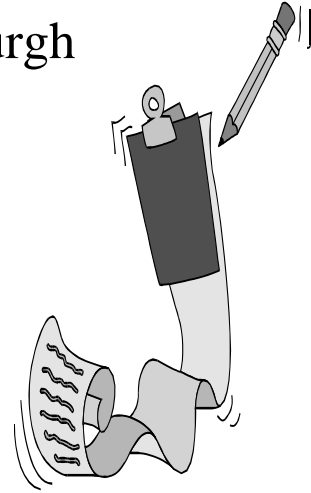


Injury Data Sources

Thomas Songer, PhD
University of Pittsburgh



The discussion in this lecture focuses on some of the key injury data systems that currently exist. These systems represent the data sources used in several injury research studies. If you are thinking of conducting an injury study of your own, then you might want to consider some of these systems as possible sources for finding injury cases. Alternatively, you might want to consider information from these sources as a means to identify a hypothesis to investigate in an analytic study.

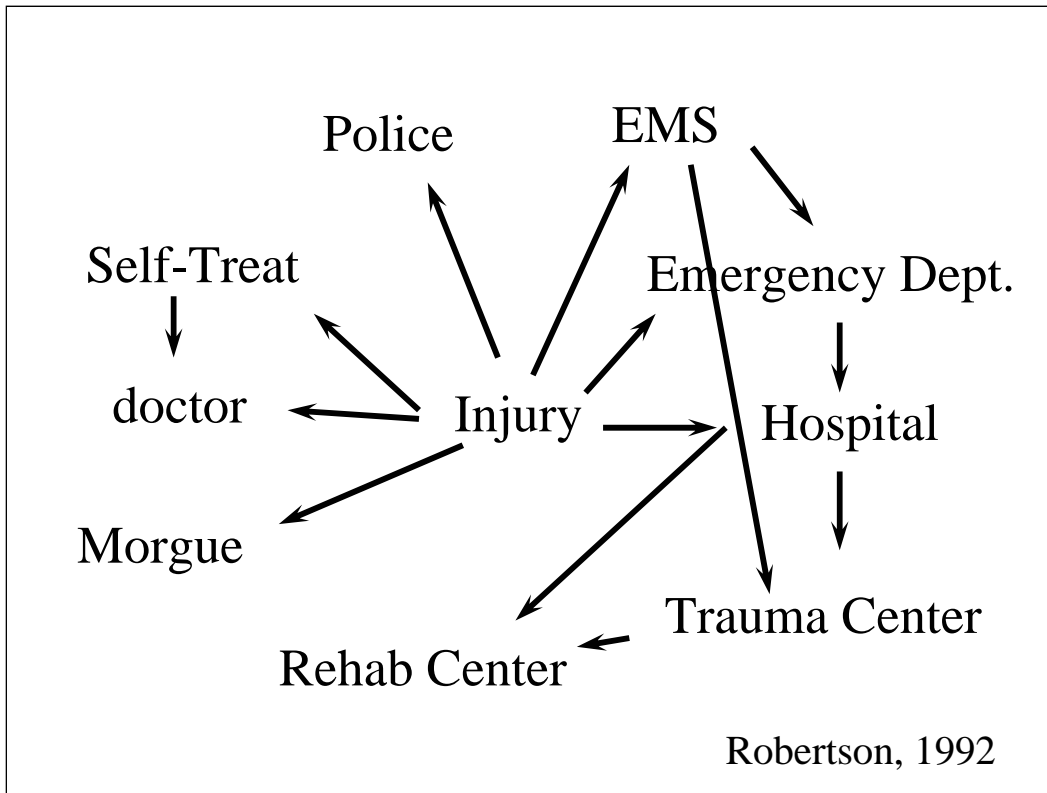
Many of the data sources presented here exist as surveillance systems. Some of the surveillance systems are specific to injuries, while others capture injuries as part of a broader surveillance effort. Remember that surveillance systems typically collect information on an ongoing basis. Thus, injury data are available from the following systems over a number of years.

Where do Injury Deaths Occur?

Cause of Death	Home	Resident Institution	Public Bldg	Industry
Collision with object or person	21%	3%	7%	21%
Falls	40%	12%	3%	3%
Firearm	43%	-	2%	55
Machinery	9%	-	1%	60%
Drowning	12%	-	1%	3%

Injury Deaths, 1980-86. Baker Injury Facts

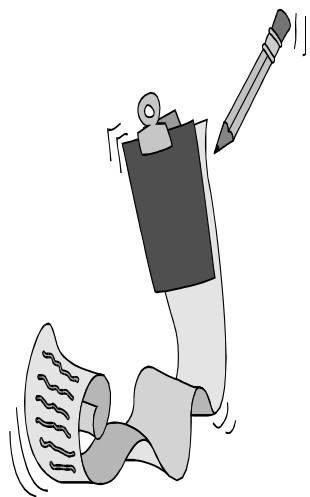
Injury data may be identified from several sources, mainly because the categorization of injuries is multi-factorial. For example, injuries may be identified from the place in which they occur; home, work, on the highway, etc. Different injuries have different characteristics. In a study of falls, for instance, you may want to consider data sources that capture events which occur in both the home and other residential facilities. Neglecting either source may cause a researcher to underestimate the impact of injuries from falls.



Injuries may also be identified from the medical facility in which they are treated. Some of the possible locations are outlined here.

Alternatively, injuries may be found through administrative sources, such as police, employment, or insurance records.

Major Injury Data Systems



Vital Statistics
Surveillance Systems
Registries
Government Surveys
Medical Records
Special Surveys

As I review the major injury data sources herein, keep in mind that the methods by which this information is collected can be markedly different. For example, the data may originate from systems set up to record all deaths, specific surveillance systems for work-related deaths, routine national surveys, health system records, or special surveys of the population. The types of information, as well as the methods to identify injuries differ between the systems.

Documents used to Record Injuries

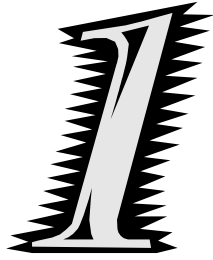
- Death certificates
- Medical records
- Surveys of medical facilities
- coroner's reports
- police reports
- crash reports
- registry forms

Injury data are typically contained within a number of specific documents. A list of the major types of forms which list injury information is shown here.

Degrees of Injury Severity



The type of injury may differ between the data sources. With respect to injury severity, using death certificates as a data source characterizes only the most severe events. Medical records would only capture those who sought medical treatment. Surveys of populations would, theoretically, capture more injury events.



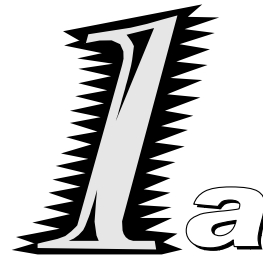
National Center for Health Statistics

<http://www.cdc.gov/nchs/>

Now let's move the discussion to the specific data sources. The data sources are grouped here as "the top ten sources". This is a grouping of convenience rather than one of rank order. There are several sources that I have chosen not to include here. So, the list is not necessarily comprehensive.

The first data source often examined in injury research is death certificates. In the United States, the National Center for Health Statistics maintains information on deaths and death certificates. The NCHS gathers this information from the individual states. Each state, in turn, has a law that requires for death certificates to be completed for all deaths.

A standard death certificate form is collected across the states. Thus, the death certificate data compiled by the NCHS represent one of the few sources that allow for comparisons across geographic regions and standard demographic factors. But, as has been mentioned before, injury deaths represent only the tip of the iceberg.

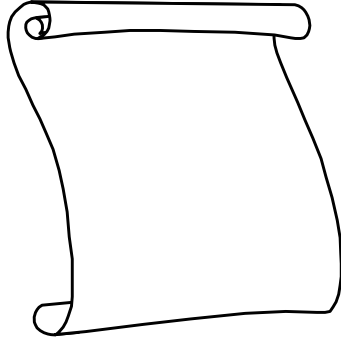


WISQARS

Web-based Injury Statistics
Query and Reporting System

www.cdc.gov/ncipc/wisqars/default.htm

Information on injury deaths in the United States is available online at the Internet site of the National Center for Injury Prevention and Control. The WISQARS system is an interactive database system that provides customized reports of injury-related data. It contains both fatal and non-fatal injuries in the United States. Take a look through this site and identify the number of injury deaths in the United States in 1998. Then, try to find the same injury deaths in 2002. You will see a different classification system between the deaths, as the coding switched in 1999 from the ICD-9 system to the ICD-10 system.



A. NHIS

National Health Interview Survey

B. NHAMCS

National Hospital Ambulatory Medical Care Survey

The NCHS is also responsible for the government-based health and health care surveys in the United States. Two important surveys for injuries are the NHIS and the NHAMCS.

The NHIS is used primarily to monitor the health of the population. It includes several questions on physician diagnosed illnesses and disability. It is based upon a sample of the population and represents a cross-sectional survey. It is conducted annually.

Injury-specific items are included in the NHIS. Two questions identify injury and poisoning events. Both address events which occurred in the previous 3 months and which required medical attention. The recent redesign of the survey has added further information on injuries. Data are now collected on external causes of injuries (E-codes), and the circumstances which surround the injury (type, activity, place of occurrence). The data in the NHIS represent self-reported injuries.

The NHAMCS is a recent survey from the NCHS. It assesses the characteristics of ambulatory care use in hospital settings. This included emergency department activities. Thus, it is of interest to injury researchers. The NHAMCS is not an annual survey. The latest data are available for the years 2002.



ICD Codes

N Codes - Nature of injury, anatomy (ICD-9)

S,T Codes – Nature of injury (ICD-10)

E-Codes - External cause of injury (ICD-9)

V, W, X, Y Codes – External cause (ICD-10)

Most of the information that NCHS maintains utilizes ICD codes to distinguish the type of injury by anatomy and the cause of injury. At the time of this lecture, the ICD-10 system is used to code injury deaths, and the ICD-9-CM system is used to code medical encounters. Remember that, in ICD9-CM, E-codes are codes that classify the cause of injury, and, in ICD-10, a different coding system is applied with V, W, X, and Y codes for externality.

National Highway Traffic Safety Administration

<http://www.nhtsa.dot.gov/>



Next, let's look at the NHTSA web site listed above. NHTSA maintains two important surveillance systems for motor vehicle related events in the United States. The first is the Fatal Analysis Reporting System (FARS) which is a census of all motor vehicle accidents involving fatalities on public roads in the United States. The second is the General Estimates System (GES) which generates data on a stratified sample of motor vehicle accidents in the United States.

A. FARS

Fatality Analysis Reporting System



The Fatality Analysis Reporting System (FARS) contains data on all traffic accidents in which a fatality is involved in the USA and Puerto Rico. FARS represents the primary sentinel event surveillance system related to transportation injuries.

This surveillance system is dependent upon reporting through the states. Standard forms are filled out at this level and include data items on vehicle, driver, and environmental characteristics of the crash. Information on these items are often taken from accident reports maintained by the police, from medical records, and from driver license files.

The definition of a event in the FARS system is “a crash involving a motor vehicle on a public traffic way that results in the death of a person (driver, occupant, or non-motorist).” The death must occur within 30 days of the crash.

The FARS system began in 1975. Data are maintained and available through NHTSA. Recently, however, the FARS data have become available online through the NHTSA site.

B. GES

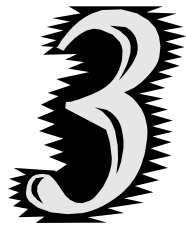
General Estimates System



The General Estimates System (GES) reports on all types of motor vehicle crashes (from minor to fatal). The GES is based on a representative sample of police reported motor vehicle accidents in the United States. It was established to provide information on the frequency of motor vehicle crashes, their driver, vehicular, and environmental characteristics, and their outcomes.

The definition of a crash in the GES is an event involving a motor vehicle traveling on a public roadway that results in property damage, injury, or death. A police accident report must be completed for each event.

The sample used in the GES is a survey of 60 geographical areas in the USA. Data collection experts make weekly visits to the police offices in those areas and sample about 50,000 accidents reports in total.



Bureau of Labor Statistics,
Safety and Health Statistics

<http://www.bls.gov/iif/>

As another example of injury related statistics available on the Internet, take a look through the Bureau of Labor Statistics, Injury and Illness Statistics homepage. This site has the reports on work injuries in the United States, and a comprehensive set of tables outlining occupational injuries.



CFOI

Census of Fatal Occupational Injuries

Another data source for fatal injuries in the United States is the Census of Fatal Occupational Injuries (CFOI) maintained by the Bureau of Labor Statistics. The CFOI is a collection of information on fatal injuries that occur in the workplace. It has been implemented in all 50 states in an effort to capture all work-related events. There is some concern, though, about its ability to capture and characterize a work-related item. For example, a person killed while driving a vehicle for work purposes may not be included in this system, because of difficulties in distinguishing work and private uses of an automobile.

The CFOI involves a surveillance of several data items in an effort to minimize this effect. These include death certificates, workers' compensation reports, source documents from the employer, and a follow-up questionnaire.

Federal Aviation Administration


<http://www.faa.gov/>



Other systems on the Internet include those maintained by the FAA. This site created some controversy when it came online, as some believe that airlines did not want this information contained within the system to become public. The concern is that airlines in the future may be less forthcoming in reporting events if they know that the information will become public knowledge.

Take a look through the safety data and databases maintained in the National Aviation Safety Data Analysis Center. Several are listed under the safety data link, including the NTSB database. The NTSB Aviation Accident/Incident Database is the main source of information on aviation related crashes and injuries.

The FARS, GES, and NTSB data sources all demonstrate surveillance systems based upon transportation related accidents. They are not entirely injury related, but provide details on injuries within them. Transportation related surveillance systems are the most advanced systems related to injuries that currently exist. Systems for other types of injuries are not as advanced in operation.



ASRS

Aviation Safety Reporting System

Another data source for is the Aviation Safety Reporting System (ASRS). The ASRS is a voluntary and anonymous reporting system for incidents related to commercial aircraft operation. It collects incident/situation reports from pilots, flight attendants, air traffic controllers, and others involved in airline operations. The ASRS strives to improve aviation safety by compiling the reports and publishing alerts and system deficiencies gathered from the database. The ASRS represents a data source that may identify exposure information for injury research. For example, the number of times that flight attendants are assaulted by passengers who have had too much to drink. However, because it is a voluntary system in terms of reporting requirements, there is some concern about it's ability to identify all events of this nature.



Federal Bureau of Investigation



Uniform Crime Reports

National Incident Based Reporting System

Some information on injuries from crime-related violence are available through the reporting systems of the FBI. The FBI maintains and publishes information from two primary sources; the Uniform Crime Reports (UCR), and the National Incident Based Reporting System (NIBRS).

The UCR is built upon the reporting of crimes from local and state police agencies into the FBI. Statistics on events and arrests are collected for 8 index crimes, including homicide, aggravated assault, rape and robbery. Not all of the 8 index crimes involve injuries. Typically, the category most examined by injury researchers in the UCR is the homicide category.

As the UCR is based upon the reporting of offenses from local to state to federal authorities, there is a large concern over the under-reporting of events.

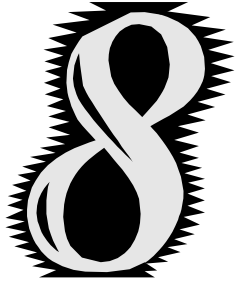
An emerging data source available from the FBI is the NIBRS. As it's name implies, NIBRS is a reporting systems of incidents of crime. NIBRS is a spin-off of the recent efforts by law enforcement agencies to automate their records systems for retrieval of information on suspected criminals. NIBRS collects information on 22 crime categories, including homicide. To this point, it has not bee widely used in the injury area.



Bureau of Justice Statistics

National Crime Victimization Survey

Another data source for crime information and injuries from violence in the United States is the National Crime Victimization Survey (NCVS) administered through the Bureau of Justice Statistics. The NCVS is a survey of persons over the age of 12 years on their encounters with crime as a victim. The NCVS is intended to complement the UCR to portray additional information about crimes. Indeed, there is generally more information on injuries available through this source, than through the UCR.



Consumer Product Safety Commission

NEISS



National Electronic Injury Surveillance System

In 1973, the US Congress established the Consumer Product Safety Commission. One of the main components of this agency is the National Electronic Injury Surveillance System (NEISS). NEISS is built upon a sample of admissions to hospital emergency departments in the United States that are statistically representative of all visits. The surveillance system was established to identify the frequency and circumstances surrounding injuries related to consumer products.

The WISQARS system maintained by the CDC uses the NEISS to monitor non-fatal injuries in the United States.



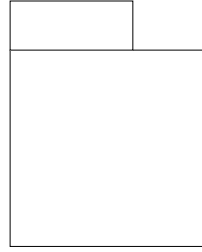
Centers for Disease Control

BRFSS

**Behavioral
Risk
Factor
Surveillance
System**

A faint, semi-transparent globe graphic is positioned behind the text 'Behavioral Risk Factor Surveillance System'.

In the 1980s, the Centers for Disease Control began the Behavioural Risk Factor Surveillance System to monitor trends in health behaviours amongst the population. The BRFSS is built upon a telephone survey of health risk behaviours in the population. The survey is a probabilistic sample of telephone numbers in the states in which it is conducted. A standard core questionnaire is used in the BRFSS to allow for comparison across the states conducting the survey. Injury related information is now included in the BRFSS. This includes data on seat belt and helmet use, and at times, information on domestic violence.



Utah Hospital Admissions

Perhaps the most unique data source is that found at the Utah Department of Health. Here, one may find an example of data from a medical database by browsing through the homepage on hospital admissions in the state of Utah. This is a useful site for understanding injuries that require overnight stays in a hospital. The key to identifying injuries at this site is the use of E-codes. Try to find the number of events related to child abuse (E-code 967.1) in the search query for the database.

Injury Control Research Information Network (ICRIN)

<http://www.injurycontrol.com/icrin/>

One of the best places to start a search for injury resources on the Internet is at the Injury Control Resource Information Network (ICRIN) site. ICRIN maintains a comprehensive listing of sites with injury-related information on a variety of topics. The category of most interest within this Internet site is the data and statistics category. Take a look through some of the hypertext links contained here.

A Minimum Basic Dataset for Unintentional Injuries

- Age, Gender, Ethnic Group, Residence
- Place of occurrence
- Date of Injury
- Outcome of Injury
- Location of Injury
- Activity when accident happened

A perfect way to conclude this lecture is to outline again a key point in injury epidemiology. We have reviewed several data sources in this lecture. While injuries are wide ranging, there is one characteristic that is common to all of the data sources discussed. “There is no standardization among them regarding the types of injury data collected.”

With this recognition, an international panel has recently recommended that a core set of injury data elements be collected in all injury data systems. These are outlined here. Take a look through the systems we examined today. Can you get the information outlined above from each of the systems?

Internet Exercise

Question 1



www.cdc.gov/ncipc/

Information on injury deaths in the United States is available at the Internet site of the National Center for Injury Prevention and Control. The WISQARS system maintains an online database of both fatal and non-fatal injuries in the United States. Take a look through this site and identify the number of injury deaths in the United States in 2002.

Internet Exercise

Question 2



www.nhtsa.dot.gov

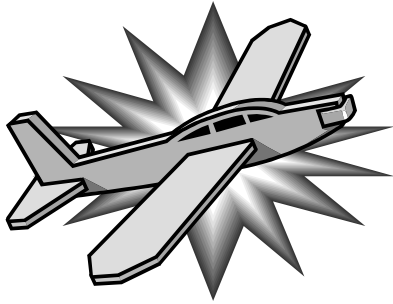
The US National Highway Traffic Safety Administration (NHTSA) maintains the two primary data sources for traffic accidents. It also provides a series of reports on transportation related items.

The first surveillance system of NHTSA is called the Fatal Analysis Reporting System (FARS) which generates information on all motor vehicle accidents involving fatalities in the United States. Look through the FARS page to identify the methods which are used to monitor these injuries.

The second is the General Estimates System (GES) which generates data on a random sample of motor vehicle accidents in the United States. Take a look at the GES page to identify the methods behind this surveillance system. How do the two systems differ?

Internet Exercise

Question 3



<http://nasdac.faa.gov>

Take a look through the web site of the National Aviation Safety Data Analysis Center. How do the reporting requirements for the NTSB database differ from those for the the ASRS database? Which database contains more incidents?

Lecture Exercise

Question 4



Violence

<http://www.fbi.gov>

<http://www.ojp.usdoj.gov/bjs/cvict.htm>

For crime-related violence, How does the UCR differ from the NCVS?

Internet Exercise

Question 5

Utah Hospital Admissions

<http://hlunix.hl.state.ut.us/hda/encode2/>

One may find an example of data from a medical database by browsing through the homepage on hospital admissions in the state of Utah. The key to identifying injuries at this site is the use of E-codes. Try to find the number of events related to child abuse (E-code 967) in the search query for the database.