

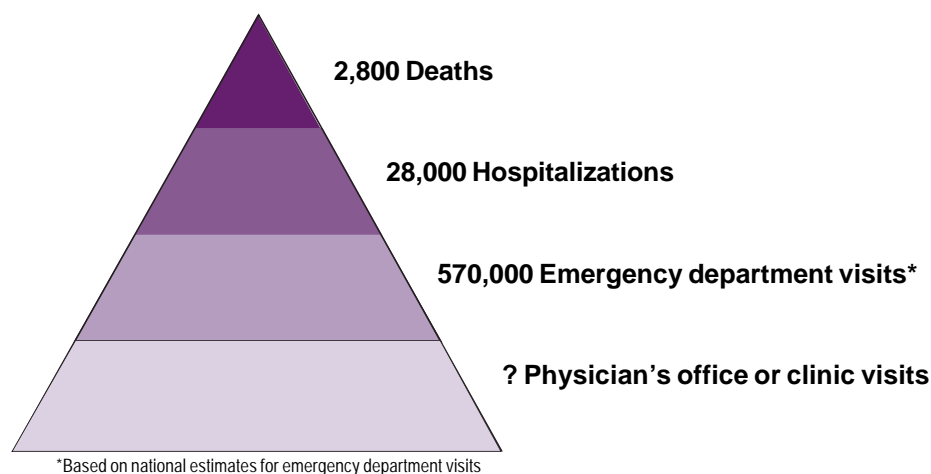
CHAPTER ONE: INTRODUCTION

Injuries affect everyone regardless of age, gender, race, or economic status. In Colorado, injuries are the third leading cause of death, with about 2,800 injury deaths occurring each year. Although injury deaths are significant, they are only the “tip of the iceberg.” Each year, more than 28,000 Coloradans are hospitalized for injuries and thousands more are treated in emergency departments and physicians’ offices. It is estimated that nearly one in eight Coloradans seeks medical treatment for an acute injury each year. For many individuals, the injury causes temporary pain and inconvenience, but for some, the injury can lead to chronic pain, disability, and a change in lifestyle. An injury affects more than the individual – families, employers, communities, and society at large are also profoundly influenced by the impact of injury.

In recognizing the importance of addressing this public health issue, the national Centers for Disease Control and Prevention (CDC)¹ and the Colorado Department of Public Health and Environment (CDPHE)² have implemented several statewide injury surveillance and prevention and control programs. These programs track injury hospitalizations and deaths through a variety of data sources and use this information

to help reduce the rates of injury through public education, intervention and prevention programs, and policy development. Data are also used to evaluate the effectiveness of Colorado’s trauma system in providing care to residents and visitors injured in the state.

Figure 1. The Colorado Injury Pyramid



Purpose of this report

The purpose of this report is to provide an understanding of the leading causes of injury deaths and hospitalizations in Colorado, the circumstances under which these injuries occur, and the populations and geographic regions of the state that are particularly at risk. Both intentional (suicide and homicide/

1. Centers for Disease Control and Prevention. (2005). *National Center for Injury Prevention and Control*. Retrieved February 17, 2005, from <http://www.cdc.gov/ncipc/>.

2. Colorado Department of Public Health and Environment. (2005). *Colorado Department of Public Health and Environment*. Retrieved February 17, 2005, from <http://www.cdphe.state.co.us/cdphehom.asp>.

assault) and unintentional injuries are addressed. This information can be used to prioritize needs, direct resources, and target prevention strategies with the ultimate goal of reducing the number and severity of injuries that affect Coloradans each year.

Author of this report

This report was prepared by staff in the Injury, Suicide, and Violence Prevention Section at the Colorado Department of Public Health and Environment. Programs in the Section work in collaboration with state and local partners to prevent injuries in Colorado.

- **The Injury Epidemiology Program** coordinates the collection and analysis of injury data.³ Current injury surveillance efforts include the Colorado Trauma Registry, the Traumatic Brain Injury Surveillance System, and the Colorado Violent Death Reporting System.
- **The Injury and Suicide Prevention Program** works to reduce both unintentional and intentional injuries through the development and implementation of community-based and statewide interventions.⁴ Current activities include enhancement of statewide capacity for injury prevention, general childhood injury prevention, community-based interventions to reduce motor vehicle-related injuries, sexual assault prevention, development of a statewide strategic plan to prevent child and adolescent violence, and oversight of the Colorado Child Fatality Review Committee.
- **The Office of Suicide Prevention**, located in the Injury and Suicide Prevention Program, coordinates suicide prevention programs and activities statewide to reduce the rates of suicidal behavior.⁵ Activities include public education and awareness, grant funding for community suicide prevention activities, and assessment of needs and resources.

Data sources

The Colorado Department of Public Health and Environment collects data on injury hospitalizations and deaths and on behavioral risk factors from several different sources.⁶ A brief description of some of the Colorado data sources used in this report follows.

- **The Colorado Trauma Registry** is a statewide repository for data on injury hospitalizations and deaths. Data from the registry are used to study the patterns of injury in Colorado and to evaluate the state trauma system.

3. Colorado Department of Public Health and Environment. (2005). *Injury Epidemiology Program*. Retrieved February 17, 2005, from <http://www.cdphe.state.co.us/pp/injepi/injuryepihom.html>.

4. Colorado Department of Public Health and Environment. (2005). *Injury Prevention Program*. Retrieved February 17, 2005, from <http://www.cdphe.state.co.us/pp/injuryprevention/injuryprevhom.asp>.

5. Colorado Department of Public Health and Environment. (2005). *Office of Suicide Prevention*. Retrieved February 17, 2005, from <http://www.cdphe.state.co.us/pp/Suicide/suicidehom.asp>.

6. Colorado Department of Public Health and Environment. (2004). *Guide to Injury Data in Colorado*. Retrieved February 17, 2005, from <http://www.cdphe.state.co.us/pp/injepi/IEInjData.pdf>.

The registry includes data from three sources: (1) death certificates; (2) hospital discharge data from the Colorado Health and Hospital Association; and (3) case abstracts from Level I, II, and III trauma centers.

Death certificate data are compiled by the Vital Records and Health Statistics Section at the Colorado Department of Public Health and Environment from information reported on the Certificate of Death.^{7,8} Information on the certificate concerning time, place, and cause of death is typically supplied by medical personnel or coroners. Demographic information, such as age, race/ethnicity, or occupation, is generally reported on the certificate by funeral directors from information supplied by the available next of kin.

Hospital discharge data are compiled by the Colorado Health and Hospital Association from all acute care and many specialty hospitals in Colorado.⁹ This database includes demographic, diagnostic, procedural, payment, and length of stay information on all inpatient admissions. Injury hospitalizations are identified using specific codes from the *International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM)*.¹⁰

Case abstracts are submitted to the state health department from trauma nurse coordinators and registrars at all Level I, II, and III trauma centers in the state.¹¹ Abstracts include information on injured patients who die in the emergency department, are transferred between hospitals, or are admitted as inpatients. Details such as a description of the injury event, the location of injury, the use of protective devices, drug or alcohol involvement, diagnoses, injury severity, co-morbidities, and outcomes are provided from this data source.

- **The Traumatic Brain Injury Surveillance System** has been in existence since 1991. This statewide, population-based data set includes information on individuals who are hospitalized or who die from a traumatic brain injury (TBI). These injuries include concussions, skull fractures, and intracranial injuries due to an external impact or forces of acceleration/deceleration.¹² Data are gathered from death certificates, hospital discharge data from the Colorado Health and Hospital Association, and a review of a sample of selected medical records. This surveillance system provides ongoing information on the incidence, common causes, risk factors and populations at high risk for sustaining a TBI.

7. Colorado Department of Public Health and Environment. (2005). *Health Statistics*. Retrieved February 17, 2005, from <http://www.cdphe.state.co.us/stats.asp>.

8. Colorado Department of Public Health and Environment. (2005). *Death Certificates*. Retrieved February 17, 2005, from <http://www.cdphe.state.co.us/hs/birth.html>.

9. Colorado Health and Hospital Association. (2005). Retrieved February 17, 2005, from <http://www.cha.com/>.

10. World Health Organization. (1979). *International Statistical Classification of Disease and Related Health Problems, Ninth Revision*. Geneva, Switzerland: World Health Organization.

11. Colorado Department of Public Health and Environment. (2005). *Trauma Registry Rules and Regulations*. Retrieved February 17, 2005, from <http://www.cdphe.state.co.us/op/regs/healthpromotion/101504ch1.pdf>.

12. Marr, A. and Coronado, V. (eds). (2004). *Central Nervous System Injury Surveillance Data Submission Standards - 2002*. Atlanta, GA: Centers for Disease Control and Prevention.

- **The Colorado Violent Death Reporting System**, established in 2003, includes information on all homicides, suicides, deaths of undetermined intent and unintentional firearm-related deaths.¹³ Data are gathered from a variety of sources, including death certificates, coroner/medical examiner reports, law enforcement investigations, and the Supplemental Homicide Report from the Colorado Bureau of Investigation. Detailed information on the circumstances of the event and precipitating factors are collected to identify populations at risk and strategies for prevention.
- **The Colorado Child Fatality Review Committee** is a multidisciplinary professional group that reviews all deaths of children from birth through age 17 that occur in Colorado each year.¹⁴ Cases for review are identified from death certificates. Additional information related to the death investigation or to the child's history and background is collected from other sources as needed, including medical records, autopsy reports, paramedic trip sheets, law enforcement investigations, traffic accident reports, public health records, and social services information.
- **The Behavioral Risk Factor Surveillance System (BRFSS)** at the Colorado Department of Public Health and Environment is an ongoing, statewide telephone survey of non-institutionalized adult Coloradans regarding their health behaviors and preventive health practices.¹⁵ The BRFSS was initiated in 1990 as a joint project between the state health department and CDC.¹⁶ Using random digit dialing techniques, approximately 1,800 Colorado residents ages 18 and older are interviewed by telephone each year. The data are weighted to account for the probability of selection and for the age and gender distribution of the state. Injury-related topics from the BRFSS include seatbelt use, drinking and driving, bicycle helmet use, smoke detectors in the home, history of falls, and suicidal ideation or attempts.
- **The Youth Risk Behavior Survey (YRBS)** at the Colorado Department of Public Health and Environment provides information on the prevalence of health risk behaviors practiced by young people.¹⁷ The YRBS, a school-based survey of students in grades 9-12, was developed by CDC in collaboration with federal, state, and private-sector partners.¹⁸ Injury-related topics from the YRBS include bicycle and motorcycle helmet use, seatbelt use, drinking and driving, carrying weapons or guns, episodes of threats or physical fights, and suicidal ideation or attempts.

13. Colorado Department of Public Health and Environment. (2005). *Colorado Violent Death Reporting System*. Retrieved May 16, 2005, from <http://www.cdphe.state.co.us/pp/injepil/cvdrs/index.html>.

14. Colorado Department of Public Health and Environment. (2005). *Child Fatality Review Committee*. Retrieved February 17, 2005, from <http://www.cdphe.state.co.us/pp/cfrc/cfrchom.asp>.

15. Colorado Department of Public Health and Environment. (2005). *Colorado Behavioral Risk Factor Surveillance System*. Retrieved February 17, 2005, from <http://www.cdphe.state.co.us/hs/brfss/index.html>.

16. Frazier, E.L., Franks, A.L., and Sanderson, L.M. (1992). *Behavioral Risk Factor Data*. In: *Using Chronic Disease Data: A Handbook for Public Health Practitioners*. Atlanta, GA: Centers for Disease Control and Prevention.

17. Colorado Department of Public Health and Environment. (2005). *Colorado Youth Risk Behavior Survey*. Retrieved February 17, 2005, from <http://www.cdphe.state.co.us/hs/yrbs/>.

18. Public Health Service. (1993). *Public Health Reports: Journal of the U.S. Public Health Service*. (USPS 324-990). Rockville, MD: U.S. Department of Health and Human Services.

- **The Colorado Child Health Survey** at the Colorado Department of Public Health and Environment began collecting data in 2004 on health risk behaviors of children ages one through 14. The survey method is similar to the BRFSS. Injury-related topics in the Child Health Survey include use of child safety seats, booster seats or seat belts; helmet use while riding a bicycle or scooter, in-line skating, roller skating or skateboarding; and activities that resulted in an injury requiring medical attention.

The Colorado Health Information Dataset (CoHID) website provides access to many of the data sets mentioned above.¹⁹ This web-based system allows users to submit custom queries to obtain reports on a variety of health topics.

Organization of this report

This report begins with an overview of the impact and magnitude of injury in Colorado, focusing on injury hospitalizations and deaths. Comparisons are made between state and national injury data, and among age, gender, race/ethnicity groups, and geographic locations in Colorado. A brief review of the different injury patterns for different age groups is also provided.

Subsequent chapters of the report provide details about specific causes of unintentional and intentional injury, including information on disparities among different age groups and sexes. Differences among race/ethnicity groups and between counties and regions of the state are also described when sufficient data are available. When applicable, detailed highlights from the Colorado Traumatic Brain Injury Surveillance System are provided in the sidebars titled “Traumatic Brain Injury Facts.” These highlights show the substantial impact of traumatic brain injury on the lives of many individuals in Colorado. Additionally, brief descriptions from the Colorado Child Fatality Review emphasize the importance of injury prevention in this vulnerable population. Finally, several chapters include brief information on the *Healthy People 2010* objectives. *Healthy People 2010* is a set of national health objectives designed to identify the most significant preventable threats to health and to establish national goals to reduce those threats.²⁰ Figures at the end of each chapter provide both Colorado and national baseline rates, current Colorado and U.S. status, and the associated 2010 objective.

Appendices in the back of the report include comprehensive data tables that support the text and figures presented in each chapter. In addition, there are technical notes providing definitions and protocols for data analyses, maps defining the regions referenced in this report, and a list of the codes used to define categories of injury mechanisms.

19. Colorado Department of Public Health and Environment. (2005). *Colorado Health Information Dataset*. Retrieved February 17, 2005, from <http://www.cdphe.state.co.us/cohid/>.

20. Office of Disease Prevention and Health Promotion. (2002). *Healthy People 2010*. Retrieved February 17, 2005, from <http://www.healthypeople.gov/>.

Technical considerations

An international coding system, the *International Classification of Diseases (ICD)*,²¹ is the method used nationally to standardize diagnosis and external cause of injury information on death certificates and hospital discharge data. Several versions of this coding system have been developed. The *International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM)* has been used routinely in Colorado to code hospital discharge data. However, it was not until 1995 that the external cause of injury codes (E-codes) were routinely applied to most injury hospitalizations. E-codes are used to identify specific causes of injury, such as motor vehicle crashes, falls, drownings, and burns. Therefore, use of hospitalization records prior to 1995 is limited, because the cause of injury information is not complete. In the years covered in this report, coding of external cause of injury was 95 percent to 99 percent complete for all injury hospitalizations. All discussion of the cause of injury resulting in hospitalization in this report is based on *ICD-9-CM*.

From 1980 through 1998, Colorado death certificates were coded using *ICD-9*. However, in 1999, by direction of the National Center for Health Statistics, the 10th revision of the ICD (*ICD-10*) was implemented for the coding of death certificates. For several external cause of injury categories, there are substantial differences between coding with *ICD-9* and *ICD-10*. In this report, all of the tables that provide annual average death information use 2001-2003 data coded using *ICD-10*. Only time trend analyses of injury deaths will show results based on data coded using *ICD-9*.

The majority of the report focuses on injuries to individuals who are residents of Colorado, but it is important to recognize that out-of-state visitors can also be hospitalized or die from injury. The distinction between residents and non-residents is denoted in this report by the terms “residents,” meaning a person who was reported as being a resident of Colorado, and “occurrences,” meaning the event took place in Colorado regardless of the state of residence of the individual. All the rates presented in the report are based on deaths and hospitalizations of Colorado residents. The injury mechanisms that result in a high proportion of hospitalizations for non-residents are noted in each chapter.

Multiple-year annual averages are frequently cited in the report. Because numbers and rates for any given year might be small for a particular age, race/ethnicity, or geographic group, annual averages provide better estimates of the “typical” value by reducing the effects of fluctuations from year to year for groups with small numbers of events.

21. World Health Organization. (1979). *International Statistical Classification of Disease and Related Health Problems*. Geneva, Switzerland: World Health Organization.