

Injury Prevention Strategic Plan

2015 – 2018

Tennessee Department of Health
Injury and Violence Prevention Program



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July 2015

To All Tennesseans:

I am pleased to present the Tennessee Injury Prevention Strategic Plan for 2015-2018. Injuries are the leading cause of death to Tennesseans from age one to 44, and more Tennesseans are dying from injuries compared to the rest of the nation.

The Tennessee Department of Health's Injury Prevention Program is pleased to share this Injury Prevention Strategic Plan. This plan outlines goals, strategies, resources, and activities needed in Tennessee to prevent injuries and fatalities.

The Injury Prevention Program worked with injury prevention stakeholders, key state agencies, and other key leaders to develop this strategic plan. We will utilize these partnerships to reach the goals outlined in this document in order to reduce the burden of injury, but we need the help of all Tennesseans.

Individuals, families, and institutions must also take steps to reduce behaviors that cause injuries from falls, motor vehicle crashes, prescription drug overdose, unsafe infant sleep practices, and other injuries. We encourage anyone who is interested to join our efforts by making injury prevention behavior part of their daily lives.

Let's work together to accelerate the changes proposed in this plan so that Tennessee can become one of the ten healthiest states in the nation.

Sincerely,

A handwritten signature in blue ink, appearing to read "M. Warren".

Michael D. Warren, MD, MPH, FAAP
Assistant Commissioner
Tennessee Department of Health

Chapter 1. Introduction

Injury is the leading cause of death and disability for Americans¹ and Tennesseans 1-44 years of age, regardless of race, gender or economic status. For those of the age groups 15-24 and 25-34, the top three causes of death are all injury related (unintentional injuries, suicides and homicides). These injuries - including car crashes, falls, poisonings, and other violent deaths - are commonly referred to as accidents, and are viewed as random events that occur inevitably. However, like diseases, they are often predictable and preventable through education, change of surroundings, interventions and policy implementations. Public health plays a key role in identifying the causes of these injuries to minimize the risk factors that can affect not only individuals but communities and populations within the state as a whole.

In 2012, over 5,100 Tennessee residents died from injuries - the fourth cause of mortality among all ages. Approximately 1 in 9 Tennesseans are treated in the emergency department, and for every 20 visits, one person sustains non-fatal injuries serious enough to be hospitalized.² The estimated medical costs for injuries are comparable to the costs for obesity and tobacco.³ Analysis of the 2012 hospitalization and emergency department data reveals that the total charges⁴ in Tennessee exceeded \$1.8 billion and \$1.6 billion, respectively. The average admission charge to a hospital for injuries was about \$49,000. These amounts do not include rehabilitation, physician costs or work loss costs. It is evident these injuries have enormous short-term and long-term impacts on families, communities and the health care system.

In 2011, the Tennessee Department of Health received a five-year Integrated Core Injury Surveillance, Prevention, and Control grant from the Centers for Disease Control and Prevention (CDC) for the development and implementation of an injury prevention state plan through 2016. One important objective of the grant is to ensure that injury prevention efforts provided by public health and private agencies are coordinated to reduce costs by eliminating redundancy, sharing resources, and increasing support and impact for injury prevention initiatives statewide. As part of this coordinated effort, the Commissioner's Council on Injury Prevention and Control was established. The statewide membership includes injury prevention experts from both the public and private sectors. Their efforts, associated with the program, focus on the recommended core components necessary for a state strategic plan aimed to reduce injury deaths and the costs associated with fatal and non-fatal injuries.

The injury priorities identified by the Council were: (1) motor vehicle crashes, (2) poisoning, (3) senior falls and (4) sleep related deaths. This plan summarizes the past successes, and emphasizes on the current and future efforts of Tennessee's injury prevention community.

¹ CDC <http://www.cdc.gov/injury/wisqars/LeadingCauses.html>

² Tennessee Department of Health, Division of Health Statistics. Hospital Discharge Data System, 2011. Nashville, Tennessee.

³ CDC Injury Fact Book, National Center for Injury Prevention and Control, Centers for Disease Control and Prevention

⁴ Hospital charges represent the billed amount for services and are not the actual costs or revenues received by the hospitals

Chapter 2. Injury: A Public Health Issue

2.1 Injuries in Tennessee

Since 2007, on average 13 people have died daily from an injury in Tennessee. Table 1 provides a breakdown of the leading causes of death in the state by different age group. The younger population is particularly at risk of experiencing an injury related fatality, both unintentional and those caused by acts of violence. This leads to an overwhelming 90 thousand years of potential life that are lost (YPLL)⁵ in the state of Tennessee for one year alone. Regardless of the age or the circumstances that led to the fatality, many of these deaths are predictable and preventable.

Table 1. Leading causes of death for Tennessee residents, 2012

Rank	<1yr	1-4yr	5-14yr	15-24yr	25-34yr	35-44yr	45-54yr	55-64yr	65+	All ages
1	Congenital anomalies	Unintentional Injuries	Unintentional Injuries	Unintentional Injuries	Unintentional Injuries	Unintentional Injuries	Malignant neoplasms	Malignant neoplasms	Heart Disease	Heart Disease
2	Unintentional Injuries	Homicide	Malignant neoplasms	Homicide	Suicide	Heart Disease	Heart Disease	Heart Disease	Malignant neoplasms	Malignant neoplasms
3	Heart Disease	Congenital anomalies	Congenital anomalies	Suicide	Homicide	Malignant neoplasms	Unintentional Injuries	Chronic lower respiratory diseases	Chronic lower respiratory diseases	Chronic lower respiratory diseases
4	Homicide	Malignant neoplasms	Homicide	Malignant neoplasms	Heart Disease	Suicide	Suicide	Unintentional Injuries	Cerebrovascular diseases	Unintentional Injuries
5	Nephritis, nephrotic syndrome and nephrosis	Influenza and pneumonia	Heart Disease	Heart Disease	Malignant neoplasms	Homicide	Chronic liver disease and cirrhosis	Diabetes Mellitus	Alzheimer's disease	Cerebrovascular diseases

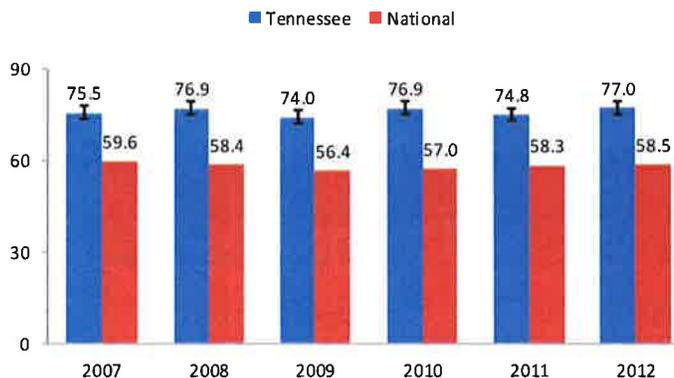
Source: Tennessee Department of Health, Death Statistical System

Counts are suppressed for leading cause categories with less than 10 cases
Source: Tennessee Department of Health, Division of Health Statistics

Injury prevention efforts at the national and state levels have slowly decreased the occurrence of injuries. Figures 1 and 2 show that while Tennessee hospitalizations due to injury have declined, injury related deaths in Tennessee have increased slightly. In 2012, the age-adjusted injury death rate in Tennessee (77.0 per 100,000) was still 32 percent above the national rate (58.5 per 100,000).

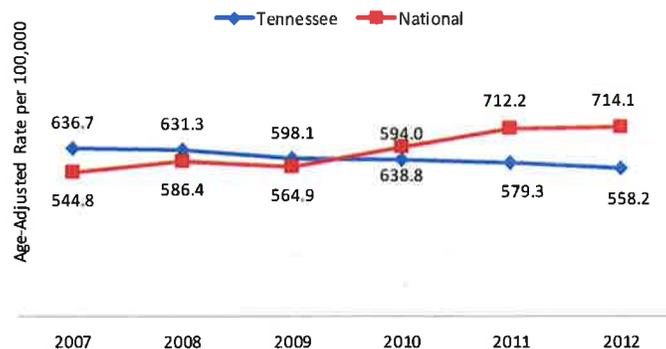
⁵ Years of Potential Life Lost (YPLL) is an estimate of premature mortality that has been defined as the number of years of life lost among persons who die before the age 65

Figure 1. National and Tennessee Age-Adjusted Injury Death Rates, 2007-2012



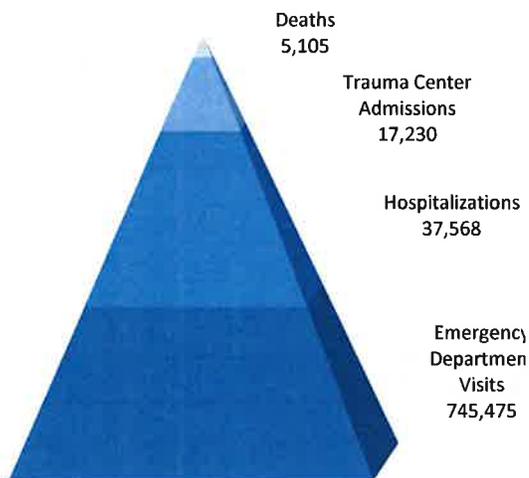
Source: Tennessee Department of Health, Division of Health Statistics

Figure 2. National and Tennessee Age-Adjusted Injury Hospitalization Rates, 2007-2012



The “Injury Pyramid” provides a visual depiction of how injury affects the health care system in Tennessee. The smallest portion of the pyramid, number of deaths, is the most striking and noticeable indicator that measures the impact of injuries in a population. However, as the pyramid in Figure 3 illustrates, the impact of injury is significantly broader and more profound than its mortality rate. The majority of those who are injured survive, although at risk of experiencing long-term disabilities and chronic pain, which contribute to the decrease of quality of life and increase in health care costs.

Figure 3. Injury Pyramid, 2012



In 2012, there were 5,105 deaths in Tennessee from unintentional injuries and those caused by acts of violence. 37,568 individuals were admitted to a Tennessee hospital, and 17,230 were admitted to a Tennessee trauma center for the most severe cases of injury. The number of trauma cases represents over 45 percent of the hospitalizations. The fourth level of the pyramid displays the number of visits (745,475) to Tennessee emergency rooms for all injuries. For every death from injury, there are approximately 3 trauma admissions, 7 hospitalizations, and 146 visits to the emergency department.

Source: Tennessee Department of Health, Division of Health Statistics; Trauma Registrar

Table 2 outlines the leading causes of injury related death, hospitalizations, and emergency department visits for Tennessee residents in 2007-2012. As shown in the chart, motor vehicle collisions continue to be the leading cause of injury deaths for age groups 1-24 years. For age groups 25-64, the leading cause of injury death was poisoning, inclusive of both unintentional and intentional acts. Finally, among individuals who were 65 years old or older, unintentional

falls were the leading cause of death. Falls were the leading cause of emergency room visits for an injury across all age groups, followed by motor vehicle accidents. The causes of hospitalizations varied across age groups, but the top two all consisted of motor vehicle accidents, poisonings and falls.

Table 2. Leading Causes of Injury Related Deaths, Hospitalizations and Emergency Room Visits by Age-Group, 2007-2012

CAUSE	DEATH	HOSPITALIZATION	EMERGENCY ROOM VISITS
Age-group 1-14yr			
#1	Motor Vehicle	Fall	Fall
#2	Drowning	Motor Vehicle	Motor Vehicle
#3	Firearms	Suicides	Poisoning
#4	Fire	Poisoning	Fire
#5	Suicides	Fire	Suicides
Age-group 15-24yr			
#1	Motor Vehicle	Motor Vehicle	Fall
#2	Firearms	Poisoning	Motor Vehicle
#3	Suicides	Suicides	Poisoning
#4	Poisoning	Firearms	Suicides
#5	Drowning	Fall	Firearms
Age-group 25-34yr			
#1	Poisoning	Poisoning	Fall
#2	Firearms	Motor Vehicle	Motor Vehicle
#3	Motor Vehicle	Suicides	Poisoning
#4	Suicides	Fall	Suicides
#5	Drowning	Firearms	Fire
Age-group 35-44yr			
#1	Poisoning	Poisoning	Fall
#2	Suicides	Motor Vehicle	Motor Vehicle
#3	Firearms	Suicides	Poisoning
#4	Motor Vehicle	Fall	Suicides
#5	Fall	Firearms	Fire
Age-group 45-64yr			
#1	Poisoning	Fall	Fall
#2	Suicides	Poisoning	Motor Vehicle
#3	Firearms	Motor Vehicle	Poisoning
#4	Motor Vehicle	Suicides	Suicides
#5	Fall	Firearms	Fire
Age-group 65+yr			
#1	Fall	Fall	Fall
#2	Motor Vehicle	Motor Vehicle	Motor Vehicle
#3	Firearms	Poisoning	Poisoning
#4	Suicides	Suicides	Fire
#5	Poisoning	Fire	Suicides

Source: Tennessee Department of Health, Division of Health Statistics

For many years, the leading cause of injury deaths among the residents of Tennessee was motor vehicle collision. Efforts from the injury prevention community within the past decade have led to a steady decrease of these crashes in the state of Tennessee.⁶ In 2009, motor vehicle collision became the second cause of all injury deaths, and poisoning has taken the lead, as seen in Figure 4. However, as seen in Figure 5, falls continue to be the major cause of injury hospitalizations.

Figure 4. Trend of the age-adjusted death rates by types of injury, 2007-2012

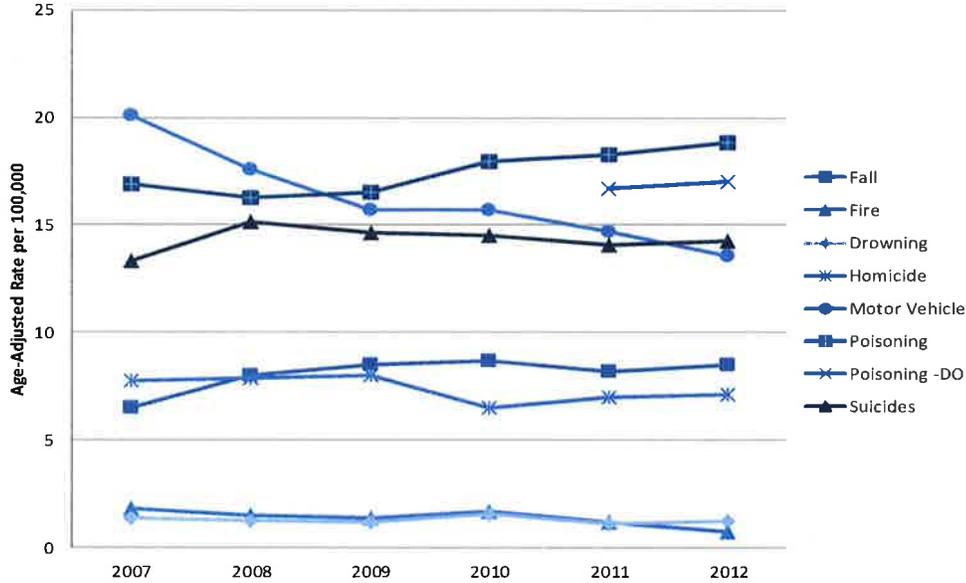
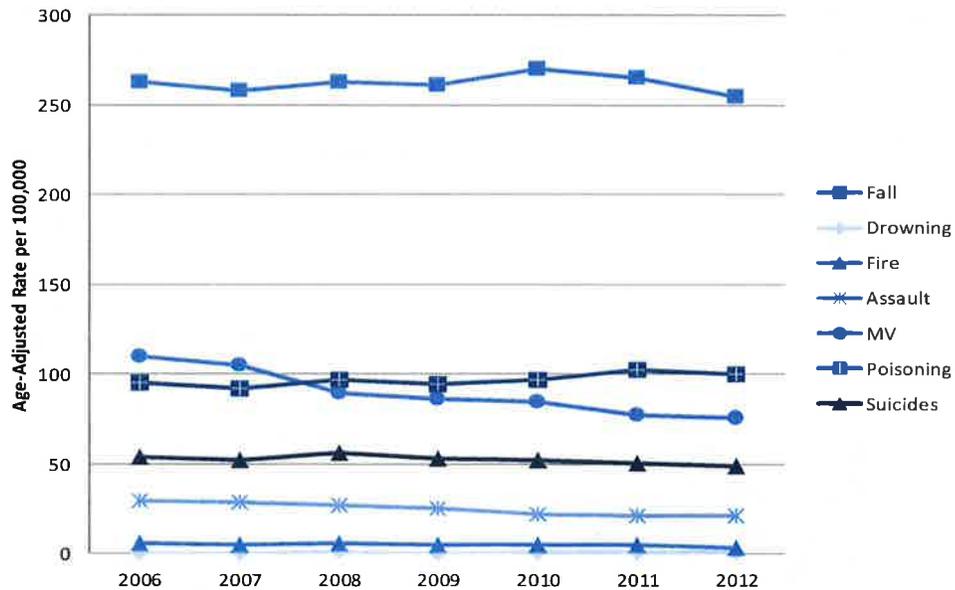


Figure 5. Trend of the age-adjusted injury hospitalization rates by types of injury, 2007-2012



⁶ CDC WISQARS. National Center for Injury Prevention and Control, Centers for Disease Control and Prevention

2.2 Motor Vehicle Related Injuries

The rate of death and hospitalization among Tennessee residents due to motor vehicle accidents has significantly decreased over the past five years. In 2012, there were a total of **889 deaths from motor vehicle accidents compared to 1,241** in 2007. The death rate in 2012 (13.6 per 100,000) has dropped below the 2020 Healthy People targeted rate of 14.4 per 100,000; however, it remains at about 20 percent above the national rate (11.3 per 100,000). The rate of hospitalization has significantly dropped as well, falling below that of the national rate in 2008. Figures 6 and 7 provide a trend of these rates from 2007 to 2012.

Figure 6. National and Tennessee Age-Adjusted Injury Death Rates Due to Motor Vehicle Accidents, 2007-2012

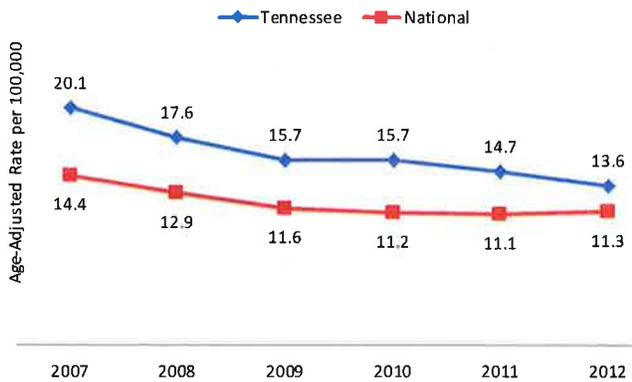
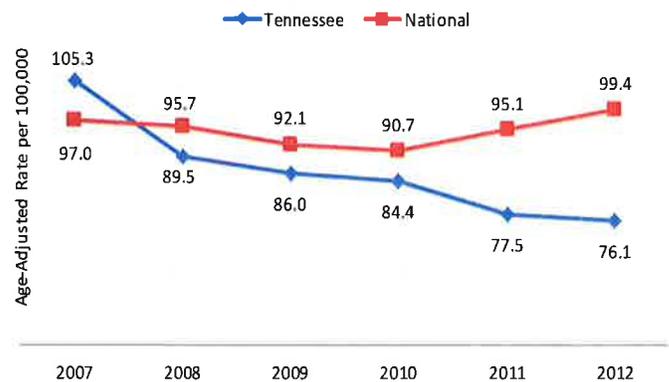


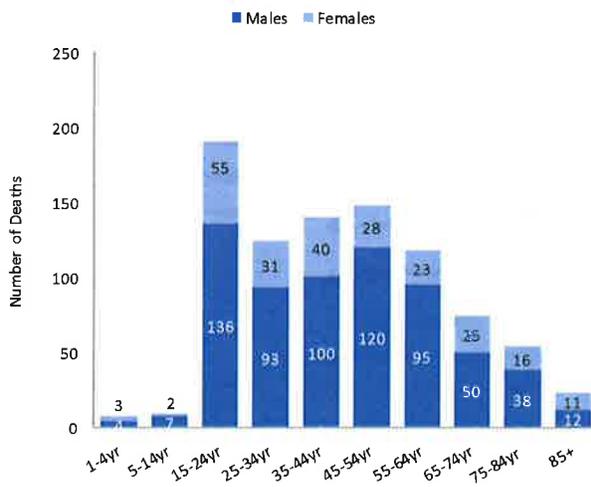
Figure 7. Age-Adjusted Injury Hospitalization Rates Due to Motor Vehicle Accidents, 2007-2012



Source: Tennessee Department of Health, Division of Health Statistics

Motor vehicle accidents continue to be the **leading cause of injury related deaths among age group 15-24**, and the second highest cause of emergency room visits across all age groups. There were about twice as many males who suffered motor vehicle fatalities as females. In 2012, figure 8 presents the distribution of deaths across age groups by gender.

Figure 8. Number of Deaths Due to Motor Vehicle Accidents by Gender Across Age-Groups, 2012



Source: Tennessee Department of Health, Division of Health Statistics

Motor Vehicle Injury Prevention Efforts

- State stakeholders promote the Battle of the Belt Seatbelt Competition among Tennessee High Schools to increase seatbelt use among teen drivers.
- A Teen Safe Driving Coalition sets goals to support evidence-based prevention and intervention statewide.
- The Governor's Highway Safety Office, American Automobile Association, and others promote safer driving for seniors.
- The Commissioner's Council on Injury Prevention Policy Committee has provided information to policy makers regarding motorcycle helmet use.

2.3 Poisoning Related Injuries

Poisoning related injuries are inclusive of both unintentional and intentional events. As the number of deaths due to motor vehicle accidents has declined, **poisoning has taken the lead in causes of injury mortality for Tennesseans of ages 25 to 64 years**. In 2012, 1,216 people died due to poisoning. The overall rate of deaths, hospitalizations and emergency visits among Tennessee residents has slowly been increasing since 2007. The death rate has consistently been at about 30 percent above the national rate. The fatalities occur largely among males. However, the hospitalization rate is higher for females. Poisoning has also become the leading cause of injury hospitalizations among those of the age group 25-44 in Tennessee, to include poisoning from drug overdose.

Figure 9. National and Tennessee Age-Adjusted Injury Death Rates Due to Poisoning, 2007-2012

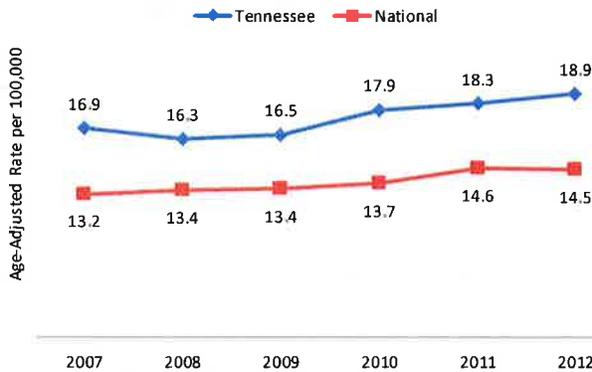
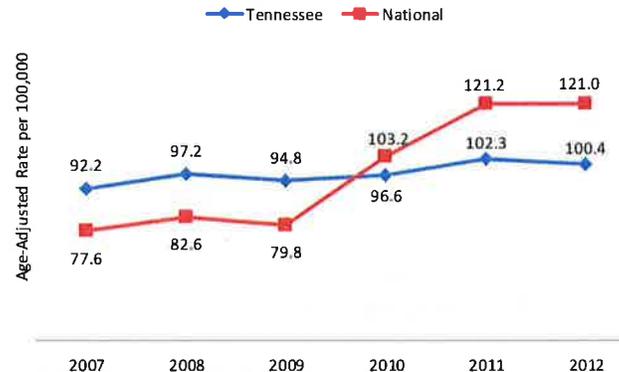


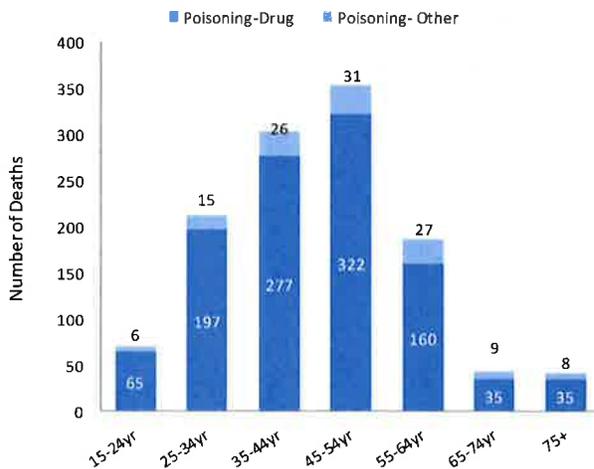
Figure 10. National and Tennessee Age-Adjusted Injury Hospitalization Rates Due to Poisoning, 2007-2012



Source: Tennessee Department of Health, Division of Health Statistics

Beginning in 2011, in addition to the poisoning cause of death indicator, CDC has defined injuries on poisoning specific to drug overdose. Other poisoning substances include gas, pesticides and common household substances such as bleach and ammonia. Figure 11 displays the breakdown of these poisoning related deaths by poisoning type and age groups.

Figure 11. Number of Deaths Due to Poisoning and Drug Overdose Across Age-Group, 2012

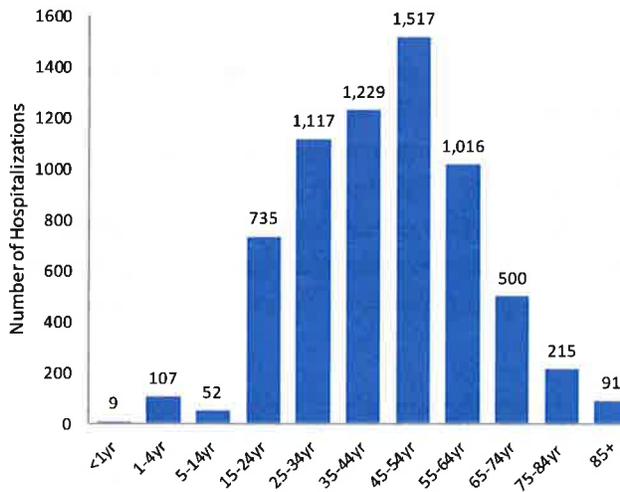


Source: Tennessee Department of Health, Division of Health Statistics

It is clear that most of the fatalities (over 90 percent) were due to drug overdose.

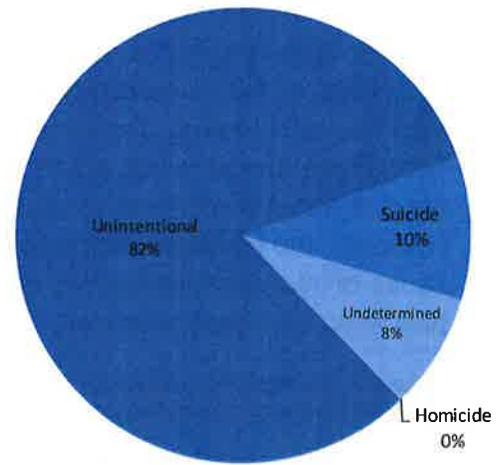
About 60 percent of the victims were males, and the age group with the most deaths and hospitalizations was 45-54 years, as depicted in Figures 11 and 12. Nearly four thousand people from that age group were hospitalized for poisoning. Over 800 people died, representing approximately 35 percent of all injury deaths for that age group alone. It is also important to note that some of these poisoning cases were self-inflicted, i.e. suicides, as shown in Figure 13.

Figure 12. Number of Hospitalizations Due to Poisoning by Age-Group, 2012



Source: Tennessee Department of Health, Division of Health Statistics

Figure 13. Distribution of the intent of poisoning related deaths, 2012



Poisoning Injury Prevention Efforts

- The Tennessee Poison Control Center educates stakeholders and policy makers about the dangers of prescription drug abuse and overdose.
- The Tennessee Department of Environment and Conservation promotes the use of drug drop boxes throughout the state.
- Prescription drug abuse prevention conferences and ongoing webinars are conducted to educate stakeholders and the general public about the dangers of poisoning and overdose.
- Six hundred drug lock boxes have been distributed as part of a pilot project partnership with the Morgan County Health Council to reduce calls to the poison center for homes where small children reside.
- The Tennessee Department of Mental Health and Substance Abuse Services and the Coffee County Anti-Drug Coalition has promoted the "Count It, Lock It, Drop It" campaign to encourage communities to monitor, secure, and dispose of their medications properly.

2.4 Fall Related Injuries

The rate of death among Tennessee residents due to unintentional falls has been increasing since 2007 and has surpassed the national rate since 2008, as seen in Figure 14. The hospitalization rate, however, has not fluctuated much, while the national rate has increased. Similar to poisoning, fall fatalities occur largely among male and the hospitalization rate is higher for females. Although the number of deaths from falls (n=590) is significantly lower than from motor vehicle crashes (n=889) or poisonings (n=1,216), there has been an annual average of nearly 200,000 emergency department visits due to falls within 2007-2012 in Tennessee, compared to 69,789 for motor vehicle injuries and 15,467 for poisoning. **The number one cause of injury related emergency department visits across all age groups is fall.** Many of these are preventable injuries that become very costly for individuals, communities, and the health care system.

Figure 14. National and Tennessee Age-Adjusted Injury Death Rates Due to Falls, 2007-2012

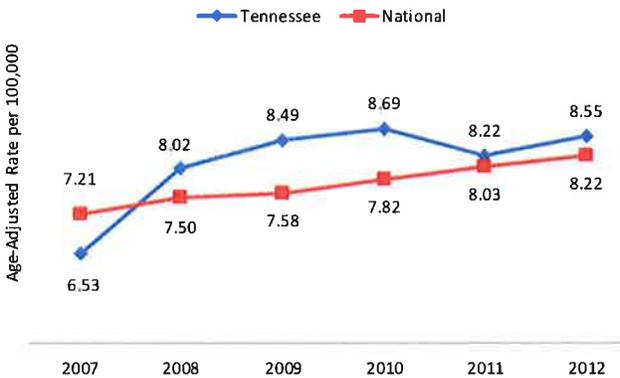
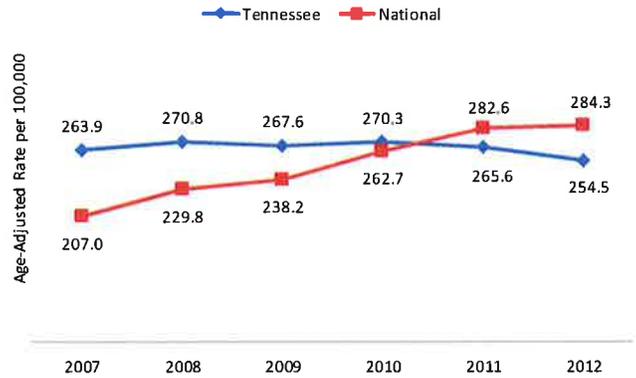


Figure 15. National and Tennessee Age-Adjusted Injury Hospitalization Rates Due to Falls, 2007-2012



Source: Tennessee Department of Health, Division of Health Statistics

Figures 16 and 17 show that most deadly falls and hospitalizations occur mostly among seniors. Falls are the leading cause of injury death, hospitalizations and emergency department visits for Tennesseans of age 65 years and above. The age group with most emergency department visits, however, was 5-14 years with over 28,000 visits.

Figure 16. Number of Deaths Due to Falls by Gender Across Age-Groups, 2012

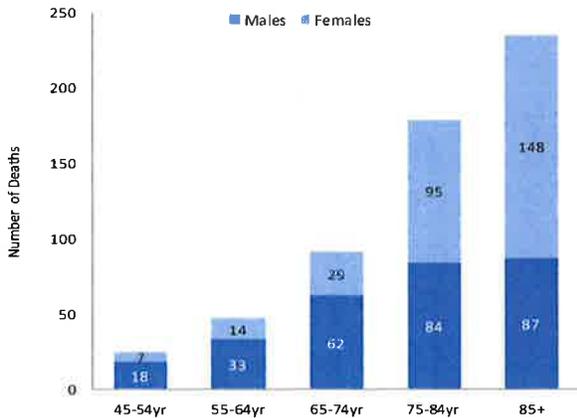


Figure 17. Number of Hospitalizations Due to Falls Across Age-Group, 2012

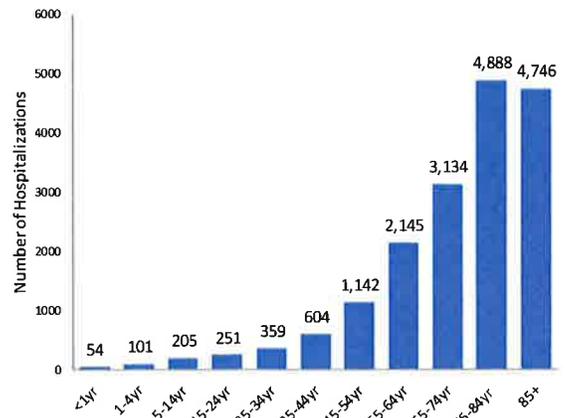
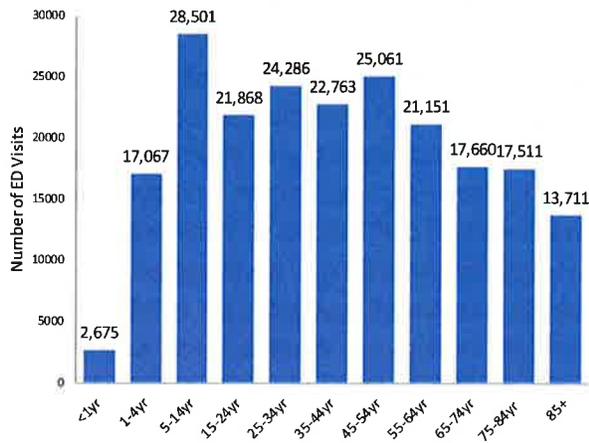


Figure 18. Number of ED visits Due to Falls by Age-Group, 2012



Source: Tennessee Department of Health, Division of Health Statistics

Fall Injury Prevention Efforts

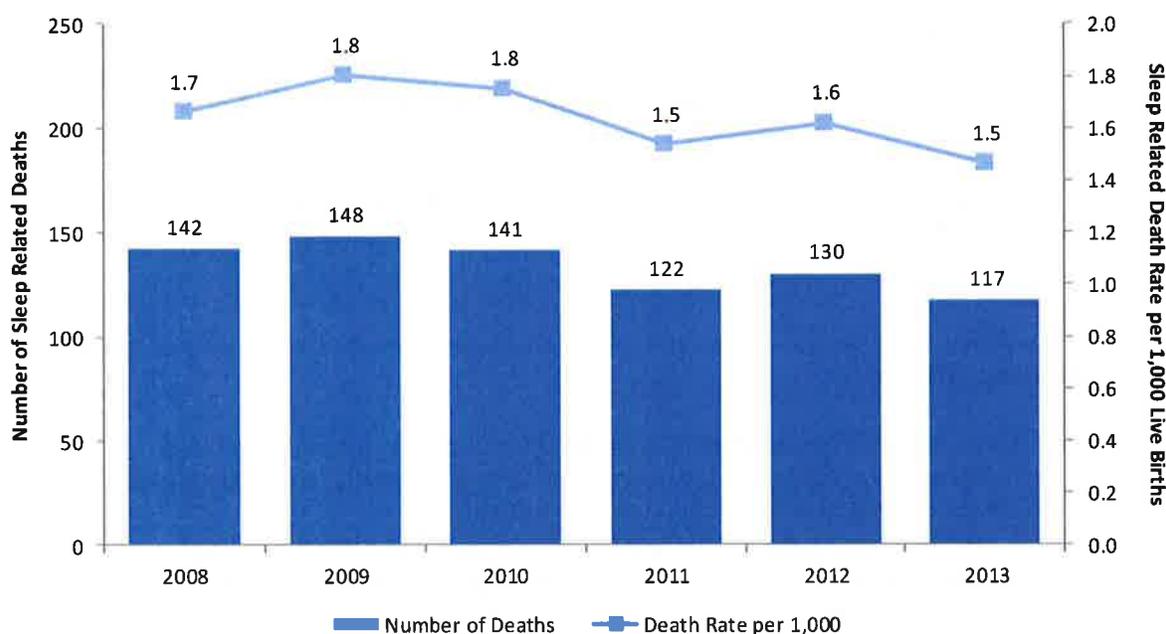
- A "Stepping On" Falls Prevention Leader training to 20 professionals was provided to volunteers so they can provide direct service training to seniors throughout the state.
- A statewide Falls Prevention Conference was held to educate stakeholders about coalition building and evidence-based falls prevention programs and resources.
- A Falls Prevention Network of over 300 senior health care professionals has been formed to increase provider knowledge about evidence-based falls prevention.
- The Tennessee Falls Prevention Coalition also supports statewide education and prevention efforts.

2.5 Sleep-Related Infant Deaths

Sleep-related infant deaths are identified when a baby is found deceased in a sleeping environment with a history of his or her head pressed into the mattress or pillow, sleeping with another person, or when he or she is found wedged against an object. Sudden Infant Death Syndrome (SIDS) is an exclusionary cause of death for children under one year of age, indicating that all evidence (including an autopsy, death scene investigation, and review of the medical record) has failed to yield the specific cause of a natural death; they are classified as sleep-related infant deaths.

In Tennessee, the number of sleep related infant deaths has been decreasing over the last six years. Figure 19 displays the number and rate of infant deaths found in a sleep environment from 2008-2013. During this timeframe, there was an 18% decrease in sleep-related deaths with a total of 142 in 2008 and 117 in 2013 that resulted from an unsafe sleep environment.

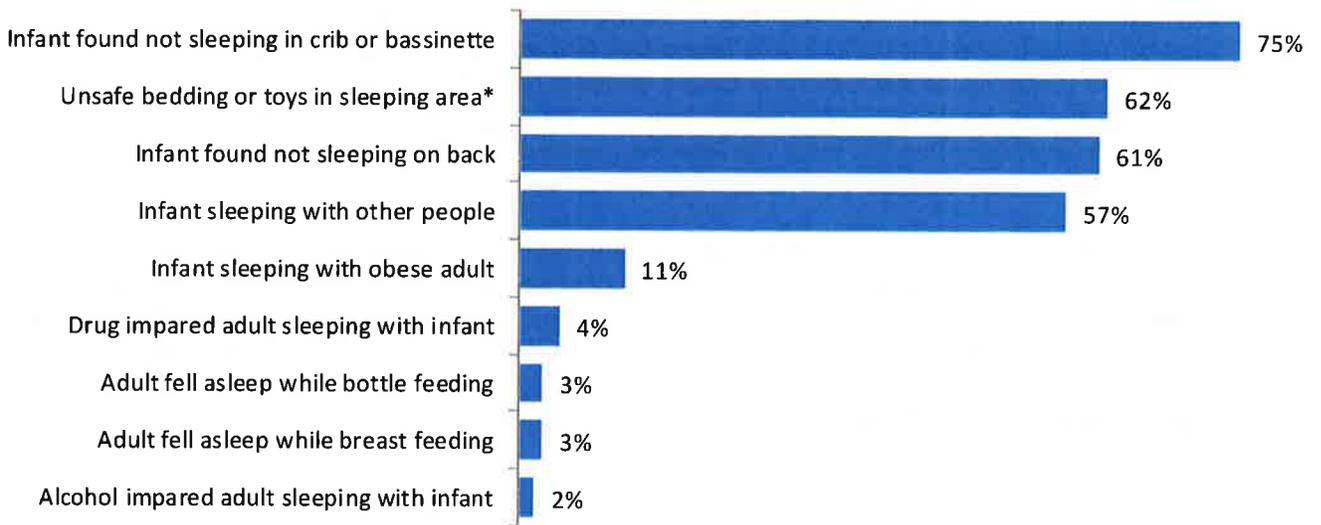
Figure 19. Number and Rate of Sleep Related Infant Deaths, 2008-2013



Data source: Tennessee Department of Health, Child Fatality Review Database System.

Among many contributing factors to an unsafe sleep environment, it was found that there are four main factors that are consistently present in sleep-related infant deaths in Tennessee: infant not sleeping in a crib or bassinette (75% of cases), unsafe bedding or toys in sleeping area (62% of cases), infant not sleeping on their back (61% of cases), and infant not sleeping alone (57% of cases). A list of contributing factors and their percentages are provided in Figure 20. These risk factors are key points for education in the Tennessee Department of Health's "ABC's of Safe Sleep" campaign (Babies should sleep Alone, on their Back, and in a Crib).

Figure 20. Contributing Factors in Sleep-Related Infant Deaths in Tennessee, 2013



Data source: Tennessee Department of Health, Child Fatality Review Database System.

*Soft objects and loose bedding – such as thick blankets, quilts, and pillows. Soft objects, loose bedding such as quilts, and comforters, should be kept out of the sleeping area. Toys, crib bumpers and quilts should be eliminated as well.

Safe Sleep Efforts

- 100% of birthing hospitals (66) and five non-delivery hospitals have implemented policies that ensure that all staff, parents, and caregivers will be educated about safe sleep guidelines.
- A statewide Safe Sleep Campaign was launched in 2012 utilizing educational materials such as flyers, posters and door hangers.
- 17 first responder agencies are implementing the Direct On Scene Education (D.O.S.E.) Program. After taking care of the emergency they were called for, first responders give any households with infants or pregnancy women information about safe sleep.
- “Safe Sleep Floor Talkers” project utilizes large decals placed on the floor of clinics and businesses to promote safe sleep.

2.6 Economic Impact of Non-Fatal Injuries

The cost of non-fatal injuries include trauma care, hospitalizations and ED visits. The number of trauma cases represents over 40 percent of the hospitalizations; the majority of those who survive experience long-term disabilities and chronic pain, both of which contribute to the increase in health care costs. In Tennessee, the average length of stay (LOS) for a non-fatal injury hospitalization in 2012 was 5 days and the average admission charge was approximately \$49,000 per admission. That same year, the total non-fatal injury related charges exceeded \$3.4 billion: \$1.6 billion from ED visits and \$1.8 billion from hospitalizations (which do not include rehabilitation or physician costs).

Tables 3 and 4 show hospital charges in dollars stratified by injury types. Injuries related to fire and firearms had the highest average hospital admission charge; however the injuries with the highest total charges were falls and motor vehicle accidents, mainly due to the higher volume. Table 6 shows that the latter is also true for injury ED visits.

Table 3. Number, LOS and Charges for Non-Fatal Injuries Hospitalized by Cause, 2012

Cause of Injury	Number of hospitalizations	Average hospital length of stay (in days)	Total charges	Average charge per hospitalization
Fall	17,629	5	\$ 751,288,433	\$ 42,617
Motor Vehicle	4,975	7	\$ 458,528,788	\$ 92,167
Poisoning	6,588	3	\$ 146,623,572	\$ 22,256
Homicide	1,347	6	\$ 93,930,912	\$ 69,733
Suicide	3,120	3	\$ 80,606,783	\$ 25,836
Firearms	762	8	\$ 78,209,215	\$ 102,637
Fire	228	12	\$ 35,825,291	\$ 157,128
Drowning	42	4	\$ 2,102,285	\$ 50,054
All	37,568	5	\$ 1,845,933,699	\$ 49,136

Source: Tennessee Department of Health, Hospital Discharge Data System.

Falls, motor vehicle crashes, and poisoning in Tennessee accounted for 77% of all non-fatal injury hospitalizations (29,192 total) in 2012 with an average cost per hospitalization of \$52,347 each. Falls alone account for 47% of non-fatal injury hospitalizations at an average cost of \$42,617 per hospitalization in 2012.

Table 4. Number and Charges for Non-Fatal Injuries Treated and Released by Cause, 2012

Cause of Injury	Number of hospitalizations	Total charges	Average charge per ED visit
Fall	212,254	\$ 531,674,313	\$ 2,505
Motor Vehicle	76,293	\$ 305,410,629	\$ 4,003
Homicide	27,108	\$ 101,410,487	\$ 3,741
Poisoning	18,983	\$ 59,182,318	\$ 3,117
Suicide	8,203	\$ 32,952,916	\$ 4,017
Firearms	1,802	\$ 12,635,416	\$ 7,012
Fire	2,276	\$ 4,158,817	\$ 1,827
Drowning	189	\$ 476,141	\$ 2,519
All	745,475	\$ 1,639,204,080	\$ 2,199

Falls, motor vehicle crashes, and poisoning in Tennessee also accounted for a large majority (42%) of the emergency department visits in 2012 with an average cost of \$3,416 per visit.

Our stated mission is to prevent injuries and their adverse health effects by working with partners to develop, implement, evaluate, and promote evidence-based prevention and care practices. If we implement evidence-based activities, programs, and strategies, we will also improve the prosperity of the people of Tennessee by reducing the economic burden of unintentional injury.

Chapter 3: Identifying Opportunities for Intervention

The Haddon Matrix was developed by Dr. William Haddon, the first administrator of what is now the National Highway Traffic Safety Administration and the founder of the Insurance Institute for Highway Safety. The matrix is a useful tool for identifying injury prevention opportunities.

The matrix classifies phases of injury (in relation to the time of the event) as well as factors involved in the occurrence of the injury: host (person), equipment, and environments (physical and social). Each cell in the matrix represents an intervention to maximize prevention of injury or mitigate the harmful effects of injury if it occurs.

As an example, the Haddon Matrix below can be used to look at motor vehicle collisions among teen drivers.

Factor \ Phase	Host	Equipment	Environment (Physical)	Environment (Social)
Pre-Event	Teen Driver Education	Anti-lock Brakes	Rumble Strips	Graduated Driver's License (GDL) Policy
Event	Wearing Seatbelt	Airbags	Barriers	Parental Knowledge of GDL and Enforcement
Post-Event	Quick Transport for Treatment	Jaws of Life	TN Highway Patrol Support/ Location	Rehabilitation and Support

The **Pre-Event Phase** is the time before the occurrence of the injury. Interventions in this phase are designed to prevent injury before it occurs. For example, a teen driver can be taught about the dangers of text messaging while driving. Cars can be equipped with anti-lock brakes to avoid the teen driver losing control of a car. From an environmental perspective, rumble strips could be installed along the highway to alert the driver when he or she veers off the road. From a broader standpoint, graduated driver's license policies can provide a gradual transition to independent driving, allowing new teen drivers to have adult supervision and guidance when first learning to drive.

The **Event Phase** is the time during the actual injury event. Interventions in this phase are designed to minimize the seriousness of injury and prevent death. A teen driver's use of a seatbelt (host factor) or a car equipped with airbags (equipment factor) can reduce the seriousness of injury to the driver. From an environmental perspective, roadside barriers (physical factor) can keep the vehicle on the highway.

The **Post-Event Phase** is the time after the injury event. Interventions in this phase are designed to mitigate the adverse consequences of injury. These interventions might include rapid transport for treatment (host), availability of extrication equipment at the scene of the injury (equipment), proximity of state highway patrol (physical environment), and availability of rehabilitation/support services (social environment). These interventions are designed to maximize recovery and improve quality of life.

The responsibility for preventing injury rests with numerous parties—parents, communities, medical providers, and policy makers. Use of the Haddon Matrix can assist these parties in identifying opportunities for intervention.

Strategies for Impacting Injury

Clearly, the most ideal time for impacting injury is to prevent the injury from ever occurring. Two modern approaches for organizing and designing prevention efforts include the “E’s of Injury” approach and the “Spectrum of Prevention” tool.

The E’s of Injury Prevention

A classic approach to preventing injury has revolved around the “E’s” of injury prevention—education, engineering, and enforcement. The list has subsequently been expanded to include evaluation, economic impact, and empowerment. Examples of each of these strategies are outlined in Table 3.

Table 3. The “E’s of Injury Prevention”

Strategy	Definition	Example
Education	Increasing awareness of injury potential and of prevention strategies.	Safe driver class for teenagers to discuss potential hazards of driving.
Engineering	Modification of products or environments in such a way as to reduce injury.	Infant car seats must meet requirements for age and weight of child.
Enactment/ Enforcement	Creating and enforcing policy or legislation designed to reduce injury.	Passing seatbelt laws to require car drivers and passengers to wear seatbelts; administering fines for failure to comply with rule.
Evaluation	Identifying whether a particular injury prevention effort has been effective.	Evaluation of teen motor vehicle collisions before and after text messaging ban to determine whether policy has reduced injuries.
Economic Impact	Analyzing impact of prevention efforts in regards to return on investment.	Evaluation of various teen motor vehicle collision prevention strategies to determine which is most cost-effective.
Empowerment	Equipping stakeholders with the necessary skills to prevent injury.	Teaching parent how to safely install car seat so that parent can properly place seat in car, maximizing likelihood of preventing injury in event of crash.

Spectrum of Prevention Tool

The Spectrum of Prevention Tool can be used for developing multifaceted, comprehensive approaches to injury and violence prevention across six interrelated action levels. Activities at each of these levels have the potential to support each other and promote overall community health and safety and increase the continuum of care needed to prevent injuries and deaths from injuries. Table 4 outlines the spectrum of prevention and opportunities for interventions at each level.

Table 4.
Spectrum of Injury Prevention

Level of Spectrum	Definition of Level
1. Strengthening individual knowledge, skills, and protections	Enhancing an individual's capability for preventing injury or illness and promoting safety
2. Promoting community education	Reaching groups of people with information and resources to promote health and safety
3. Educating providers	Informing providers who will transmit skills and knowledge to others
4. Fostering coalitions and networks	Bringing together groups and individuals in order to achieve broader goals and greater impact
5. Changing organizational policies	Adopting regulations and shaping norms to improve health and safety
6. Influencing policy	Developing strategies to change policies to influence outcomes

Chapter 4: Understanding the Impact of Prevention

“Injury is probably the most under recognized major public health problem facing the nation today, and the study of injury presents unparalleled opportunities for realizing significant savings in both financial and human terms- all in return for a relatively modest investment.”

National Academy of Sciences, Injury Control

Once an injury occurs, the consequences must be addressed. These consequences may include injuries that require short- and long-term medical care, damage to equipment, or loss of life. Interventions that can prevent these consequences can be outlined in the Haddon Matrix as described previously. As a rule, the consequences of injury are much more costly than the interventions aimed at preventing the injury. Table 5 outlines the relative cost of preventive interventions compared to the costs associated with injury.

Table 5.
Cost Savings Associated with Injury Prevention Strategies

For every \$1 spent on...	The savings in injury-related costs are:
Childproof Cigarette Lighter	\$72
Booster Seat	\$71
Bicycle Helmet	\$48
Child Safety Seat	\$42
Zero Alcohol Tolerance, Driver Under 21	\$25
Smoke Alarm	\$17
Pediatrician Counseling	\$9
Poison Control Center	\$7

Source: Children’s Safety Network: *Injury Prevention: what works? A summary of cost outcome analysis for injury prevention programs (2010 update)* [online] 2010. URL <http://www.childrenssafetynetwork.org/sites/childrenssafetynetwork.org/files/InjuryPreventionWhatWorks2012.pdf>

Expenditures for prevention (pre-event interventions) generate substantial cost-savings as well as prevention of life-threatening or life-limiting injuries. However, as demonstrated in the Haddon Matrix, there are other phases at which intervention can occur, and cost-savings can also be found with these interventions.

One such example is the Tennessee Poison Control Center, an event-phase intervention. The Tennessee Poison Control Center is staffed 24 hours a day, 7 days a week, and provides telephone consultations to callers who have questions related to possible poisonings and provides 24 hour emergency and information hotline services for poisonings via the toll-free Poison Help line at 1-800-222-1222. The annual operating budget for the center is \$1.8 million. In 2014, Center staff received 48,260 calls. The medical professionals who answer the hotline calls are registered pharmacists, nurses and physicians with extensive poison management experience. The poison specialists can often avert unnecessary emergency department trips by providing first aid treatment advice and follow-up monitoring. In 2014, 70% of the poison exposure calls were safely managed at home under the monitoring of the poison specialist. Consultation with a poison control center can significantly decrease the patient’s length of stay in a hospital by more effective use of the laboratory testing, more efficient use of antidotes and appropriate monitoring practices. For every \$1 invested in poison control

services, an estimated \$14 is saved in other medical spending. Patients managed with poison center assistance had on average, shorter hospitalizations helping healthcare providers serve more patients, improving health outcomes and decreasing health care costs.

2013-2018 PRIORITIZED FIVE YEAR GOALS

The Injury Prevention Planning Group consulted with the Injury Prevention Department of the Department of Health to establish goals and objectives to achieve the mission of injury prevention for Tennessee. These goals also were informed by the CDC CORE Violence and Injury Prevention Grant objectives.

- GOAL 1:** Establish a sustainable and funded infrastructure necessary to provide leadership, coordination and support of injury prevention core functions.
- GOAL 2:** Increase the quality and availability of statewide and community-specific data for planning, surveillance, and evaluation.
- GOAL 3:** Build capacity for implementation and evaluation of evidence-based injury prevention initiatives.
- GOAL 4:** Provide centralized technical support and training to dedicated injury prevention staff and collaborative partners.
- GOAL 5:** Communicate and provide scientific information on the magnitude and burden of injury, associated risks, proven interventions and cost impact to policy makers to assist them in making informed decisions.

GOAL 1: Establish a sustainable and funded infrastructure necessary to provide leadership, coordination and support for injury prevention core functions.

GOAL 1: Establish a sustainable and funded infrastructure necessary to provide leadership, coordination and support for injury prevention core functions.				
STRATEGY	LEAD(S)	RESOURCE(S)	STATUS	
Objective 1: Provide the TIVPP with support necessary to accomplish goals/objectives of the strategic plan.				
1A	Develop a comprehensive injury and violence prevention (IVP) website to provide communication and disseminate information.	Violence Injury Prevention Program (VIPP*) Staff	Tennessee Department of Health (TDH) Web Development Staff	Ongoing; in progress
1B	Develop social media campaigns to educate stakeholders and public about IVP website resources.	VIPP Staff	TDH Public Relations Department TDH Social Media Injury Planning Group (ICPG) Partner Social Media	Ongoing; in progress
Objective 2: Provide coordination and support to the injury steering group (CCIP).				
2A	Identify injury program and policy priorities through the ICPG.	ICPG Policy Committee	TDH Epidemiologist Access to TDH Data ICPG Policy Committee	Ongoing; in progress
2B	Update the strategic plan to reflect the inclusion of new priorities.	ICPG Planning Committee	TDH Epidemiologist Access to TDH Data ICPG Policy Committee	Completed; Need to review and update annually
2C	Obtain Memorandums of Understanding from ICPG participants and injury prevention stakeholder groups.	VIPP Staff	ICPG Members TDH Staff	Completed; Need to review and update annually
2D	Schedule quarterly meetings for ICPG (1 yr. in advance).	VIPP Staff	TDH Staff State Meeting Space	Completed; Need to review and update annually
2E	Incorporate at least one skill building activity at each quarterly meeting.	VIPP Staff & ICPG Members	TDH Staff ICPG Members TN Injury Prevention Professionals	Completed; Need to review and conduct annually
2F	Create orientation packet for new membership (roles and responsibilities and terms of reference).	VIPP Staff	TDH Staff	Ongoing; in progress
2G	Implement activities outlined in collaborative/integrative partner MOUs.	VIPP Staff	TDH Staff	Ongoing; in progress
2H	Identify resources for ongoing support of the strategic plan as needed.	ICPG Planning Committee & VIPP Staff	TDH Staff ICPG Members	Ongoing; in progress

Measures of Success

- Annual collection and analysis of data.
- Annual cost analysis of data.
- An updated strategic IVP plan will exist.
- Funding will be increased for state and local efforts.
- State laws, regulations and organizational policies will support IVP efforts.
- Community partnerships will exist to address IVP.

GOAL 2: Increase the quality and availability of statewide and community-specific data for planning, surveillance, and evaluation.

STRATEGY	LEAD(S)	RESOURCE(S)	STATUS	
Objective 1: Increase the quality and availability of statewide and county specific data for planning, surveillance, and evaluation.				
1A	Produce reports annually: Burden of injury report, injury fact sheets for decision makers and IVP advocates and annual injury indicator report (with timely submission).	VIPP Staff	TDH Epidemiologist TDH Data Centers for Disease Control (CDC) Data	Completed; Need to review and update annually
1B	Post on comprehensive IVP website, health statistics site.	VIPP Staff	TDH Web Development Staff	Ongoing; in progress
Objective 2: Develop web-based reporting systems and partner to develop a centralized injury data clearinghouse.				
2A	Survey IPCG members and other stakeholders to determine injury data resources.	VIPP Staff ICPG Data Committee	TDH Epidemiologist ICPG Data Committee	Ongoing; in progress
2B	Compile injury data sources and promote resource to injury prevention professionals.	ICPG Planning Committee	TDH Epidemiologist Access to TDH Data Policy Subcommittee	Ongoing; in progress
Objective 3: Partner to improve the quality of external cause of injury coding (e-coding).				
3A	Implement recommendations from the MMWR report to improve e-coding.	VIPP Staff	TDH Epidemiologist TDH Staff	Ongoing; in progress
3B	Evaluate completeness of e-coding in trauma registry data.	VIPP Staff	TDH Epidemiologist	Ongoing; in progress
3C	Produce reports for clinicians and coders to demonstrate the importance and value of their efforts.	VIPP Staff & ICPG Members	TDH Epidemiologist Access to TDH Data Policy Subcommittee	Ongoing; in progress
Objective 4: Assess community needs surrounding injury and violence prevention priority areas and related data.				
4A	Survey local hospitals, health departments, and other programs to determine the types of data they need to conduct community assessments.	VIPP Staff	TDH Staff	Ongoing; in progress
4B	Provide opportunities to build capacity in the interpretation and use of injury data.	VIPP Staff	TDH Epidemiologist Access to TDH Data	Ongoing; in progress

Measures of Success

- Injury data will be complete, of high quality, readily available on state website and in a format/type that is based on the needs of the data users.
- Centralized injury data clearinghouse will be published online.
- Hospital survey data and community assessment tools will be shared with stakeholders.

GOAL 3: Build capacity for implementation and evaluation of evidence-based injury prevention initiatives.

STRATEGY		LEAD(S)	RESOURCES(S)	STATUS
Objective 1: Increase state-of-the-art knowledge and skills (capacity) in the IVP workforce.				
1A	Create an evidence based injury and violence prevention program work group within the ICPG.	VIPP Staff	ICPG Planning Committee; CDC Evidence-Based Programs	Ongoing; in progress
1B	Encourage colleges, universities, and medical schools to provide courses in injury related subjects.	VIPP Staff	THD Staff; ICPG Members	Ongoing; in progress
Objective 2: Work with CDC appointed contractor (state and cross state).				
2A	Maintain contact with CDC appointed technical advisor to discuss evaluation of interventions.	VIPP Staff	TDH Epidemiologist ICPG Data Subcommittee	Ongoing; in progress
2B	Conduct annual evaluation of selected injury prevention program and share results with stakeholders.	VIPP Staff	TDH Contract Evaluators; TDH Epidemiologist	Completed; Need to review and update annually
Objective 3: Increase the use of evidence-based injury and violence prevention interventions statewide.				
3A	Update existing "best practices" in research literature and create guide to promote successful injury prevention strategies.	VIPP Staff	ICPG Members TDH Staff	Ongoing; in progress
3B	Disseminate the results of evidence-based interventions for new or emerging injury issues/priorities.	VIPP Staff	TDH Staff State Meeting Space	Ongoing; in progress
3C	Perform gaps analysis to determine gaps in injury prevention interventions; encourage the development and dissemination of interventions to fill gaps.	VIPP Staff & CCIP Members	TDH Staff CCIP Members TN Injury Prevention Professionals	Ongoing; in progress
Objective 4: Assess community needs surrounding injury and violence prevention priority areas and related data.				
4A	Partner with Injury Centers, Universities, and Schools of Public Health to conduct program evaluations of existing programs and policies.	VIPP Staff	TDH Staff TDH Epidemiologist	Completed; Need to review and update annually
4B	Collaborate with CCIPC to review evaluation plan for current programmatic efforts targeting priority injuries.	VIPP Staff	TDH Staff TDH Epidemiologist	Ongoing; in progress

Objective 5: Increase statewide collaboration around injury and violence prevention in Tennessee – Focus on ICPG and collaborative Partners.				
5A	Identify new partners (IVP practitioners and community stakeholders working on IVP projects) and solicit their membership on the ICPG.	VIPP Staff ICPG Members	TDH Staff	Ongoing; in progress
5B	Provide a "Member Spotlight" at each of the meetings so members can find out more about each other.	VIPP Staff	ICPG Members	Ongoing; in progress
5C	Regularly inventory the ICPG membership and affiliations/connections and determine what groups should be involved.	VIPP Staff	TDH Resources	Ongoing; in progress
5D	Create a list serve to disseminate information about Injury Prevention Efforts.	VIPP Staff	TDH Resources	Ongoing; in progress
5E	Identify contact person at each hospital/medical center/trauma center and local health department to begin communication on the topic of injury and violence prevention.	VIPP Staff	TDH Staff Trauma Center Staff	Ongoing; in progress
5E	Collaborate with other stakeholder prevention leaders/groups to promote injury prevention partnerships.	VIPP Staff	TDH Staff ICPG Members Professional Associations	Ongoing; in progress
Objective 6: Provide support and guidance to facilitate and monitor program fidelity and evaluation adherence.				
6A	Identify leadership who can assist the Department with Stepping On program monitoring.	VIPP Staff	ICPG Members Stepping On Partners	Ongoing; in progress
6B	Partner with Stepping On Leaders to monitor progress of classroom training.	VIPP Staff	ICPG Members Stepping On Partners	Ongoing; in progress

Measures of Success

- New ICPG partners will be recruited annually.
- Injury Prevention Email Networks will be utilized quarterly to connect stakeholders on specific injury topics.
- Individuals will be identified in local health departments and hospitals as a contact person for injury and violence prevention
- Evidence-based injury prevention strategies will be used routinely throughout Tennessee.
- Injury and violence prevention efforts will be well coordinated at the state and local level.
- Program fidelity will be documented by TDH trained volunteers.

GOAL 4: Provide centralized technical support and training to dedicated injury prevention staff and collaborative partners.

STRATEGY		LEAD(S)	RESOURCE(S)	STATUS
Objective 1: Provide education and training workshops (and/or webinars) on injury and violence topics.				
1A	Conduct Injury Prevention 101 Class at least once annually.	VIPP Staff	TDH Resources State Meeting Space ICPG Members	Ongoing; in progress
1B	Provide an annual injury prevention symposium.	VIPP Staff	TDH Resources State Meeting Space ICPG Members	Ongoing; in progress
1C	Provide webinars regarding identified injury prevention priority topics.	VIPP Staff	TDH Resources State Meeting Space ICPG Members	Ongoing; in progress
1D	Provide evidence-based trainer of trainer falls prevention program annually and support Master Trainer training.	VIPP Staff	TDH Resources State Meeting Space Stepping On Master Trainers	Ongoing; in progress
1E	Work with the Coffee County Drug Prevention Coalition to provide "Count It, Lock It, Drop It" training to coalitions who adopt the program.	VIPP Staff	TDH Resources (i.e. Adobe Connect Webinar) (i.e. Adobe Connect Webinar)	Ongoing; in progress
1F	Work with TN Department of Health to develop work place safety webinar.	VIPP Staff	TDH Resources (i.e. Adobe Connect Webinar)	Ongoing; in progress
1G	Work with ICPG Education and Training Committee to identify other training opportunities for IVP staff and local community coalitions.	VIPP Staff	ICPG Members	Ongoing; in progress
1H	Identify training opportunities that encourage social marketing.	VIPP Staff	TDH Communications Staff	Ongoing; in progress
Objective 2: Promote and distribute annual injury prevention awards.				
2A	Solicit nominations from CCIP members and other injury prevention professionals.	VIPP Staff CCIP Data Subcommittee	TDH Epidemiologist CCIP Data Subcommittee	Ongoing; in progress
2B	Recognize individuals and community groups who impact injury prevention priorities.	VIPP Staff	TDH Resources	Ongoing; in progress
2C	Submit press release regarding awards and publish winners on IVP website.	VIPP Staff	TDH Communications	Ongoing; in progress

Measures of Success

- Injury Prevention 101, Annual Symposium, and Webinars will be documented annually or as needed.
- Stepping On Falls Prevention Trainer of Trainers, Social Marketing training, and other IVP training will be documented.
- Annual recognition of persons/organizations/communities making notable contributions to injury and/or violence prevention in the state.

GOAL 5: Communicate and provide scientific information on the magnitude and burden of injury, associated risks, proven interventions and cost impact to policy makers to assist them in making informed decisions.

STRATEGY		LEAD(S)	RESOURCE(S)	STATUS
Objective 1: Increase awareness of injury including violence as a public health problem.				
1A	Use IVP website to increase awareness (inclusion of stakeholder info and links, information about EBP, data and program evaluation).	VIPP Staff	TDH Epidemiologist TDH Data CDC Data	Completed; Need to review and update annually
1B	Provide presentations on the topic of injury and violence prevention at conferences (Coordinated School Health, TN College of Surgeons, Pediatricians, others).	VIPP Staff	TDH Web Development Staff	Ongoing; in progress
1C	Provide presentations at TN Public Health conferences.	VIPP Staff	TDH Staff	Ongoing; in progress
Objective 2: Create a compelling injury and violence prevention message that galvanizes support.				
2A	Work with executive leadership from the TDH to identify a safety message and a campaign with materials for local health departments	VIPP Staff	TDH Staff	Ongoing; in progress
2B	Create a safety calendar for use at local health departments (inclusion of chronic diseases and healthy behaviors).	ICPG Planning Committee	TDH Staff ICPG Members	Ongoing; in progress
Objective 3: Encourage media coverage of injuries as a public health problem.				
3A	Provide training to local communities on methods to address the media on issues pertaining to injury and violence prevention.	VIPP Staff	TDH Communications Staff	Completed; Need to review and update annually
3B	Provide injury media packets as a resource for local communities and/or health councils/ community coalitions.	VIPP Staff	TDH Staff TDH Communications Staff	Completed; Need to review and update annually
3C	Work with Commissioner's Office to distribute press releases on topics pertaining to injury and violence prevention (Falls Awareness Day, other injury topics from injury calendar).	VIPP Staff & CCIP Members	TDH Staff CCIP Members TDH Communications Staff	Completed; Need to review and conduct annually
Objective 4: Demonstrate the cost-benefit of injury prevention programs/interventions.				
4A	Provide data on the costs of fatal and nonfatal injury and the benefits of prevention.	VIPP Staff	TDH Epidemiologist TDH Data CDC Data	Ongoing; in progress
4B	Develop a one page sheet depicting costs savings of IVP for distribution to policy makers.	VIPP Staff	TDH Epidemiologist TDH Data CDC Data	Ongoing; in progress

Objective 5: Establish a Policy and Advocacy Workgroup for the CCIPC.				
5A	Perform policy gap analyses related to IVP policies.	VIPP Staff	TDH Epidemiologist TDH Data	Completed; Need to review and update annually
5B	Identify best practice and/or evidence based policy strategies.	VIPP Staff	ICPG Policy Committee	Ongoing; in progress
5C	Coordinate the production of Stakeholder Policy Education Alerts/Booklet and distribute to policy makers.	VIPP Staff	TDH Staff ICPG Members TDH Communications Staff	Ongoing; in progress
Objective 6: Create a compelling injury and violence prevention message that galvanizes support.				
2A	Work with leadership from the TDH to identify safety messages and materials for local health departments.	VIPP Staff CCIP Data Subcommittee	TDH Staff TDH Communications Staff ICPG Members	Ongoing; in progress
2B	Create a safety calendar for use at local health departments (inclusion of chronic diseases and healthy behaviors).	CCIP Planning Committee	TDH Staff TDH Communications Staff ICPG Members	Completed; Need to review and update annually
Objective 7: Encourage media coverage of injuries as a public health problem.				
3A	Provide training to local communities on methods to address the media on issues pertaining to injury and violence prevention.	VIPP Staff	CCIP Members TDH Staff	Completed; Need to review and update annually
3B	Provide injury media packets as a resource for local communities and/or health councils/ community coalitions.	VIPP Staff	TDH Staff State Meeting Space	Completed; Need to review and update annually
3C	Distribute press releases on injury and violence prevention topics (Falls Awareness Day, & other injury topics).	VIPP Staff & CCIP Members	TDH Staff CCIP Members TN Injury Prevention Professionals	Completed; Need to review and conduct annually
Objective 8: Assess community needs surrounding injury and violence prevention priority areas and related data.				
4A	Survey local hospitals, health departments, and other programs; determine data needs to conduct community assessments.	VIPP Staff	TDH Staff	Ongoing; in progress
4B	Provide opportunities to build capacity in the interpretation and use of injury data.	VIPP Staff	TDH Staff	Ongoing; in progress

Measures of Success

- Documented website, presentations, safety calendar, policy guide, safety message campaigns, trainings, and community needs assessments conducted by hospitals.

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