

# Consensus Recommendations for Injury Surveillance in State Health Departments

Report from the Planning Comprehensive Injury Surveillance in  
State Health Departments Working Group  
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# Consensus Recommendations for Injury Surveillance in State Health Departments

## Executive Summary

State health agencies rely on injury surveillance to assess specific needs for injury prevention programs and policies and to monitor their effectiveness. Injury surveillance is the ongoing process of tracking and monitoring incidence rates, causes and circumstances resulting in fatal and non-fatal injuries. Analysis and dissemination of the data is utilized in injury prevention efforts. To improve the performance of state injury surveillance systems, a Working Group with members representing the State and Territorial Injury Prevention Directors Association (STIPDA); the Council of State and Territorial Epidemiologists (CSTE); the National Center for Injury Prevention and Control (NCIPC), Centers for Disease Control and Prevention; and the Society for Advancement of Violence and Injury Research (SAVIR) recommends a set of state surveillance capacities for injury prevention programs in different phases of program development. The Working Group further recommends that 14 specific injuries and injury risk factors be put under surveillance by all states. Finally, the Working Group endorses a set of principles and goals for data system integration.

The ultimate goal of these recommendations is to improve state injury surveillance to support injury prevention programs and policies. By helping to standardize injury surveillance at the state level, the Working Group also hopes to further integrate injury prevention with traditional public health activities. In the interest of standardization, this report recommends a minimum set of state surveillance standards. However, these recommendations are not intended to limit individual states in setting and achieving their own specific objectives for injury surveillance.

## Background

Within state health departments, injury prevention is still struggling for recognition as a critical component of public health practice. Public health practitioners rely on surveillance data to assess the need for new policies and programs or to evaluate the effectiveness of existing policies and programs. Injury surveillance data are also important for monitoring state progress toward achieving the Health People 2000 (and 2010) Injury-Related Objectives (1). Therefore, improving the performance for state injury surveillance systems, which could be achieved by setting standards for surveillance capacities, specific injuries and injury risk factors, injury data sets, and the integration of injury data systems, would better support state injury prevention programs and policies. Moreover, if these standards are compatible with standards set for state surveillance of other public health problems, injury surveillance could be more easily integrated with traditional public health surveillance. Consequently, injury prevention programs and policies could become integral to state public health departments.

The National Public Health Surveillance System (NPHSS) provides an opportunity for injury prevention to become better integrated within state public health departments. NPHSS is a conceptual framework (2) for all public health surveillance activities. This conceptual framework proposes that public health professionals at the state, national and local levels reach consensus on the diseases, injuries, risk factors, services and outcomes to be placed under surveillance and the standards and methods that should be used to collect, manage and analyze surveillance data. NPHSS has been envisioned and promoted by the Council of State and Territorial Epidemiologists (CSTE), with support from the Centers for Disease Control and Prevention (CDC).

Obstacles to the inclusion of injury data in NPHSS include insufficient state capacity to conduct injury surveillance and insufficient standardization of case definitions, data collection and reporting methods. These issues make it difficult to link, compare or integrate data from different systems within and between states. A plan is needed to develop an injury surveillance infrastructure compatible with NPHSS.

To develop this plan, representatives of STIPDA, CSTE, NCIPC, CDC and SAVIR formed a Working Group with the following specific objectives:

- Determine surveillance capacities for state injury surveillance programs.
- Recommend a list of specific injuries and injury risk factors for surveillance by all state injury prevention programs.
- Recommend a list of injury data sets to be used for surveillance by all state injury prevention programs.
- Establish principles and goals for injury data system integration.

From November 1998 through June 1999, the Working Group met on three occasions and communicated by e-mail between meetings to achieve the objectives and produce this report.

# State Injury Surveillance Capacities

In the United States, state injury prevention programs differ markedly in their phases of development. As described in *SAFE STATES: Five Components of a Model State Injury Prevention Program & Three Phases of Program Development* (3), some state injury prevention programs are just getting started (Phase 1), others have targeted, but not comprehensive, injury prevention activities (Phase 2), and a few have developed all five core components of a model state injury prevention program, including data collection and analysis; program design, implementation and evaluation; coordination and collaboration; technical support and training; and public policy (Phase 3). These core competencies have also been updated in *SAFE STATES, 2003*.

Within the core component of data collection and analysis, Phase 1 injury prevention programs are expected to: Become familiar with available data about injury problems and potential solutions in the state and region as compared with the nation as a whole.

Identify data sources and their managers.

Read books and articles about injury prevention to learn what methods work best.

Thus, Phase 1 injury prevention programs are not expected to conduct injury surveillance.

Phase 2 programs, however, should be involved in surveillance activities. Specifically, a Phase 2 injury prevention program should be able to:

- Access and analyze data— for example, vital records, hospital discharge data and BRFSS data to respond in a timely manner to constituents' requests. "Timely" may mean within the same day or sooner (even within the hour) if the request is urgent.
- Understand and interpret E-coded (external cause of injury coded) data.
- Generate data to support strategic planning for injury prevention in the state.
- Provide data-based consultation to injury prevention program services staff.
- Produce periodic (for example, annual) reports.

Phase 2 injury prevention programs should also be able to investigate clusters of injuries, find out whether data sources can be linked and whether there is any benefit for prevention from linking them, and assist other state agencies in understanding and disseminating their data for injury prevention purposes.

The Working Group considers injury surveillance capacities for Phase 2 programs to be rudimentary. By contrast, Phase 3 injury prevention programs should have well-developed surveillance capacities. Therefore, Phase 3 programs should have all the surveillance capacities of Phase 2 programs, but should also be able to:

- Access all 11 core data sets recommended for surveillance in this report: vital records, hospital discharge data, the Fatality Analysis Reporting System (FARS), the Behavioral Risk Factor Surveillance System (BRFSS), the Youth Risk Behavior Surveillance System (YRBSS), emergency department data, medical examiner or coroner data, child death review data, the National Occupant Protection Use Survey (NOPUS), the Uniform Crime Reporting (UCR) System, and emergency medical services data.
- Assess the completeness and validity of all 11 core data sets and evaluate the surveillance systems that generated these data sets using standard evaluation criteria.
- Link data sets.
- Ensure that each injury event is counted only once when using patient records.
- Conduct special analyses.
- Identify and measure interim program outcomes.
- Evaluate the state injury prevention program.
- Use surveillance to support applied research.
- Produce routine reports based on core data to support the five components of a model state injury prevention program (3): data collection and analysis; program design, implementation and evaluation; coordination and collaboration; technical support and training; and public policy.
- Develop and implement surveillance for additional major injury problems, e.g. nonfatal interpersonal violence (including intimate partner violence, sexual assault and child abuse).
- Develop unique surveillance systems to meet the states special needs for data.

To develop these capacities, an injury prevention program must have skilled staff, computer hardware and software, networked or online data systems, and other resources. The specific resources to support these capacities may vary from state to state, depending on access to resources from other programs, population size and other factors. Some capacities and resources may be short-term, for the purpose of fulfilling grant requirements, but the capacities listed here are necessary to maintain even after grant funding expires. Furthermore, the Working Group's recommendations for Phase 3 surveillance capacities may evolve as state injury prevention programs mature and accept greater challenges for injury prevention. Consequently, surveillance capacities recommended in this report for Phase 3 injury prevention programs are considered to be minimum surveillance capacities.

Administrative structures for injury programs may differ from state to state, but if capacities are fragmented across programs, they may in effect be inaccessible to the injury prevention program. That is, an injury surveillance unit may not have to be physically or administratively housed within the state injury prevention program, but ties should be close enough so that the injury prevention program is adequately served by these recommended surveillance capacities. Confidentiality and security provisions are necessary for all state injury data systems, as they are for all public health information systems.

## Injuries, Injury Risk Factors and Injury Data Sets

Injury surveillance (3) is the ongoing process of tracking and monitoring incidence rates, causes and circumstances resulting in fatal and non-fatal injuries. Analysis and dissemination of the data is utilized in injury prevention efforts. State injury prevention programs use surveillance data to assess the need for new policies or programs and to evaluate the effectiveness of existing policies and programs.

Population-based surveillance is the preferred method of monitoring the occurrence of injuries (4), because rates of injuries and injury risk factors can be calculated and generalized to the population. In this report, “population-based” implies a geopolitical population of states and counties because state health agencies have authority and responsibility for the health of the population within their boundaries. Within state health agencies, the responsibility and authority for preventing injuries is often delegated to the state injury prevention program. Injury surveillance is the state’s method of assessing injury prevention needs and monitoring the effectiveness of the state’s response.

In addition to serving the population of the state as a whole, many state injury prevention programs also work with their counties and cities to develop community-based prevention projects to address local injury prevention priorities. Therefore, population-based surveillance systems that represent counties and metropolitan areas are useful for assessing the need for and monitoring the effectiveness of local prevention projects.

The Working Group nominated specific injuries, injury risk factors, and data sets for core surveillance by all states. Several criteria were discussed for recommending specific injuries, injury risk factors, and data sets, including feasibility, morbidity and mortality rates, cost of injury, public perception of risk, preventability, need for raising public awareness, consistency with other published recommendations, representativeness, completeness, cost of surveillance, linkage to cause, ease of standardization, data quality, standards for quality assurance, usefulness and timeliness.

Feasibility was an important consideration, such that some conditions for which surveillance is greatly needed were not included in this report. Cost, limited data access, lack of systematically collected data, and other practical limitations make it infeasible to recommend routine surveillance by all states for some injury conditions that are major public health problems. For example, nonfatal interpersonal assaults, including intimate partner violence, sexual assault and child abuse, are enormous public health problems for which there is urgent need for basic data; but the wherewithal to develop and implement surveillance for these problems does not yet exist in most states.

After a series of discussions and ballots, the Working Group endorsed, by consensus, 14 injuries and injury risk factors and 11 data sets for core surveillance (Table).

Table. Core Injuries, Injury Risk Factors, and Data Sets for State Injury Surveillance

Injury/Injury Risk Factor	VR	HDD	FARS	BRFSS, YRBSS	ED	ME	CDR	Other
Motor Vehicle Injuries	3	3	(3)		(3)	(3)	(3)	(EMS)
Alcohol in MV deaths			3			(3)		
Self-reported seat belt/safety seat use				Both				(OPU)
Homicide	3				(3)	(3)	(3)	(UCR)
Suicide	3				(3)	(3)	(3)	
Suicide attempts		3		Both	(3)			
Firearm injuries	3	3			(3)	(3)	(3)	(UCR)
Traumatic brain injuries	3	3			(3)		(3)	
Fire and burn injuries	3	3			(3)		(3)	
Smoke alarm use				BRFSS				
Submersion injuries	3	3			(3)			(EMS)
Traumatic spinal cord injuries*	(3)	3			(3)			
Fall injuries*	3	3			(3)		(3)	
Poisoning*	3	3			(3)		(3)	

NOTES

Abbreviations: VR=vital records, HDD=hospital discharge date, FARS=Fatality Analysis Reporting System data, BRFSS=Behavioral Risk Factor Surveillance System data, YRBSS=Youth Risk Behavior Surveillance System data, ED=emergency department data, ME=medical examiner and coroner data, CDR=child death review team data, OPU=National Occupant Protection Use Survey data, UCR=Uniform Crime Reporting System data, EMS=emergency medical services data.

Parentheses indicated data sets that are considered supplementary. All other data sets are considered essential. Asterisks(\*) indicate three conditions — traumatic spinal cord injuries (TSCI), fall injuries and poisoning — for which the Working Group did come to closure on specific recommendations for surveillance.

TSCI - Vital records systems have very low sensitivity in the detection of TSCI.

Surveillance systems for TSCI that have been developed in several states have depended on medical record abstraction of hospitalized cases for reliable data collection. Development of a less costly and less labor-intensive approach would put TSCI surveillance more realistically within reach for all state health departments.

Fall Injuries and Poisoning - For these conditions, the Working Group has not yet developed surveillance case definitions to be recommended for routine use in all states.

## Injuries and Injury Risk Factors

**Motor vehicle injuries** are the leading cause of injury death in the U.S., despite a 90 percent decline in the annual death rate per vehicle miles traveled since 1925 (5). Much of this decline has resulted (6) from a comprehensive approach to motor vehicle injury prevention that addresses risk factors specific to the host (the driver and passengers), the agent (the vehicle), and the driving environment. Programs and policies that have contributed to the decline in motor vehicle injury have been based upon surveillance data describing not only injury outcomes (such as death certificates), but data describing the events of the crash that resulted in injury. Police crash reports and other data on fatal motor vehicle injury are collected at the state level and submitted to the national Fatality Analysis Reporting System (FARS). Some states have linked crash data to other data sets, including emergency medical services data, emergency department data, hospital discharge data, medical examiner and coroner data and vital records. These linked data systems are known as Crash Outcome Data Evaluation Systems (CODES).

A different approach to motor vehicle injury surveillance in many states is taken by child death review teams (6), which gather and analyze data on the circumstances surrounding all causes of child deaths. These sentinel event surveillance systems are complementary sources of information for injury prevention.

**Alcohol involvement in motor vehicle deaths** is a common, serious and preventable injury risk factor (7). Data on alcohol as a risk factor for motor vehicle injury are critical for evaluating the success of countermeasures targeting drinking and driving. The national Fatality Analysis Reporting System (FARS) collects alcohol level information for fatal motor vehicle injuries. Medical examiner and coroner data systems often have these data as well, although few of these systems are centralized, standardized or statewide (6).

**Self-reported seat belt safety seat use** is measured at the state level by household telephone surveys for the Behavioral Risk Factor Surveillance System (BRFSS), by school-based surveys for the Youth Risk Behavior Surveillance System (YRBSS), and by direct observation of passenger vehicle occupants for the National Occupant Protection Use Survey (NOPUS).

**Homicide** rates may be calculated using vital records data, but other sources of data must be accessed to provide information on homicide circumstances and risk factors. These other sources include emergency department data, medical examiner and coroner data, child death review data and Uniform Crime Reporting (UCR) System data. UCR is a voluntary system based on reports from law enforcement agencies (6). The Supplementary Homicide Report to the UCR System collects information on homicide incidents, although detailed information on the homicide weapon is not available from this source.

**Suicide** rates may also be calculated from vital records data. Other sources of data, such as emergency department data, medical examiner and coroner data and child death review data, can be used to supplement vital records suicide data by providing information on circumstances and risk factors. Suicides are not reported to the UCR System.

**Suicide attempts** and suicide often have different determinants, and therefore they are considered separately in this report. Hospital discharge data and emergency department data may be useful for calculating attempted suicide rates, although attempted suicide may be under-reported in these systems. Annual population-based data on suicidal thoughts, plans and attempts are available from the Behavioral Risk Factor Surveillance System (BRFSS) and the Youth Risk Factor Behavior Surveillance System (YRBSS). BRFSS and YRBSS data are collected in such a way as to be representative of the state that submitted them, but the data cannot be stratified by county or city.

**Firearm injuries** are as common as motor vehicle injuries in some states. As of 1997 (8), 31 states were conducting some type of firearm injury surveillance. E-coded vital records, hospital discharge data and emergency department data provide data on firearm injury outcomes. For fatal firearm injuries, medical examiner and coroner data document the manner of death and use of alcohol and other drugs by the victim. The Supplemental Homicide Report of the Uniform Crime Reporting (UCR) System has information about the shooter (9, 10). Child death review team data may provide detailed information on selected cases.

Unfortunately, none of these data sets provides much information on firearm characteristics, sources and patterns of use. Information about weapons is available in police reports and ballistics laboratory reports, but these data are seldom compiled or automated. Only 19 of the 31 states that conduct firearm injury surveillance collect data on the type of firearm (8).

**Traumatic brain injuries** can be counted using vital records, hospital discharge data and emergency department data. Child death review team data may provide greater detail on the circumstances of injury for selected cases. Some states have required physicians to report traumatic brain injuries to local health departments. The CDC has worked with states to develop a traumatic brain injury surveillance system (11) to: characterize the risk factors for and the incidence, external causes, severity, and outcomes of traumatic brain injuries; support prevention programs; and facilitate access to health care and other services for injured persons.

**Fire and burn injuries** can be monitored using vital records, hospital discharge data and emergency department data. Child death review team data may provide greater detail on the circumstances of injury for selected cases.

**Smoke alarm use** can be obtained by household at the state level from Behavioral Risk Factor Surveillance System (BRFSS).

**Submersion injuries** include incidents of drowning and non-drowning. Incidence rates can be calculated using vital records, hospital discharge data and emergency department data. Emergency medical services data, when available on a statewide population basis, may provide additional detail on the location and circumstances of injury and the neurologic status of the submersion victim at the time of emergency transport.

**Traumatic spinal cord injuries** ascertained from ICD-9-CM-coded hospital discharge data have low positive predictive value. Hospital discharge data that are verified by medical record abstractions are a better source of information on these injuries. Some states have required physicians to report traumatic spinal cord injuries to local health departments or other registries. [See Table, Note 3.]

**Fall injuries** are the leading cause of injury hospitalization. Vital records, hospital discharge data and emergency department data can be used to calculate incidence rates. Child death review team data may provide greater detail on the circumstances of injury for selected cases. [See Table, Note 3.]

**Poisoning** injuries can be monitored using vital records, hospital discharge data and emergency department data. Child death review team data may provide greater detail on the circumstances of injury for selected cases. [See Table, Note 3.]

## Data Sets

**Vital records** include birth certificates and death certificates. Death certificates classify injuries by external cause of death (E-codes). All fatal injuries with E-code classifications (which represent the most common causes of injury death) can be monitored with death certificate data. The residence of the deceased is recorded on the death certificate, so population-based injury cause-of-death data can be generated from this data set for large or small geopolitical units. Death certificate data capture the most severe injuries, and therefore are important for creating and evaluating programs and policies, but they do not capture less serious and more common injuries. Risk factor information is not generally recorded on death certificates.

**Hospital discharge** data are generated from uniform hospital billing forms (12) used in many states to bill for hospital services. This form has a dedicated field for recording an E-code. As of October 1997, 42 states and the District of Columbia were collecting and managing statewide hospital discharge data sets. Of these 42, 36 were routinely collecting E-codes, and 23 were mandating that E-codes be submitted for all injury hospitalizations. Statewide hospital discharge data sets, like vital records, provide population-based injury data. Like vital records, these data can be stratified by county and city. Hospital discharge data may be more useful than vital records for surveillance in less-populated areas where some causes of injury death occur infrequently.

Risk factor information is not recorded on hospital billing forms. Incidence rates may sometimes be inaccurate because of measurement problems in the hospital discharge data system. For example, if an injured person is treated at more than one hospital, the injury may be counted more than once, or if a person has multiple concurrent injuries some of them may not be counted. Also, hospital discharge data are affected by changes in the health care system that influence hospital admissions and coding practices. These changes may compromise the utility of these data for monitoring trends in injury morbidity.

**Fatality Analysis Reporting System (FARS)** data describe in detail all fatal motor vehicle injuries occurring on public roads (6). This data set contains a wealth of risk factor information on drivers, passengers, vehicles and driving conditions at the time of the crash. FARS is population-based at state, county and city levels. Some states also have centralized crash report data sets for non-fatal motor vehicle injuries and a few states have linked crash data to other data sets, including emergency medical services data, emergency department data, hospital discharge data, medical examiner and coroner data and vital records. These linked data systems are known as Crash Outcome Data Evaluation Systems (CODES). CODES can be used to assess the effect of risk factors such as seat belt and safety seat use on motor vehicle injury outcomes.

**Behavioral Risk Factor Surveillance System (BRFSS)** data are obtained by household telephone surveys (6). Specific questions on the surveys address the use of seat belts, safety seats, bicycle helmets and smoke alarms, as well as risky behaviors such as drinking and driving. BRFSS data are representative of the population of the state that collects the data, but the data cannot be stratified by county or city without modifications of the survey sampling strategy. Survey respondents are limited to adults in households with telephones.

**Youth Risk Behavior Surveillance System** data are obtained from school-based surveys conducted every two years to monitor risk behaviors for students in grades 9-12 (6). Specific questions address seat belt use, suicide attempts, fighting, weapon carrying and riding with a drinking driver. These data are representative of the national population of students in grades 9-12, which excludes only about five percent of adolescents in this age group (who do not attend school).

**Emergency department** data were collected from all hospital emergency departments in 12 states and Puerto Rico as of October 1997 (12). Of these, 11 states were routinely collecting E-codes and nine were mandating E-codes. However, states were not publishing surveillance reports based on these data. Injuries treated in emergency departments that are not severe enough to require hospital admission are more common than injury hospitalizations. Therefore emergency department data are superior to hospital discharge data for tracking injuries that are common but not severe. Because injuries requiring emergency treatment but not hospitalization are common, emergency department data may be useful for assessing injury prevention priorities in sparsely populated areas where injury deaths and hospitalizations may occur too infrequently to be useful.

Moreover, emergency department visits are less likely than overnight hospital admissions to be affected by changes in the health care system. Therefore emergency department data systems, if they are population-based, may be superior to hospital discharge data systems for injury morbidity surveillance. Unfortunately, risk factor data such as the circumstances of injury and the use of safety devices are not often captured on emergency department records or hospital discharge records.

**Medical examiner** systems exist in 22 states and coroner systems in 11 states (6). The remainder have mixed medical examiner and coroner systems. A medical examiner is usually a licensed physician, but a coroner does not have to be a physician and may have little or no formal medical training. For surveillance purposes, the ideal medical examiner system is statewide, population-based and has standardized systems of death certification and data management (7). Since 1987 the national Medical Examiner and Coroner Information Sharing Program has been working to improve the quality of data on death certificates and to increase the availability of these data for injury prevention (6). Medical examiner and coroner reports are medico-legal documents, and therefore the circumstances of intentional injuries are often well described. Information is often available on the use of alcohol and other drugs. The Institute of Medicine has recently recommended (6) expanding medical examiner and coroner systems to create a fatal intentional injury surveillance system for all homicides and suicides, modeled after the Fatality Analysis Reporting System (FARS). Currently, state medical examiner and coroner systems do not capture all deaths, although a few capture all injury deaths.

**Child death review** data are gathered and analyzed by child death review teams to explore the circumstances surrounding the deaths of children for the purpose of preventing future deaths. All states have state and/or local child death review teams (6). Many child death reviews focus on the prevention of child abuse deaths, but child death review teams have also applied their findings to the prevention of motor vehicle injuries, suicide, firearm injuries, traumatic brain injuries, fall injuries, fire and burn injuries and poisoning.

**National Occupant Protection Use Survey (NOPUS)** data are obtained from direct observations of passenger vehicle occupants to evaluate shoulder-belt use, motorcycle helmet use and child safety seat use (6). These data are used primarily to monitor compliance with safety standards for the purpose of awarding federal funds to states. The data are assumed to be representative of the state where they were collected, but cannot be further stratified by county or city.

**Uniform Crime Reporting (UCR) System** data are based on voluntary reports from law enforcement agencies (6). The Supplementary Homicide Report to the UCR System collects information on homicide incidents, although detailed information on the homicide weapon is not available.

**Emergency medical services (EMS)** data are collected from ambulance run reports for injuries and other medical emergencies. The data are most useful for assessing EMS transport times and the medical condition of the injured person upon EMS arrival and during subsequent transport to definitive care. EMS data may provide useful information for submersion injuries, such as the location of the submersion incident, duration of the submersion and neurologic status of the submersion victim.

As the table of core data sets for injury surveillance demonstrates, all of the injuries recommended for core surveillance can be monitored successfully with access to just two of the 11 core data sets; vital records and hospital discharge data. All states have vital records data, and at least 36 states have E-coded hospital discharge data. Therefore state injury prevention programs that are building state injury surveillance systems should begin by accessing death certificate data as well as E-coded hospital discharge data, if available. The remaining core data sets can then be added to strengthen these injury surveillance systems.

Many important injury risk factors can be monitored now with three core data sets: FARS, BRFSS and YRBSS. Most states contribute data to these three national data sets, and therefore state-level injury data should be accessible to most state injury prevention programs. The remaining core data sets can then be added to strengthen these injury risk factor surveillance systems.

## Principles of Injury Surveillance

No single data set is sufficient to assess injury prevention priorities. As shown in the table, access to two or more data sets may be necessary to detect specific types of injury problems, design interventions to address these problems and evaluate how well the interventions work. Using more than one data set to address an injury problem is faster, easier and produces data of better quality if the data systems responsible for collecting and managing data are integrated. Integration is facilitated when data are collected in similar ways. For example, the Data Elements for Emergency Department Systems (DEEDS) contains uniform specifications for data entered in emergency department patient records, including E-codes and incorporates national standards for electronic data interchange (6).

The Working Group discussed data system integration and agreed on the following principles and goals:

- Injuries and injury risk factors should be counted and reported in standardized ways. For example, recommended frameworks for presenting injury mortality and morbidity data (13, 14) have recently been developed to facilitate analysis, comparison and communication of data on injuries.
- Case definitions should be developed so that data can be obtained from existing data sets in a comparable manner and linked to data from other sources without ambiguity or double-counting.
- Common data definitions should be developed for variables such as age and date of birth, consistent with the process established by the Centers for Disease Control and Prevention (CDC) for the development and approval of proposed standard data elements for use in health information and surveillance systems (<http://www.cdc.gov/data>).
- Data linkage works best when unique identifiers are available; however, probabilistic linkages are also possible.
- Duplication of data systems should be avoided; instead, integrated data systems should be built on existing data systems.
- When more than one source of data is available to contribute information about a particular variable, a hierarchy of data sources should be established.
- Data linkage is more applicable to some data sets and injuries than to others. For example, CODES data linkage has been successful for motor vehicle injury and a similar linkage process may be applicable to firearm injury.
- Injury prevention can achieve greater integration with traditional public health activities if its data systems can be used to support other program efforts within and even outside the state health department.
- Data systems should be constructed and maintained in such a way as to protect the confidentiality of the public; security provisions must be maintained for all federal, state and local injury data systems.

In the absence of unique identifying information, such as a social security number, for each injured person in every data record for a particular injury, probabilistic data linkages using combinations of other variables such as age, sex and zip code are often possible. However, data integration is much easier to achieve when individuals can be identified by social security number or some other unique identifier, irrespective of how many different data systems have data on that individual. When unique identifiers are available, strict security (15) is necessary to protect individuals' privacy.

## Conclusion

Most state injury prevention programs have not yet achieved the injury surveillance capacities recommended in this report. Most state injury prevention programs are not currently monitoring all 14 of the injuries and injury risk factors recommended for immediate surveillance in this report, and most state injury prevention programs have yet to routinely use the 11 recommended data sets for injury surveillance. In fact, most states would probably have difficulty adhering to the principles of injury surveillance recommended in this report. In plain language, most states have not yet achieved the minimum standards for injury surveillance recommended by the Working Group in this report.

The Working Group concluded that the need for state injury prevention programs to achieve these standards is immediate. Without effective injury surveillance, injury prevention programs and policies cannot be justified, evaluated, modified or sustained. Therefore the Working Group set the standards for injury surveillance recommended in this report at a minimum level, while recognizing that most state injury prevention programs have not yet achieved even these minimum standards. The Working Group recommends that all state injury prevention programs work toward these minimum standards.

As state injury prevention programs achieve these standards, they should continue to expand their surveillance capacities. Moreover, individual states should not be limited by these recommendations, but should add surveillance capacity whenever necessary to meet their local needs for surveillance to support injury prevention programs and policies. Standardizations should facilitate the expansion and improvement of injury prevention programs and policies, not impede them.

Achieving minimum standards for injury surveillance requires staff, equipment, office space, supervision, training, technical assistance and regular communication with colleagues within states and across the nation. The more resources an injury prevention program has, the better it will be able to achieve its injury surveillance objectives. However, the Working Group chose deliberately not to set a price tag on its recommendations. This report sets milestones for state injury surveillance. The great challenge to states will be finding ways to achieve them.

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# Planning Comprehensive Injury Surveillance in State Health Departments

## Working Group Members

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