist)
V13.17 (Pedal cyclist)
V13.18 (Pedal cyclist)
V13.19 (Pedal cyclist)
V13.20 (Pedal cyclist)
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V13.29 (Pedal cyclist)
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V13.31 (Pedal cyclist)
V13.32 (Pedal cyclist)
V13.33 (Pedal cyclist)
V13.34 (Pedal cyclist)
V13.35 (Pedal cyclist)
V13.36 (Pedal cyclist)
V13.37 (Pedal cyclist)
V13.38 (Pedal cyclist)
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V13.42 (Pedal cyclist)
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V13.54 (Pedal cyclist)
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V13.98 (Pedal cyclist)
V13.99 (Pedal cyclist)
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V17.2 (Pedal cyclist)
V17.3 (Pedal cyclist)
V17.4 (Pedal cyclist)
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V17.9 (Pedal cyclist)
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V18.2 (Pedal cyclist)
V18.3 (Pedal cyclist)
V18.4 (Pedal cyclist)
V18.5 (Pedal cyclist)
V18.6 (Pedal cyclist)
V18.7 (Pedal cyclist)
V18.8 (Pedal cyclist)
V18.9 (Pedal cyclist)
V19.0 (Driver injured in collision with other and
V19.1 (Passenger injured in collision with other and
V19.2 (Unspecified pedal cyclist injured in collision
V19.3 (Pedal cyclist [any] injured in unspecified
V19.4 (Driver injured in collision with other and
V19.5 (Passenger injured in collision with other and
V19.6 (Unspecified pedal cyclist injured in collision
V19.7 (Pedal cyclist [any] injured in unspecified
V19.8 (Pedal cyclist [any] injured in other
V19.9 (Pedal cyclist [any] injured in unspecified
-V20-V29 (Motorcycle rider injured in transport accident)

Browse the list by opening and closing items.
Use Ctrl+Click to multiple select, Shift+Click for a range.
Unintentional MVT deaths

- All unintentional MVT deaths
- Occupant
Unintentional MVT deaths

- All unintentional MVT deaths
- Occupant
- Pedestrians
Analyzing “unintentional motor vehicle traffic deaths”

• What are the recent trends in numbers of deaths from unintentional MVT in the U.S.?
• How do trends compare according to decedent’s role (car occupant, biker, cyclist, pedestrian)?
• Which type of MVT decedent is likelier to suffer from a traumatic brain injury? Cyclists or pedestrians?
“Traumatic Brain Injury” (TBI) codes

- S01 - open wound of the head;
- S02.0, S02.1, S02.3, S02.7–S02.9 - fracture of the skull and facial bones;
- S04.0 - injury to optic nerve and pathways;
- S06 - intracranial injury;
- S07 - crushing injury of head;
- S09.7–S09.9 - other and unspecified injuries of head;
- T90.1, T90.2, T90.4, T90.5, T90.8, T90.9 - sequelae of injuries of head.

Source: “Surveillance for Traumatic Brain Injury-Related Deaths --- United States, 1997—2007” MMWR Surveillance Summaries, May 6, 2011 / 60(SS05);1-32
6. Select underlying cause of death:

Click a button to select ICD codes by Chapters or by Groups.

- UCD - ICD-10 Codes
- UCD - ICD-10 113 Cause List
- UCD - ICD-10 130 Cause List (Infants)
- UCD - Drug/Alcohol Induced Causes
- UCD - Injury Intent and Mechanism

Browse or search to find items in the UCD - ICD-10 Codes Finder Tool, then highlight the items to use for this request. (The Currently selected box displays all current request items.)

Finder Tool Help  Advanced Finder Options

Currently selected:

- V12.3 (Pedal cyclist)
- V12.4 (Pedal cyclist)
- V12.5 (Pedal cyclist)
- V12.9 (Pedal cyclist)
- V13.3 (Pedal cyclist)
- V13.4 (Pedal cyclist)
- V13.5 (Pedal cyclist)
- V13.6 (Pedal cyclist)
- V13.7 (Pedal cyclist)
- V13.8 (Pedal cyclist)
- V13.9 (Pedal cyclist)
- V14.4 (Pedal cyclist)

Browse the list by opening and closing items. Use Ctrl+Click to multiple select, Shift+Click for a range.
7. Select multiple cause of death:

Click a button to select ICD codes by Chapters or by Groups.

- MCD - ICD-10 Codes
- MCD - ICD-10 130 Cause List (Infants)
- MCD - ICD-10 113 Cause List
- MCD - Drug/Alcohol Induced Causes

Items in the Select Records box will be used for your request.
Enter codes by hand, one per line, or find items in the Finder Tool and Move (highlighted) Items Over.

Finder Tool Help

Select Records
with any of these items:
S01.0 (Open wound of
S01.1 (Open wound of
S01.2 (Open wound of
S01.3 (Open wound of

AND any of these items:

Clear

Move Items Over <<<

Browse the list by opening and closing items.
Use Ctrl+Click to multiple select, Shift+Click for a range.
## Multiple Cause of Death, 1999-2009 Results

<table>
<thead>
<tr>
<th>Year</th>
<th>Deaths</th>
<th>Population</th>
<th>Crude Rate Per 100,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>1999</td>
<td>326</td>
<td>279,040,168</td>
<td>0.1</td>
</tr>
<tr>
<td>2000</td>
<td>304</td>
<td>281,421,906</td>
<td>0.1</td>
</tr>
<tr>
<td>2001</td>
<td>294</td>
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<td>2002</td>
<td>280</td>
<td>288,368,706</td>
<td>0.1</td>
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<td>2003</td>
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<td>290,810,789</td>
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<td>0.1</td>
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<td>2006</td>
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<td>299,398,484</td>
<td>0.1</td>
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<td>2007</td>
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<td>2008</td>
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</tr>
<tr>
<td>2009</td>
<td>244</td>
<td>307,006,550</td>
<td>0.1</td>
</tr>
<tr>
<td>Total</td>
<td>3,227</td>
<td>3,227,110,864</td>
<td>0.1</td>
</tr>
<tr>
<td>Year</td>
<td>Unintentional MVT deaths</td>
<td>Occupant</td>
<td>Motorcyclist</td>
</tr>
<tr>
<td>------</td>
<td>--------------------------</td>
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<td>--------------</td>
</tr>
<tr>
<td>1999</td>
<td>40,965</td>
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<tr>
<td>2006</td>
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<tr>
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<td>16,560</td>
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<tr>
<td>2008</td>
<td>37,985</td>
<td>13,677</td>
<td>5,037</td>
</tr>
<tr>
<td>2009</td>
<td>34,485</td>
<td>12,349</td>
<td>4,214</td>
</tr>
</tbody>
</table>
Percentage of decedents with TBI, by type of unintentional MVT victim

- Percent cyclists w TBI
- Percent pedestrians w TBI
Surveillance of deaths involving “Traumatic Brain Injury” (TBI)

TBI-related deaths are defined using the multiple causes. Mention of any of the following:

S01 - open wound of the head;
S02.0, S02.1, S02.3, S02.7–S02.9 - fracture of the skull and facial bones;
S04.0 - injury to optic nerve and pathways;
S06 - intracranial injury;
S07 - crushing injury of head;
S09.7–S09.9 - other and unspecified injuries of head;
T90.1, T90.2, T90.4, T90.5, T90.8, T90.9 - sequelae of injuries of head

Source: “Surveillance for Traumatic Brain Injury-Related Deaths --- United States, 1997—2007” MMWR Surveillance Summaries, May 6, 2011 / 60(SS05);1-32
Surveillance of deaths involving “Traumatic Brain Injury” (TBI)

- What’s the distribution of TBI-related deaths (“any mention” of a TBI code) across injuries by intent?
- What age groups are at higher risk for TBI-related death?
- What states have an increased risk of TBI-related death?
## 1. Organize table layout

### Group Results By

<table>
<thead>
<tr>
<th>And By</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td></td>
</tr>
<tr>
<td>None</td>
<td></td>
</tr>
<tr>
<td>None</td>
<td></td>
</tr>
<tr>
<td>None</td>
<td></td>
</tr>
</tbody>
</table>

### Optional Measures

(Select box to include in results.)

- [ ] Crude Rate Standard Error
- [ ] Crude Rate 95% Confidence Interval
- [ ] Percent of Total

### Title

[ ] This selected option is not displayed in the table.
6. Select underlying cause of death:

Click a button to select ICD codes by Chapters or by Groups.

- UCD - ICD-10 Codes
- UCD - ICD-10 113 Cause List
- UCD - Injury Intent and Mechanism
- UCD - Injury Intent
- UCD - Injury Mechanism & All Other Leading Causes

UCD - Injury Intent
- All Causes of Death
- Unintentional
- Suicide
- Homicide
- Undetermined
- Legal Intervention / Operations of War
- Non-Injury, no intent classified

UCD - Injury Mechanism & All Other Leading Causes
- All Causes of Death
- Cut/Pierce
- Drowning
- Fall
- Fire/Flame
- Hot object/Substance
- Firearm
- Machinery
- Motor Vehicle Traffic
- Other Pedal cyclist
- Other Pedestrian

Hint: Use Ctrl + Click for multiple selections, or Shift + Click for a range.

7. Select multiple cause of death:

Click a button to select ICD codes by Chapters or by Groups.

- MCD - ICD-10 Codes
- MCD - ICD-10 113 Cause List
- MCD - Drug/Alcohol Induced Causes

Items in the Select Records box will be used for your request.
Enter codes by hand, one per line, or find items in the Finder Tool and Move (highlighted) Items Over.
7. Select multiple cause of death:

Click a button to select ICD codes by Chapters or by Groups.

- MCD - ICD-10 Codes
- MCD - ICD-10 130 Cause List (Infants)
- MCD - ICD-10 113 Cause List
- MCD - Drug/Alcohol Induced Causes

Items in the Select Records box will be used for your request.
Enter codes by hand, one per line, or find items in the Finder Tool and Move (highlighted) Items Over.

Finder Tool Help

Select Records

with any of these items:
S01.0 (Open wound of...
S01.1 (Open wound of...
S01.2 (Open wound of...
S01.3 (Open wound of...

AND any of these items:

Leave box empty, or use *All*, to select all values.

Move Items Over

MCD - ICD-10 Codes

- T90.2 (Sequela of fracture of skull and facial bone)
- T90.3 (Sequela of injury of cranial nerves)
- T90.4 (Sequela of injury of eye and orbit)
- T90.5 (Sequela of intracranial injury)
- T90.8 (Sequela of other specified injuries of head)
- T90.9 (Sequela of unspecified injury of head)
- T91 (Sequela of injuries of neck and trunk)

Use Ctrl+Click to multiple select, Shift+Click for a range.
## Multiple Cause of Death, 1999-2009 Results

### Quick Options

<table>
<thead>
<tr>
<th>Year</th>
<th>Deaths</th>
<th>Population</th>
<th>Crude Rate Per 100,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>1999</td>
<td>49,979</td>
<td>279,040,168</td>
<td>17.9</td>
</tr>
<tr>
<td>2000</td>
<td>48,955</td>
<td>281,421,906</td>
<td>17.4</td>
</tr>
<tr>
<td>2001</td>
<td>51,020</td>
<td>285,317,572</td>
<td>17.9</td>
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<tr>
<td>2002</td>
<td>51,157</td>
<td>288,368,706</td>
<td>17.7</td>
</tr>
<tr>
<td>2003</td>
<td>51,322</td>
<td>290,810,789</td>
<td>17.6</td>
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<tr>
<td>2004</td>
<td>51,735</td>
<td>293,655,404</td>
<td>17.6</td>
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<tr>
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<tr>
<td>Total</td>
<td>567,415</td>
<td>3,227,110,864</td>
<td>17.6</td>
</tr>
</tbody>
</table>
6. Select underlying cause of death:

Click a button to select ICD codes by Chapters or by Groups.

- UCD - ICD-10 Codes
- UCD - ICD-10 113 Cause List
- UCD - Injury Intent and Mechanism
- UCD - Injury Intent
- All Causes of Death
- Unintentional
- Suicide
- Homicide
- Undetermined
- Legal Intervention / Operations of War
- Non-Injury, no intent classified
- UCD - Injury Mechanism & All Other Leading Causes
- All Causes of Death
- Cut/Pierce
- Drowning
- Fall
- Fire/Flame
- Hot object/Substance
- Firearm
- Machinery
- Motor Vehicle Traffic
- Other Pedal cyclist
- Other Pedestrian

Hint: Use Ctrl + Click for multiple selections, or Shift + Click for a range.

7. Select multiple cause of death:

Click a button to select ICD codes by Chapters or by Groups.

- MCD - ICD-10 Codes
- MCD - ICD-10 113 Cause List
- MCD - Drug/Alcohol Induced Causes

Items in the Select Records box will be used for your request.
Enter codes by hand, one per line, or find items in the Finder Tool and Move (highlighted) Items Over.
<table>
<thead>
<tr>
<th>Year</th>
<th>Deaths</th>
<th>Population</th>
<th>Crude Rate Per 100,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>1999</td>
<td>29,748</td>
<td>279,040,168</td>
<td>10.7</td>
</tr>
<tr>
<td>2000</td>
<td>28,919</td>
<td>281,421,906</td>
<td>10.3</td>
</tr>
<tr>
<td>2001</td>
<td>30,229</td>
<td>285,317,572</td>
<td>10.6</td>
</tr>
<tr>
<td>2002</td>
<td>30,510</td>
<td>288,368,706</td>
<td>10.6</td>
</tr>
<tr>
<td>2003</td>
<td>30,546</td>
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<td>10.0</td>
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<tr>
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<td>9.4</td>
</tr>
<tr>
<td>Total</td>
<td>336,161</td>
<td>3,227,110,864</td>
<td>10.4</td>
</tr>
</tbody>
</table>
6. Select underlying cause of death:

Click a button to select ICD codes by Chapters or by Groups.

- UCD - ICD-10 Codes
- UCD - ICD-10 113 Cause List
- UCD - ICD-10 130 Cause List (Infants)
- UCD - Injury Intent and Mechanism
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UCD - Injury Intent
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- Drowning
- Fall
- Fire/Flame
- Hot object/Substance
- Firearm
- Machinery
- Motor Vehicle Traffic
- Other Pedestrian
- Other Pedestrian
- other

Hint: Use Ctrl + Click for multiple selections, or Shift + Click for a range.

7. Select multiple cause of death:

Click a button to select ICD codes by Chapters or by Groups.

- MCD - ICD-10 Codes
- MCD - ICD-10 113 Cause List
- MCD - ICD-10 130 Cause List (Infants)
- MCD - Drug/Alcohol Induced Causes

Items in the Select Records box will be used for your request.
Enter codes by hand, one per line, or find items in the Finder Tool and Move (highlighted) Items Over.
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<thead>
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<th>Year</th>
<th>Deaths w any mention of TBI code</th>
<th>Injury deaths w mention of TBI</th>
<th>Unintentional injury deaths w mention of TBI</th>
<th>Suicide w mention of TBI</th>
<th>Homicide w mention of TBI</th>
</tr>
</thead>
<tbody>
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<td>1999</td>
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</tr>
<tr>
<td>2005</td>
<td>54,902</td>
<td>53,425</td>
<td>32,329</td>
<td>14,412</td>
<td>6,008</td>
</tr>
<tr>
<td>2006</td>
<td>54,454</td>
<td>52,944</td>
<td>31,903</td>
<td>14,293</td>
<td>6,057</td>
</tr>
<tr>
<td>2007</td>
<td>54,710</td>
<td>53,256</td>
<td>31,581</td>
<td>14,835</td>
<td>6,063</td>
</tr>
<tr>
<td>2008</td>
<td>53,835</td>
<td>52,444</td>
<td>30,366</td>
<td>15,586</td>
<td>5,743</td>
</tr>
<tr>
<td>2009</td>
<td>52,682</td>
<td>51,178</td>
<td>28,997</td>
<td>15,984</td>
<td>5,488</td>
</tr>
</tbody>
</table>
U.S. deaths with mention of at least one TBI code, 1999-2009
Injury deaths with mention of at least one TBI code, by intent, 1999-2009
### 1. Organize table layout:

<table>
<thead>
<tr>
<th>Group Results By</th>
<th>Option</th>
<th>And By</th>
<th>Option</th>
<th>And By</th>
<th>Option</th>
<th>And By</th>
<th>Note: See the Rate options section below to choose standard or non-standard age-adjusted rates, or to adjust the number rates are calculated for.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Age Groups</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td>Optional Measures</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(Check box to include in results.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>□ Crude Rate Standard Error</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>□ Crude Rate 95% Confidence Interval</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>□ Percent of Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Title: [Input Field]
## Multiple Cause of Death, 1999-2009 Results

**Multiple Cause of Death Data**

<table>
<thead>
<tr>
<th>Ten-Year Age Groups</th>
<th>Deaths</th>
<th>Population</th>
<th>Crude Rate Per 100,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 1 year</td>
<td>3,791</td>
<td>44,814,938</td>
<td>8.5</td>
</tr>
<tr>
<td>1-4 years</td>
<td>7,437</td>
<td>176,060,646</td>
<td>4.2</td>
</tr>
<tr>
<td>5-14 years</td>
<td>12,859</td>
<td>447,373,447</td>
<td>2.9</td>
</tr>
<tr>
<td>15-24 years</td>
<td>97,374</td>
<td>454,008,804</td>
<td>21.4</td>
</tr>
<tr>
<td>25-34 years</td>
<td>76,002</td>
<td>443,365,546</td>
<td>17.1</td>
</tr>
<tr>
<td>35-44 years</td>
<td>78,096</td>
<td>483,483,129</td>
<td>16.2</td>
</tr>
<tr>
<td>45-54 years</td>
<td>79,140</td>
<td>454,591,223</td>
<td>17.4</td>
</tr>
<tr>
<td>55-64 years</td>
<td>57,414</td>
<td>320,076,448</td>
<td>17.9</td>
</tr>
<tr>
<td>65-74 years</td>
<td>50,574</td>
<td>208,030,921</td>
<td>24.3</td>
</tr>
<tr>
<td>75-84 years</td>
<td>70,086</td>
<td>141,040,199</td>
<td>49.7</td>
</tr>
<tr>
<td>85+ years</td>
<td>51,631</td>
<td>54,265,563</td>
<td>95.1</td>
</tr>
<tr>
<td>Not Stated</td>
<td>272</td>
<td>Not Applicable</td>
<td>Not Applicable</td>
</tr>
</tbody>
</table>

**Total**

<table>
<thead>
<tr>
<th>Deaths</th>
<th>Population</th>
<th>Crude Rate Per 100,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>584,676</td>
<td>3,227,110,864</td>
<td>18.1</td>
</tr>
</tbody>
</table>
Death rates for decedents of all causes with any mention of TBI codes, by age, 1999-2009

Rate per 100,000 population

- < 1 year
- 1-4 years
- 5-14 years
- 15-24 years
- 25-34 years
- 35-44 years
- 45-54 years
- 55-64 years
- 65-74 years
- 75-84 years
- 85+ years
Make all desired selections and then click any Send button one time to send your request.

1. Organize table layout:

<table>
<thead>
<tr>
<th>Group Results By</th>
<th>State</th>
</tr>
</thead>
<tbody>
<tr>
<td>And By</td>
<td>None</td>
</tr>
<tr>
<td>And By</td>
<td>None</td>
</tr>
<tr>
<td>And By</td>
<td>None</td>
</tr>
<tr>
<td>And By</td>
<td>None</td>
</tr>
</tbody>
</table>

Note:
See the Rate options section below to choose standard or non-standard age-adjusted rates, or to adjust the number rates are calculated for.

Optional Measures (Check box to include in results.):
- Crude Rate Standard Error
- Crude Rate 95% Confidence Interval
- Percent of Total

Title
Death rates for decedents of all causes with any mention of TBI codes, by state, 1999-2009
WEB RESOURCES FOR INJURY-RELATED MORTALITY RESEARCH
CDC WONDER – “Wide-ranging Online Data for Epidemiologic Research”

http://wonder.cdc.gov/
CDC WISQARS – “Web-based Injury Statistics Query and Reporting System”

Welcome to WISQARS™

WISQARS™ (Web-based Injury Statistics Query and Reporting System) is an interactive database system that provides customized reports of injury-related data. Learn more about WISQARS™ >>

NOTE TO USERS: The Nonfatal Injury Reports module has been updated with new national-level population estimates based on recently released bridged-race intercensal estimates of the July 1, 2001-July 1, 2009 and April 1, 2010 resident population of the United States. See U.S. Census Populations With Bridged Race Categories. However, population estimates for the Fatal Injury Reports and Violent Death (NVDRS) Reports will not be updated until March or April of 2012 when state level bridged-race intercensal population estimates will be made available.

**Fatal Injury Data**

Death certificate data from the National Vital Statistics System — deaths, death rates, and years of potential life lost (a measure of premature death) by specific causes of injury mortality and common causes of death.

**Nonfatal Injury Data**

National estimates of injuries treated in U.S. hospital emergency departments from the National Electronic Injury Surveillance System - All Injury Program (NEISS-AIP) — nonfatal injuries and nonfatal injury rates.

**Violent Deaths (NVDRS)**

Data from the National Violent Death Reporting System (NVDRS) — violent incidents and deaths, death rates, and causes of injury mortality. Data provided for 16 states and are not nationally representative.

NCHS’ Injury Data and Resources Webpage

http://www.cdc.gov/nchs/injury.htm
WHO’s ICD-10 Online

International Statistical Classification of Diseases and Related Health Problems 10th Revision

You may browse the classification by using the hierarchy on the left or by using the search functionality.

More information on how to use the online browser is available in the Help.

http://apps.who.int/classifications/icd10/browse/2010/en
Thanks!

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MWarner@CDC.GOV

Arial M. Miniño, MPH
AMinino@CDC.GOV