

# North Carolina Childhood Injury Report: 2011-2014



**Injury and Violence Prevention Branch  
North Carolina Division of Public Health**

**July 2016**

# **N.C. Childhood Injury Report: 2011-2014**

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## Acknowledgements

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We wish to acknowledge the UNC Injury Prevention Research Center (IPRC) for helping to establish the reporting format and content.

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## 1. Overview of Childhood Injury in North Carolina: 2011-2014

### Introduction

Injury is the number one cause of death among children in the United States [1]. Injuries are defined by intent and outcome: **unintentional** or **intentional**, and **fatal** or **nonfatal**.

Unintentional injury is consistently the number one cause of death among children ages 1-18 in both the state of North Carolina and nationally [2]. In North Carolina during the year 2014, there were 353 deaths in this age group, 229 of which were unintentional in nature. For this same group nationally, there were 6,374 deaths from unintentional injury [3].

Common causes of all unintentional injuries are motor vehicle crashes, suffocation, drowning, fire and burns, falls, poisoning, and pedestrian injuries. These are distinct from intentional injuries, which are classified as homicides or assaults and suicides or self-inflicted.

The CDC reports:

- One child dies from injury every hour in the United States [2].
- Nearly 20% (one in five) of all deaths among children are due to injury [2].
- Every four seconds, a child is treated for an injury in an emergency department in the United States [2].
- Annually, an estimated 9.2 million children have emergency department visits for an unintentional injury in the U.S. [4].
- The national economic burden created by unintentional injuries (all ages) was \$671 billion in 2013 [5].

This report provides an overview of the public health burden of injury in children ages 0-18 in the state of North Carolina (N.C.). In an effort to evaluate and understand the scope of the problem of child injury in N.C., analyses were performed on injury-related deaths from 2011-2014, hospitalizations from 2011-2013, and emergency department visits from 2013-2014. Each cause of injury was stratified by age and sex. Injury deaths, hospitalizations, and emergency department visit rates were calculated per 100,000 children residing in the state. **A detailed explanation of the data analysis is provided in Appendix A.**

Data for this report has been obtained from three sources: N.C. Division of Public Health death certificate data, N.C. Hospital Discharge data, and N.C. Emergency Department Visit data has been analyzed separately for three age groups; 0-4, 5-9, 10-14, and 15-18.

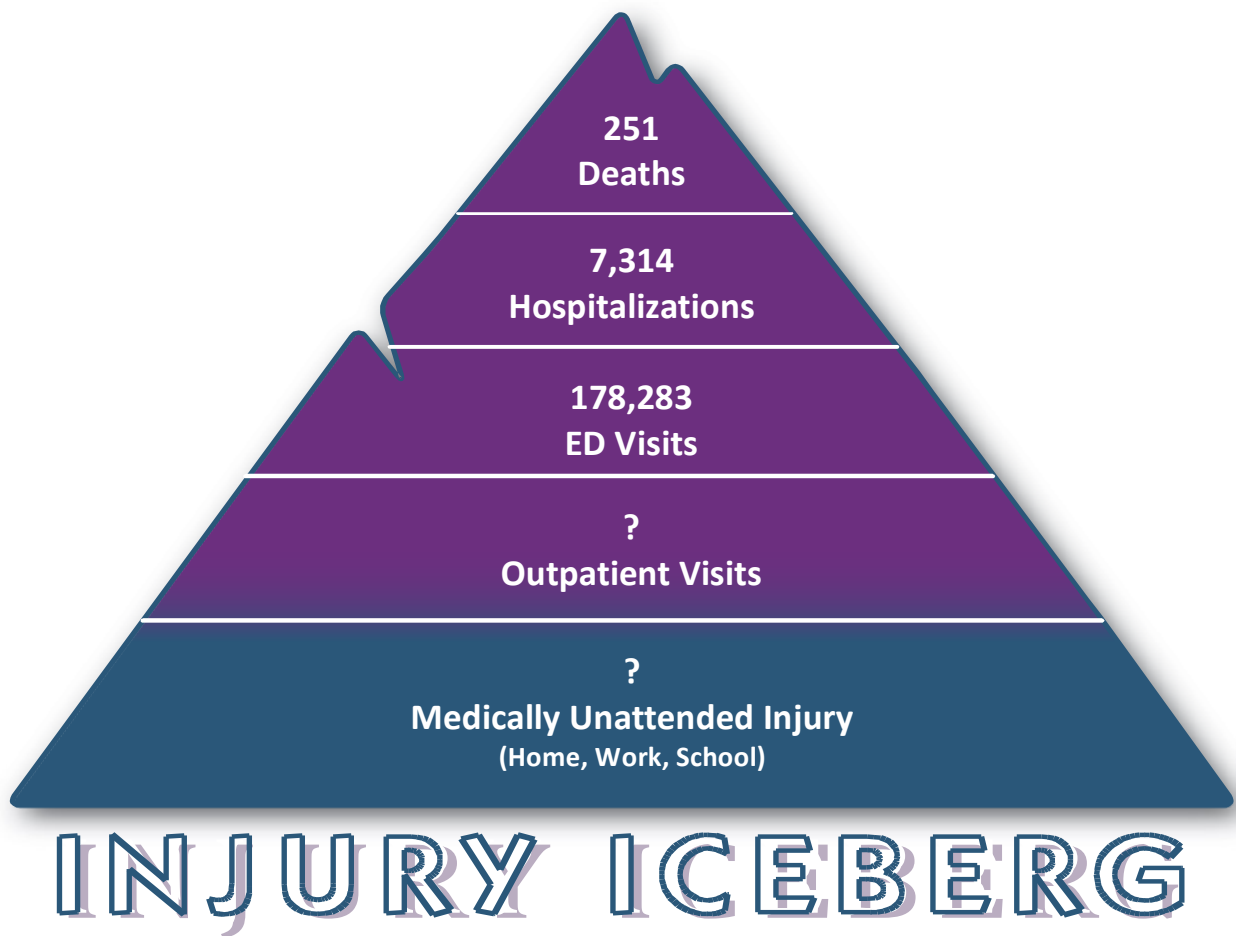
This report is intended to increase public health practitioners' and policy makers' understandings of prevalent, yet preventable, causes of injury and consequently direct programmatic and policy decisions to decrease the burden of childhood injury. The data can improve prioritization of injury prevention resources, assist researchers with surveillance, and help physicians educate children and parents on preventive measures.

The report is an update to the "N.C. Child Injury Report: 2007-2010."

The burden caused by childhood injury can be better understood from the “Injury Iceberg” in *Figure 1*. Deaths from injury are the represented by the “tip of the iceberg” – a small fraction, yet the most visible, of the total number of childhood injury events. The second tier of the iceberg refers to hospitalizations, which are more prevalent than deaths but still underestimate the “true” number of injury-related events. The third level signifies emergency department (ED) visits as a result of injury. The larger, lower layers of the iceberg embody unidentified, high frequencies of childhood injuries that are not recorded as part of routine surveillance efforts. Such injuries include those seen and treated in outpatient facilities or those where no medical attention is sought.

In 2013, for every one childhood injury death, there were 29 hospitalizations, 710 emergency department visits, and an unknown, but likely high, number of outpatient medical visits. Even more injuries go unreported and unattended.

**Figure 1: Injury Iceberg, North Carolina Childhood Injuries, Ages 0-18: Deaths, Hospitalizations, and ED, 2013. Injury and Violence Prevention Branch, Chronic Disease and Injury Section, Division of Public Health.**



## The Problem of Childhood Injury

Among North Carolina children ages 0-18, injuries resulted in **1,068 deaths** (11.7 per 100,000) from 2011-2014, **22,775 hospitalizations** (332 per 100,000) from 2011-2013, and **352,049 emergency department (ED) visits** (7,698 per 100,000) from 2013-2014.

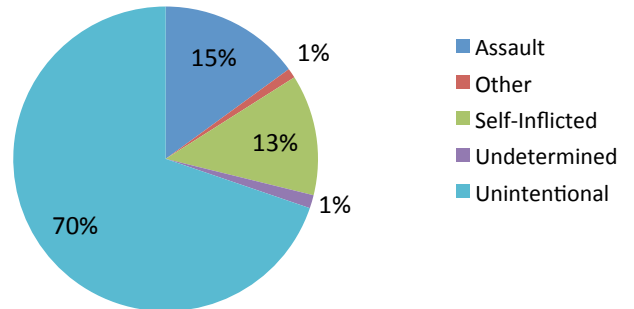
**Unintentional injuries caused 70% of deaths** (Figure 2), **33% of hospitalizations** (Figure 3), and **69% of ED visits** (Figure 4).

Figure 2 shows that 13% of childhood deaths were the result of suicide/self-inflicted injury; 15% resulted from a homicide/assault; and the remaining 2% have an undetermined intent or resulted from another mechanism.

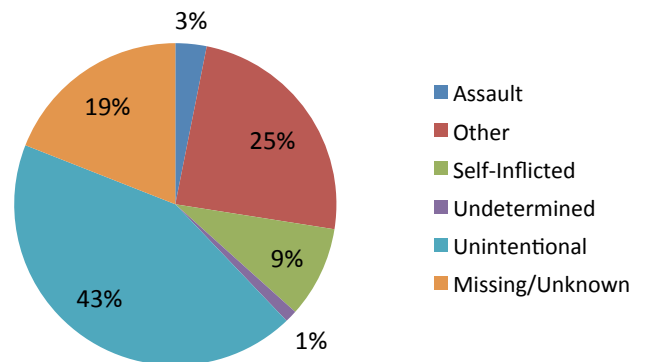
As demonstrated in Figure 3, the intents of injury-related hospitalizations are widespread. While **19% of hospitalizations are self-inflicted**, another 19% are the result of undetermined intent, and 6% are from other intents. Assault accounts for 7% of hospitalizations between 2011 and 2013, and 6% of hospitalization cases had missing or unknown intent.

While **unintentional injury accounted for 69% of ED visits**, Figure 4 shows that 27% of ED visits have a missing or unknown intent. The remaining 4% of ED visits were due to assault (2%), other intent (1%), and self-inflicted (1%) injuries.

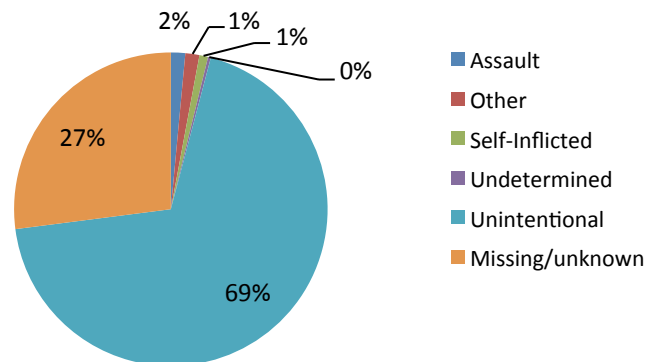
**Figure 2: N.C. Child Injury Deaths by Intent, Ages 0-18: 2011-2014 (N=1,068)**



**Figure 3: N.C. Child Injury Hospitalization by Intent, Ages 0-18: 2011-2013 (N=22,775)**



**Figure 4: N.C. Child Injury ED Visit by Intent, Ages 0-18: 2013-2014 (N=352,049)**



## Leading Causes of Childhood Injury

The **leading cause of injury-related death** among children in North Carolina from 2011-2014 was **motor vehicle crashes**, accounting for 32% (n=343) of deaths. Adverse effects caused by other intents were the leading cause of injury-related hospitalizations, accounting for 24% (n=5,543) admissions from 2011-2013, and **unintentional falls** were the **second leading type of injury for ED visits**, responsible for 20% (n=71,203) visits from 2013-2014. Motor vehicle crashes are the fourth leading cause of hospitalizations (6%, n=1,443) and the sixth leading cause (5%, n=17,979) of ED visits for children ages 0-18. Falls were the mechanism responsible for 10% (n=2,194) of hospitalizations and 20% (n=71,203) of ED visits. **Suffocation** was the mechanism underlying 11% (n=116) of deaths. In regards to childhood injuries, 19% (n=4,334) of hospitalizations and 27% (n=95,145) of ED visits have both unknown injury mechanisms and unknown intent.

*Note: All death data is from 2011-2014; hospitalization data from 2011-2013; all ED visit data from 2013-2014.*

Table 1: N.C. Leading Types of Childhood Injury Deaths, Ages 0-18: 2011-2014		Table 2: N.C. Leading Types of Childhood Injury Hospitalizations, Ages 0-18: 2011-2013		Table 3: N.C. Leading Types of Childhood Injury ED Visits, Ages 0-18: 2013-2014	
Injury Type	Number of Deaths	Injury Type	Number of Admissions	Injury Type	Number of Visits
Motor Vehicle (Unintentional)	343	Adverse Effects (Other)	5,543	Unknown Cause (Unknown Intent)	95,145
Suffocation (Unintentional)	116	Unknown Cause (Unknown Intent)	4,334	Falls (Unintentional)	71,203
Drowning (Unintentional)	95	Fall (Unintentional)	2,194	Struck (Unintentional)	43,760
Firearm (Assault)	81	Motor Vehicle (Unintentional)	1,448	Natural/Environment (Unintentional)	20,621
Suffocation (Self-Inflicted)	70	Poisoning (Self-Inflicted)	1,309	Unspecified (Unintentional)	18,117
Firearm (Self-Inflicted)	59	Fire/Burn (Unintentional)	1,010	Motor Vehicle (Unintentional)	17,979
Poisoning (Unintentional)	38	Poisoning (Unintentional)	844	Overexertion (Unintentional)	16,132
Fire/Burn (Unintentional)	34	Other Specified/Classified (Unint.)	768	Other Specified/Classified (Unint.)	15,096
Unspecified (Assault)	25	Unspecified (Unintentional)	680	Cut/Pierce (Unintentional)	13,518
Other Specified/Classified (Assault)	24	Natural/Environment (Unintentional)	595	Poisoning (Unintentional)	6,714
All Other Causes	183	All Other Causes	4,050	All Other Causes	33,764
<b>Total</b>	<b>1,068</b>	<b>Total</b>	<b>22,775</b>	<b>Total</b>	<b>352,049</b>



## Causes of Childhood Unintentional Injury

Unintentional injuries account for **70% of all childhood injury-related deaths** (Figure 2). The leading causes of unintentional injury-related mortality are motor vehicle crashes (46%), suffocation (16%), and drowning (13%) for 2011-2014.

While only 9% of children mortally suffer from fall-related injuries, **falls are the leading mechanism of childhood unintentional injury-related hospitalizations** (22%) and ED visits (29%). Injury-related hospitalizations for children ages 0-18 were largely caused by falls (22%), motor vehicle crashes (15%), fire/burn (10%), and poisoning (9%).

**ED visits were largely caused by falls** (29%), **strikes\*** (18%), and natural/environment (9%) factors. Note that, while motor vehicle-related injuries caused large proportions of childhood mortality (46%) and hospitalization (15%), motor vehicle crashes were the mechanism for only 7% of ED visits.

Unintentional Injury Type	Number of Deaths
Motor Vehicle	343
Suffocation	116
Drowning	95
Poisoning	38
Fire/Burn	34
Firearm	21
Other Land Transport	15
Pedestrian (Other)	15
Natural/Environment	14
Unspecified	13
Fall	9
All Other Causes	32
<b>Total</b>	<b>745</b>

Unintentional Injury Type	Number of Admissions
Fall	2,194
Motor Vehicle	1,448
Fire/Burn	1,010
Poisoning	844
Other Specified/Classified	768
Unspecified	680
Natural/Environment	595
Struck	546
Transport (Other)	487
Other Specified/Not Classified	315
All Other Causes	930
<b>Total</b>	<b>9,817</b>

Unintentional Injury Type	Number of Visits
Fall	71,203
Struck	43,760
Natural/Environment	20,621
Unspecified	18,117
Motor-Vehicle	17,979
Overexertion	16,132
Other Specified/Classified	15,096
Cut/Pierce	13,518
Poisoning	6,714
Other Specified/Not Classified	5,841
All Other Causes	13,444
<b>Total</b>	<b>242,425</b>

\*Strike is defined as: being struck by or against an object; strike by thrown, projected or falling object; accidental strike against or bump into or by another person; crushed, pushed, or stepped on by a crowd or human stampede; or intentional assault, self-harm, undetermined intent, or legal intervention by blunt object or bodily force. Examples of such objects are sports equipment, automobile airbag, furniture, walls, and other stationary objects.

## Deaths, Hospitalizations, and Emergency Department Visits by Age and Sex

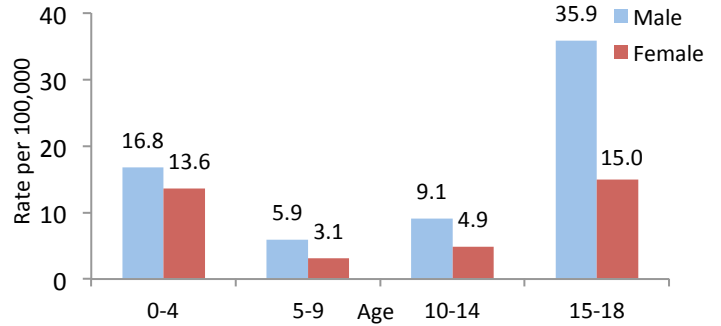
Childhood injury mortality rates in N.C. are displayed by age and sex in *Figure 5* for 2011-2014.

**Death rates are highest for adolescents, ages 15-18, with males' mortality rate more than two times higher than females'.** Children ages 5-9 had the lowest mortality rates amongst the other age groups. Males consistently have higher mortality rates than females in all age groups for injury-related deaths. Overall, **0.01% of the N.C. child population died of injury** from 2011-2014.

The hospitalization rates in *Figure 6* show that males have a higher admission rate than females in every age group. The **highest hospitalization rates are seen in the youngest age group, 0-4 years old**, and are followed by the oldest age group, 15-18 years old. Contrarily, 10-14 year olds had the fewest hospitalizations as a result of injury. Of the entire N.C. childhood population from 2011-2013, **0.33% were hospitalized** as a result of an injury.

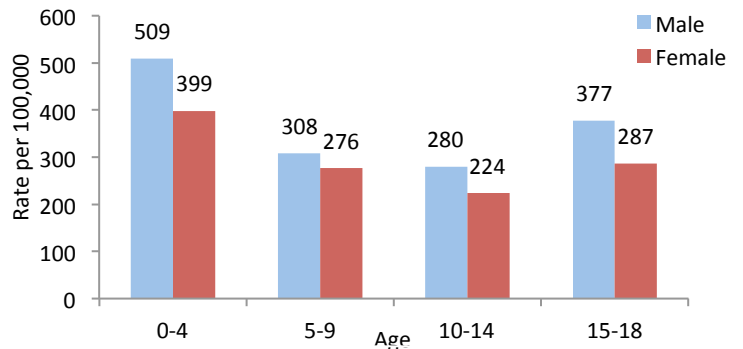
As *Figure 7* exemplifies, males had a consistently higher rate of ED visits than females, for all ages in 2013-2014. Among males, the **highest rate was 10,699 visits per 100,000 males, ages 15-18.** Females of the same age group had a rate of 7,822 visits per 100,000. Children ages 10-14 had the lowest rates for male and female ED visits in North Carolina. During 2013-2014, **8% of the childhood population visited the ED visits for an injury.**

**Figure 5: N.C. Childhood Injury Deaths by Age and Sex, Age 0-18: 2011-2014 (n=1068)**



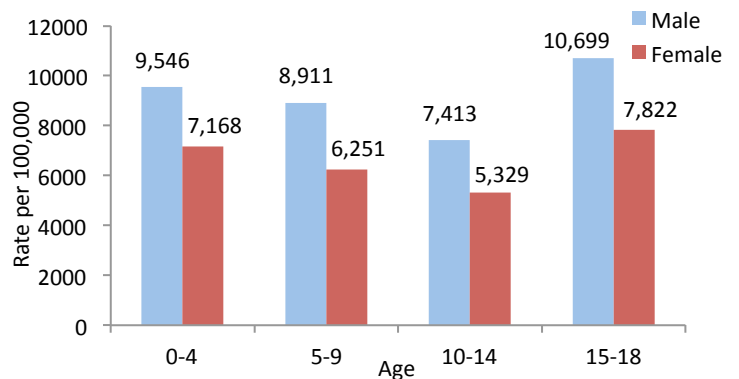
Note: 4 missing age (Figure 5)

**Figure 6: N.C. Childhood Injury Hospitalizations by Ages and Sex, Age 0-18: 2011-2013 (n=22,775)**



Note: 2 missing sex (Figure 6)

**Figure 7: N.C. Childhood Injury ED Visits by Age and Sex, Ages 0-18: 2013-2014 (n=352,049)**



Note: 29 missing sex (Figure 7)

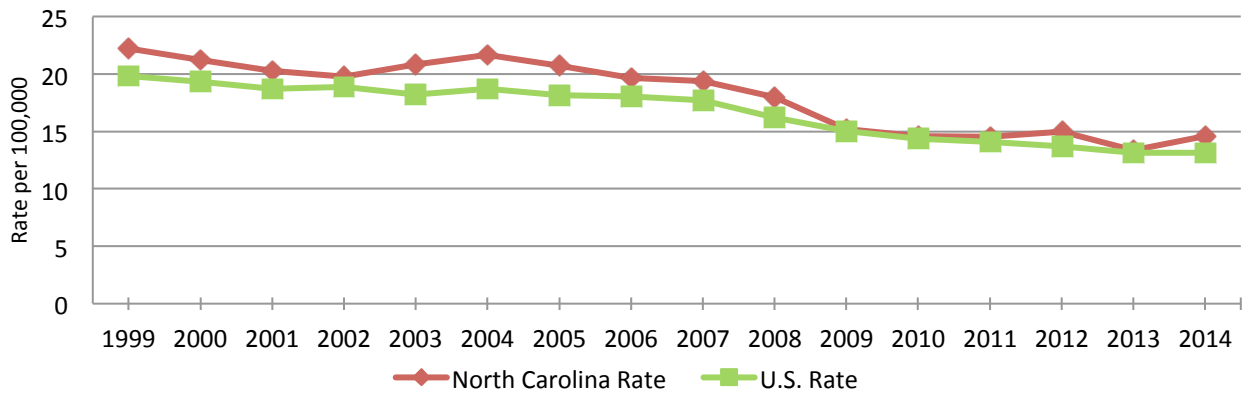


## Comparison to the United States and Comparison over Time

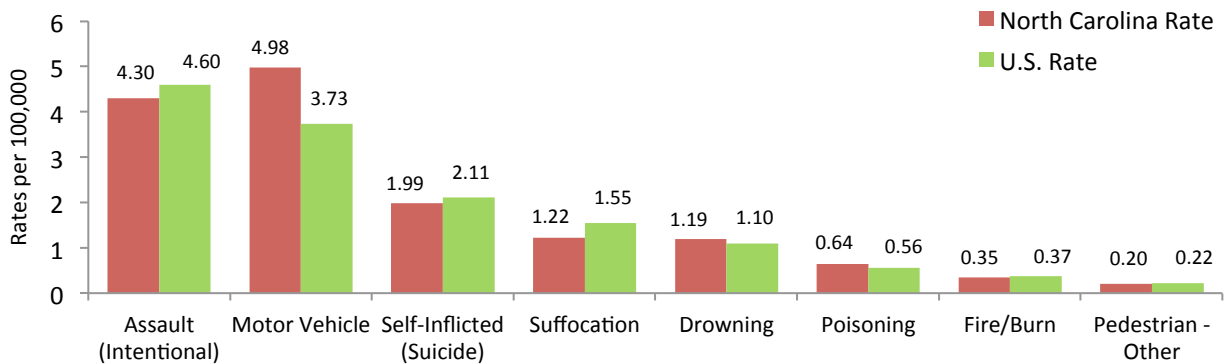
The childhood injury-related mortality rates in North Carolina and the United States followed similar trends from 1999-2013. In 2013-2014, the childhood injury-related death rate in N.C. increased (13.4 to 14.6 deaths/100,000 children) while the national mortality rate plateaued (13.1 deaths/100,000 children). Throughout the 15 year period in *Figure 9*, N.C. had a consistently higher injury-related rate of death for children ages 0-18 than the rate for the entire U.S.

**Assault and motor vehicle injuries were the leading causes of injury-related death for 0-18 year olds in the U.S. and N.C. from 2011-2014.** N.C.'s childhood mortality rate for motor vehicle crashes (4.98 deaths/100,000 children) was greater than the national rate (3.73 deaths/100,000 children). N.C.'s mortality rate for drowning and poisoning also exceeded the U.S.' mortality rates. However, the U.S. had a higher assault mortality rate (4.6 deaths/100,000 children) than N.C. (4.3 deaths/100,000 children) during the same time period. National childhood mortality rates were also greater than N.C.'s rates for suicide, suffocation, fire/burn, and pedestrian (other) injuries.

**Figure 9: Child Injury Death Rates in the United States and North Carolina, Ages 0-18: 1999-2014**



**Figure 10: Child Injury Death Rates in North Carolina and the United States by Type of Injury, Ages 0-18: 2011-2014**



*Note: All types of injury in Figure 10 are unintentional, unless otherwise indicated. Rates from WISQARS are age-adjusted and comparable to national rates.*

## Hospitalization Charges for Childhood Injuries from 2011-2013

Between 2011 and 2013, hospitalizations from childhood injuries in North Carolina generated nearly **\$842 million** in medical and economic expenses. Referring to *Figure 11*, **unintentional childhood injuries were the cause of 34% (\$289 million) of total hospitalization charges**. Assault and self-inflicted injuries each accounted for 3% of total charges.

*Figure 12* reflects the economic burden of unintentional motor vehicle crashes, falls, and fire and burn injuries on children and their families.

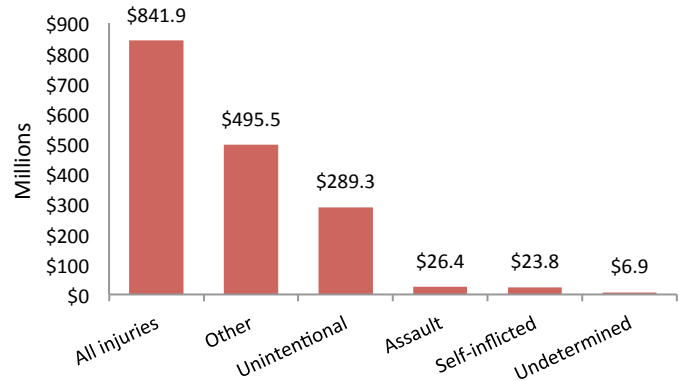
Median charges in *Figure 13* estimate the charge per injury for specific types of childhood injury. Disparities in median charges can be attributed to differences in each patient’s case, including the extent of trauma, types of procedures and treatments, and length of hospital stay.

**Firearm (assault, self-inflicted, and unintentional) injuries have the most expensive median hospitalization charges per case, followed by motor vehicle crashes.**

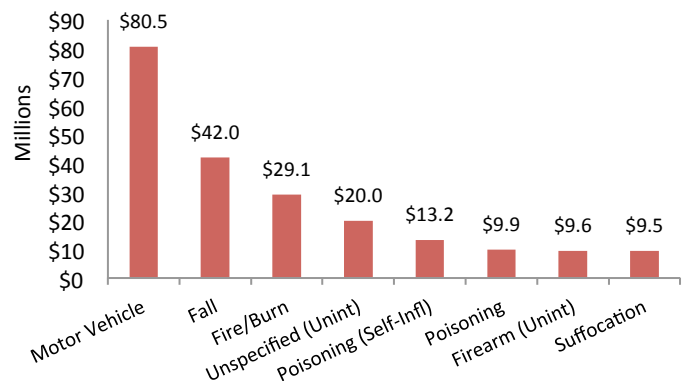
These charges provide an estimate of the financial toll of the medical care requiring hospitalization for childhood injuries, but do not account for the indirect costs of childhood injury that contribute to a greater burden on children and their families. Such indirect costs include lost productivity and a decreased quality of life.

*Note:*  
*Int = intentional injury;*  
*Unint = unintentional injury;*  
*Self-Infl = self-inflicted injury.*

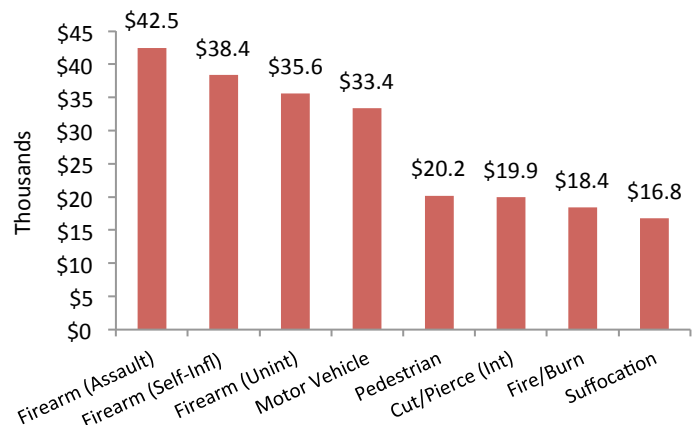
**Figure 11: Total Hospitalization Charges for Childhood Injuries in N.C., Age 0-18: 2011-2013**



**Figure 12: Total Hospitalization Charges for Childhood Injury in N.C. by Type of Injury, Age 0-18: 2011-2013**



**Figure 13: Median Hospitalization Charges for Childhood Injury in N.C. by Type of Injury, Age 0-18: 2011-2013**



## 2. Types of Childhood Injury

### 2.1 Unintentional Injury

#### Motor Vehicle Injury

Among childhood injuries in N.C., motor vehicle crashes were **the leading cause (32%) of mortality**, the fourth leading cause (6%) of hospitalizations, and the sixth overall cause (5%) of ED visits.

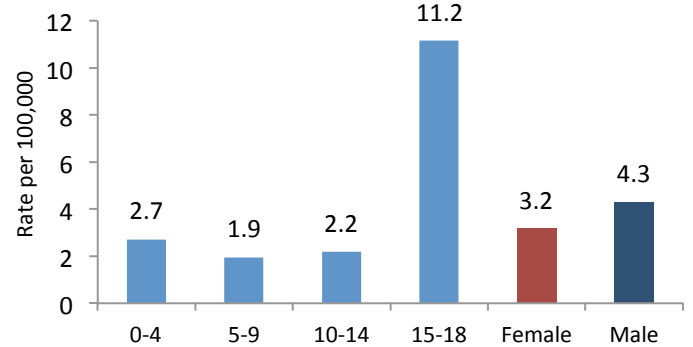
As seen in *Figures 14, 15, and 16*, childhood injuries caused by motor vehicle crashes resulted in: **343 deaths** (3.7 per 100,000 children) from 2011-2014, **1,448 hospitalizations** (21 per 100,000 children) from 2011-2013, and **17,979 ED visits** (393 per 100,000 children) from 2013-2014.

Motor vehicle crashes' hospitalization charges totaled \$80.5 million from 2011-2013. Motor vehicle injuries were the **highest mechanism for total hospitalization charges** and the fourth-highest mechanism for median hospitalization charges at \$33,392, with an average charge of \$55,619, as shown in *Table 7*.

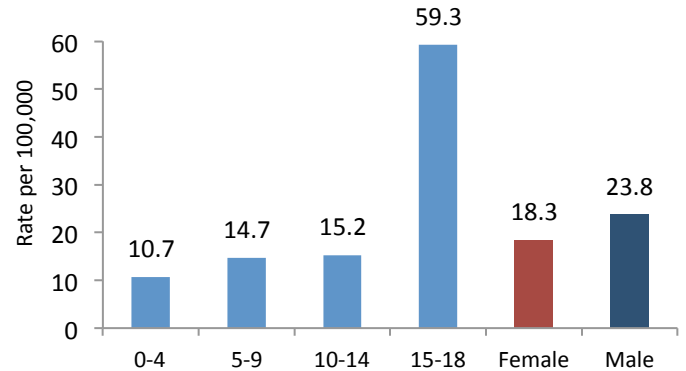
Children **ages 15-18 are significantly more affected by motor vehicle injuries in deaths, hospitalizations, and ED visits**. Note the distinct correlation between novice driving ages and rates of incidence. Additionally, males have the highest mortality and hospitalization rates, while females have the highest ED visit rates.

<b>Total Charges</b>	<b>\$80,536,090</b>
<b>Median Charges</b>	<b>\$33,392</b>
<b>Average Charge</b>	<b>\$55,619</b>

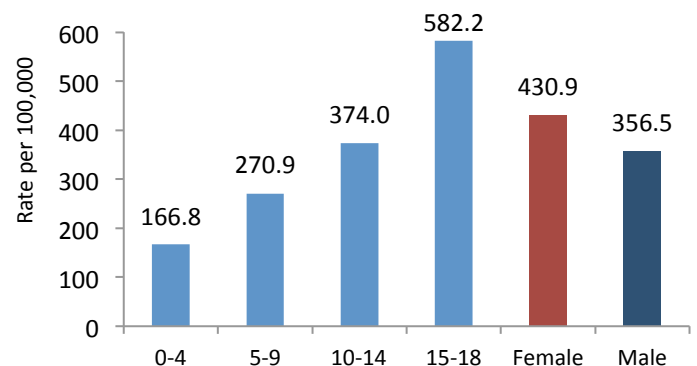
**Figure 14: N.C. Childhood Unintentional Motor Vehicle Deaths by Age and Sex, Ages 0-18: 2011-2014 (n=343)**



**Figure 15: N.C. Childhood Unintentional Motor Vehicle Injury Hospitalizations by Age and Sex, Ages 0-18: 2011-2013 (n=1448)**



**Figure 16: N.C. Childhood Unintentional Motor Vehicle ED Visits by Age and Sex, Ages 0-18: 2013-2014 (n=17,979)**



Note: 10 missing sex (Figure 16)

## Suffocation

Among childhood injuries in N.C., unintentional suffocation was the **second leading cause (11%) of mortality**, caused 1% of hospitalizations, and 0.1% of ED visits.

As seen in *Figures 17, 18, and 19*, childhood injuries caused by suffocation resulted in: **116 deaths** (1.3 per 100,000 children) from 2011-2014, **185 hospitalizations** (2.7 per 100,000 children) from 2011-2013, and **352 ED visits** (7.7 per 100,000 children) from 2013-2014.

Suffocation injuries' hospitalization charges totaled \$9.5 million from 2011-2013. **Suffocation was the eighth leading mechanism for both total and median hospitalization charges** and had an average charge of \$51,398, as shown in *Table 8*.

**Children ages 0-4 are more affected by suffocation injuries in deaths, hospitalizations, and ED visits.** Infants and young children are significantly more susceptible to suffocation. Additionally, males have the highest mortality and hospitalization rates, while females have the highest ED visit rates for suffocation injuries.

Table 8: Estimated Hospitalization Charges Resulting from Childhood Unintentional Suffocation Injuries in N.C., Ages 0-18: 2011-2013	
Total Charges	\$9,508,653
Median Charges	\$16,817
Average Charge	\$51,398

Figure 17: N.C. Childhood Unintentional Suffocation Deaths by Age and Sex, Ages 0-18: 2011-2014 (n=116)

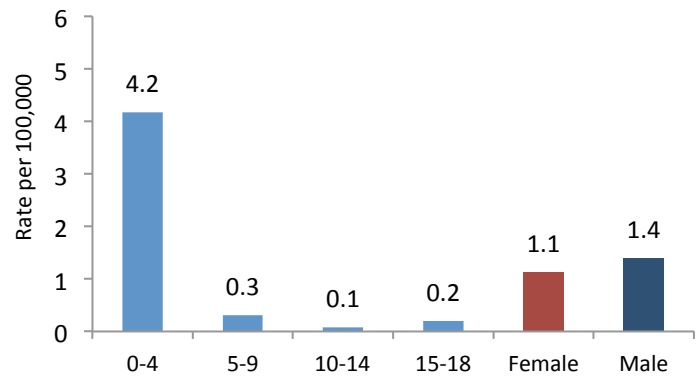
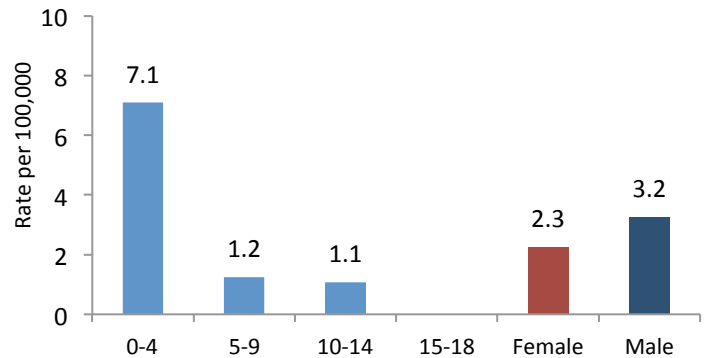
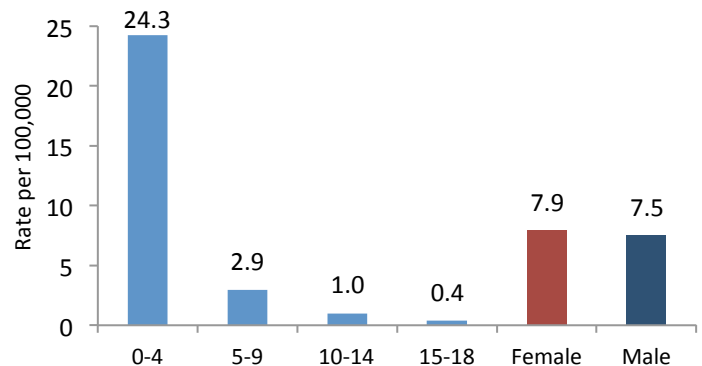


Figure 18: N.C. Childhood Unintentional Suffocation Hospitalizations by Age and Sex, Ages 0-18: 2011-2013 (n=185)



Note: Data suppressed if n<10 (Figure 18)

Figure 19: N.C. Childhood Unintentional Suffocation ED Visits by Age and Sex, Ages 0-18: 2013-2014 (n=352)



## Drowning

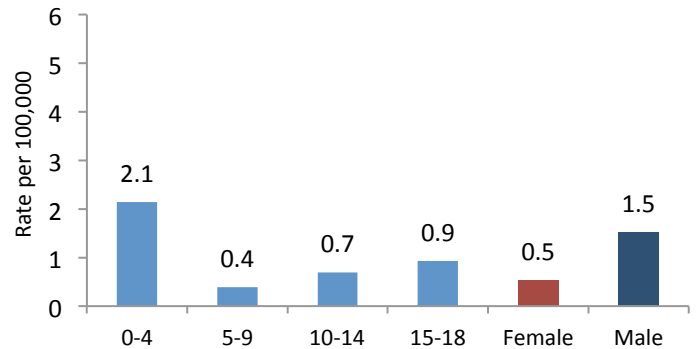
Among childhood injuries in N.C., drowning was the **third leading cause (8.9%) of mortality** and responsible for 0.5% of hospitalizations and 0.05% ED visits.

As seen in *Figures 20, 21, and 22*, Childhood injuries caused by drowning resulted in: **95 deaths** (1.0 per 100,000 children) from 2011-2014, **119 hospitalizations** (1.7 per 100,000 children) from 2011-2013, and **173 ED visits** (3.8 per 100,000) from 2013-2014.

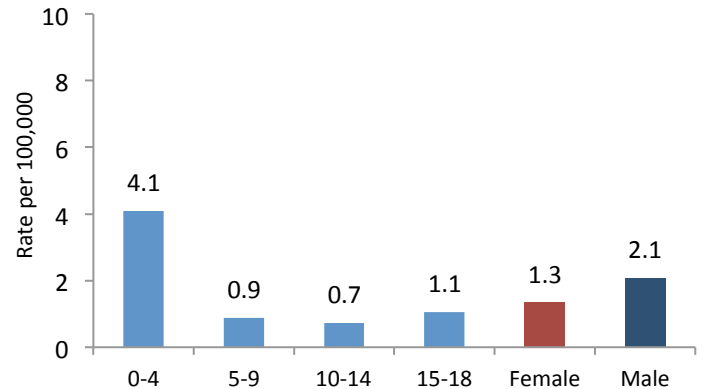
Drowning injuries' hospitalization charges totaled \$4.1 million from 2011-2013. Drowning was the 10<sup>th</sup> leading mechanism for total hospitalization charges and 13<sup>th</sup> leading mechanism for median hospitalization charges, with a median charge of \$9,474 and an average charge of \$34,129, as referenced in *Table 9*.

**Children ages 0-4 are most affected by drowning injuries in deaths, hospitalizations, and ED visits.** Infants and young children are significantly more susceptible to drowning. Additionally, males have greater mortality, hospitalization, and ED visit rates than females for drowning injuries.

**Figure 20: N.C. Childhood Unintentional Drowning Deaths by Age and Sex, Ages 0-18: 2011-2014 (n=95)**



**Figure 21: N.C. Childhood Unintentional Drowning Hospitalizations by Age and Sex, Ages 0-18: 2011-2013 (n=119)**



Note: 1 missing sex (Figure 21)

**Figure 22: N.C. Childhood Unintentional Drowning ED Visits by Age and Sex, Ages 0-18: 2013-2014 (n=173)**

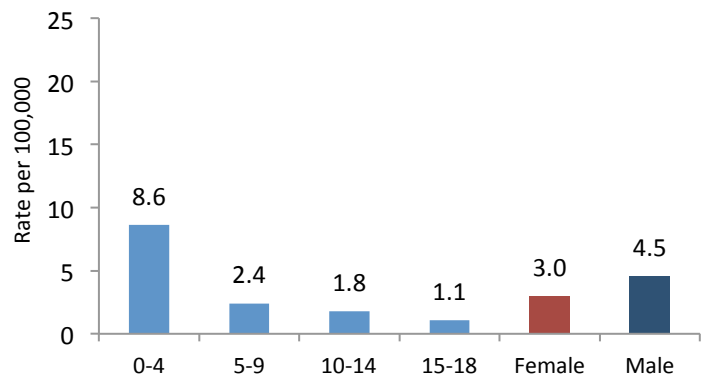


Table 9: Estimated Hospitalization Charges Resulting from Childhood Unintentional Drowning Injuries in N.C., Ages 0-18: 2011-2013	
Total Charges	\$4,061,386
Median Charges	\$9,474
Average Charge	\$34,129



## Fire/Burn

Among childhood injuries in N.C., fire/burns were the eighth leading cause (3%) of mortality, the sixth leading cause (4%) of hospitalizations, and the 14th overall cause (1%) of ED visits.

As seen in *Figures 23, 24, and 25*, childhood injuries caused by fire/burns resulted in: **34 deaths** (0.4 per 100,000 children) from 2011-2014, **1,010 hospitalizations** (14.7 per 100,000 children) from 2011-2013, and **3,820 ED visits** (83.5 per 100,000 children) from 2013-2014.

Fire and burns' hospitalization charges totaled \$29.1 million from 2011-2013. Fire and burn injuries were the **third-highest mechanism for total hospitalization charges** and the **seventh-highest mechanism for median hospitalization charges** at \$18,436, with an average charge of \$28,792, as shown in *Table 10*.

Children ages 0-4 are most affected by fire and burns in hospitalizations and ED visits, and are equally affected as children ages 5-9 in death. Additionally, males have the higher rates than females for mortality, hospitalizations, and ED visits related to fire and burn injuries.

Table 10: Estimated Hospitalization Charges Resulting from Childhood Fire/Burn Unintentional Injuries in N.C., Ages 0-18: 2011-2013	
Total Charges	\$29,079,886
Median Charges	\$18,436
Average Charge	\$28,792

Figure 23: N.C. Childhood Unintentional Fire/Burn Deaths by Age & Sex, Ages 0-18: 2011-2014 (n=34)

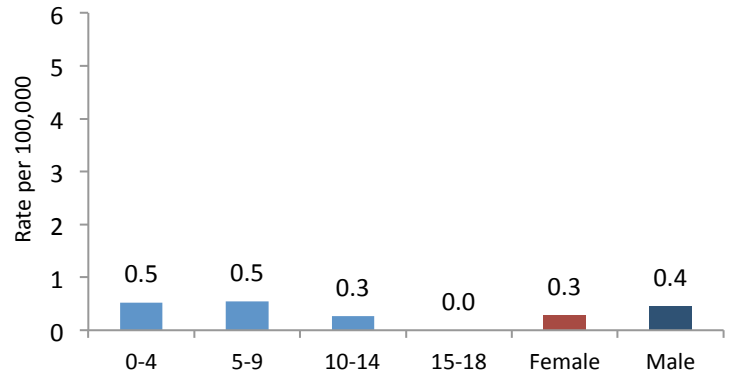


Figure 24: N.C. Childhood Unintentional Fire/Burn Hospitalizations by Age & Sex, Ages 0-18: 2011-2013 (n=1010)

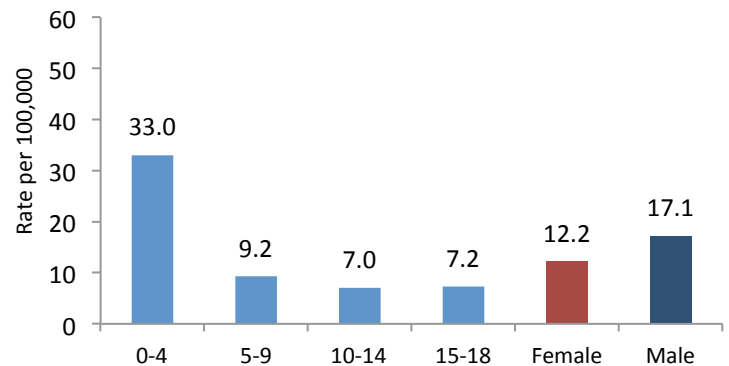
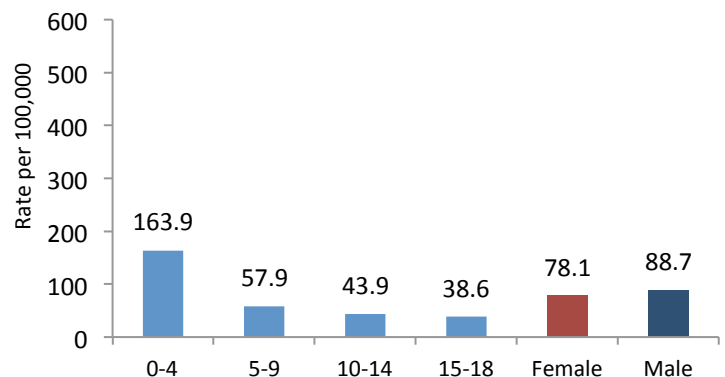


Figure 25: N.C. Childhood Unintentional Fire/Burn Emergency Department Visits by Age & Sex, Ages 0-18: 2013-2014 (n=3820)



## Falls

Among childhood injuries in N.C., falls are the second leading cause (20%) of ED visits, and the third leading cause (10%) of hospitalizations.

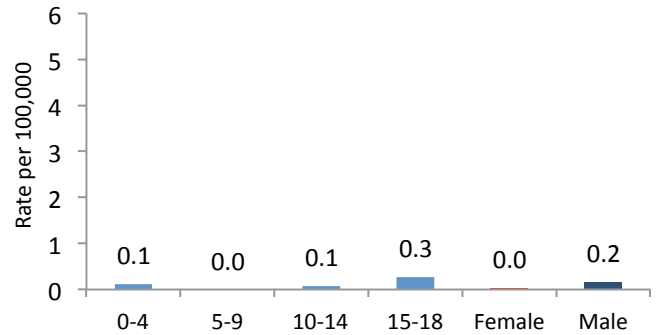
As seen in *Figures 26, 27, and 28*, childhood injuries caused by falls resulted in: **9 deaths** (0.1 per 100,000 children) from 2011-2014, **2,194 hospitalizations** (32 per 100,000 children) from 2011-2013, and **71,203 ED visits** (1,557 per 100,000 children) from 2013-2014.

Hospitalization charges resulting from falls totaled \$42 million from 2011-2013. Fall injuries were the **second-highest mechanism for total hospitalization charges** and the **seventh-highest mechanism for median hospitalization charges** at \$13,986, with an average charge of \$19,137, as shown in *Table 11*.

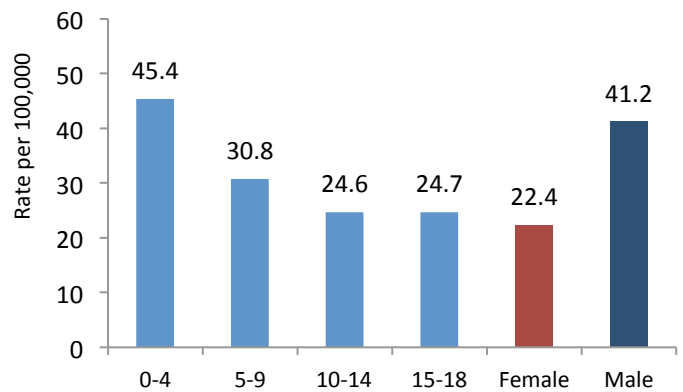
Children ages 0-4 are most affected by fall injuries in hospitalization and ED visits, while adolescents ages 15-18 suffer the most deaths from unintentional falls. However, children of all ages suffer injuries from falls that result in ED visits, hospital admissions and mortality. Additionally, males are more susceptible to fall injuries than females.

<b>Total Charges</b>	<b>\$41,967,724</b>
<b>Median Charges</b>	<b>\$13,986</b>
<b>Average Charge</b>	<b>\$19,137</b>

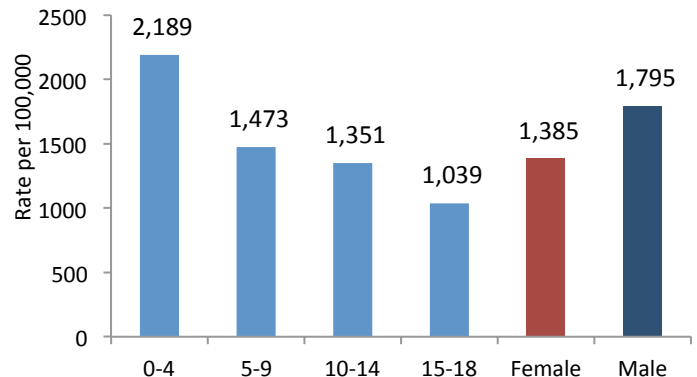
**Figure 26: N.C. Child Unintentional Fall Injury Deaths by Age and Sex, Ages 0-18: 2011-2014 (n=9)**



**Figure 27: N.C. Child Unintentional Fall Injury Hospitalizations by Age and Sex, Ages 0-18: 2011-2013 (n=2194)**



**Figure 28: N.C. Child Unintentional Fall Injury ED Visits by Age and Sex, Ages 0-18: 2013-2014 (n=71,200)**



## Poisoning

Among childhood injuries in N.C., unintentional poisoning was the seventh leading cause of both mortality (4%) and hospitalizations (4%), and the 10th overall cause (2%) of ED visits.

As seen in *Figures 29, 30, and 31*, childhood injuries caused by unintentional poisoning resulted in: **38 deaths** (0.4 per 100,000 children) from 2011-2014, **844 hospitalizations** (12.3 per 100,000 children) from 2011-2013, and **6,714 ED visits** (146.8 per 100,000 children) from 2013-2014.

Unintentional poisonings' hospitalization charges totaled \$10 million from 2011-2013. Poisoning injuries were the **sixth-highest for total hospitalization charges** and the 15<sup>th</sup> ranked mechanism for median hospitalization charges at \$6,368, with an average charge of \$11,711, as shown in *Table 12*.

Children ages 15-18 and males suffered the most fatalities as a result of unintentional poisoning. Children ages 0-4 were dramatically more affected by poisoning in hospitalizations and ED visits. Additionally, males had slightly higher rates of incidence for hospitalizations and ED visits.

Table 12: Estimated Hospitalization Charges Resulting from Childhood Unintentional Poisoning Injuries in N.C., Ages 0-18: 2011-2013	
Total Charges	\$9,872,467
Median Charges	\$6,368
Average Charge	\$11,711

Figure 29: N.C. Childhood Unintentional Poisoning Deaths by Age and Sex, Ages 0-18: 2011-2014 (n=36)

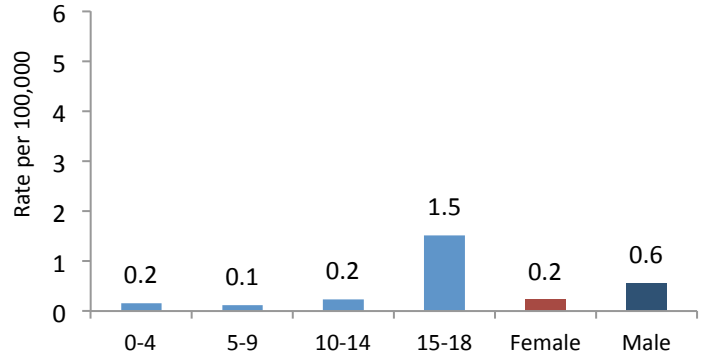


Figure 30: N.C. Childhood Unintentional Poisoning Hospitalizations by Age and Sex, Ages 0-18: 2011-2013 (n=844)

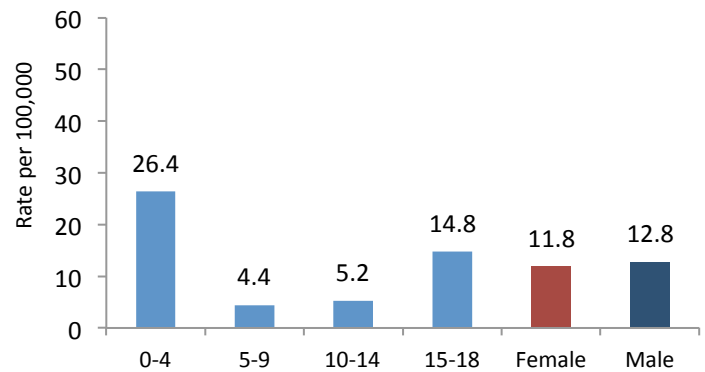
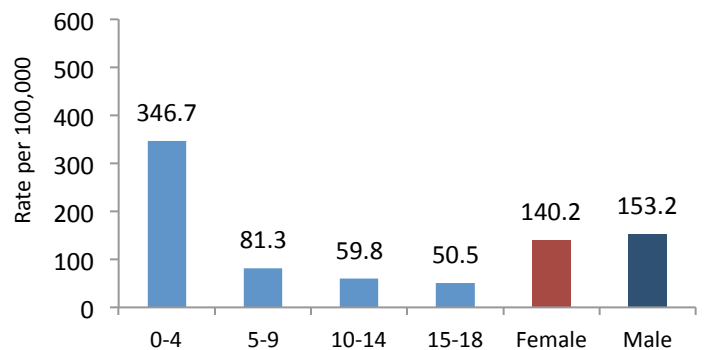


Figure 31: N.C. Childhood Unintentional Poisoning ED Visits by Age and Sex, Ages 0-18: 2013-2014 (n=6,714)



## Pedestrian

Among childhood injuries in N.C., unintentional pedestrian injuries were the fourteenth-ranked cause (1%) of mortality, the 28<sup>th</sup> cause (0.2%) of hospitalization, and the 25<sup>th</sup> overall cause (0.1%) of ED visits.

As seen in *Figures 32, 33, and 34*, childhood injuries caused by pedestrian injuries resulted in: **15 deaths** (0.2 per 100,000 children) from 2011-2014, **50 hospitalizations** (0.2 per 100,000 children) from 2011-2013, and **191 ED visits** (191 per 100,000 children) from 2013-2014.

Pedestrian injuries' hospitalization charges totaled \$2.1 million from 2011-2013, the 12<sup>th</sup> highest mechanism for total hospitalization charges, and the **fifth-highest mechanism for median hospitalization charges** at \$20,187, with an average charge of \$42,312, as shown in *Table 13*.

Children ages 0-4 are most affected by pedestrian injuries in deaths and hospitalizations. Children ages 0-9 are equally affected by pedestrian injuries in ED visits. Males have the highest rates of hospitalization and ED visits, while females have a higher mortality rate.

Table 13: Estimated Hospitalization Charges Resulting from Childhood Unintentional Pedestrian Injuries in N.C., Ages 0-18: 2011-2013	
Total Charges	\$2,115,597
Median Charges	\$20,187
Average Charge	\$42,312

Figure 32: N.C. Child Unintentional Pedestrian Injury Deaths by Age and Sex, Ages 0-18: 2011-2014 (n=15)

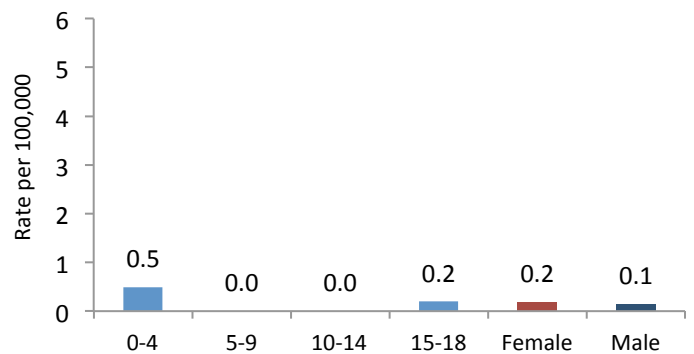


Figure 33: N.C. Child Unintentional Pedestrian-Related Injury Hospitalizations by Age and Sex, Ages 0-18: 2011-2013 (n=50)

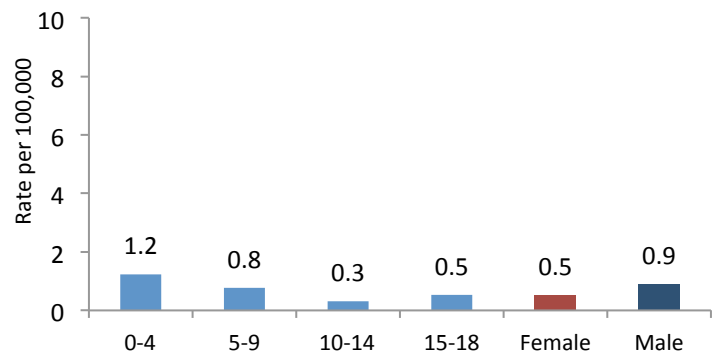
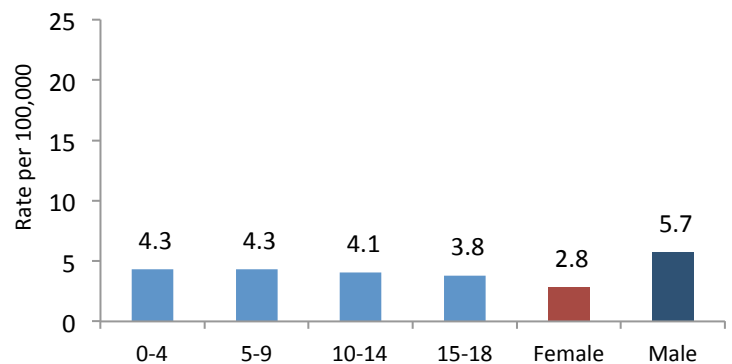


Figure 34: N.C. Child Unintentional Pedestrian Injury ED Visits by Age and Sex, Ages 0-18: 2013-2014 (n=191)



## 2.2 Intentional Injury

### Assault

Among childhood injuries in N.C., assault was the second leading overall cause (15%) of mortality, the fifth leading cause (7%) of hospitalization, and the third leading cause (2%) of ED visits.

As seen in *Figures 35, 36, and 37*, Childhood injuries caused by assault resulted in: **159 deaths** (1.7 per 100,000 children) from 2011-2014, **712 hospitalizations** (10.4 per 100,000 children) from 2011-2013, and **5,201 ED visits** (113.7 per 100,000 children) from 2013-2014.

Assault is the intent underlying 3% of total hospitalization charges, with a total of \$26 million from 2011-2013. Assault inflicted by firearms was ninth-leading mechanism for total hospitalization charges and **the leading mechanism for median hospitalization charges** at \$42,466, with an average charge of \$64,542, as shown in *Table 14*.

Children ages 0-14 and 15-18 have the highest mortality and hospitalization rates, with the 15-18 year old age group being most affected. Additionally, males are more affected by assault injuries than females, as exemplified by a mortality rate more than double that of females.

Table 14: Estimated Hospitalization Charges Resulting from Childhood Assault Injuries in N.C., Ages 0-18: 2011-2013	
Total Charges	\$6,066,982
Median Charges	\$42,466
Average Charge	\$64,542

Figure 35: N.C. Childhood Intentional Assault Injury Deaths by Age and Sex, Ages 0-18: 2011-2014 (n=159)

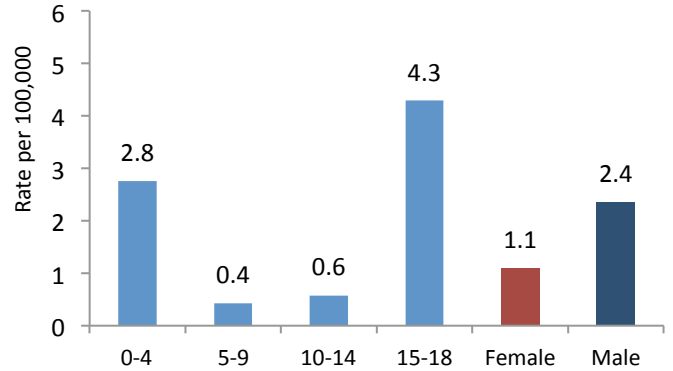


Figure 36: N.C. Childhood Intentional Assault Injury Hospitalizations by Age and Sex, Ages 0-18: 2011-2013 (n=712)

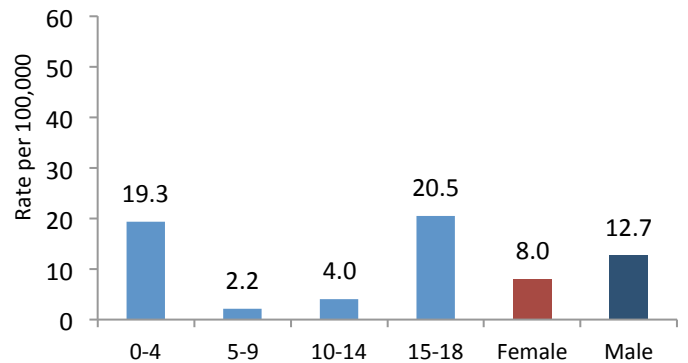
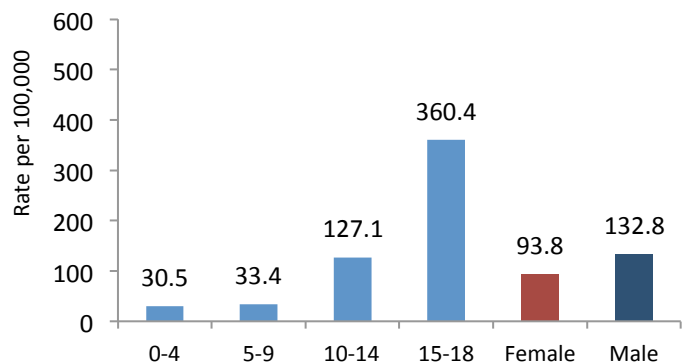


Figure 37: N.C. Childhood Intentional Assault Injury ED Visits by Age and Sex, Ages 0-18: 2013-2014 (n=5,201)



Injuries resulting from assault accounted for **15% of overall childhood injury-related mortality**, at a rate of 1.7 deaths per 100,000 children from 2011-2014. The leading causes of assault deaths are firearms (50%), unspecified (16%) and other specified/classified (15%).

Hospitalizations from assault only accounted for 3% of admissions from 2011 to 2013, occurring at a rate of 10.4 per 100,000 children. The other specified/classified mechanism (44%) was the leading causes of assault hospitalizations, followed by unspecified (13%), other specified/not classified (12%), and striking (10%).

Assault was responsible for 1% of ED visits from 2013-2014, with a rate of 113.7 visits per 100,000 children. Of assault ED visits, the leading mechanisms of assault were striking (49%), other specified (both classified and not classified, 31%), unspecified (14%), cut or piercing (3%), and firearms (2%).

While firearms are a leading mechanism for both assault mortality and hospitalizations, there were a total of 268 assault injuries involving firearms. In contrast, there were 2,607 injuries from striking and 206 injuries from a cut or piercing.

Table 15: N.C. Types of Childhood Assault Injury Deaths, Ages 0-18: 2011-2014	
Injury Type	Number of Deaths
Firearm	80
Unspecified	25
Other Specified/ Classified	24
Cut/Pierce	10
Suffocation	9
Other Specified/ NEC*	5
Poisoning	3
Drowning	1
Struck	1
Fire/Burn	1
<b>Total</b>	<b>159</b>

Table 16: N.C. Types of Childhood Assault Injury Hospitalizations, Ages 0-18: 2011-2013	
Injury Type	Number of Admissions
Other Specified/ Classified	313
Unspecified	96
Firearm	94
Other Specified/ Not Classified	85
Struck	68
Cut/Pierce	36
Fire/Burn	12
Poisoning	5
Suffocation	2
Fall	1
<b>Total</b>	<b>712</b>

Table 17: N.C. Types of Childhood Assault Injury ED Visits, Ages 0-18: 2013-2014	
Injury Type	Number of Visits
Struck	2,538
Other Specified/ Not Classified	855
Other Specified/ Classified	775
Unspecified	746
Cut/Pierce	160
Firearm	84
Suffocation	14
Fire/Burn	13
Fall	7
Poisoning	7
Motor Vehicle	2
<b>Total</b>	<b>5,201</b>

Note: NEC = not elsewhere classified.

## 2.3 Self-Inflicted

### Suicide / Self-Inflicted Injury

Among childhood injuries in N.C., self-inflicted injuries were the third leading overall cause (13%) of mortality, the second leading cause (19%) of hospitalization, and the fourth leading cause (1%) of ED visits.

Childhood injuries caused by self-infliction resulted in: **136 deaths** (1.5 per 100,000 children) from 2011-2014, **2,086 hospitalizations** (30.4 per 100,000 children) from 2011-2013, and **3,136 ED visits** (68.6 per 100,000 children) from 2013-2014.

Self-infliction is the intent responsible for 3% of all injury hospitalization charges, totaling at \$24 million from 2011-2013. Self-harm by intentional drug poisoning is the **fifth leading mechanism for total hospitalization charges**; while self-harm by firearm is the **second-highest mechanism for median hospitalization charges**.

Though children ages 10-14 suffer from self-inflicted injuries, ages 15-18 are most affected by self-inflicted injuries in deaths, hospitalizations, and ED visits. Additionally, males have highest mortality rate, while females have the highest hospitalization and ED visit rates for self-inflicted injuries.

Table 18: Estimated Hospitalization Charges Resulting from Intentional Self-Inflicted Injuries in Children in N.C., Ages 0-18: 2011-2013	
Total Charges	\$23,766,677
Median Charges	\$8,722
Average Charge	\$11,393

Figure 38: N.C. Childhood Suicides by Age and Sex, Ages 0-18: 2011-2014 (n=136)

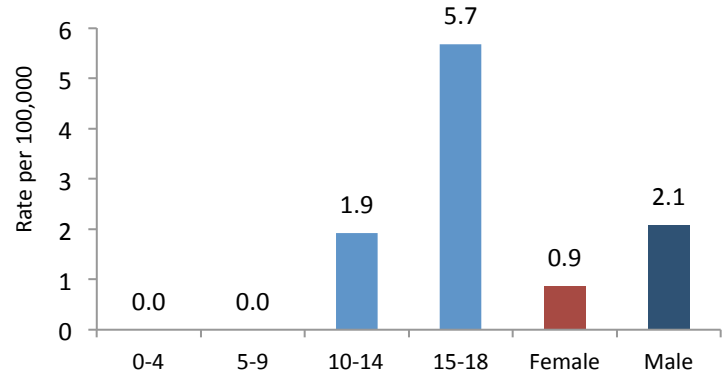


Figure 39: N.C. Childhood Intentional Self-Inflicted Injury Hospitalization by Age and Sex, Ages 0-18: 2011-2013 (n=2086)

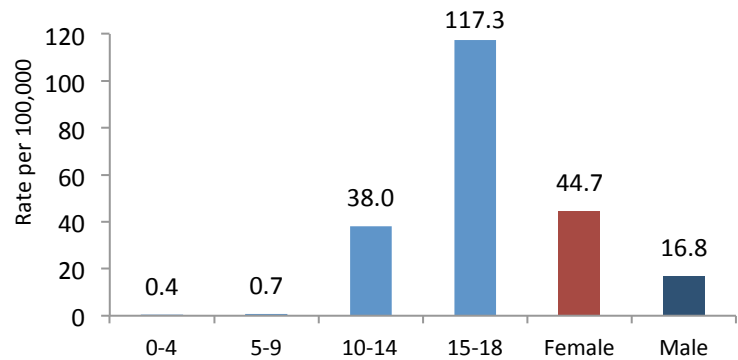
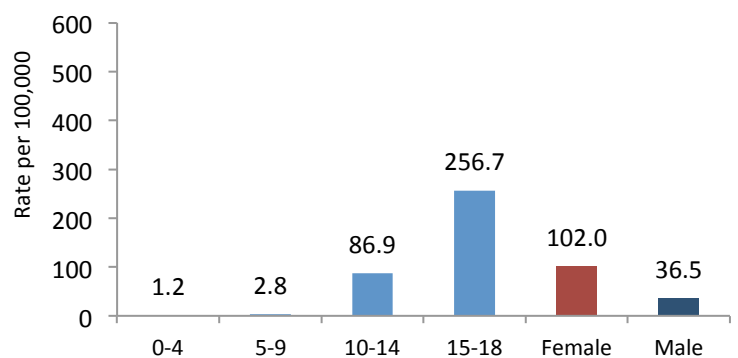


Figure 40: N.C. Childhood Intentional Self-Inflicted Injury ED Visits by Age and Sex, Ages 0-18: 2013-2014 (n=3136)



Injuries resulting from intentional self-inflictions accounted for **13% of overall childhood injury related mortality**, at a rate of 1.5 deaths per 100,000 children from 2011 to 2014. The most prevalent methods of suicide are suffocation (51%) and firearms (43%).

Hospitalizations from self-inflictions accounted for 9% of admissions from 2011 to 2013, occurring at a rate of 30.4 per 100,000 children. Poisoning (63%) was the leading cause of intentional self-inflicted hospitalizations, followed by cut or piercing (19%) and unspecified (13%).

Intentional self-inflicted injuries caused 1% of ED visits from 2013-2014, at a rate of 68.6 visits per 100,000 children. Of intentionally self-inflicted ED visits, the leading mechanisms were poisoning (63%) and cut and piercing (33%).

Poisoning and cuts and piercing were the most frequently utilized mechanisms for intentionally self-inflicted injuries. From this data set, there were a total of 3,301 incidences of poisoning and 1,418 incidences of cuts and piercing. While both poisoning and cuts and piercings largely contributed to hospitalizations and ED visits, they were not primary causes of mortality.

Type of Self-Inflicted Injury	Number of Deaths
Suffocation	70
Firearm	58
Poisoning	3
Drowning	2
Other Specified/Classified	2
Fire/Burn	1
<b>Total</b>	<b>136</b>

Type of Self-Inflicted Injury	Number of Admissions
Poisoning	1,309
Cut/Pierce	398
Unspecified	265
Suffocation	40
Other Specified/Not Classified	37
Firearm	12
Fall	11
Fire/Burn	7
Other Specified/Classified	5
Motor Vehicle	2
<b>Total</b>	<b>2,086</b>

Type of Self-Inflicted injury	Number of Visits
Poisoning	1,989
Cut/Pierce	1,020
Other Specified/Not Classified	232
Unspecified	142
Suffocation	27
Fall	11
Firearm	5
Fire/Burn	4
Other Specified/Classified	3
Drowning	1
Motor Vehicle	1
Natural/Environment	1
<b>Total</b>	<b>3,136</b>



### 3. Conclusions and Recommendations

Injury is a significant source of morbidity and mortality for children ages 0-18 in North Carolina, and it is a largely preventable problem. The purpose of this report is to achieve a greater understanding of the most significant causes of childhood injury in the state, especially those that create the greatest social, psychological, and economic burden on society. A better understanding of these injuries can help guide prevention efforts to where they will be most effective.

#### Summary of Statistics

- Childhood injuries in N.C. resulted in a total of: **1,068 deaths** from 2011-2014, **22,775 hospitalizations** from 2011-2013, and **352,049 emergency department visits** from 2013-2014.
  - 70% of injury deaths were unintentional in nature.
  - Overall, **males had higher rates of injury incidence** than females.

**Every day in N.C....**  
**1 child dies from injury.**  
**21 children are hospitalized for an injury.**  
**322 children visit the emergency department for an injury.**

- **Leading mechanisms of death** amongst children from 2011-2014 in N.C. are unintentional motor vehicle crashes (32%), unintentional suffocation (11%), and unintentional drowning (9%).
  - For children ages 0-4, the leading cause of death was unintentional suffocation, and motor vehicle crashes claimed the most lives of children 5-18.
- **Leading causes of hospitalization** from 2011-2013 in N.C. children were adverse effects (24%), unknown causes (19%), unintentional falls (10%), and unintentional motor vehicle crashes (6%).
  - For children ages 0-9, the leading cause of hospitalization was unintentional falls. Children ages 10-18 suffered the most hospitalizations from self-inflicted injuries.
  - For children ages 10-18, the leading cause of hospitalization was intentionally self-inflicted injuries.
- **Leading causes of emergency department visits** from 2013-2014 in N.C. were unknown (27%), unintentional falls (20%), unintentional striking (12%), and unintentional natural/environmental mechanisms (6%).
  - Falls were the leading mechanism of injury related ED visits for all children, ages 0-18.
- **Injury mortality rates for children in N.C. have been consistently higher than the national average**, with an increase in disparity from 2013-2014. Both national and N.C. rates have an overall decreasing trend in injury from 1999-2014.

## Recommendations

Statewide injury prevention efforts should mirror national initiatives to reduce childhood injury rates. The following evidence-based recommendations are based on expert review for The Community Guide for Preventive Services and the National Action Plan for Child Injury Prevention. The below list of recommendations is not exclusive and are merely examples of efforts that can reduce injury.

### Motor Vehicle & Traffic Injury Prevention

For younger children, child safety seat laws and access can reduce the frequency of injuries caused by motor vehicle and traffic crashes.

- Increasing the enforcement of child safety seat laws that “require children riding in motor vehicles to be restrained in federally approved infant or child safety seats,” can decrease the injuries incurred to smaller children upon impact [6].
- Increase seat distribution programs to increase access of child safety seats to low-income parents and caregivers [6].

For teenagers and young drivers, who suffer the significantly more from motor vehicle crash injuries, strong evidence encourages policy for graduated drivers licensing programs.

- Implement and/or strengthen graduated drivers licensing program [7].
- Driver inexperience is the chief cause of motor vehicle crashes involving teenagers. Teenage drivers are the biggest safety threat to themselves and their peers. Hence, graduated driver licensing protects and prevents injuries for all drivers and passengers through three-stage systems: learner’s permit, provisional license, and then unrestricted license.
- Intermediate, or provisional, licenses can restrict teenage drivers’ passengers, curfews, cell phone usage, and more [8].

For all passengers and drivers, seat belt usage is critical in preventing, or at least limiting the extent of, motor vehicle crash injuries.

- Increasing and enhancing primary enforcement of safety seat belt laws can decrease the number of injuries incurred by motor vehicles. Such initiatives include “Click-it-or-ticket” campaigns [6], [7].

It is illegal for any child to consume alcohol. For all children and adults, drivers under the influence of alcohol risk the safety and health of every person in a motor vehicle.

- Maintaining laws that prohibit persons ages 21 and younger from consumer alcohol are an additional measure to prevent motor vehicle crashes [6].

### Suffocation Injury Prevention

Knowledge of cardiopulmonary resuscitation (CPR) procedures can improve health outcomes under the circumstances of a suffocation injury.

- Increasing and facilitating opportunities for CPR training targeted towards older children, parents, day care providers and caregivers can prevent deaths when a child is deprived of adequate air and oxygen [7].

Young children are vulnerable to suffocation while sleeping. Hence, it is important for all parents understand healthy sleeping positions.

- Educating parents on the importance of safe sleeping and healthy sleep positions can decrease the rate of child suffocation incidents. Well-child exams are effective platforms to discuss healthy sleeping positions and for providers to promote the “Safe to Sleep” campaign [7].

Community and school recreational grounds can contribute toward preventive measures against childhood suffocation.

- Park and school ground designers should carefully design and maintain playgrounds so that they “reduce entrapment, suffocation, and strangulation” [7].

### **Drowning Injury Prevention**

Increasing the knowledge and prevalence of life saving skills in communities can decrease the rate of children suffering from drowning injuries.

- Increasing the accessibility and availability of CPR training in communities can increase the number of older children and adults that are able to save lives in drowning (and other medical) emergencies. Offering free or reduced CPR classes and/or offering courses at more convenient locations will increase the number of people who will be able to receive CPR training.
- Similarly, by increasing the accessibility and availability of swimming lessons in communities, more children will develop and strengthen their swimming and water survival skills. Offering free or reduced-cost swimming lessons allows more children to develop strong enough water skills to prevent drowning [7].

Private, backyard swimming pools pose a great risk to young children’s safety. Small children can accidentally fall into pools without parental knowledge or supervision and drown.

- Requiring all swimming pools to have a four-sided isolation fence, completely separate from the house and yard, with self-closing and self-latching gates will prevent unsupervised children from accessing a body of water and consequent drowning hazard [7].

Swimming pools are not the only drowning hazard for children; natural bodies of water threaten childhood drowning, as well.

- Enforcing laws mandating children younger than 13 to wear life jackets “in and around natural bodies of water, such as lakes or the ocean” (regardless of swimming ability) and swimming pools (for weaker swimmers) will reduce children’s risk for drowning injuries [7].

### **Falls Injury Prevention**

Homes contain a plethora of fall hazards. To reduce the risk of fall injuries at home, preventive measures can be taken to protect children’s health and safety.

- “Build[ing] capacity through community preventive services and local health departments to integrate assessment of fall home hazards into other ongoing home assessments (e.g. lead poisoning)” can increase the identification and recommendation for removal of fall hazards [7].
- Particularly for younger children, increasing the “amount and use of protective devices,” such as handrails in stairwells and window guards can reduce the risk of childhood falls [7].

## 4. Appendix

### Appendix A: Data Sources and Technical Notes

#### Comparison of U.S. and North Carolina Injury Rates 1999-2014

The Web-based Injury Statistics Query and Reporting System (WISQARS) from the Centers for Disease Control and Prevention, National Center for Injury Prevention and Control provided the comparative U.S. and North Carolina fatal injury rates for the years 1999 to 2014 and by injury type for 2011 to 2014. Crude rates were reported unless otherwise noted. The WISQARS injury mortality reports were retrieved on March 15, 2016 from: [http://webappa.cdc.gov/sasweb/ncipc/dataRestriction\\_inj.html](http://webappa.cdc.gov/sasweb/ncipc/dataRestriction_inj.html).

#### North Carolina Population Estimates 2011-2014

The North Carolina State Center for Health Statistics (SCHS) provided North Carolina population data for the years 2011 to 2014. SCHS obtained the population data from the CDC National Center for Health Statistics bridged population file (2014 version).

#### North Carolina Death Data 2011-2014

The North Carolina State Center for Health Statistics provided death certificate data for every death in North Carolina. Only state residents with a North Carolina county address and ages 0-18 years old were analyzed for this report. Primary cause of death was assigned with the International Classification, 10th Revision; Clinical Modification (ICD-10) codes. Injuries were then classified into manner and mechanism using CDC's standard injury matrix framework.

#### North Carolina Hospital Discharge Data 2011-2013

The North Carolina State Center for Health Statistics provided data for every North Carolina hospital discharge of North Carolina residents ages 0-18. A hospital discharge occurs after a patient leaves a hospital following admission. These data do not represent number of patients, but number of discharges (multiple discharges per patient are possible). Cause of injury was assigned with International Classification, 9th Revision, Clinical Modification (ICD-9-CM) diagnosis codes and External Causes of Injury codes (E-Codes). Injuries were then classified into manner and mechanism using the CDC's Recommended Framework of E-code groupings for Presenting Injury Mortality and Morbidity Data.

#### North Carolina Emergency Department Data 2013-2014

The North Carolina Disease Event Tracking and Epidemiologic Collection Tool (NC DETECT) is North Carolina's statewide syndromic surveillance system. NC DETECT collects data from a number of secondary sources to address the need for early event detection and timely public health surveillance. NC DETECT collects near real-time emergency department (ED) visit data from all civilian 24/7 acute-care hospital-affiliated EDs in North Carolina. In 2013, NC DETECT collected ED visit data from all 124 of 124 qualifying EDs and in 2014 NC DETECT collected data from all 123 of 123 qualifying EDs (one facility closed in 2014). The ED visit data, death data, and the hospital discharge data are not mutually exclusive. The nature and mechanism of injury was assigned by hospital coders using the *International Classification, 9th Revision, Clinical Modification* (ICD-9-CM) diagnosis codes and External Causes of Injury codes (E Codes) as part of standard administrative and hospital billing procedures. Injuries were then classified into manner and mechanism of injury using the CDC's Recommended Framework of E-code groupings for Presenting Injury Mortality and Morbidity Data. For more information about NC DETECT ED data, please visit <http://www.ncdetect.org>.

**Unintentional Motor Vehicle, Traffic (MVT)**

Unintentional Motor Vehicle, Traffic (MVT) injuries were categorized as an occupant, pedestrian and/or motorcyclist injured in a motor vehicle traffic crash with an unintentional intent. This definition included injuries from incidents that involved automobiles, trucks, vans, motorcycles, and motorized cycles traveling on public roadways. This classification did not include motor vehicle non-traffic, other land transport and other transport. Cause of death ICD-10 codes: V02-V04 (.1, .9), V09.2, V12-V14 (.3-.9), V19 (.4-.6), V20-V28 (.3-.9), V29 (.4-.9), V30-V79 (.4-.9), V81.1, V82.1, V83-V86 (.0-.3), V80 (.3-.5), V87 (.0-.8), V89.2. Hospital and emergency department E-codes: E810-E819 (.0-.9).

**Unintentional Suffocation**

Deaths, Hospitalizations and ED visits resulting from choking and suffocation refer to mechanical causes (e.g., plastic bags, refrigerator entrapment, or fallen earth); pressure on the trachea (e.g., drapery cords, clothing drawstrings); and inhalation of food or foreign bodies. Fatal suffocation, such as choking in young children, typically involves not only round food products such as candies, nuts, grapes and hot dogs, but also non-food products such as undersized pacifiers, small toys, and latex balloons. Cause of death ICD-10 codes: W75-W84. Hospital and ED E-codes: E911-E913.9

**Unintentional Drowning or Near Drowning:**

Drowning and near-drowning injuries refer to those injuries caused by suffocation or near-suffocation as a result of submersion in water. If the victim survives the suffocation, severe neurological injuries may result. Drowning and near-drowning primarily occur in three environments: pools, bathtubs, and naturally occurring bodies of water such as streams, lakes, and waters along the North Carolina coast. Cause of death ICD-10 codes: W65-W74. Hospital and ED E-codes: E830.0-.9, E832.0-.9, E910.0-.9.

**Unintentional Fire or Burn**

Unintentional fire or burn injuries included injuries categorized with an unintentional intent and resulting from exposure to a fire and contact with heat or hot substances. Cause of death ICD-10 codes: X00-X19. Hospital and emergency department E-codes: E890.0-E899, E924.0-.9.

**Unintentional Fall**

Unintentional falls included falls with an unintentional intent and the following mechanisms: on same level involving ice and snow; on same level from slipping, tripping and stumbling; involving ice-skates, skis, roller-skates or skateboards; on same level due to collision with, or pushing by, another person; while being carried or supported by other persons; involving wheelchair, bed, chair or other furniture; involving playground equipment; on and from stairs and steps; on and from ladder; on and from scaffolding; from, out of, or through a building or structure; from tree; from cliff; diving or jumping into water causing injury other than drowning or submersion; from one level to another; other on same level; and unspecified. Cause of death ICD-10 codes: W00-W19. Hospital and emergency department E-codes: E880.0-E-886.9, E888.

**Unintentional Poisonings**

Unintentional poisoning included injuries with an unintentional intent resulting from ingestion of harmful drugs, medicines, gases, household products, solvents, chemicals, acids, and poisonous foods or plants. Cause of death ICD-10 codes: X40-X49. Hospital and emergency department E-codes: E850.0-E869.9.

**Unintentional Pedestrian Injuries (Non-motor vehicle related)**

Deaths, hospitalizations, and ED visits resulting from pedestrian injuries are coded in two different categories: as a subcategory under motor vehicle traffic collision (meaning the injury resulted from a collision with a motor vehicle on a public highway) or through a category labeled "Pedestrian, Other". A "Pedestrian, Other" injury

involves a pedestrian injured in a collision with a railway vehicle, a motor vehicle not on public highway, or other road vehicle (e.g., bicycle, animal being ridden, streetcar, non-motorized vehicle or object in motion). “Pedestrian, other” injuries are reported in this document. Cause of death ICD-10 codes: V01, V02-V04 (.0), V05, V06, V09 (.0,.1,.3,.9). Hospital and ED E-codes: 800-807 (.2), E820-E825 (.7), E826-E829 (.0)

### **Homicide/Assault**

Assault injuries were categorized as assault intent by any mechanism (e.g., firearm, struck, etc.). Cause of death codes: X85-Y09, Y87.1. Hospital and emergency department E-codes: E960.0-E969.9, E979, E999.1.

### **Suicide/Self-Inflicted**

Self-inflicted injuries were categorized as self-inflicted intent by any mechanism (e.g., firearm, poisoning, etc.). Cause of death code: X60-X84, Y87.0. Hospital and emergency department E-codes: E950-E959.

## **Methods**

In order to explore the extent of the current older adult injury problem in North Carolina, two methodological approaches were undertaken: (a) a quantitative analysis of mortality, hospital discharge data and emergency department visits to determine injury rates; and (b) a description of hospital charges for injuries.

### **Injury Rate Calculations**

Crude rates were reported unless otherwise specified. Mortality and hospitalization rates were calculated based on the North Carolina Death and Hospitalization files for 2011-2014 and 2011-2013, respectively. Emergency department visit rates were calculated based on NC DETECT for 2013-2014. The processes for calculating the rates for North Carolina older adult injuries were similar. First, duplicate records or records with a primary diagnosis other than injury were excluded. Next, E-codes using CDC’s injury matrix standard definitions were collapsed to create injury groups that were suitable for describing the external causes of injuries. Denominators for rate calculations were based upon age group population estimates over the specified time period (2011-2014 for deaths, 2011-2013 for hospitalizations, 2013-2014 for ED visits) from the North Carolina State Center for Health Statistics and were expressed “per 100,000 persons” unless otherwise noted.

### **Hospital Charges Calculations**

Hospital charge estimates were computed by summing the charges across all cases within each injury group (e.g., overall, unintentional falls, motor vehicle traffic, etc.). It is important to note that hospital charges reflect only a part of the cost of injuries. Physician charges, emergency vehicle services, out-patient drug charges, medical equipment and time lost from work were not included in this report. All charges were reported in that year’s dollars and were not adjusted for inflation. Hospital charges also reflect contracts that hospitals have with insurance companies.

### **Standardization of Graphic Analysis**

Use caution and observe the scale when analyzing and comparing graphs. While the importance of standardized scales in graphs is acknowledged, it was not possible in this report, due to the wide variation of rate ranges within mortality, hospitalization, and ED visit data.

### **Other E-Codes Used in Analysis**

Additional injury coding was used to categorize differing types of unintentional injuries. These codes were based on the CDC Injury Matrix Framework: Deaths/Mortality: [www.cdc.gov/nchs/data/ice/icd10\\_transcode.pdf](http://www.cdc.gov/nchs/data/ice/icd10_transcode.pdf)

**Hospitalization Discharge and Emergency Department Visits Nonfatal:**

[www.cdc.gov/ncipc/osp/matrix2.htm](http://www.cdc.gov/ncipc/osp/matrix2.htm)

**Age Groups Used in Analysis**

Throughout this report, each age group is defined as less than its upper boundary age. For example, the 15-18 year old bracket includes children from 15 years old through children younger than 18 years old. It does not include children 18 years of age and older.

## **Appendix B: Injury Prevention Resources**

### **CDC Centers for Excellence**

UNC Injury Prevention Research Center  
University of North Carolina  
CVS Plaza, Suite 500  
137 East Franklin Street, CB#7505  
Chapel Hill, NC 27599-7505  
Phone: (919) 966-2251  
[www.iprc.unc.edu/](http://www.iprc.unc.edu/)  
Director: Stephen Marshall, Ph.D.

### **Injury and Violence Prevention Branch**

Chronic Disease and Injury, North Carolina Division of Public Health  
North Carolina Department of Health and Human Services  
1915 Mail Service Center  
Raleigh, NC 27699-1915  
Phone: (919) 707-5425  
Email: [beinjuryfreenc@ncmail.net](mailto:beinjuryfreenc@ncmail.net)  
[www.communityhealth.dhhs.state.nc.us/injury](http://www.communityhealth.dhhs.state.nc.us/injury)  
Branch Head: Alan Dellapenna, Jr., R.S., M.P.H.  
Chief Director of Chronic Disease and Injury: Ruth Petersen, M.D., M.P.H.

### **National Center for Injury Prevention and Control**

Centers for Disease Control and Prevention  
Mailstop F63  
4770 Buford Highway NE  
Atlanta, GA 30341-3717  
Phone: (800) 232-4636  
Email: [cdcinfo@cdc.gov](mailto:cdcinfo@cdc.gov)  
[www.cdc.gov/injury](http://www.cdc.gov/injury)  
Director: Debra Houry, M.D., M.P.H.

### **Safe Kids North Carolina**

North Carolina Department of Insurance – Office of Safety and Fire Marshall  
1202 Mail Service Center  
Raleigh, NC 27699-1202  
Phone: (919) 647-0080  
[www.ncdoi.com/OSFM/ProgramsPreventionAndGrants/SafeKidsMessage.asp](http://www.ncdoi.com/OSFM/ProgramsPreventionAndGrants/SafeKidsMessage.asp)  
Chairman: Wayne Goodwin  
Deputy Director: Meg Langston



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- [5] Centers for Disease Control and Prevention (2015). Injuries cost the US \$671 billion in 2013. *CDC Newsroom*. Retrieved from <http://www.cdc.gov/media/releases/2015/p0930-injury-costs.html>
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- [7] National Center for Injury Prevention and Control (2016). National Action Plan for Child Injury Prevention. *Centers for Disease Control and Prevention*. Retrieved from <http://www.cdc.gov/safechild/nap/index.html>
- [8] National Center for Injury Prevention and Control, Division of Unintentional Injury Prevention (2015). Parents are the Key to Safe Teen Drivers. *Centers for Disease Control and Prevention*. Retrieved from <http://www.cdc.gov/parentsarethekey/index.html>

Childhood Injuries in North Carolina: 2011-2014

North Carolina  
Injury & Violence   
 PREVENTION Branch



**Injury and Violence Prevention Branch**

**[www.injuryfreenc.ncdhhs.gov](http://www.injuryfreenc.ncdhhs.gov)**

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