

A PROFILE OF WAKE COUNTY CHILDHOOD INJURY &

INJURY PREVENTION

MAY 2014

Full Report



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ABBREVIATIONS

AHRQ	Agency for Healthcare Research and Quality
CCHI	Carolina Center for Health Informatics
CDC	Center for Disease Control and Prevention
CPC	Carolinas Poison Center
DOI	Digital Object Identifier
ED	Emergency Department
EMS	Emergency Medical Services
EMSPIC	Emergency Medical Services Performance Improvement Center
ICD-10	International Classification of Diseases - tenth edition
ICD-9	International Classification of Diseases - ninth edition
IOM	Institute of Medicine
IP	Injury Prevention
IPRC	Injury Prevention Research Center
IVP	North Carolina Department of Public Health; Injury and Violence Prevention Branch
JRE	John Rex Endowment
NACCHO	National Association of County and City Health Officials
NC DETECT	North Carolina Disease Event Tracking and Epidemiological Collection Tool
NC DOT	North Carolina Department of Transportation
NC DPH	North Carolina Department of Public Health
NC VDRS	North Carolina Violent Death Reporting System
NCIPC	National Center for Injury Prevention and Control
NREPP	National Registry of Evidence-based Programs and Practices
OJJDP	Office of Juvenile Justice and Delinquency Prevention
SCHS	NC State Center for Health Statistic
SEF	Socio-ecological Framework
USPSTF	U.S. Preventive Services Task Force

Executive Summary

A. Background

The John Rex Endowment (JRE) seeks to support an environment where children and families in greater Wake County, NC live healthy lives. The mission of JRE underscores a fundamental belief that all children should have support to: reach their full potential, thrive, live their lives fully, and be physically, mentally, and emotionally well. In 2013, The John Rex Endowment (JRE) released a five-year plan entitled *Our Plan for Impact, 2013-2018* and Injury Prevention is one of four focus areas in the plan.

To support the plan and funding efforts to prevent childhood injury in Wake County, NC, JRE funded a team from the University of North Carolina at Chapel Hill from August 1, 2013 to January 31, 2014 to complete the *Wake County Childhood Injury Prevention (IP) Assessment Project*. The project's main goals were to:

1. Summarize Wake County Childhood Injury Data and Gaps.
2. Create a Profile of Wake County Organizations Addressing Childhood Health and Safety.
3. Investigate the Connection between the Injury Data and the Injury Prevention activities of Organizations responding to an online survey.
4. Summarize Recommendations to foster learning and commitment, build capacity, and increase funding streams for injury prevention.

The service-oriented *Healthy Solutions* Team, within the Department of Health Behavior at The University of North Carolina (UNC) at Chapel Hill Gillings School of Global Public Health, was contracted to complete the project. *Healthy Solutions* team members collaborated with faculty and staff at the *Carolina Center for Health Informatics (CCHI)*, a practice-based, multidisciplinary research unit within the Department of Emergency Medicine at the University of North Carolina at Chapel Hill. The *Healthy Solutions* and *CCHI* Teams conducted regular conference calls and/or in-person meetings with staff at JRE to: a) clarify the scope of work, including review of criteria needed to implement project activities; b) provide updates on progress for each phase of work; and c) submit draft of methods or materials developed for the project to solicit feedback.

B. Methodology

To complete the *Wake County Childhood Injury Prevention Assessment Project*, UNC Team members completed four primary data collection and analysis activities:

1. An in-depth review of currently available secondary data sources about childhood injury mortality and morbidity among Wake County children ages 0 through 17;
2. The identification and survey of organizations, coalitions, networks, and taskforces currently working in Wake County to address childhood injury and violence prevention;
3. A comparison between the leading causes of injury identified by the secondary data and the degree to which organizations participating in this project are addressing those causes of injury; and
4. A review and summary of evidence-based practices for the leading causes of intentional and unintentional injury identified through secondary data.

C. Results

1. *Wake County Injury and Violence Secondary Data*

a. Summary of Leading Causes of Childhood Injury

Three main data sources were used to develop an overall picture of injury mortality and morbidity among children age 0 through 17 in Wake County, North Carolina:

1. *Mortality* (deaths) were identified in data available through the NC State Center for Health Statistics (SCHS) and the NC Violent Death Reporting System.
2. *Hospital Discharges* with injury diagnoses or coded external cause of injury were identified through the NC SCHS hospital discharge data file and accessed by staff in the Injury and Violence Prevention Branch at NC Division of Public Health (NC DPH).
3. *Emergency Department Visits* (injury related) were identified through NC DETECT data and accessed by UNC project staff under a Data Use Agreement with NC DPH.

Table ES-1 lists the top five injury causes for each data source. Color coding is used to depict if/how the five leading causes of injury within one data source were also a top five leading cause of injury in another source. In Table ES-2, we describe the process used to develop a list of the ten overall leading causes of injuries occurring among Wake County children ages 0 through 17. The ten leading injury causes are listed in column two of Table ES-2.

Table ES-1. Five leading injuries/events for mortality, hospital discharge, and emergency department data.

Rank	Mortality (2006-2011)			Hospital Discharge (2006-2011)			ED Visits (2006-2012)		
	N = 124			N = 3,007			N = 138,047		
	<u>Mortality Injury Causes</u>	#	%	<u>Hospital Discharge Injury Causes</u>	#	%	<u>ED Visit Injury Causes</u>	#	%
1	MVC -Occupant	20	16.1	Falls	646	21.5	Falls	36,833	26.7
2	Assault	16	12.9	MVC Traffic-All	309	10.3	Struck By or Against	25,766	18.7
3	MVC -Pedestrian	15	12.1	Self-Inflicted/Self-Harm	272	9.0	MVC Traffic-Occupant	9,953	7.2
4	Self-Inflicted/Self-Harm	14	11.3	Burns	203	6.8	Natural/Environmental Factors	7,250	5.3
5	Unintentional Suffocation/Choking/Breathing Threat	11	8.9	Assault	165	5.5	Bicycle injury/crashes	2,994	2.2

Table ES-2. Process used to Identify the 10 overall leading injury causes, across three primary data sources.

Process Summary	10 Leading Injury Causes
<ul style="list-style-type: none"> We studied the data in Table ES-1 by moving from left to right across data sources, and from rank 1 to 5 within each data source. <i>Motor Vehicle Crashes (MVCs)</i> (occupant, pedestrian, all) were one of the five leading causes for <u>all three</u> data sources, thus their placement as the 1st and 3rd leading injury causes. MVC-Pedestrian was kept separate as the 3rd leading cause given differences in prevention approaches for occupants versus pedestrians. <i>Assault</i> and <i>Self-Inflicted/Self Harm</i> were in the top five injury causes for both <u>mortality</u> and <u>hospital discharges</u>, thus their placement as 2nd and 4th leading causes. <i>Falls</i> was in the top five injury causes for both <u>hospital discharges</u> and <u>ED visits</u>, and the number of fall events was significantly higher than the number of deaths due to <i>Unintentional Suffocation</i>, thus the placement of <i>Falls</i> and <i>Suffocation</i> in the 5th and 6th leading causes, respectively. <i>Burns</i>, <i>Struck By/Against</i>, <i>Natural/Environmental Factors</i>, and <i>Bicycle Injury/Crashes</i> were placed in the 7th through 10th positions because they were among the five leading injury causes for hospital <u>discharge</u> or <u>ED visits only</u>. 	<ol style="list-style-type: none"> 1. MVC Traffic-Occupant 2. Assault 3. MVC Traffic-Pedestrian 4. Self-Inflicted/Self-Harm 5. Falls 6. Unintentional Suffocation 7. Burns 8. Struck By or Against 9. Natural/Environmental Factors 10. Bicycle Injury/Crashes

2. Organization survey

A total of 110 organizations participated in the John Rex Endowment Wake County Childhood Health and Safety Profile Survey (Response Rate=71%).

a. Organizational Demographics and Outreach

Organization Type: Half (50%) of the responding organizations were small, with fewer than 10 full-time employees. The median number of employees is 16 and the median number of full time employees is 11. Almost three quarters (74%) of organizations selected ‘non-profit’ as their entity type, with another 18% being state or local government agency.

Geographical Service Areas: Organizations were asked to identify their geographical service areas; the majority of organizations selected Wake County, followed in descending order by the Greater Triangle Area, The City of Raleigh, The State of North Carolina and lastly, The United States.

Target Populations: Organizations were asked to identify whether they specifically targeted selected populations. Over half of the organizations indicated specifically targeting (from highest to lowest): low income (72%); African-American (52%); and Hispanic (51%); populations. Organizations identified different types of population groups that their organization interacted with, including over half working directly with Children (85%), Parents/caregivers (78%), Teachers (67%), Policy Makers/ Decision Makers (64%), and medical professionals (58%).

b. Injury Prevention Focus of Organizations

About half of the organizations identified education (71%), funding (55%), advocacy (54%) and program evaluation (49%) as very important to their work. Almost all organizations (88%) indicated that childhood injury and/or violence prevention was somewhat to extremely important.

c. Organizational Resources

Organizational Capacity: Organizations reported their abilities to identify resources (i.e. locate evidence based practices; find childhood injury data; identify funding sources; and identify other local childhood injury and/or violence prevention networks) and integrate resources (i.e. use evidence based practices in injury prevention programs; use childhood injury data; obtain funding; and use existing local childhood injury and/or violence prevention network). Respondents self-reported their capacity using a four point scale from high level of capacity to no capacity. Obtaining funding, identifying funding, researching evidence based programs and finding relevant data sources received the lowest scores for organizational capacity. Using research about evidence based programs, identifying and using Wake County injury and/or violence networks, and using data for program planning and implementation received the highest scores.

Data Sources: Survey respondents were asked to identify data sources used by their organization. Over half of the organizations identified using at least one source of national level data (66%), North Carolina state level data (70.9%) and Wake County level data (57.3%). The data sources used most frequently were NC Division of Public Health (including the State Center for Health Statistics) (63.1%) and the Center for Disease Control and Prevention (59.2%).

Funding Sources: Survey respondents were asked to identify the types of funding they received. The most common funding was received from private donors (43.1%) followed by NC funding Sources, such

as North Carolina Foundations (John Rex Endowment, Kate B. Reynolds, The Duke Foundation) (36.3%), and the North Carolina Department of Health and Human Services (27.5%). Most organizations (45%) identified receiving one to three funding sources and several organizations (22%) indicated that they did not receive funding from external sources.

Capacity Building Activities: Survey respondents were asked to rate on a four point scale how valuable specific capacity building activities are to their organizational work. The majority (81.2%) of organizations rated receiving resources related to childhood injury and violence prevention as very or somewhat valuable. The majority also responded that networking with Wake County stakeholders (77.2%), receiving Wake County data reports (76.2%) and participating in information networking sessions (76.2%) were very or somewhat valuable.

d. Organizational Characteristics by Organizational Capacity Levels

The majority of organizations (N=98 organizations), were assigned a “capacity” index score based on self-reported responses to the survey. The capacity index, ranging from a low of eight to a high of 32, was divided into three equal categories based on the frequency distribution. Categories were divided into High Capacity (greater than or equal to 25), Medium Capacity (less than 25 and greater than or equal to 21) and Low Capacity (less than 21). Indicators for the organizational capacity sub groups were reviewed and we reported differences greater than 10% from the overall average.

Injury Prevention Focus of Organizations

- Almost all (87%) of the High Capacity organizations reported Childhood Injury and Violence Prevention as “Very Important” or “Extremely Important” to their organizational work focus, compared to Medium Capacity (69%) and Low Capacity (35%).
- High Capacity organizations were more likely to report Program Evaluation (64%), Research/Data (42%) and Communication/Media (45%) as very important to their organizational work focus compared to other organizations.
- High Capacity organizations were more likely to work in Child Abuse/Maltreatment (79%), Self Inflicted/Self Harm (61%), and Firearms (30%), than other organizations (Table ES-3).

Organizational Resources by Organizational Capacity Level

- High Capacity organizations were more likely to use all levels of data in some capacity.
- High Capacity organizations were more likely to receive funding from each funding source.

e. Relationship among the Leading Causes of Childhood Injury, Injury Prevention Focus, and Programmatic Approach

The secondary data analysis identified the leading injury causes for Wake County children; of these, two are intentional and eight are unintentional (Table ES-3). More organizations identified working in intentional injuries and/or violence than unintentional injuries. Almost half of all organizations identified working in Assault (including Assaults/physical violence (57%), Child Abuse/Maltreatment (66%), Sexual Violence (47%)); or Self-Inflicted/Self-Harm (46%), more than any leading unintentional injury cause. Across the leading injury causes, there are a greater percentage of High Capacity organizations working in intentional areas.

Assault and Self-Inflicted/Self-Harm were identified as priority areas for organizations regardless of capacity level. MVC Traffic- Occupant was identified as the leading cause for mortality and morbidity in Wake County; however, fewer than half of the organizations identified working in this field. Across

all eight unintentional leading causes, fewer than half of the organizations reported working within any unintentional injury cause.

Table ES-3. Organizations by leading ten events and organizational capacity level.

Leading Injury Types	All Organizations		High Capacity		Med Capacity		Low Capacity	
	N=110	%	N=33	%	N=33	%	N=32	%
1. MVC Traffic-Occupant	38	36%	15	45%	9	27%	9	28%
2. Assault								
a. Assault/Physical Violence	62	57%	22	67%	18	55%	17	53%
b. Child Abuse/ Maltreatment (physical, sexual, emotional)	71	66%	26	79%	18	55%	22	69%
c. Sexual Violence (e.g. assault, rape)	51	47%	18	55%	11	33%	18	56%
3. MVC Traffic-Pedestrian	30	28%	12	36%	9	27%	6	19%
4. Self-Inflicted/ Self-Harm	50	46%	20	61%	11	33%	15	47%
5. Falls	25	23%	9	27%	9	27%	6	19%
6. Unintentional Suffocation	12	11%	6	18%	3	9%	2	6%
7. Burns	15	14%	6	18%	6	18%	3	9%
8. Struck By or Against								
9. a. Natural/Environmental Factors	24	22%	9	27%	11	33%	4	13%
b. Animal bites	11	10%	4	12%	4	12%	2	6%
10. Bicycle Injury/Crashes	25	23%	8	24%	10	30%	4	13%

Estimated program impact scores increased when programs were coded for higher levels on the Socio-Ecologic Framework, Frieden's Health Impact Pyramid, and the Three E's of injury prevention. Estimated program impact index ranged from three to 12, with an average of 5.8. In addition to coding for the various impact frameworks, all programs were assigned an injury category code; intentional only, unintentional only, or both intentional and unintentional. High Capacity organizations had the highest averages for program impact. The highest program impact average is for high capacity unintentional injury programs (8.3) (Table ES-4).

Table ES-4. Average program impact index by injury intent and organization capacity level, range low (3) to high (13).

Injury Type	All Programs N= 243	High Capacity N=110	Med Capacity N= 75	Low Capacity N=46
Intentional Only	4.5	4.6	4.3	4.6
Unintentional Only	6.6	8.3	4.4	5.6
Both Intentional and Unintentional	6.9	8.1	6.5	5.8
All programs	5.8	6.3	5.5	5.6

3. Coalition Survey

A total of 15 coalitions (response rate 83%) completed the John Rex Endowment Childhood Health and Safety Profile Survey, with a median of 25 active members. Specific aspects of their responses include:

- The average size is 57 members per network; 60% are small networks (0-50 members) and 40% are large networks (50+ members).
- At least 60% of all coalitions identified specifically targeting African-American, Caucasian, Hispanic, urban and low income populations.
- Almost one third (30%) of coalitions identified advocacy as a type of service provided, followed by direct services (21%), and research evaluation (18%). One (7%) coalition identified funding as a type of service provided.

- The majority of coalitions reported that childhood injury and/or violence prevention was very to extremely important, with the average of 5.9, or very important.
- Over half of the coalitions identified working in motor vehicle crashes (67%) and poisoning (53%).
- Overall, most coalitions reported having medium to high levels of capacity on the capacity indicators. The highest level of capacity was reported for the use of childhood injury data for prioritizing program development and planning (64%), followed by the ability to find relevant childhood injury data for prioritizing program development and planning.
- All of the coalitions reported using data. Almost all (80%) reported using at least one data source from North Carolina.
- The capacity building activities reported as ‘somewhat valuable’ to ‘very valuable’ were attending trainings on evidence-based injury prevention programs, interventions, and strategies (39%), followed by attending trainings focused on building capacity in resource development (38%) and participating with Wake County stakeholders working in injury prevention to dialogue about childhood injury priorities and networking (37%).
- Our analysis also revealed that coalitions completing the survey (although we did not create an impact index for them) identified working with policy makers (80%) and public safety officials (80%) most often. This is in contrast with the programs submitted by organizations, which most frequently identified working with children (85%) and parents (78%).

4. Summary of Evidence Based Practices

A total of 234 programs, interventions, and countermeasures were included in and Evidence-based Practices Compilation developed for this project. Programs were coded for injury causes that address a combination of intentional and unintentional injury using our standardized terminology. The compilation of injury prevention programs includes interventions from 16 registries.

Programs addressing unintentional injury were the most common (50%) followed by programs that address intentional injuries (31%). Several of the programs included in the National Registry of Evidence-based Programs and Practices (NREPP) addressed risk factors that relate to intentional and sometimes unintentional injuries. These risk factors were included in the compilation to provide additional information on the prevention of injury and violence. The most common risk factor was alcohol (48%), followed by social functioning (31%) and drugs (27%).

Targeted age groups and/or setting were identified for the programs based on categories from NREPP. Age groups were considered ‘targeted’ when the program directly addressed a specific age group (e.g. age group is early childhood for Early Head Start programs) or if they were targeted for behavior change by an intervention (e.g. age groups are adolescent, young adulthood, and adult for Blood Alcohol Content Laws).

D. Discussion

1. Secondary Data

For the leading causes of childhood injury, Table ES-5 summarizes by injury type (e.g., Intentional and Unintentional), factors associated with secondary data, including: rank for morbidity and mortality leading causes; age distributions; sex distributions; injury location; and costs.

Table ES-5. Summary of leading causes of childhood injury in Wake County, NC by injury type.

Unintentional Injury

#1 Motor Vehicle Traffic Crash – Occupants

- a. There were twice as many male deaths than females deaths (Males=41, Females=20).
- b. Older children (age groups 10-14 and 15-17) are at highest risk of MVC-occupant injury.
- c. Many children injured or killed in MVCs are coded as “Unspecified.”
- d. MVCs are expensive injuries, with the second highest hospital charges reported in the hospital discharge data.
- e. A higher than expected proportion of MVC-occupant injury related ED visits were self-pay (18.2%).

#3 Motor Vehicle Traffic Crash – Pedestrian

- a. Child pedestrians hit by motor vehicles are likely to be fatalities (15 fatalities to 310 ED visits).
- b. Over 60% of child pedestrian fatalities (66.7%) and ED visits (61.8%) are males.
- c. Many (42.9%) pedestrian deaths were children under 5 years of age but 83.8% of ED visits for pedestrian injury were 5-17 years of age, with 33.8% in the 15-17 year age group (i.e. younger children are more vulnerable, more likely to die from these injuries).
- d. More than a quarter (25.7%) of the pedestrian injury ED visits were admitted to the hospital or transferred to another hospital.
- e. “Hot spots” for crashes involving child pedestrians have been identified in a previous JRE funded study.

#5 Falls

- a. Falls are overwhelmingly the leading injury cause of hospital discharges (21.5%) and ED visits (26.7%) for Wake County children.
- b. Most fall injuries are to males (60.5% hospital discharge, 58.1% ED visits).
- c. All age groups have high numbers of fall related injury.
- d. There were over 3,000 ED visits for injury related to falling from playground equipment and over 2,000 ED visits for falls from bed.
- e. Many fall related ED visits do not have specific sub-mechanism codes assigned (14.8% are Unspecified Fall).

#6 Unintentional Suffocation

- a. Eleven children died due to unintentional suffocation or other breathing threats (e.g. choking), and eight were under 1 year of age.
- b. There were only 47 hospital discharges and 87 ED visits due to unintentional suffocation.
- c. More suffocation deaths were females (6 of 11, 54.5%) but 52.9% of ED visits due to suffocation were males.
- d. Almost half (48.8%) the ED visits due to suffocation listed Medicaid/Medicare as the expected payment source.
- e. Over half the ED visits due to suffocation resulted in admission to the hospital (51.2%).

#7 Burns

- a. Burns include injury from both fire and hot liquids, steam and other hot substances/objects. The vast majority (83.0%) of burn injuries treated in the ED were from hot liquids/steam/substances/objects.
- b. Burn injury was the 4th leading cause of injury related hospital discharges, responsible for 6.8%, and the 6th leading cause of injury related ED visits, with over 1,500 burn injuries identified in this study.
- c. Males accounted for 55% of the burn related ED visits.
- d. Over half the burn related ED visits (50.2%) were for children ages 1-4 years of age.
- e. Most burns did not require admission to the hospital, with 81.6% discharged home.

#8 Struck by or against

- a. This category includes being *unintentionally* struck by or striking against people or objects, with or without subsequent fall. About 43 percent (42.6%) of these are coded as “Other”, with no further information.
- b. Almost 26,000 ED visits (18.7%) were for injury resulting from being struck by or striking against something, thus being the second leading cause of injury related ED visits.
- c. 35% of these injuries are due to being struck or striking against something or someone in sports activity.
- d. 13.3% of these injuries involved furniture or falling objects.
- e. These injuries do not include injuries caused by falling and then striking against something.

#9 Natural and environmental factors

- a. This category includes a wide variety of injury mechanisms; most (92.2%) were due to injury involving animals or insects (e.g. dog bites, bee stings).
- b. Weather related injury (exposure to heat/cold, extreme weather) was responsible for only 4.1% of the ED visits due to natural and environmental factors but resulted in five child deaths, with four of these deaths from one cataclysmic storm.

Table ES-5. Summary of leading causes of childhood injury in Wake County, NC by injury type.

- c. Dog bites resulted in an average of 278 ED visits for Wake County children per year.
- d. Children ages 1-4 years of age were most at risk, accounting for 34.5% of ED visits for injury from natural and environmental factors; children ages 5-9 represented 28.2%.
- e. Male children were the injured patient in 55.5% of the ED visits for this cause.

#10 Bicycle Injury

- a. Injuries from falls and crashes involving bicycles, not including those involving a motor vehicle, led to over 3,000 ED visits for Wake County children during the years 2006-2012.
- b. Bicycle injury related ED visits are overwhelmingly for male patients (70.8%).
- c. Children ages 5-9 are at highest risk of bicycle injury, followed by those ages 10-14.
- d. Bicycle injuries are responsible for 85.8% of all Other Transportation related injury, which include injuries related to animals being ridden, animal-drawn vehicles, other non-motorized road vehicles, railway transport, water transport and water craft, and other vehicles not elsewhere classifiable.

Other - Poisoning

- a. More children are hospitalized and visit the ED for self-inflicted poisoning than for unintentional poisoning.
- b. Many ED visits for poisoning may be averted by calls to the Carolinas Poison Center hotline; over 32,000 calls to the poison control hotline were made for Wake County children ages 0 through 17 during the years 2006-2012.
- c. Most calls (68.1%) are for children ages 1-4 years.
- d. "Analgesics" (e.g. aspirin, acetaminophen, ibuprofen) were a leading substance of exposure for all age groups. "Cosmetics/personal care products" was the leading substance group for exposures by children ages 1-4 years.
- e. Most exposures reported through calls to the poison control hotline did not result in clinical effects or serious medical outcomes.
- f. Results highlight the importance of looking at unintentional and self-inflicted poisoning separately. While many prevention strategies may address both intentional and unintentional poisoning, these two sub-sets of childhood poisoning affect different groups of children and have different healthcare outcomes.
- g. Calls to the CPC for child exposures to potentially harmful materials are important to note because numbers are much higher than what we see for poisonings in the ED Visit data; calls to CPC may be keeping children at low risk from a potential poisoning exposure out of the ED.

Intentional Injury

#2 Assault

- a. Children under age five are at highest risk of death from assault.
- b. Children 15-17 years of age are most likely to be hospitalized or visit the ED for injuries related to assault.
- c. Over half the child deaths from assault were female while approximately two out of three hospital discharges and ED visits for assault were for males.
- d. ED visits for assault are more likely than other injury related ED visits to have Medicaid/Medicare as the expected payment.
- e. Firearm assault injuries had the highest reported median hospital charges of any injury type reported and a median hospital length of stay of five days.

#4 Self Inflicted / Self Harm

- a. Eight of the 14 child suicide deaths were for children 10-14 years old.
- b. Ten of the 14 child suicide deaths were from hanging.
- c. For hospital discharges and ED visits for self-inflicted injury, approximately 70% were for ages 15-17 years.
- d. Most suicide deaths (78.6%) were male but most hospital discharges (71.0%) and ED visits (70.3%) for self inflicted injury were females. Males tend to chose more lethal means to attempt self-harm.
- e. Non-fatal self inflicted injury was overwhelmingly due to poisoning (71.7% hospital discharges, 71.3% ED visits).
- f. Most ED visits for self-inflicted injury were admitted to the hospital or transferred to another hospital (70.5%).
- g. Anecdotally, we suspect that there may be a reluctance to code injuries as self-harm in children under 10 years old; these may be more likely to receive an "Undetermined" intent code.

2. Comparison of Organizational Capacity and Interest in Capacity Building Activities

Forty percent or more (range of 44% to 56%) of the organizations responding to the online survey rated all capacity building activities assessed as 'very valuable.' High Capacity and Medium Capacity organizations, in particular, expressed interest in all capacity building activities described in the survey. Information collected in

the organization survey, however, does not allow us to determine why Low Capacity organizations were less interested in capacity building activities.

3. Relationship Among the Leading Causes of Childhood Injury, Injury Prevention Focus, and Programmatic Approach

a. Leading Cause of Injury and Injury Prevention Focus

When considering results from both secondary data and the organization survey conducted for this project, it is valuable to identify the degree to which organizations in Wake County are addressing childhood injury and violence prevention. To what degree are these organizations focused on the leading causes of childhood injury in Wake County? To examine this question, we identified two Tiers of Leading Injury Causes to investigate the distribution of effort across organizations and then to specifically assess if there are any differences in injury prevention focus by organizational capacity.

The leading injury causes in Tier I appear to be appropriately addressed, with almost 50% of all organizations and 60% of High Capacity organizations addressing prevention in these leading injury causes (Table ES-6). Fewer than 40% of coalitions identified working in these leading injury causes. Among all organizations (regardless of capacity level) and coalitions, additional emphasis on these leading causes of childhood injury would be beneficial.

With approximately 20% of All, High Capacity and Medium Capacity organizations, and coalitions, addressing the leading injury causes in Tier II, enhanced emphasis to address these leading causes of childhood injury seems warranted.

Table ES-6. Average Percentage of Organizations Working to Prevent Injuries by Ten Leading Injury Causes Tiers.

<i>Leading Injury Event Tiers^a</i>	<i>All Organizations</i>	<i>High Capacity</i>	<i>Medium Capacity</i>	<i>Low Capacity</i>	<i>Coalitions</i>
	<i>N = 110</i>	<i>N = 33</i>	<i>N = 33</i>	<i>N = 32</i>	<i>N=15</i>
Tier I 1. MVC Traffic-Occupant 2. Assault a. Assault/Physical Violence b. Child Abuse/ Maltreatment (physical, sexual, emotional) c. Sexual Violence (e.g. assault, rape) 3. MVC Traffic-Pedestrian 4. Self-Inflicted/ Self-Harm	46.7%	57.2%	38.3%	45.3%	36.7%
Tier II 5. Falls 6. Unintentional Suffocation 7. Burns 8. Struck By or Against ^b 9. a. Natural/Environmental Factors b. Animal bites 10. Bicycle Injury/Crashes	17.2%	21.0%	21.5%	11.0%	17.9%

^a Leading Injury Event Tiers were created by reviewing the differences between leading causes of mortality leading causes of morbidity.

^b Struck By or Against was not collected in the organization survey.

b. Injury Prevention Focus and Programmatic Approach

Considering results from both secondary data and the organization survey conducted for this project, it is also important to identify the degree to which organizations in Wake County addressing childhood injury and violence prevention are appropriately applying a public health approach to their efforts to prevent childhood injury in Wake County, NC.

The field of injury prevention has significantly developed over the past sixty years. Years behind the field of chronic disease, it was not until 1981 when the first national conference on injury control was sponsored by the CDC at Johns Hopkins (Christoffel & Gallagher, 2000). This national conference was followed by a CDC publication in 1982 providing an Injury Control and Implementation Plan for State and Local Governments. In 1990, the first six states mandated E-coding as a standard practice. In 1993, President Bill Clinton declared injury a public health problem. In 1999, the Institute of Medicine published “Reducing the Burden of Injury” (Bonnie, Fulco, & Liverman, 1999), drawing attention and comprehensive research into the spotlight. These, among other pivotal events over the past six decades, have made significant strides in the public health contribution to the prevention of injury and/or violence.

The complexity of public health issues requires the implementation of multi-level approaches to address childhood injury (e.g. population based approaches, individual education approaches). Programs that are focused on individual knowledge, skills, and behavior (e.g. counseling and education), are necessary; however, additional interventions should address population-level factors (e.g. socioeconomic factors, environmental conditions, public policy changes). Population-level interventions will increase the public health impact, leading to a reduction in childhood injury mortality and morbidity (Frieden, 2010).

The estimated program impact index, developed by coding programs listed by responding organizations, was based on several public health models, including: Socio-Ecological Framework; Frieden’s Health Impact; and the 3E’s of injury prevention (Environment, Education, Enforcement). Our estimated program index measure for an organization represents the average estimated program impact index for the programs listed by the organization.

Our analysis reveals that self-reported capacity can make a difference, in that High Capacity organizations were more likely to have a higher estimated program impact index for programs addressing intentional injury (8.3) and for programs addressing both intentional and unintentional injury events (8.1).

4. Accessibility of Evidence-Based Practices

The accessibility of readily available and comprehensive evidence-based resources for intentional injuries and/or violence (including risk factors) was greater than the accessibility of comparable resources related to unintentional injuries. More effort was required to identify and compile programs and interventions which addressed unintentional injuries. Information about unintentional injuries was commonly found in the form of tips for individuals on safety practices, laws and policies, and environmental approaches to modify the physical environment. Many curriculums and programs are available to educate individuals about safe behaviors and safety practices. However we were not able to identify a comprehensive database to review supporting evidence of such interventions. The development and dissemination of a registry, for programs addressing unintentional injuries, would increase the ability for the public to easily access and use such programs.

E. Recommendations

1. *Foster Learning, Commitment, and Capacity among Organizations Addressing Childhood Injury & Violence Prevention in Wake County, NC*

a. *Continued Engagement with Participating Organizations and Coalitions*

We support plans by JRE to: make available to the public the results from this project; provide follow-up technical assistance to organizations interested in increasing their capacity and program effectiveness; and promote discussion about the data collection methods and recommendations. The strategic use of the findings from this project will help to both increase awareness of injury and violence prevention in Wake County, as well as to influence the actions that can be taken by multiple stakeholders (e.g., local organizations/coalitions, state agencies, academic/research institutions) to further the efforts already underway to prevent childhood injury and violence in Wake County, NC.

b. *Enhancing Evaluation Methods to Improve Effectiveness*

The degree to which childhood injury or violence prevention organizations evaluate their programs is important as evaluation results can increase program effectiveness. A focused emphasis on evaluation could include assessing practices for formative, process, impact, and outcome evaluation. Such an assessment could include the degree to which organizations: a) develop measurements for short/medium/long-term indicators and logic models; b) collect data and use reliable data collection methods; and/or c) select appropriate data analysis methods. JRE could specifically identify and focus capacity building on evaluation components that relate to ‘program effectiveness’ and ‘program impact.’ We recommend addressing, on a programmatic level, the identification of the following topics: 1) Reach which includes: program frequency of contact; duration of contact; intensity of contact; and population groups targeted/reached by individual programs; 2) Identify whether they use Evidence-based Practices which includes: application of programs identified as *Recommended* and/or *Promising*; and 3) Fidelity of program implementation which includes: delivery schedule; meeting training requirements; determining if program messages were received by intended targets; and documentation through process evaluation.

c. *Capacity Building Courses and Evaluation Consultation*

Relevant entities could use multiple methods to deliver capacity building services to organizations addressing childhood injury and violence prevention in Wake County, NC.

- Short-courses: in collaboration with the NC Injury & Violence Prevention Branch, UNC Injury Prevention Research Center and/or Department of Health Behavior, mini-courses in program planning, implementation, and evaluation for childhood injury and violence prevention could be developed. These courses could be specialized one to three day courses that could be supported and tailored to those working in intentional or unintentional injuries, including the identification of best-practices.
- Fellowship-learning experience: organizations could be asked to nominate staff to attend a series of program planning, implementation, and evaluation training courses (e.g., over a year) to support a project identified specifically for the fellowship program. The fellows would receive guidance on their project and have the opportunity to increase their knowledge and skill through a series of workshops held during the year long program.
- Implementing injury prevention programs and/or retaining or linking to program and evaluation consultants: to support organizations/coalitions implementing injury prevention programs, the services of program and evaluation consultants could be retained to ensure that evaluation is

conducted. The quality of evaluation will be improved through the development of tailored evaluation plans. In addition, the capacity of local organizations to conduct evaluation will be enhanced.

d. Use Evidence-based Practice Compilation

We recommend that JRE consider the information summarized in this project's Compilation of evidence-based practice registries to: 1) prioritize JRE supported activities based on evidence; 2) identify effective program(s) for the leading cause of injury; 3) encourage (or require) injury prevention activities using high impact approaches; and/or 4) identify programs tailored for specific settings/populations.

2. Childhood Injury Secondary Data

a. Further Analysis of Leading Cause of Childhood Injury Data

To further study causes of childhood injury in Wake County, NC, we provide several recommendations organized by the leading injury causes identified in this project by secondary data.

#1 - Motor Vehicle Traffic Crash – Occupants. Work with NC DOT to link crash report data with EMS and ED visit data. The IVP Branch is considering this idea should funds become available.

#2 – Assault. Apply Patty Schnitzer's algorithm (Schnitzer, Slusher, Kruse, & Tarleton, 2011) for estimating child maltreatment and neglect based on *weighting* of diagnosis and mechanism of injury codes, as well as combinations of these. Meghan Shanahan, a public health researcher at UNC Injury Prevention Research Center (IPRC), applied this method to two years of ED visits by Wake County children and identified 126 children who were likely to have experienced maltreatment, almost as many as identified by specific codes for the 7 years of ED visit data reported here. ED data may capture a different population of children who experience maltreatment than those identified through Child Protective Services (CPS) data, although the age distribution for each type of abuse is similar between the two data sources (Shanahan, Proescholdbell, Waller, & Deyneka, 2013).

#3 - Motor Vehicle Traffic Crash – Pedestrian. Work with NC DOT to try to link crash data with healthcare data for child pedestrian injury. JRE has previously funded a project that used NC DOT crash data to examine child pedestrian crashes in Wake County. An innovative project in Boston, MA, has utilized crash data, EMS data, and ED visits data to: examine the characteristics of pedestrian and bicycle crashes resulting in injury; develop and implement interventions; and evaluate the impact of those interventions. JRE could potentially build on projects they have already funded in this area to expand the data used to inform child pedestrian prevention efforts in Wake County, if this is determined to be a priority area.

#4 - Self Inflicted / Self Harm. Promote accurate hospital coding for poisoning to reduce "Undetermined" poisoning codes. Sharing the results of this project with hospitals in Wake County, including highlighting areas of potential improvement in data quality through hospital coding practices, may indirectly improve the accuracy of this coding in the future.

#5 – Falls. A detailed report of Fall related injuries resulting in ED visits and/or hospital admissions should be completed. Analysis of school and community based efforts to prevent fall injuries to children should be undertaken. Ways to determine severity of fall injury and outcomes should be found or developed.

#8 - Struck by or against. Struck by or against is a non-specific and diffuse cause of injury but accounts for a large proportion of childhood injury morbidity in Wake County. Many of these injuries are sports

related, as are many fall injuries. We did not explore this area in great detail in this study. A detailed report of sports related injury to children should be undertaken which would investigate all the various codes related to injury in sports activities. By undertaking a project to specifically address sports related injury, including those identified through struck by or against codes, fall codes, activity codes, and place of occurrence codes, as well as through key word searches of chief complaints and triage notes, we can better describe these injuries and identify prevention strategies.

#10 - Bicycle Injury. Undertake a study of bicycle injury in Wake County that utilizes ED data, including details from chief complaints and triage notes, EMS responses, and NC DOT crash reports (for those involving a motor vehicle on a public road) to gain a deeper understanding of who is at risk and where to better inform prevention efforts.

Other – Poisoning. Expand the exploration of poisoning injury in Wake County children through deeper analysis of the poisoning codes used in the ED visit and hospital discharge data, as well as the CPC call data. This is currently an area of intense public health interest nationally and in North Carolina, offering opportunities to partner and leverage resources.

b. Additional Analysis of E-Code Mechanism and Sub-Mechanism Data

To further inform what has been learned about the leading causes of injury in Wake County for this project, we suggest additional detailed analysis, at the mechanism and sub-mechanism level utilizing the depth of E-coding available in the Wake County ED visit data. Conducting such an analysis would increase understanding for some of the leading causes of injury and better inform injury prevention efforts in the community. Examples of additional analysis include:

- A special analysis into sports related injuries in Wake County children is warranted, if this becomes an area of injury identified as a priority for prevention efforts in Wake County. Such an analysis would use all codes related to sports activity, from various mechanisms (e.g. struck by/against, falls) as well as activity and place of occurrence codes, to identify these injuries and describe further the circumstances of injury and the population experiencing these injuries.
- Expand the record level review of injury related ED visits with multiple mechanism of injury codes, using the text information available in the triage notes and chief complaints, for those causes of injury determined to be priorities for prevention in Wake County. This will allow more detailed understanding of certain injury mechanisms, such as falls, self-inflicted, or pedestrian injury.
- Conduct analyses utilizing ZIP code level data for leading causes of injury in the ED visit data. This is a challenging task because 5-digit ZIP code is the most granular place of residency variable available in the ED visit data, however, ZIP codes do not conform nicely to geographic boundaries in Wake County.
- The entire coding scheme for diagnosis and intent/mechanism of injury in both hospital discharge and ED visit data will change in 2014, from ICD-9-CM to ICD-10-CM. The potential for detailed coding of circumstances of injury will expand, as will the potential for miscoding. This change in the secondary data available should be monitored and its impact on local data for surveillance and evaluation examined. This will be taking place at the state level through ongoing work at NC DETECT.

c. Secondary Injury Data

- The ability to readily generate a multi-year child injury mortality report at the county level would be a welcome addition to the tools currently available through the State Center for Health Statistics (SCHS) website. This would make it much easier for community organizations to generate county specific injury mortality data to inform injury prevention efforts.
- Making hospital discharge data readily available, to projects such as this one, should be considered by the State Center for Health Statistics.

- The Emergency Department visit data for childhood injury in Wake County were generally very good. Continued monitoring of data completeness for E-codes is necessary to insure high quality data for Wake County.
- Many ED visit records in Wake County include multiple codes for mechanism of injury. Improving the specificity of the codes used and decreasing the incidence of conflicting codes (e.g. motor vehicle crash – driver and motor vehicle crash – passenger) would be helpful to anyone attempting to use these data for program planning and evaluation.

I. Background

A. John Rex Endowment Background

The John Rex Endowment (JRE) was formed in 2000, the result of the purchase of Rex Healthcare by the University of North Carolina Health Care System. With a primary focus on Wake County residents, JRE seeks to support an environment where children and families in greater Wake County live healthy lives. Seven years following its charter, JRE aligned with a national call for significant attention to the issue of childhood obesity. This shifted JRE's emphasis from 'access to health care' to the health and well-being status of children and the prevention of health problems. The mission of JRE underscores a fundamental belief that all children should have support to: reach their full potential, thrive, live their lives fully, and be physically, mentally, and emotionally well.

In 2013, The John Rex Endowment (JRE) released a five-year plan entitled *Our Plan for Impact, 2013-2018* (http://files.www.rexendowment.org/what-we-fund/Our_Plan_for_Impact_2013-2018.pdf). Injury Prevention is one of four focus areas in the plan. According to Wake County stakeholders who participated in JRE's five-year planning process, the level of injury prevention activity in Wake County was lacking, and those activities that do exist are not well coordinated. In addition, there does not appear to be a community-wide consensus on priorities for preventing injury and ensuring the overall safety of Wake County children from ages 0 through 17 years.

B. Purpose of the Wake County Childhood Injury Prevention Assessment Project

To support the JRE's strategic plan and funding efforts to prevent childhood injury in Wake County, NC, JRE issued a *Request for Consultant Services* in May 2013 to:

1. **Summarize Wake County Childhood Injury Data and Gaps** (i.e., review of secondary data sources to identify the leading causes of childhood injury morbidity and mortality among Wake County children ages 0- through 17, hereafter referred to as 0-17 years));
2. **Create a Profile of Wake County Organizations Addressing Childhood Health and Safety** (i.e., primary data collection survey among organizations working in Wake County to promote childhood health and safety with a focus on those that conduct injury and/or violence prevention activities); and
3. **Investigate the Connection between the Injury Data and Organizational Profile** (i.e., compare the degree to which Wake County Organizations are addressing the leading causes of injury morbidity and mortality); and
4. **Summarize Recommendations to foster learning and commitment, build capacity, and increase funding streams for injury prevention.**

The service-oriented *Healthy Solutions* Team, within the Department of Health Behavior at The University of North Carolina (UNC) at Chapel Hill Gillings School of Global Public Health, was contracted to complete the *Wake County Childhood Injury Prevention (IP) Assessment Project* from August 1, 2013 to January 31, 2014. Based in Chapel Hill, NC, the Healthy Solutions team works with numerous local, state and national organizations across the United States. Housed at a major research institution, the team specializes in tailoring research-tested methods to build program capacity and promote the use of policy, environmental, and system strategies. *Healthy Solutions* uses 21st century solutions to help agencies, foundations, organizations, and community groups address public health challenges. UNC Team members believe the public health workforce and their non-profit partners can contribute to transformative outcomes when using strategies grounded in population-based prevention and social equity (<http://www.unc.edu/healthysolutions/index.htm>).

Healthy Solutions team members completing this project included: 1) Research Associate Professor *Dr. Carolyn E Crump*; 2) Research Associate *Mr. Robert J. Letourneau, MPH*; and 3) Research Associate *Ms. Rachel Page, MPH*. They collaborated with faculty and staff at the *Carolina Center for Health Informatics (CCHI)*, a practice-based, multidisciplinary research unit within the Department of Emergency Medicine at the University of North Carolina at Chapel Hill. CCHI team members collaborating on this project included: 1) Director *Dr. Anna Waller, ScD*; 2) Program Director *Ms. Amy Ising, MSIS*; and 3) Graduate Research Assistant *Mr. Steven Lippmann, MSPH*.

C. Summary of Process to Complete the Wake County Childhood Injury Prevention Assessment Project

As with all of its funders, the *Healthy Solutions* and *CCHI* Teams were committed to working collaboratively with John Rex Endowment staff and other entities who were engaged in the work to complete this project. Our collaboration with CCHI's user-centered design and development approach is complimentary to the community focus of the *Healthy Solutions Team*. CCHI is committed to working with the people in the community and in particular, the end user of data, to make sure what is provided is meeting the community's needs.

The *Healthy Solutions* and *CCHI* Teams conducted regular conference calls and/or in-person meetings with staff at JRE to: a) clarify the scope of work, including review of criteria needed to implement project activities; b) provide updates on progress for each phase of work; and c) submit draft versions of methods or materials developed for the project to solicit feedback.

Team members from *Healthy Solutions* and *CCHI* facilitated a project start-up meeting with JRE staff on August 20, 2013. At this meeting, attendees completed the following primary objectives: 1) Discussed project accomplishments to date; 2) Outlined the overall goals for the project; 3) Clarified project terminology and integration of project components; 4) Discussed project identity for external communication; 5) Reviewed existing Wake County data sources and identify areas for further exploration; 6) Obtained input on data related decisions; 7) Considered criteria to apply for inclusion and exclusion in Profile (and/or data); and 8) determined when/how UNC and JRE will work together to maximize time, energy and efforts. In addition to numerous internal project meetings held among *Healthy Solutions* and *CCHI* staff, UNC Team members conducted six project update conference calls with JRE Program Director, Kate Shirah (September 9, October 8, November 7, and December 6, 2013; and January 8 and 27, 2014).

Additional information about the steps used to complete the project is detailed in Section II-Methodology.

II. Methodology

A. Introduction

To complete the *Wake County Childhood Injury Prevention Assessment Project*, UNC Team members completed four primary data collection and analysis activities:

1. An in-depth review of currently available secondary data sources about childhood injury mortality and morbidity among Wake County children ages 0 through 17 years, inclusive;
2. The identification and survey of organizations, coalitions, networks, and taskforces currently working in Wake County to address childhood injury and violence prevention;
3. A comparison between the leading causes of injury identified by the secondary data and the degree to which organizations participating in this project are addressing those causes of injury; and
4. A review and summary of evidence-based practices for the leading causes of intentional and unintentional injury identified through secondary data.

Data collection for these activities were aligned with terminology used by the Centers for Disease Control and Prevention (CDC) and the North Carolina Disease Event Tracking and Epidemiologic Collection Tool (NC DETECT) to create 12 primary categories for unintentional and intentional injury causes (Appendix A). The standardization of terminology allowed for consistent presentation, review, and discussion of similarities, differences, and gaps among the project activities completed for the *Wake County Childhood Injury Prevention Assessment Project*.

B. Wake County Injury and Violence Secondary Data

1. Secondary Data Collection

Data on childhood injuries in Wake County were acquired from six secondary data sources, including both data from publicly available sources and data obtained through consultation and under data use agreements with the respective data owners. For all data sources, we restricted the age range to include only 0 through 17 year olds to maintain our emphasis on childhood injuries.

The data collected for the *Wake County Childhood Injury Prevention Assessment Project* addresses a wide spectrum of injury severity including data regarding: 1) Mortality; 2) Hospital Discharges; 3) Emergency Department (ED) Visits; 4) calls to the Carolinas Poison Center; 5) Emergency Medical Services (EMS) Responses; and 6) Population Estimates (Table 1). Six and in some cases seven years of data were included for analysis in this project. Only four years of data were available for Wake County EMS.

These data sources should be considered complementary, and not mutually-exclusive, since some injured children receive care in multiple health care settings. Take, for example, a child who accidentally ingested a household chemical; her parents may have called the poison center and then taken her to the emergency department where she was ultimately hospitalized. That single injury event would contribute data as a poison center call, an ED visit, and a hospital discharge, with each data source including slightly different information. On the other hand, a child who was the victim of a fatal assault who died before receiving any medical attention would only be counted in the mortality data, and not appear in any of the other data sources. These data sources are not linked, making it virtually impossible to determine which records are continuations of care for records from another data source. While linking data sources offers the possibility of tracking the course of care for injured children across multiple levels, it is a challenging process due to the lack of common identifiers across secondary data sources. Most ED visits do not result in admission to the hospital and most hospital admissions do not result in death. Thus, each data source gives a different perspective on childhood injury in Wake County.

Table 1. Overview of data sources for childhood injuries in Wake County, NC.

<i>Data Type</i>	<i>Data Source(s)</i>	<i>Availability</i>	<i>Years</i>
MORTALITY			
1. Mortality	State Center for Health Statistics	Publicly available	2006-2011
	NC Violent Death Reporting System	Consultation with NC Injury and Violence Prevention Branch, NC Division of Public Health	
MORBIDITY			
2. Hospital discharges	NC Hospital Discharge System	Consultation with NC Injury and Violence Prevention Branch, NC Division of Public Health	2006-2011
3. ED Visits	NC Disease Event Tracking and Epidemiologic Collection Tool (NC DETECT)	Data use agreement	2006-2012
4. Poison Control Center Calls	Carolinas Poison Center (via NC DETECT)	Data use agreement	2006-2012
5. Emergency Medical Service responses	Wake County EMS (via NC DETECT)	Data use agreement	2009-2012
OTHER			
6. Population estimates (by age group and sex)	State Demographics branch, NC Office of State Budget and Management	Publicly available	2010-2012

For mortality data, deaths were considered injury-related if they had an International Classification of Diseases, Tenth Revision (ICD-10) external cause of mortality code (V01-Y98). For this report, injury-related mortality data exclude deaths due to adverse events/medical complications/medical misadventures (n=2).

Hospital discharge data include information about all hospital stays, such as patient demographics, diagnoses, external cause of injury, patient disposition at discharge, expected payment source, length of stay and hospital charges. The hospital from which the patient was discharged is not available in these data. Hospital discharge data were not directly available for analysis by our project team. Thus, we were limited to requesting data runs through NC Department of Public Health (NC DPH) staff. As a result, we were unable to get sub-mechanism analyses completed for this report. In addition, all cell sizes less than 10 are required to be masked to prevent the inadvertent identification of injury victims.

Injury related hospital discharges were identified based on ICD-9-CM codes for injury. The presence of *either* an external cause of injury code (E-code) of E000.x – E999.x *or* an injury diagnosis code of 800.xx – 999.xx resulted in inclusion in our analyses. Unlike emergency department visit data, hospital discharge data for North Carolina include only one external cause of injury code (E code) for each record. A single E-code makes it easier to work with these data but also limits the amount of information available for indentifying and describing injury related hospitalizations.

For Emergency Department visit data, we included visits made by patients who either *resided* in Wake County (i.e., county of residence is recorded as “Wake County”) or visited a hospital emergency department *located* in Wake County. Injury related ED visits were identified by ICD-9-CM diagnosis and E-codes in the same way described previously for hospital discharges.

ICD-9-CM external cause of injury (E-codes) were critical to our efforts to describe childhood injury in Wake County. The E-code is used to describe the *circumstances* of the injury event, while the diagnosis codes describe the physical injury. For example, a patient with a diagnosis of a fractured femur could have E-codes

that tell us the injury occurred at home (E849.0) when he fell off a ladder (E881.0) while gardening and landscaping (E016.1). A summary and *Fact Sheet* describing E-codes is included in Appendix B.

The E-codes describe the circumstances of injury in several ways. For this report, the three most important are intent, mechanism and sub-mechanism of injury. The mechanism of injury E-codes are divided into three main *intent* categories: 1) Unintentional, 2) Intentional, and 3) Undetermined. The intentional category has two main sub-categories of intent: a) Assault and b) Self-Inflicted/Self-harm. Undetermined intent is used to indicate that the clinician could not determine if the injury was inflicted intentionally or unintentionally. In this study, Undetermined intent was most often used for poisonings. Mechanism of injury categories are generally broad, with sub-mechanisms providing more detail within each mechanism. There is, however, some variation in how broad and specific the various code levels are. Table 2 provides some examples of mechanisms and sub-mechanisms within each intent category.

Table 2. Examples of levels of external cause of injury codes (E-codes).		
<i>Injury Intent</i>	<i>Injury Mechanisms (examples)</i>	<i>Injury Sub-Mechanisms (examples)</i>
Unintentional (Accidental)	Falls (E880-E888)	Fall from stairs or steps (E880.x) Fall from ladder (E881.0) Fall from playground equipment (E884.0) Fall from bed (E884.4) Fall from skateboard (E885.2) Fall in sports (tackle) (E886.0)
	Motor Vehicle Traffic (MVT) Accidents (E810-E819)	MVT involving collision with motor vehicle, injured person=passenger (E812.1) MVT involving collision with pedestrian, injured person=pedestrian (E814.7) MVT involving collision on highway, injured person =motorcycle driver (E815.2)
	Accidental Poisoning (E850-E869)	Poisoning by other non-narcotic analgesics (E850.7) Poisoning by anti-depressants (E854.0) Poisoning by soap products (E861.1) Poisoning by herbicides (E863.5) Poisoning by other specified foods (E865.8) Poisoning by cosmetics (E866.7) Poisoning by unspecified carbon monoxide (E868.9)
Intentional Assault – Injury Purposely Inflicted by Other Persons (E960-E969)	Fight, Brawl, Rape (E960.x)	Unarmed fight or brawl (E960.0) Rape (E960.1)
	Assault by poisoning (E962.x)	Poisoning – drugs/medicinal substances (E962.0) Poisoning – other gases/vapors (E962.2)
	Assault by Firearms/Explosives (E965.x)	Assault by handgun (E965.1) Assault by letter bomb (E965.7)
	Assault by Other/Unspecified Means (E968.x)	Assault by blunt or thrown object (E968.2) Assault by human bite (E968.7) Other specified means (E968.8)
Intentional Self-Harm - Suicide and Self- Inflicted Injury (E950-E959)	Self-Inflicted Poisoning (E950- E952)	Poisoning - tranquilizers/ psychotropic agents (E950.3) Poisoning – other gases/vapors (E952.8)
	Hanging, Strangulation, Suffocation (E953.x)	Hanging (E953.0) Unspecified means (E953.9)
	By Firearms, Air Guns, Explosives (E955.x)	Self-inflicted injury by shotgun (E955.1) Self-inflicted injury by air gun (E955.6)
	By Other/Unspecified Means (E958.x)	Self-inflicted injury by burns/scalds (E958.1) Self-inflicted injury by electrocution (E958.4)

Table 2. Examples of levels of external cause of injury codes (E-codes).

<i>Injury Intent</i>	<i>Injury Mechanisms (examples)</i>	<i>Injury Sub-Mechanisms (examples)</i>
Undetermined	Poisoning (E980-E982)	Poisoning by tranquilizers/psychotropic agents (E980.3) Poisoning by arsenic (E980.8) Poisoning by motor vehicle exhaust (E982.0)
	Falling From High Place (E987.x)	From residential premises (E987.0) From other man-made structure (E987.1)
	Other/Unspecified Means (E988.x)	Crashing of motor vehicle (E988.5) Unspecified means (E988.9)

An example of the complexity of the injury coding system is the set of codes used for motor vehicle crashes. Detailed decision trees govern the coding of factors such as the type of vehicle (e.g. car, truck, motorcycle), the people injured (e.g. drivers, passengers, pedestrians), the nature of the collision (e.g. collision with other motor vehicle, collision with other object), and the whether or not the incident took place in traffic. The data sources that we accessed had varying specificity with regard to the level of detail available on motor vehicle crash related injuries. In deciding how to combine or separate the detailed motor vehicle crash categories, we have balanced the specificity of the data available and the need to suppress small cell sizes under our data use agreements.

The following technical notes are important when considering the Wake County childhood injury data:

1. A data quality review of the Wake County emergency department visit data indicated that injury E-codes were not being submitted for most visits for the period from January-June 2010. As a result, the numbers of injury-related ED visits in this report represents an underestimate of the true incidence for that six month period. When calculating *rates* for ED visits, the 2010 data year was excluded.
2. Under the coding guidelines of the International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM), adverse effects and medical misadventures are reported with External Cause of Injury codes (E-codes). For this report, we have excluded ED visits, hospital discharges, and deaths due to adverse effects or medical misadventures since these are not relevant to the types of intervention work that the John Rex Endowment is pursuing.
3. Child maltreatment and neglect is not readily identified in secondary health data sources due to limitations in the codes available to describe medical encounters and the fact that, while maltreatment and neglect often lead to medical conditions, they are not necessarily a medical condition in themselves. To address this important issue, codes indicating a perpetrator of abuse and codes including neglect were used to identify child maltreatment and neglect related ED visits and deaths.
4. While all the data considered for this report are from secondary data sources, the ED visit data in NC DETECT are more directly available to the CCHI staff who worked on this project. The data are owned by NC Division of Public Health but CCHI staff, under a contract between NC DPH and UNC-CH, works to develop and maintain the ED visit data for public health use. Thus, the ED visit data are well known to our team and we have actively worked at insuring the quality of these data. One example of this is that the ED visit data include up to five E-codes per record while the hospital discharge database is limited to only one E-code per record. More in-depth analyses of mechanism of injury within the ED visit data are therefore presented.

The Carolinas Poison Center (CPC) provides a 24/7 service to field calls from the entire state of NC. These calls can be from parents, healthcare providers or individuals with concerns or questions about actual or potential exposures of various types of potentially poisonous materials. These calls are answered by trained Specialists in Poison Information who collect standardized and thorough information, entered directly into a computerized data system. Follow-up calls are made by CPC staff members to caregivers to track the condition of children with exposures of concern and updates are made to the data records based on further information collected through these follow-up calls. CPC call data, including updates, are provided to NC

DETECT hourly for public health surveillance purposes. For this project, a Data Use Agreement was obtained to access CPC call data for Wake County children through NC DETECT. All calls reported to NC DETECT for the years 2006-2012 in which the patient was a child age 0-17 years and the residence was Wake County were included for analysis.

Emergency Medical Services (EMS) data includes all EMS responses made by the Wake County EMS system, even if these runs are to addresses incidents across the Wake County border. A Data Use Agreement was established between Wake County EMS and CCHI to allow access to Wake County EMS data available in NC DETECT. Data for Wake County EMS responses for children ages 0-17 years for 2009-2012 were provided for analysis. In addition, we worked with Wake County EMS to request an EMS Pediatric Trauma Care Toolkit report from the Emergency Medical Services Performance Improvement Center (EMSPIC). The report covered the years 2011-2012 and children ages 0-15 years. Information from this report was used where applicable.

Appendix B contains additional information about these data sources, including a description of ICD-9-CM E-codes.

2. Secondary Data Analysis

Descriptive statistics and cross-tabulations were computed using SAS version 9.2 and Microsoft Excel. For mortality, hospital discharges, and emergency department visits, injury intent and mechanism were categorized based on ICD-9-CM (ED and hospital) or ICD-10 (mortality) external cause codes (Appendix B). Rates were computed using mid-year population estimates for 2010-2012 as the population denominators.

In both the ED visit and hospital discharge data, some observations had multiple injury-related ICD-9-CM diagnosis codes or E-codes. Specifically, hospital discharge records contain up to 9 diagnosis codes and 1 E-code each, while the ED visit records contain up to 11 ICD-9-CM diagnosis codes and five E-codes each. In our analysis, we used various approaches to determine which code to treat as the primary injury-related reason for the hospital discharge or ED visit, for different presentations of the data, as follows:

- **First-listed:** For some tables, we used only the first-listed injury-related diagnosis or E-code; in these instances, we first scanned and categorized the full set of diagnosis or E-codes to determine which ones were injury-related, then we selected the first *injury-related* code listed for that medical record, even if non-injury-related codes appeared earlier in the record.
- **Adjudicated for Intent and Mechanism:** Since the ED visit records contain up to 5 E-codes, there were some instances where there were multiple intent, mechanism, and/or place of occurrence codes. In most cases, all of the codes were consistent with each other, but in other cases, there were conflicting intent or mechanism codes. For these 2,152 records (1.6%) we conducted an adjudication review to try to determine which intent or mechanism code to treat as the *primary* reason for the visit. This review included a review of the diagnosis codes, E-codes, patient age, and two free-text fields: triage notes and chief complaints. The triage notes and chief complaints were helpful in ascertaining the context in which the injury occurred. We did not modify or re-assign any cases to intent or mechanism categories that were not already present in the original codes for that record, although there were some instances where such changes seemed warranted, such as records that seemed to indicate child maltreatment but were coded with "unintentional" intent E-codes or poisoning cases coded as "undetermined intent" when the intent seemed evident. If the additional information available for review was insufficient to determine the appropriate intent and mechanism code for the record, we assigned the first listed code. The end result of this adjudication process was to assign each record to one intent and one mechanism from the conflicting intents and/or mechanisms included in their multiple codes.
- **Adjudicated for Sub-Mechanism:** To describe ED visits for injury at the sub-mechanism level, all records with multiple E-codes were reviewed by hand and assigned to one sub-mechanism. Decision

rules followed included first, taking the sub-mechanism code related to the mechanism assigned based on the adjudication for intent and mechanism; second, taking specific codes over unspecific codes; and third, taking the first listed code if none of the other processes resulted in a single sub-mechanism code.

For Carolina Poison Center (CPC) call data, substance groupings and clinical effects codes provided by CPC were used to describe the exposures and clinical symptoms reported. Medical outcome codes, including level of effect (none, minor, moderate, major), were used to describe the severity of the exposures.

EMS data did not include clear coding to identify injury related calls and responses. Dispatch complaints indicative of injury were examined, as were Provider Primary Impression codes for “traumatic injury” and “poisoning/drug ingestion.” Unfortunately, many potentially useful variables in the EMS data were missing for large proportions of the records, limiting the potential utility of these data.

For the final analysis step, we rank-ordered the top five injury causes occurring in each of the three main data sources (mortality, hospital discharge, and emergency department visits) to develop a list of the ten leading causes of injuries occurring among Wake County children ages 0-17. We conducted sub-analyses for these leading injury causes to identify specific mechanisms and sub-mechanisms of injury, estimated hospital charges, and source of payment. The inclusion of only five leading causes of injury per primary data source was due to the number of events becoming too small to identify the top 10 injury causes of deaths and hospitalizations. To comply with our data use agreements, all frequency counts of 1-9 are masked in presentation of the hospital discharge and ED visit data to protect against potential identification of injured patients. Additionally, small counts in aggregate data covering several years are notoriously unstable and thus we felt should be avoided in the summary top ten causes of injury for this report.

In identifying the leading causes of childhood Injury in Wake County, we drew causes from various levels in relationship to the E-codes. “Assault” and “Self-Inflicted/Self-Harm” are intent level categories of injury and incorporate all mechanism and sub-mechanism codes within each intent category. Within the “Unintentional” intent category, we chose some injury mechanisms (Falls, Burns, Struck by/against, Natural/environmental factors, and Suffocation) as well as some sub-mechanism level causes (Motor vehicle crash - occupants, Motor vehicle crash - pedestrians, and Bicycle injury/crashes).

While this approach created some challenges in working with the various data sources, we felt it was appropriate to get beyond the confinements of the injury coding structures to try to address the real injury issues in the community. Furthermore, each of our main data sources presented different coding issues and challenges. For example, the mortality data were coded using ICD-10, which has a completely different structure than ICD-9-CM. However, the relatively few childhood injury deaths in Wake County made it possible to review each code used for these deaths and assign it to an appropriate cause category. The hospital discharge data are limited to only one E-code and are missing any E-code for more than 10% of those with an injury diagnosis. The Wake County ED visit data often have 3-5 E-codes per record, presenting a wealth of detail but requiring hand review and sub-categorization for many records that had conflicting codes (e.g. intentional unarmed fight and unintentional human bite; unintentional fall and unintentional cutting/piercing instrument). In these cases, reading the information available in the chief complaint and triage note fields, along with reviewing the diagnosis codes and the age of the child usually provided enough information to choose which injury intent and mechanism codes to use. When efforts to determine the most appropriate codes failed, we used the first listed mechanism and intent codes. A similar approach was used for determining sub-mechanism assignment when multiple conflicting sub-mechanism codes were present (e.g. Fall from slip/trip/stumble and Fall from stairs/steps).

C. Profile of Wake County Organizations Addressing Childhood Health and Safety

1. Survey Data Collection

a. Selection/Identification Process for Profile Organizations and Coalitions

To initiate the process of creating a Profile of Wake County organizations addressing childhood health and safety, UNC Team members developed a 'Master List' of organizations, networks, coalitions and taskforces, hereafter referred to as "coalition(s)", identified through online searches (Appendix C). Entities were included in the list if they met the following criteria: 1) identified as an organization or a coalition and not an individual; 2) work in Wake County; and 3) conduct activities which may be relevant for the JRE Childhood Injury Profile.

The initial identification process was intentionally broad and included organizations or coalitions that were directly or indirectly working on childhood injury and/or violence prevention. For example, organizations working on teen job skill development were considered to be indirectly working on related protective prevention factors for injury and/or violence.

As the list of organizations was refined, several were removed for various reasons, including: they were addressing a one-time target group; they targeted unrelated age groups (e.g. adult men, elder populations); their work was/could be accounted for by other participating organizations; they served populations outside of Wake County; they consisted solely of online information; they were not currently providing services; JRE requested removal; there was no available contact information and they were not responsive to follow up contact; they asked to be "self-removed"; and/or they provided a duplicated entry.

Information collected about organizations was compiled into a working data base, which was continually revised and updated between August and October 2013. Additional internet research and professional contacts provided primary (e.g., Executive Director, CEO) and secondary (e.g., Assistant Director, Program Manager) names and emails for listed organizations and coalitions. A few organizations were added based on suggestions by organizations completing the survey. The final number of organizations identified and invited to participate in this project was 154. The final number of networks/coalitions/task forces identified and invited to participate in this project was 18.

b. Survey Development

Team members determined that primary data collection using an on-line survey was the most appropriate method to collect information about organizations working in Wake County to promote childhood health and safety, with a focus on those that conduct injury and/or violence prevention activities.

The organization survey development process consisted of three phases: 1) UNC identification of survey questions (e.g. organizational demographics, target populations); 2) review and alignment by JRE staff and evaluation consultants (e.g. definition of organizational capacity and identification of capacity building activities); and 3) pilot-testing and finalization of survey instrument.

The organization survey included 27 questions (Appendix D) and the coalition survey included 23 questions (Appendix E). Each survey included questions about organizational demographics, populations served, focus of work and types of services, types of injury and/or violence prevention activities, capacity, data and funding sources used, topics of interest for further support, and a question about whether they would like to be included in future reports/announcements from JRE. During the first phase of survey development, UNC identified the need to create a separate tailored survey instrument for coalitions (i.e., a coalition survey). This was determined due to the subtle but important differences between the organizational structure and focus of

coalitions, networks, or task forces that seek to advocate for childhood health and safety, as compared to organization that conduct work to prevent childhood injuries. The coalition survey was comparable to the organization survey. The two main differences were: 1) Coalitions were asked to report on the frequency (e.g. monthly, quarterly) and method(s) (e.g. email, in person) of meetings; and 2) Coalitions were not asked to name or quantify their Childhood IVP Programs/Activities.

Tables 3 to 5 summarize three main areas of questions included in the John Rex Endowment Organization Survey conducted in September and October of 2013: 1) Demographics and Outreach; 2) Injury Prevention Focus of Organizations; 3) Organizational Resources. For each area, we summarize: a) the category (Column 1); b) the survey question number and number of survey items included (column 2); c) response options or specific indicators (column 3); and d) related response formats and scales (column 4).

Table 3. Organization demographics and outreach. ^a			
Category of Questions	Survey Item #	Response Options	Response Format/Scale
1. Organizational Demographics	#4 (n=3)	<ul style="list-style-type: none"> # Employees # of Full Time Employees # Volunteers 	TEXT
2. Organization Type	#5 (n=10)	<ul style="list-style-type: none"> Committee/Task Force Local Government Hospital/Health Center Non-profit Private Religious Organization Research State Government Volunteer Organization Other 	Check all that apply (0-No; 1= Yes)
3. Geographical Area Served	#6 (n=6)	<ul style="list-style-type: none"> The City of Raleigh Wake County The Greater Triangle Area The State of NC Nationally, The United States Other (e.g. neighborhoods, cities, towns) 	Check all that apply (0-No; 1= Yes)
4. Populations Served ^b	#7 (n=16)	<ul style="list-style-type: none"> African American American Indian Caucasian Hispanic Female Male Lesbian, Gay, Bisexual, Transgender Rural Urban Homeless Low income Foster Children Orphans Children/youth living with a disability (e.g. cognitive, sensory, physical) Refugees Other 	Check all that apply (0-No; 1= Yes) No response was counted as not working in this area.
5. Targeted Groups Served	#8 (n=8)	<ul style="list-style-type: none"> Children Parents/Caregivers Religious Leaders Teachers Medical Professionals (e.g. doctors, nurses, EMT) Policy Makers/Decision Makers (e.g. commissioners, government officials) Public Safety (e.g. police, fire) Other 	Check all that apply (0-No; 1= Yes)

^a Coalitions were asked all question included in this table (#1 - #5).

^b Percentages were created based on those who indicated targeting a populations, those who were non-responders were considered to not be targeting that population.

Table 4. Injury prevention focus of organization. ^a			
Category of Questions	Survey Item #	Response Options	Response Format/Scale
6. Organizational Work Focus	#10 (n=9)	<ul style="list-style-type: none"> Counseling Organizational Work/Education Advocacy Research/Data Program Evaluation Communication/Media Writing Rules or Policies Funding Other 	Not at all important (0) to Very Important (6)
7. Importance of Childhood health and safety	#12 (n=7)	<ul style="list-style-type: none"> Consider overall work of organization 	Not at all important (0) to Extremely Important (7)
8. Intentional Injuries	#14 (n=6)	<ul style="list-style-type: none"> Child Abuse/Maltreatment (physical, sexual, emotional) Assault/Physical Violence Sexual Violence (e.g. assault, rape) Self Inflicted/Self Harm Intentional Injuries /Bullying Human trafficking 	Check all that apply (0-No; 1= Yes)
9. Unintentional Injuries	#15 (n=14)	<ul style="list-style-type: none"> MVC-Bicycles MVC-Cars/trucks/buses MVC-Motorcycles MVC-Pedestrians MVC-Other Animal bites Bicycle injury/crashes (NOT MVC) Burns, including fire and scalds Drowning/submersion Environmental Factors (e.g. weather related) Falls Suffocation Firearm Poisoning/overdose 	Check all that apply (0-No; 1= Yes)
10. Childhood IVP Programs/Activities	#16	<ul style="list-style-type: none"> How many (#) childhood health and safety programs or activities are provided at your organization? 	Numerical Value
11. Name/description of “TOP FIVE” Programs and Activities	#17	<ul style="list-style-type: none"> Names of programs 	TEXT

^a Coalitions were not asked to name or quantify their Childhood IVP Programs/Activities, therefore question categories 10 and 11 were not asked of coalitions.

Table 5. Organizational resources. ^a			
Category of Questions	Survey Item #	Response Options	Response Format/Scale
12. Organizational Capacity	#19 (n=8)	<ul style="list-style-type: none"> Research and identify evidence-based injury prevention programs, interventions, strategies Use research about evidence-based injury prevention programs Find relevant childhood injury data Use childhood injury data Identify possible funding/in-kind sources Obtain funding/in-kind contributions Identify other Wake County entities Use existing Wake County injury prevention networks 	No Capacity (1) to High Level of Capacity (4); or 5 - Don't Know 6 - Not Applicable

Table 5. Organizational resources.^a

<i>Category of Questions</i>	<i>Survey Item #</i>	<i>Response Options</i>	<i>Response Format/Scale</i>
13. Data Sources	#20 (n=14)	<ul style="list-style-type: none"> We do not use data in our organization Center for Disease Control and Prevention (CDC) Kids Count Data Center Carolinas Poison Control Emergency Medical Service Performance Improvement Center (EMSPIC) NC DETECT NC Department of Transportation NC Violent Death Reporting System NC Division of Public Health (including the State Center for Health Statistics) UNC Highway Safety Research Center UNC Injury Prevention Research Center Wake County Safe Kids Wake County Community Health Assessment Other 	Check all that apply (0-No; 1= Yes)
14. Project Funding Sources	#21 (n=17)	<ul style="list-style-type: none"> Center for Disease Control and Prevention (CDC) Department of Justice, Office of Juvenile Justice and Delinquency Prevention (OJJDP) Federal Block Grant Health Resources and Services Administration's (HRSA) Maternal and Child Health Bureau National Foundations (The Robert Wood Johnson Foundation, Ford Foundation, Kaiser Permanente, etc) National Highway Traffic Safety Administration (NHTSA) NC Department of Health and Human Services (NC DHHS) NC Foundations (John Rex Endowment, K.B. Reynolds, The Duke Foundation) NC State Budget Allocation Wake County Cooperative Extension Wake County Department of Human Services Wake County Department of Justice Private Donors Other Governmental Funding (federal, state or local) Corporate Sponsors Insurance Companies Other 	Check all that apply (0-No; 1= Yes)
15. Capacity Building Activities	#24 (n=7)	<ul style="list-style-type: none"> Receive resources related to childhood injury and injury prevention in Wake County Receive Wake County childhood injury data reports Participate with Wake County stakeholders working in injury prevention to dialogue about childhood injury priorities and networking Attend trainings on evidence-based injury prevention programs, interventions, and strategies Attend trainings focused on building capacity in resource development Participate in informational networking sessions on injury prevention grant funding available from the John Rex Endowment and/or other public and private funders Other 	Not Valuable (1) to Very Valuable (4)

^a Coalitions were asked all questions included in this table (# 12-15).

c. Survey Implementation

To establish contact with the 154 organizations and 18 networks/coalitions/task forces identified on the project's Master List, John Rex Endowment staff initiated contact by emailing invitations on September 16, 2013. Invited organizations and coalitions were asked to complete a Qualtrics survey (a link was included) by October 15, 2013. Email invitations included an individualized, tailored email addressed to the primary contact for each organization or coalition. Executive directors and CEOs were asked to forward the email to the most appropriate individual(s) within their organization. The email (Appendix F) included an introduction to the Wake County Childhood Health and Safety Injury and Violence Prevention Profile, a link to the Qualtrics survey; and contact information for a UNC team member.

UNC team members monitored the completion of surveys for organizations and coalitions on a daily basis. UNC sent up to four reminder emails to each organization until the contact either completed the survey or the final deadline passed.

2. Survey Data Analysis

a. Survey Data Processing

Information was collected and provided by Qualtrics in CSV format. Surveys that were initiated, yet did not contain data, were removed from the total count. Data were cleaned to be aligned with the appropriate formats (e.g. numerical, text). Data were summarized using Microsoft Excel 2007 for appropriate measures, including sums, averages, and frequencies. In some cases, data were used to generate new variables, such as composite scores for related information. All data management processes were documented and are summarized in a final code book (Appendix G).

Analysis of responses to two survey questions (Appendix D, Question #14, and Question #15) was conducted by reviewing similarities and differences across 22 (excluding 'none of the above') individual injury causes categories for both intentional and unintentional injury. Summaries for individual injury causes categories (e.g., suffocation, assault) were created based on survey responses from organizations indicating that they work either directly or indirectly to prevent an injury causes. Data were summarized using Microsoft Excel 2007 for appropriate indicators, including sums, averages, and frequencies. In some cases, data were used to generate new variables, such as composite scores for related information. Injury causes with evident differences are reported in the results section.

b. Coding to Assess Organizational Capacity and Program Impact (for Organization survey only)

UNC Team members conducted additional analysis of survey data to better estimate **Organizational Capacity** and **Program Impact**. UNC staff identified survey questions that related to organizational capacity and program impact. Upon review of responses provided to the survey questions, additional follow-up was conducted (online, and through telephone contact with the organization) to obtain missing information pertaining to capacity and impact.

To assess **Organizational Capacity**, UNC developed a capacity index. Participating organizations responded to items (Table 5 and Question #19 in Appendix D) related to organizational capacity to conduct activities to promote childhood health and safety through the prevention of injury and/or violence.

JRE wanted to assess the degree to which organizations can identify resources (e.g. locate evidence based practices; find childhood injury data; identify funding sources; and identify other local childhood injury and/or violence prevention networks) and integrate resources (e.g. use evidence based practices in injury prevention

programs; use childhood injury data; obtain funding; and use existing local childhood injury and/or violence prevention network).

Response options included “no capacity” (1), “low level of capacity” (2), “medium level of capacity” (3) and “high level of capacity” (4). To reduce missing variables, “Don’t know” and “Not Applicable” responses were substituted with the average response calculated from the responding organizations. This step was applied to seven responding organizations with missing responses for one to five indicators.

Responses for the eight items creating the organizational capacity index ranged from the lowest possible capacity of eight points to the highest possible capacity of 32 points. Capacity index scores were reviewed and divided into three similar sized categories: 1) High Capacity (≥ 25 points); 2) Medium Capacity (≥ 21 , < 25); and Low Capacity (< 21). Indicators for the organizational capacity sub groups were reviewed and we reported differences greater than 10% from the overall average.

For **Program Impact**, respondents were asked to identify and list their “TOP FIVE programs, interventions or activities focused on childhood health and safety through the prevention of injury and/or violence” (Survey Item #17, Table 4 and Question # 17 Appendix D). The programs provided in response to this question were coded for injury prevention focus across the categories of intentional injury, unintentional injury, or both.

Several leading public health and/or injury and violence frameworks were considered to identify the most applicable program descriptors for injury and/or violence prevention. Some of these frameworks include the National Research Council (2009); National Center for Injury Prevention and Control, Division of Violence Prevention (2013); National Action Plan for Child Injury Prevention (2012); the North Carolina Institute for Medicine (2005); The Spectrum of Prevention (Cohen & Swift, 1999); An Agenda for Suicide Prevention in the United States (Caine, 2013); Charting the Waves of Prevention (Daro & Donnelly, 2002); Haddon’s Matrix (1970); A Public Health Approach to Children’s Mental Health: A Conceptual Framework (Miles, Espiritu, Horen, Sebian, & Waetzig, 2010); Flay et al. (2005) Standards of Evidence: Criteria for Efficacy, Effectiveness and Dissemination; and Frieden’s Health Impact Pyramid (2011). UNC applied a combination of these frameworks (Appendix H) to each program by coding the programs for attributes related to the frameworks.

Table 6 describes how framework descriptors were applied to the programs: 1) IP focus; 2) Prevention level; 3) Socio-ecological Framework; 4) Frieden’s Health Impact Pyramid; and 5) Three E’s of Injury Prevention. Two separate coders reviewed all programs listed by responding organizations and independently coded each program for the framework descriptors. Discrepancies were reviewed and reconciled through consensus. Distributions, frequencies and matrices were analyzed for similarities and differences. A program impact index variable was derived from summing the coded variables for the Socio-Ecological Framework, Frieden’s Health Impact Pyramid, and the Three E’s of injury prevention. Sums, averages, and frequencies were compared across frameworks.

Table 6. Application of injury prevention categories and frameworks to programs listed by responding organizations.

<i>Program Descriptors</i>	<i>Variable(s)</i>	<i>Response Format/Scale</i>
1. IP Focus ^a	<ul style="list-style-type: none"> 1- Intentional 2 - Unintentional 3- both 	Descriptive Numerical Value (1-3)
2. Prevention level ^a	<ul style="list-style-type: none"> 1-Primary Prevention 2-Secondary Prevention 3-Tertiary Prevention 4-Primary & Tertiary 5-Primary & Secondary 6--Secondary & Tertiary 7-All Levels of Prevention 	Descriptive Numerical Value (1-7)
3. Socio-Ecological Framework	<ul style="list-style-type: none"> 1-Individual 2-Relationship 3- Community 4- Society 	Lower Impact (1) – Higher Impact (4)
4. Freidan’s Health Impact Pyramid	<ul style="list-style-type: none"> 1 - Counseling and Education 2 - Clinical Interventions 3 - Long Lasting Protective Interventions 4 - Changing the Context 5 - SES Factors 	Lower Impact (1) – Higher Impact (5)
5. 3Es of Injury Prevention	<ul style="list-style-type: none"> 1- Education 2- Enforcement or Engineering 3 - Combination of two Es 4- All 3Es 	Lower Impact (1) – Higher Impact (4)

^aIP focus and level of prevention were included as descriptive information. They are not included in the program impact index.

c. Analysis of Program Impact by Organizational Capacity Levels

Program impact sums, averages and frequencies were compared across organization capacity levels. Distributions by frameworks were also reviewed. We reported differences greater than 10% from the overall average.

D. Relationship among the Leading Causes of Childhood Injury, Injury Prevention Focus, and Programmatic Approach

UNC conducted additional analyses comparing the leading causes of injury to the degree to which organizations that participated in this project address those causes of injury. Information collected in the survey of organizations identified those organizations that self-identified as working to prevent specific types of intentional or unintentional injury (Table 4). We summarized which injury categories and types were more frequently addressed by organizations responding to the survey. In addition, we characterized the organizational capacity by injury causes. To guide the comparisons, we used our terminology (Appendix A) to align the secondary data analysis with the organization survey data (Table 7).

Table 7. Alignment between leading childhood injury causes from secondary data and survey data.

<i>Rank</i>	<i>Leading 10 Events and Injuries</i>	<i>Categories from Survey</i>
1	MVC Traffic-Occupant	1. MVC-Cars/Trucks/Buses
2	Assault	2. Assault <ul style="list-style-type: none"> a. Child Abuse/Maltreatment (physical, sexual, emotional) b. Assault/Physical Violence c. Sexual Violence (e.g. assault, rape)
3	MVC Traffic-Pedestrian	3. MVC-Pedestrians
4	Self-Inflicted/ Self-Harm	4. Self Inflicted/Self Harm
5	Falls	5. Falls
6	Unintentional Suffocation	6. Suffocation
7	Burns	7. Burns, including Fire and Scalds
8	Struck By or Against	8. Not available
9	Natural/Environmental Factors	9. Environmental Factors (e.g. weather related) <ul style="list-style-type: none"> a. Animal Bites
10	Bicycle Injury/Crashes	10. Bicycle Injury/Crashes

E. Compilation of Evidence-based Practices for Childhood Unintentional and Intentional Injury

UNC conducted a literature review to identify evidence-based programs for the leading causes of injury in Wake County. UNC staff conducted online reviews and searches for evidence based or best practices registries. Due to the difference in known causes and prevention methods for intentional and unintentional injury-related events, a combination of 16 registries was used (Table 8).

Table 8. Injury and/or violence prevention evidence-based or best practice registries.	
Registry Name	Sponsoring Agency
Intentional Injury	
1. Blueprints for Healthy Youth Development	University of Colorado Boulder; Institute of Behavioral Science Center for the Study and Prevention of Violence; In partnership with the Annie E. Casey Foundation
2. California Evidence-Based Clearinghouse for Child Welfare	The Office of Child Abuse Prevention (California)
3. National Institute of Justice Office of Justice Programs, Crimesolutions.gov	National Institute of Justice, US Department of Justice
4. National Registry of Evidence-Based Programs and Practices (NREPP)	Substance Abuse and Mental Health Services Administration (SAMHSA)
5. Office of Juvenile Justice and Delinquency Prevention (OJJDP), Model Programs Guide	Office of Justice Programs, National Institute of Justice, US Department of Justice
6. Promising Practices Network	National Institute of Justice, US Department of Justice
Unintentional Injury	
7. CDC's Morbidity and Mortality Weekly Report, Injury-Control Recommendations: Bicycle Helmets	The Centers for Disease Control and Prevention (CDC)
8. CDC Motor Vehicle Safety Resources - Teen Drivers, Policy Impact	The Centers for Disease Control and Prevention (CDC)
9. Children's Safety Network	Health Resources and Services Administration's Maternal and Child Health Bureau, U.S. Department of Health and Human Services
10. Coalition for Evidence-Based Policy	The Coalition is a nonprofit, nonpartisan organization, and has no affiliation with any programs or program models. Their work is primarily funded by philanthropic foundations, including the John D. and Catherine T. MacArthur Foundation, the William T. Grant Foundation, the Laura and John Arnold Foundation, and the Annie E. Casey Foundation.
11. Child Injury Prevention Tool Selecting Best Practices	<u>Stage One:</u> The Child Death Review Capacity-Building Project was based at the Harborview Injury Prevention and Research Center in Seattle, Washington. The project was supported by a grant from Health Resources and Services Administration, through its EMS-C Targeted Issues Grant Program (1H34MC02543-01-033) <u>Stage Two:</u> National Center for Child Death Review and the Children's Safety Network Project: grant No. 1 U93 MC 00225-01 and grant No 05-381.0.03.01 from the Maternal and Child Health Bureau (Title V, Social Security Act), Health Resources and Services Administration, Department of Health and Human Services.
12. National Association of County & City Health Officials (NACCHO)	NACCHO is funded by many agencies http://www.naccho.org/about/partners_funders.cfm
13. National Center for Injury Prevention and Control (NCIPC)s	The Centers for Disease Control and Prevention (CDC)

Table 8. Injury and/or violence prevention evidence-based or best practice registries.

<i>Registry Name</i>	<i>Sponsoring Agency</i>
14. The Cochrane Collaboration	Cochrane's funding model reflects the international and dispersed nature of the organization. While their core income (income paid directly to Cochrane and used to sustain its information management system, research programs, website etc) comes principally from the proceeds of The Cochrane Library and other Cochrane products, their groups are supported by national governments, international governmental and non-governmental organizations, universities, hospitals, private foundations, and personal donations. They are not permitted to accept funding from commercial organizations such as pharmaceutical companies. This is to ensure that the conclusions of Cochrane Reviews are not influenced by commercial interests.
15. United States Preventive Services Task Force (USPSTF)	Agency for Healthcare Research and Quality (AHRQ)
Both Intentional and Unintentional Injury	
16. CDC's The Community Guide	The Centers for Disease Control and Prevention (CDC)

In 2013, Blueprints for Healthy Youth Development created a list of intentional injury programs and interventions and their ratings from several leading federal and private agencies (Mihalic, 2014). Building from this initial list of programs, the evidence-based practices compilation was created for this project to include information from SAMHSA's National Registry of Evidence-Based Programs and Practices (NREPP) registry. NREPP's structural framework was adopted to organize information for reviewed injury and/or violence interventions listed in the compilation. The evidence-based practices Compilation prepared for this project includes information for interventions, programs and/or activities that address youth-related injury and/or violence prevention. When available, the evidence-based practices Compilation developed for this project includes 18 descriptors: registry source; the criterion rating assigned by the registry; basic program description; extended program description; review date; primary source website; additional resources; manual; published articles; specific outcomes; notes; age groups; setting; and availability in Spanish (Table 9).

Table 9. Evidence-based practices compilation variable description and format/scale.

<i>Intervention Description</i>	<i>Variable Description</i>	<i>Format/Scale</i>
1. Program Name	The name of the strategy or program as identified by the reviewer or source.	Text
2. Evidence-Based Reviewers and Ratings	Citation of the source of evidence-based reviews of the strategy/program and specific rating.	Text
3. Basic description	A brief description of the program/strategy	Text
4. Extended Description	A longer and more detailed description of the program/strategy	Text
5. Review Date	Date/year of review by the primary source	Month/Year
6. Primary Review Website	Link to primary source	Hyperlink
7. Additional Resources	Link to additional information about the strategy/program (e.g. other sources, the developer of the program, or technical assistance for implementers).	Hyperlink
8. Program Manual	Link to manuals or guides	Hyperlink
9. Published Articles	Link to published articles/bibliographies	Hyperlink
10. Specific Outcomes	Major injury outcome categories by the primary source. If no outcomes were explicitly stated, then the injury category for the strategy/program was included as the specific outcome	Category from NREPP/identified by Review of Abstract

Table 9. Evidence-based practices compilation variable description and format/scale.		
<i>Intervention Description</i>	<i>Variable Description</i>	<i>Format/Scale</i>
	(e.g., MVC injuries and fatalities for MVC interventions).	
11. Outcome Categories	General categories of outcomes, from primary reviewer and based on NREPP's categories. Several interventions addressed risky sexual behavior (e.g. early pregnancy, unprotected sexual intercourse) and therefore we included this as an additional risk factor category.	Category from NREPP/identified by Specific Outcome categories
12. Notes	Any additional information that may be readily available about a specific strategy/program (e.g. adaptations, available translations of materials, limitations on availability and replication).	TEXT
13. Spanish	Indicates whether or not the program has necessary materials that are readily available in Spanish.	1=Yes
14. Risk Factors for Injury and Violence	These categories represent major outcomes that are addressed by many childhood injury and violence prevention programs. These outcomes represent risk factors for unintentional and intentional injury types. This list is not comprehensive, but helps to describe the nature of many youth-focused programs available. Some programs only address risk factors, some programs only address specific injury types, and some programs may address both risk factors and specific injury types.	<ol style="list-style-type: none"> 1. Alcohol 2. Crime/Delinquency 3. Drugs 4. Mental Health 5. Family Relationships 6. Social Functioning 7. Substance Abuse 8. School Readiness/Academic Achievement 9. Risky Sexual Behavior
15. Intentional Injury Event	These categories were identified to align with the injury causes from the organization survey. Several programs were selected for other injury types (e.g. unintentional and intentional), but the evaluation level for all injury causes selected varies.	Table 4, #8 and #9
16. Unintentional Injury Event		
17. Age Group	Age categories, as defined by NREPP, were coded based on the sources' explicit indication when possible or based on the source's language in describing the program. Age categories were applied to the target of the program, e.g. the category of the individuals or groups whose behavior the strategy/program addresses.	<ul style="list-style-type: none"> • Early Childhood (0-5) • Childhood (6-12) • Adolescent (13-17) • Young Adulthood (18-25) • Adult (26-55) • Universal (e.g. laws, mass media)
18. Setting	Setting categories, as defined by NREPP, were coded based on the source's explicit indication when possible or based on the source's language in describing the strategy/program. A separate setting category was created for community-wide interventions (e.g. laws and mass media campaigns).	<ul style="list-style-type: none"> • School • Home • Workplace • Residential • Outpatient • Correctional • Primary Care • Other or Unspecified • Universal (e.g. laws, mass media)

Programs (including interventions and countermeasures) were reviewed and included if they addressed an intentional and/or unintentional injury event or risk factor. The same injury and violence categories from the survey were used in the compilation to code programs. In addition, many programs addressed risk factors for injury and violence and we identified these in the compilation by using NREPP's outcome categorizations.

NREPP identified outcome categories include the following eight risk factors: 1) alcohol; 2) crime/delinquency; 3) drugs; 4) mental health; 5) family relationships; 6) social functioning; 7) substance abuse; and 8) school readiness/academic achievement. Several interventions addressed risky sexual behavior (e.g. early pregnancy, unprotected sexual intercourse) and therefore we included this as an additional risk factor category. Targeted age groups and program setting (e.g. school, home) information was also coded.

Using Microsoft Excel, summaries and matrices were created and used to describe the range of interventions that could be implemented to reduce the relevant injury cause(s). The final Evidence-based compilation is a searchable database.

Each registry used to create the compilation includes a rating system for the programs they selected for review. Registries did not use a standardized system and therefore there is variation in the rating, criteria, quality and terminology of reviewed programs. For this project, reviewed programs are reported as listed by the source registry. Source registry criteria for categories such as *Recommended*, *Promising*, *Unproven*, *Harmful*, *Insufficient Evidence* to *Recommended Against* vary. Detailed definitions of the ratings used by each source registry are in Appendix I. Most registries require a specific level of scientific rigor to be included in the review; however, there is also variation in the review process used by each registry. For example NREPP provides their ratings based on several independent trained reviewers evaluating the following: 1) reliability of measures; 2) validity of measures; 3) intervention fidelity; 4) missing data and attrition; 5) potential confounding variables; and 6) appropriateness of analysis, whereas the Community Guide convenes a coordination team to lead a review process overseen by the Community Preventive Task Force Members appointed by the director of the Center for Disease Control and Prevention. We have provided a summary of the ratings used in the compilation in Appendix I.

III. Results

This section provides a summary of results, with references to related appendices for: A) Wake County Injury and Violence Secondary Data: Mortality and Morbidity; B) Summary of Leading Causes of Injury for Wake County Injury and Violence Secondary Data; and C) Survey of Wake County Organizations Addressing Childhood Health and Safety; D) Survey of Wake County Coalitions Addressing Childhood Health and Safety; and E) Summary of Evidence Based Practices.

A. Wake County Injury and Violence Secondary Data: Mortality and Morbidity

Three main data sources were used to develop an overall picture of injury mortality and morbidity among children age 0-17 in Wake County, North Carolina.

1. **Mortality** (deaths) were identified in data available through the NC State Center for Health Statistics (SCHS) and the NC Violent Death Reporting System.
2. **Hospital Discharges** with injury diagnoses or coded external cause of injury were identified through the NC SCHS hospital discharge data file and accessed by staff in the Injury and Violence Prevention Branch at NC Division of Public Health (NC DPH).
3. **Emergency Department Visits** (injury related) were identified through NC DETECT data and accessed by UNC project staff under a Data Use Agreement with NC DPH.

The next three sections describe and list the causes and number of injury/events for each of the three primary types of data analyzed (i.e. mortality, hospital discharge, ED visit), to the extent possible, emphasizing the five leading types of injury/event for each data source.

Subcategories for the leading injury causes are listed if they represent a minimum of 5% of the total cases for any of the three leading data sources (i.e. mortality, hospital discharge, ED visit).

1. Mortality

Among the 124 fatal injuries occurring for Wake County children ages 0-17 between 2006-2011, the five leading causes of injury death (in descending order) were: 1) Motor Vehicle Crashes (occupants) (n=20); 2) Assault/Physical Violence (n=16); Motor Vehicle Crashes (Pedestrian) (n=15,); 4) Self Inflicted/Self Harm (n=14); and 5) Suffocation (n=11).

Table 10 lists all causes of injury death, with the top five causes shaded yellow. Three of the five leading causes of injury death were unintentional injury types, and two were intentional injury types. The overall child injury fatality rate for Wake County for the years 2010-2011 was 0.08 child injury deaths per 1,000 person-years.

Table 10. Injury/Event mortality data, Wake County, NC, 2006-2011.	N=124
Intentional Injury	30
2. Assault/Physical Violence	16
a. Struck (fight, brawl, blunt/thrown object)	0
b. Cutting or piercing instrument	1
c. Abuse of child or adult (emotional, physical, or sexual)	5
d. Firearms or explosives	4
e. Human bite	0
f. Rape	0
3. Self Inflicted/Self Harm	14
a. Poisoning	0
b. Cutting or piercing instrument	0
c. Suffocation (Hanging)	10
d. Firearms or explosives	4
Unintentional Injury	93
4. Motor Vehicle Crashes^a	61
a. Cars/trucks/buses (occupants)	20
i. Passenger	15
ii. Driver	5
b. Pedestrian	15
c. Bicyclist	1
d. Motorcyclist	0
e. Other specified	1
5. Poisoning/overdose	3
6. Bicycle injury/crashes (NOT involving a motor vehicle)	0
7. Falls	1
a. Slipping, tripping, stumbling	0
b. Fall striking against other object	0
c. From playground equipment	0
d. From one level to another	0
e. On or from stairs/steps	0
f. From bed	0
8. Natural/Environmental Factors (e.g. weather related, insect/animal bites)	6
a. Venomous and non-venomous arthropods (insects) and arachnids (e.g. spiders)	0
b. Dog bite	0
c. Bite/other injury caused by animals (including rats and snakes)	0
d. Excessive heat/cold, exposure to weather/storms	5
9. Firearm	3
10. Drowning/submersion	4
11. Burns, including fire and scalds	4
12. Suffocation/Choking/Breathing Threat	11
13. Struck by or against	0
a. Other struck against with/without fall	0
b. In sports	0
c. By Other stationary object	0
d. By Furniture	0
e. By falling object	0
Undetermined Intent of Injury	1

^a For mortality data, all MVC deaths were combined since there were few that clearly coded traffic vs. non-traffic. Almost all that were specified were traffic but there were some coded as non-traffic.

2. Morbidity—Hospital Discharges

Among the 3,007 injury-related Hospital Discharges occurring among Wake County children ages 0-17 between 2006-2011, the five leading causes of injury morbidity (in descending order) were: 1) Falls (n=646); 2) Motor Vehicle Crashes (traffic) (n=309); 3) Self Inflicted/Self Harm (n=272); 4) Burns, including fire and scalds (n=203); and 5) Assault/Physical Violence (n=165).

Table 11 lists causes of injury-related hospital discharge, with the top five causes shaded yellow. Three of the five leading causes of injury-related hospital discharges were unintentional injury types, and two were intentional injury types. The overall hospital discharge rate for childhood injury in Wake County, 2010-2011 was 2.22 hospital discharges per 1,000 person-years.

Detailed tables describing the hospital discharge data for injured Wake County children ages 0-17 years, 2006-2011, are included in Appendix J. Overall, 58.1% of the injury hospital discharges were for male children and males accounted for over 50% of injury hospitalizations in all age groups. Children ages 15-17 years had more injury hospitalizations than any other age group and accounted for 27.7% of all injury hospital discharges. The most frequent injury diagnosis category for injury hospitalizations was Fractures (33.5%), followed by Poisonings (10.4%). Almost 9 out of 10 injury related hospital discharges were discharged home (89.1%) and there were 29 deaths in hospital for injured patients (1.0%).

Table 11. Injury/event hospital discharge data, Wake County, NC, 2006-2011.	N=3,007
Intentional Injury	437
1. Assault/Physical Violence	165
a. Struck (fight, brawl, blunt/thrown object)	22
b. Cutting or piercing instrument	16
c. Abuse of child or adult (emotional, physical, or sexual)	Not available ^a
d. Firearms or explosives	20
e. Human bite	Not available ^a
f. Rape	Not available ^a
2. Self Inflicted/Self Harm	272
a. Poisoning	195
b. Cutting or piercing instrument	35
c. Suffocation (Hanging)	^b
d. Firearms or explosives	0
Unintentional Injury	2,320
3. Motor Vehicle Crashes (traffic)	309
a. Cars/trucks/buses (occupants)	Not available ^a
i. Passenger	Not available ^a
ii. Driver	Not available ^a
b. Pedestrian	Not available ^a
c. Bicyclist	Not available ^a
d. Motorcyclist	Not available ^a
e. Other specified	Not available ^a
4. Poisoning/overdose	157
5. Bicycle injury/crashes (NOT involving a motor vehicle)	Not available ^a
6. Falls	646
a. Slipping, tripping, stumbling	Not available ^a
b. Fall striking against other object	Not available ^a
c. From playground equipment	Not available ^a
d. From one level to another	Not available ^a
e. On or from stairs/steps	Not available ^a
f. From bed	Not available ^a
7. Natural/Environmental Factors (e.g. weather related, insect/animal bites)	144
a. Venomous and non-venomous arthropods (insects) and arachnids (e.g. spiders)	Not available ^a
b. Dog bite	Not available ^a
c. Bite/other injury caused by animals (including rats and snakes)	Not available ^a
d. Excessive heat/cold, exposure to weather/storms	Not available ^a
8. Firearm	^b
9. Drowning/submersion	17
10. Burns, including fire and scalds	203
11. Suffocation	46
12. Struck by or against	162
a. Other struck against with/without fall	Not available ^a
b. In sports	Not available ^a
c. By Other stationary object	Not available ^a
d. By Furniture	Not available ^a
e. By falling object	Not available ^a
Undetermined Intent of Injury	56

^a Sub-mechanism data for hospital discharges were not available to the research team, but may be available through a data request to the Injury and Violence Prevention Branch at the NC DPH. ^b Data use agreements require that frequencies of 1-9 be masked.

3. Morbidity—Emergency Department Visits

Among the 138,047 injury-related Emergency Department Visits occurring among Wake County children ages 0-17 between 2006-2012, the five leading causes of injury morbidity (in descending order) were: 1) Falls (n=36,833); 2) Struck By/Against (n=25,766); 3) Motor Vehicle Crashes (traffic-occupants) (n=9,953); 4) Natural/Environmental Factors (e.g. weather related, insect/animal bites) (n=7,250); and 5) Bicycle injury/crashes (NOT involving a motor vehicle) (n=3,007).

Table 12 lists causes of injury-related Emergency Department Visits, with the top five causes shaded yellow. The overall ED visit rate for childhood injury in Wake County, 2011-2012 was 94.31 ED visits per 1,000 person-years.

Unintentional injury types dominated the leading causes of injury-related emergency department visits; no intentional injury types were identified in the top five causes for ED visits. Detailed tables describing the Emergency Department Visit data for injured Wake County children ages 0-17 years, 2006-2012, are included in Appendix K.

Between January 1, 2006 and December 31, 2012, a total of 138,047 injury-related emergency department (ED) visits were made by patients aged 0-17 who either resided in Wake County or visited a Wake County based hospital emergency department. More than half these visits (58.5%) were by male children and males accounted for more than half the injury-related ED visits for all age groups. The highest numbers of injury-related ED visits were for children ages 1-4 years, followed by those 10-14 years. The number of injury-related ED visits for Wake County children increased steadily each year between 2006 and 2012. Nine out of ten injury-related ED visits by Wake County children resulted in being discharged to home (91.2%), while 4.5% of these visits to the ED resulted in being admitted to the hospital or transferred to another hospital. The first listed injury diagnosis was Open Wound for almost a quarter of the injury-related ED visits (24.1%) and another 15.1% listed Fracture as the first diagnosis. Falls were overwhelmingly the leading injury mechanism for these ED visits, accounting for 30.8% of all injury ED visits for Wake County children during these years.

Table 12. Injury/event emergency department visit data, Wake County, NC, 2006-2012.		N=138,047
Intentional Injury		2,893
1. Assault/Physical Violence		2,044
a. Struck (fight, brawl, blunt/thrown object)		1,002
b. Cutting or piercing instrument		99
c. Abuse of child or adult (emotional, physical, or sexual)		152
d. Firearms or explosives		92
e. Human bite		75
f. Rape		87
2. Self Inflicted/Self Harm		849
a. Poisoning		605
b. Cutting or piercing instrument		172
c. Suffocation (Hanging)		22
d. Firearms or explosives		^a
Unintentional Injury		116,378
3. Motor Vehicle Crashes (traffic)		10,974
a. Cars/trucks/buses (occupants)		9,953
i. Passenger		8,046
ii. Driver		1,893
b. Pedestrian		310
c. Bicyclist		142
d. Motorcyclist/Motorcycle Passenger		178
e. Other specified		62
4. Poisoning/overdose		2,142
5. Bicycle injury/crashes (NOT involving a motor vehicle)		3,007
6. Falls		36,833
a. Slipping, tripping, stumbling		6,776
b. Fall striking against other object		5,252
c. From playground equipment		3,091
d. From one level to another		2,854
e. On or from stairs/steps		2,345
f. From bed		2,077
7. Natural/Environmental Factors (e.g. weather related, insect/animal bites)		7,250
a. Venomous and non-venomous arthropods (insects) and arachnids (e.g. spiders)		3,675
b. Dog bite		1,948
c. Bite/other injury caused by animals (including rats and snakes)		601
d. Excessive heat/cold, exposure to weather		294
8. Firearm		73
9. Drowning/submersion		114
10. Burns, including fire and scalds		1,516
11. Suffocation		87
12. Struck by or against		25,766
a. Other struck against with/without fall		10,978
b. In sports		8,942
c. By Other stationary object		2,304
d. By Furniture		2,131
e. By falling object		1,304
Undetermined Intent of Injury		235

^a Data use agreements require that frequencies of 1-9 be masked.

B. Wake County Injury and Violence Secondary Data: Leading Cause of Injury Summary

1. Overall Summary

This section summarizes additional data about the leading causes of injury identified through secondary data analysis of mortality, hospital discharge, and emergency department visit data. Table 13 lists the top five injury causes for each data source. Color coding is used to depict if/how the five leading causes of injury within one data source were also a top five leading cause of injury in another data source. In Table 14, we describe the process used to develop a list of the ten overall leading causes of injuries occurring among Wake County children ages 0 through 17. The ten leading injury causes are listed in column two in Table 14.

Table 13. Five leading injuries/events for mortality, hospital discharge, and emergency department data.

Rank	Mortality (2006-2011)			Hospital Discharge (2006-2011)			ED Visits (2006-2012)		
	N = 124			N = 3,007			N = 138,047		
	<u>Mortality Injury Causes</u>	#	%	<u>Hospital Discharge Injury Causes</u>	#	%	<u>ED Visit Injury Causes</u>	#	%
1	MVC -Occupant	20	16.1	Falls	646	21.5	Falls	36,833	26.7
2	Assault	16	12.9	MVC Traffic-All	309	10.3	Struck By or Against	25,766	18.7
3	MVC -Pedestrian	15	12.1	Self-Inflicted/Self-Harm	272	9.0	MVC Traffic-Occupant	9,953	7.2
4	Self-Inflicted/Self-Harm	14	11.3	Burns	203	6.8	Natural/Environmental Factors	7,250	5.3
5	Unintentional Suffocation/Choking/Breathing Threat	11	8.9	Assault	165	5.5	Bicycle injury/crashes	2,994	2.2

Table 14. Process used to Identify the 10 overall leading injury causes, across three primary data sources.

Process Summary	10 Leading Injury Causes
<ul style="list-style-type: none"> We studied the data in Table 13 by moving from left to right across data sources, and from rank 1 to 5 within each data source. <i>Motor Vehicle Crashes (MVCc)</i> (occupant, pedestrian, all) were one of the five leading causes for <u>all three</u> data sources, thus their placement as the 1st and 3rd leading injury causes. MVC-Pedestrian was kept separate as the 3rd leading cause given differences in prevention approaches for occupants versus pedestrians. <i>Assault</i> and <i>Self-Inflicted/Self Harm</i> were in the top five injury causes for both <u>mortality</u> and <u>hospital discharges</u>, thus their placement as 2nd and 4th leading causes. <i>Falls</i> was in the top five injury causes for both <u>hospital discharges</u> and <u>ED visits</u>, and the number of fall events was significantly higher than the number of deaths due to <i>Unintentional Suffocation</i>, thus the placement of <i>Falls</i> and <i>Suffocation</i> in the 5th and 6th leading causes, respectively. <i>Burns</i>, <i>Struck By/Against</i>, <i>Natural/Environmental Factors</i>, and <i>Bicycle Injury/Crashes</i> were placed in the 7th through 10th positions because they were among the five leading injury causes for hospital <u>discharge</u> or <u>ED visits only</u>. 	<ol style="list-style-type: none"> MVC Traffic-Occupant Assault MVC Traffic-Pedestrian Self-Inflicted/Self-Harm Falls Unintentional Suffocation Burns Struck By or Against Natural/Environmental Factors Bicycle Injury/Crashes

2. Additional Information on Leading Causes of Injury (Hospital Discharge and ED Visits)

Table 15 summarizes the hospital charges and length of stay for the leading causes of injury. Charges vary widely from \$601 to \$565,721. Length of hospital stay (mean or median) also varied from 0 to 104 days.

Table 15. Hospital charges^a and length of stay, leading injury causes hospital discharge data, Wake County children, ages 0-17 years, 2006-2011.^{b,c}

Injury Event	Hospital Charges		Hospital Length of Stay (in days)	
	Mean	Range	Mean	Range
Intentional Injury				
Assault/Physical Violence (N=165)	\$32,502	\$686-\$500,899	6.7	0-104
Self Inflicted/Self Harm (N=272)	\$11,997	\$707-\$126,330	5.6	0-43
Unintentional Injury	Median	Range	Median	Range
Motor Vehicle Crashes – Traffic (N=309)	\$30,395	\$2,322-\$398,051	3	0-62
Falls (N=646)	\$13,773	\$601-\$524,339	1	0-98
Natural/Environmental Factors (e.g. weather related, insect/animal bites) (N=144)	\$8,227	\$955-\$143,866	2	0-24
Burns, including fire and scalds (N=203)	\$12,525	\$1,187-\$565,721	3	0-91
Suffocation (N=46)	\$13,996	\$823-\$199,952	2	0-45
Struck by or against (N=162)	\$14,995	\$2,000-\$148,580	1	0-85

^a "Hospital charges" are reported by the hospital and do not necessarily reflect actual costs or what the patient or insurance company actually pays.

^b Assault/Physical Violence and Self Inflicted/Self Harm are intent level groupings of injury causes. As such, they are made up of several mechanism level groupings. The hospital discharge data were provided to us aggregated at the mechanism level. This allowed us to calculate means for each of these groups but not medians.

^c MVC-Traffic – Occupant, MVC-Traffic – Pedestrian, and Bicycle Injury/Crash are not available in the hospital discharge data due to limitations in our access to the data at the sub-mechanism level.

For Emergency Department Visit data, we also analyzed Patient Sex (Table 16), Patient Age Group (Table 17), Emergency Discharge Disposition (Table 18), and Expected Source of Payment (Table 19) for the ten causes of injury overall.

Table 16. Top ten causes of injury by sex, ED visit data, Wake County children, ages 0-17 years, 2006-2012.

Patient Sex	Female		Male	
	N	%	N	%
Intentional Injury				
1. Assault/Physical Violence	728	35.6	1,316	64.4
2. Self Inflicted/Self Harm	596	70.3	252	29.7
Unintentional Injury				
3. Motor Vehicle Crashes (traffic) – Occupants ^a	5,449	54.4	4,568	45.6
4. Motor Vehicle Crashes (traffic) - Pedestrians ^a	120	38.2	194	61.8
5. Bicycle injury/crashes (NOT involving a motor vehicle) ^a	883	29.3	2,136	70.8
6. Falls	15,422	41.9	21,415	58.1
7. Natural/Environmental Factors (e.g. weather related, insect bites)	3,224	44.5	4,026	55.5
8. Burns, including fire and scalds	685	45.0	836	55.0
9. Suffocation	41	47.1	46	52.9
10. Struck by or against	8,401	32.6	17,365	67.4

^a For these sub-mechanism causes, we used a slightly different approach to enumerating the total visit counts. We scanned through all E-codes (up to five) present in the visit record and if any of the record's E-code matched these sub-mechanism causes, it would be counted in that category. As a result, it is possible that some records may match more than one of these sub-mechanism causes. This differs from our approach for the other causes listed here, where each record would be counted in only one intent or mechanism, either by matching to only that category or, in the case of multiple or conflicting codes, through our text-review adjudication process.

Table 17. Top ten causes of injury by age group, ED visit data, Wake County children, ages 0-17 years, 2006-2012.

Patient Age Group	0 years		1-4 years		5-9 years		10-14 years		15-17 years	
	N	%	N	%	N	%	%	%	N	%
Intentional Injury										
1. Assault/Physical Violence	54	2.6	91	4.5	177	8.7	625	30.6	1,097	53.4
2. Self Inflicted/Self Harm	0	0	---	---	---	---	252	29.7	588	69.3
Unintentional Injury										
3. Motor Vehicle Crashes (traffic) – Occupants ^b	500	5.0	1,738	17.4	2,170	21.7	2,372	23.7	3,237	32.3
4. Motor Vehicle Crashes (traffic) - Pedestrians ^b	0	0	51	16.2	64	20.4	93	29.6	106	33.8
5. Bicycle injury/crashes (NOT involving a motor vehicle) ^b	0	0	377	12.5	1,249	41.4	1,111	36.8	282	9.3
6. Falls	1,993	5.4	13,155	35.7	10,120	27.5	8,267	22.4	3,302	9.0
7. Natural/Environmental Factors (e.g. weather related, insect bites)	219	3.0	2,501	34.5	2,046	28.2	1,553	21.4	931	12.8
8. Burns, including fire and scalds	133	8.7	763	50.2	263	17.3	197	13.0	165	10.9
9. Suffocation	35	40.2	31	35.6	---	---	---	---	---	---
10. Struck by or against	418	1.6	5,402	21.0	6,048	23.5	8,477	32.9	5,421	21.0

^aThe symbol [---] indicates cell counts <10 but >0. Data use agreements require those data to be suppressed.

^bFor these sub-mechanism causes, we used a slightly different approach to enumerating the total visit counts. We scanned through all E-codes (up to five) present in the visit record and if any of the record's E-code matched these sub-mechanism causes, it would be counted in that category. As a result, it is possible that some records may match more than one of these sub-mechanism causes. This differs from our approach for the other causes listed here, where each record would be counted in only one intent or mechanism, either by matching to only that category or, in the case of multiple or conflicting codes, through our text-review adjudication process.

Table 18. Top ten causes of injury by disposition, ED visit data, Wake County children, ages 0-17 years, 2006-2012.

ED Disposition ^a	Discharged to Home/Self-care		Admitted or Transferred	
	N	%	N	%
Intentional Injury				
1. Assault/Physical Violence	1,626	85.9	192	10.1
2. Self Inflicted/Self Harm	177	22.6	553	70.5
Unintentional Injury				
3. Motor Vehicle Crashes (traffic) – Occupants ^b	8,475	91.2	445	4.8
4. Motor Vehicle Crashes (traffic) - Pedestrians ^b	203	70.5	74	25.7
5. Bicycle injury/crashes (NOT involving a motor vehicle) ^b	2,511	90.2	154	5.5
6. Falls	31,354	91.2	1,445	4.2
7. Natural/Environmental Factors (e.g. weather related, insect bites)	6,193	91.8	255	3.8
8. Burns, including fire and scalds	1,133	81.6	200	14.4
9. Suffocation	35	42.7	42	51.2
10. Struck by or against	22,510	94.1	378	1.6

^a This table presents only Discharged Home/Self-care and Admitted or Transferred to Another Hospital.

^b For these sub-mechanism causes, we used a slightly different approach to enumerating the total visit counts. We scanned through all E-codes (up to five) present in the visit record and if any of the record's E-code matched these sub-mechanism causes, it would be counted in that category. As a result, it is possible that some records may match more than one of these sub-mechanism causes. This differs from our approach for the other causes listed here, where each record would be counted in only one intent or mechanism, either by matching to only that category or, in the case of multiple or conflicting codes, through our text-review adjudication process.

The pattern of expected payment source varies by cause of injury (Table 19). Private insurance was expected to pay more often (>50%) for Motor Vehicle Crashes, Self-Inflicted/Self-Harm, Struck By or Against, Falls, and Bicycle injury. Medicaid/Medicare was expected to pay most often (>40%) for Suffocation, Assault/Physical Violence, Burns, and Natural/Environmental Factors.

Table 19. Top ten injury causes by expected source of payment, ED visit data, Wake County children, ages 0-17 years, 2006-2012.^{a,b,c}

Expected Source of Payment	Private Insurance		Medicaid/Medicare		Self-Pay	
	N	%	N	%	N	%
Intentional Injury						
Assault/Physical Violence	489	24.9	934	47.5	383	19.5
Self Inflicted/Self Harm	459	56.7	208	25.7	104	12.8
Unintentional Injury						
Motor Vehicle Crashes (traffic) – Occupants ^b	5,428	56.5	2,114	22.0	1,752	18.2
Motor Vehicle Crashes (traffic) – Pedestrians ^b	181	59.0	74	24.1	40	13.0
Bicycle injury/crashes (NOT involving a motor vehicle) ^b	1,489	51.5	882	30.5	334	11.6
Falls	19,560	55.4	10,905	30.9	3,276	9.3
Natural/Environmental Factors (e.g. weather related, insect/animal bites)	2,606	37.2	3,082	44.0	974	13.9
Burns, including fire and scalds	561	38.2	659	44.9	180	12.3
Suffocation	30	36.6	40	48.8	---	---
Struck by or against	13,920	56.4	7,148	29.0	12,136	9.2

^a This table presents only Private Insurance, Medicaid/Medicare, and Self-Pay categories of expected source of payment. Other categories included other government payment, workers compensation, and Other /Unknown.

^b For these sub-mechanism causes, we used a slightly different approach to enumerating the total visit counts. We scanned through all E-codes (up to 5) present in the visit record and if any of the record's E-code matched these sub-mechanism causes, it would be counted in that category. As a result, it is possible that some records may match more than one of these sub-mechanism causes. This differs from our approach for the other causes listed here, where each record would be counted in only one intent or mechanism, either by matching to only that category or, in the case of multiple or conflicting codes, through our text-review adjudication process.

^c The symbol [---] indicates cell counts <10 but >0. Data use agreements require those data to be suppressed.

3. Detailed Summary for Leading Causes of Childhood Injury

This section provides detailed results about leading causes of injury among Wake County children ages 0-17 years.

#1 - Motor Vehicle Crashes – Traffic and #3 - Motor Vehicle Crashes – Pedestrian

Motor vehicle crashes (MVCs) - occupants were the leading injury cause of death, motor vehicle *traffic* crashes - all were the second leading injury cause of hospitalization, and motor vehicle traffic crashes – *occupants* were the third leading injury cause of ED visits for children in Wake County. For the mortality data, all motor vehicle crash deaths, including both traffic and non-traffic, were combined due to lack of specificity in many of the codes assigned. Of those specifically coded, most were MVC-traffic related deaths. Of the 61 deaths to Wake County children in motor vehicle crashes in the years 2006-2011, 24 were coded as an unspecified person, while 20 were coded as occupants and 15 as pedestrians (Table 9). Twice as many males (41) died in motor vehicle crashes as females (20). Older children were at greater risk, with 26 deaths in the 15-17 year age group. Of those, 11 were occupants of the motor vehicle and 12 were unspecified.

In the hospital discharge data, we were unable to breakout motor vehicle occupants from pedestrians and other or unspecified roles, which are coded at the sub-mechanism coding level. There were 309 hospital

discharges for motor vehicle traffic crash related injury to Wake County children ages 0-17 years during the years 2006-2011, accounting for 10.3% of all injury related hospital discharges for Wake County children during that time (Tables 10). Over half (53.1%) were for the age group 15-17 years, with another 19.1% for ages 10-14 years. Males accounted for 57.0% of the hospital discharges due to motor vehicle crashes. Motor vehicle crash injuries resulted in the death of the patients for 5.5% in the hospital discharges related to these injuries, much higher than the 1.0% of overall injury related hospital discharges resulting in death. Another 8.4% of these hospitalizations resulted in the patient being discharged to another healthcare facility, such as a long term care or rehabilitation facility. Injuries due to motor vehicle crashes have the second highest hospital charges reported for the leading injury causes, with a median charge of \$30,395; they also have a median length of stay in the hospital of 3 days.

Motor vehicle traffic crash related injury resulted in 10,974 ED visits for children ages 0-17 years in Wake County during the years 2006-2012 (Table 20). Most children injured in MVCs and treated in the ED were occupants of the motor vehicle (90.7%) and most of those (80.8%) were passengers. The ED visit rate for MVC-occupants for Wake County children, 2011-2012, was 6.23 per 1,000 person years. Slightly over half of the MVC occupant injury related ED visits were by females (54.4%). The number of injured children in MVCs increased sharply in the 15-17 year age group, who accounted for 32.3% of all MVC occupant injury ED visits in these data. While MVC occupant injury has the potential to be quite serious, 91.2% of these ED visits resulted in being discharged home, with only 4.8% admitted to the hospital or transferred to another hospital or healthcare facility. The proportion of MVC occupant related ED visits expected to be paid by Medicaid/Medicare (22.0%) was lower than for injury overall, while the proportion expected to be paid by private insurance (56.5%) was slightly higher. The 18.2% of MVC occupant injury related ED visits coded as self-pay was higher than the 10.9% self-pay for Wake County child injury related ED visits overall.

Table 20. Motor vehicle crashes – traffic, injured person Wake County children ages 0-17 years, ED visits 2006-2012 (n=10,974).

<i>MVC Type</i>	<i>Frequency</i>	<i>Percent of MVC-Traffic</i>
Occupant	9,953	90.7
Passenger	8,046	73.3
Driver	1,893	17.2
Occupant - Unspecified	14	0.1
Pedestrian	310	2.8
Motorcyclist/Motorcycle Passenger	178	1.6
Bicyclist ^a	142	1.3
Other specified	62	0.6
Unspecified	329	3.0

^a Note that these include only bicyclists injured in motor vehicle traffic crashes. Another 3,007 ED visits for bicycle crash injuries were reported as a sub-mechanism of Other Transportation injury and did not include a MVC code.

MVC pedestrian injury related ED visits accounted for only 2.8% of all MVC traffic related injury ED visits. Of these, 61.8% were for males and 33.8% were for patients ages 15-17 years. Another 29.6% were for ages 10-14 and 20.4% were ages 5-9. The overall ED visit rate for MVC-pedestrian injuries to Wake County children was 0.16 per 1,000 person-years. While 6 of the 14 child pedestrian *deaths* were children under 5 years of age, 83.8% of *ED visits* for child pedestrian injury are for ages 5-17 years. ED visits for pedestrians injured in MVCs resulted in admission to the hospital or transfer to another hospital 25.7% of the time, with 70.5% discharged home from the ED. Private insurance was expected to pay for 59.9% of ED visits for pedestrians injured in MVCs, while Medicaid/Medicare was expected to pay for 24.1% and 13.0% of the visits were coded as self-pay.

Children who are hit by motor vehicles as pedestrians have a high case fatality rate, with 15 child pedestrian deaths reported in Wake County during 2006-2011. The NC Department of Transportation (NC DOT) reports

203 crashes in Wake County for the years 2006-2010 involving pedestrians ages 15 years or younger, of which 59% involved a male pedestrian. For comparison, during the same years, NC DOT reports 133 MVCs in Wake County involving child bicyclists ages 15 years or younger, 84% of whom were male. These crashes may or may not involve an injury to the child pedestrian but did generate an official crash report. There has currently been no attempt to link these crash reports to ED visit data. A report prepared for JRE in 2012 includes additional details about MVCs involving child pedestrians in Wake County reported to NC DOT in 2007-2010, including that 20% of all Wake County pedestrian crashes during these years involved children under age 18 and over 50% of child pedestrian crashes involved children ages 10-14. Over 50% of child pedestrian crashes occurred between 2pm and 8pm and 55% involved a male child. Perhaps most helpful, this report identified geographical “hot spots” in Wake County – areas where child pedestrian crashes were most likely to happen, allowing for targeted prevention strategies.

The Wake County EMS Pediatric Trauma Toolkit for 2011-2012 reports that 26% of EMS attended trauma calls for patients 0-15 years were for motor vehicle traffic crashes. Wake County EMS data for 2009-2012 in NC DETECT indicate that “Traffic Accident” was the Dispatch Complaint for over 10% of *all* calls for patients 0-17 years.

#2 - Assault

Assault is a leading cause of injury to children in Wake County. It is the second leading cause of injury death behind motor vehicle crashes, with 16 assault related deaths during the years 2006-2011. All assaults are intentionally inflicted injuries with the potential to result in death or serious injury.

Of the 16 assault related deaths reported, 10 were children under age 5, including all 5 deaths due to child maltreatment/neglect. Nine of the 16 deaths were females and 4 were the result of firearm injury. Five deaths were infants under 1 year of age, including 3 of the 6 deaths due to unspecified assault mechanisms.

Of the 165 hospital discharges for assault related injury during the years 2006-2011, almost half (47.3%) were for patients ages 15-17 years. Another 21.8% were for infants under 1 year of age. Over 2/3 of the patients discharged following assault related injury were male (67.3%). Being struck in a fight or brawl or with a blunt or thrown object accounted for 13.3% of the assault related hospital discharges but injuries due to other specified types of assault were the most common (44.2%) and we were unable to get further into these sub-mechanism codes. While assaultive injuries from firearms resulted in only 20 hospital discharges during this time period, these injuries resulted in the highest median hospital charges reported, at \$35,489, and a median length of stay of 5 days.

Assault injuries to Wake County children 0-17 years of age resulted in 2,044 ED visits during the years 2006-2012 (Table 21). Of these, 53.7% were for children ages 15-17 years and another 30.6% were for ages 10-14 years. Almost two out of three of these ED visits (64.4%) were for males. The overall rate of assault related ED visits for Wake County children, 2011-2012, was 1.09 per 1,000 person-years. ED visits due to assault related injury were more likely to be admitted to the hospital or transferred to another hospital (10.1%) than injury related ED visits overall (4.5%). Almost half (47.5%) of assault related injury ED visits had Medicaid/Medicare coded as the expected source of payment for the visit, compared to 32.8% overall for injury related ED visits, and another 19.5% were coded as self-pay, almost twice the 10.9% self-pay reported overall for injury related ED visits. Almost half of the assault injuries resulting in ED visits were due to being struck, with the most frequent sub-mechanism being struck in an unarmed fight/brawl (41.5%), and another 7.5% being struck by a blunt or thrown object. Other specified means, which could not be further delineated, accounted for 19.5% of the assault related ED visits.

Table 21. Leading causes of assault injury, Wake County children ages 0-17 years, ED visits 2006-2012 (n=2,044).

Assault Type	Frequency	Percent of Assault Injury
Struck – Unarmed Fight/Brawl	848	41.5
Other Specified Means	402	19.7
Striking with Blunt/Thrown Object	154	7.5
Child Abuse (coded Perpetrator of Abuse)	152	7.4
Cutting/Piercing Instrument	99	4.8
Firearms(including air gun)	92	4.5
Rape	87	4.3
Human Bite	75	3.7

We identified 152 ED visits for Wake County children, 0-17 years of age, 2006-2012, treated in the ED for an injury and receiving a code indicating a perpetrator of abuse and/or neglect (Table 17). These numbers are undoubtedly an underestimate of this cause of childhood injury. It is important to note that 7.4% of the ED visits coded for intentional assaultive injuries received a code for a perpetrator of abuse. Mortality data did include specific codes for maltreatment and neglect; of the 5 child deaths due to maltreatment and neglect in Wake County, 2006-2011, all indicated an *unspecified* perpetrator.

To provide context, the number of reports of child abuse and neglect investigated in Wake County increased each year from 3,261 in fiscal year 2006 to 5,381 in fiscal year 2008 and then dropped each year to 4,361 in fiscal year 2012. Between 44-46% of the reports each year were for children 0-5 years of age. Over 60% of the children involved in these investigations had no finding of abuse or neglect, with about half of those referred for some kind of service and the rest having either unsubstantiated findings or no referral for service (Source: UNC School of Social Work Management Assistance website, <http://ssw.unc.edu/ma/>). The 2013 Wake County YOUTH THRIVE report noted there were 4,442 reports to Child Protective Services in 2012, resulting in 1,072 (24%) confirmed cases of abuse or neglect involving 2,416 children; 318 children entered foster care in Wake County in 2012.

#4 - Self-Inflicted / Self-Harm

Self-inflicted injury was the third leading cause of injury death to Wake County children in the years 2006-2011, with 14 suicide deaths. While all of these deaths were to children ages 10-17, 8 of them were in the younger 10-14 year age group. Most of the suicide deaths (11) were males. Ten of the 14 deaths were due to hanging and the remaining 4 were due to firearms.

Of the 272 hospital discharges due to self-inflicted injury for Wake County children during the years 2006-2011, 70.6% were children 15-17 years of age and another 27.6% were ages 10-14 years. Self-inflicted injury related hospital discharges were overwhelmingly for female patients (71.0%) and due to poisoning (71.7%), with another 12.9% due to injury with a cutting or piercing instrument.

There were 270 ED visits for self-inflicted injury by Wake County children in the years 2006-2012, with an overall rate of 0.56 ED visits per 1,000 person-years for 2011-2012. ED visits for self-inflicted injury by Wake County children ages 0-17 years during 2006-2012 were similar to hospital discharges, in large part because 70.5% of these ED visits resulted in admission or transfer to another hospital. Only 22.6% of these visits were discharged home, compared to 91.2% of injury related ED visits overall. ED visits due to self-inflicted injury involved children 10 years and older 99.9% of the time (69.3% ages 15-17 years and 30.6% ages 10-14 years). These visits were mostly made by female patients (70.3%) and 71.3% were for injuries due to poisoning, with another 20.3% due to cutting or piercing instruments (Table 22). For ED visits due to self-inflicted injury,

private insurance was the expected source of payment for 56.7%, with Medicaid/Medicare expected to pay for 25.7% and 12.8% of visits coded as self-pay.

Table 22. Leading causes of self-inflicted injury, Wake County children ages 0-17 years, ED visits 2006-2012 (n=849).

<i>Self-Inflicted Type</i>	<i>Frequency</i>	<i>Percent of Self-Inflicted Injury</i>
Poisoning	605	71.3
Cutting/Piercing Instrument	172	20.3
Other Specified	42	4.9
Suffocation (Hanging)	22	2.3

#5 - Falls

Falls are the leading cause of injury related hospital discharges and ED visits for Wake County children. While Falls result in very few deaths, they account for 21.5% and 26.7% of all injury related hospital discharges and ED visits, respectively, for Wake County children in these data. Almost all of these falls are coded as unintentional (99.9%).

All 646 fall injury related hospital discharges for Wake County children ages 0-17 years during the years 2006-2011 were unintentional. Approximately 60% were for males and hospital discharges for fall related injury were fairly evenly distributed by age group, with 27% in ages 1-4 years, 28% in ages 5-9 years, and 23% in ages 10-14 years. The median charges for Fall related hospital discharges in Wake County children, 2006-2011, was \$13,773 and the median length of stay for these hospitalizations was 1 day.

Falls are responsible for over 36,000 ED visits for children in Wake County during the years 2006-2012, with an overall rate of 21.51 fall related ED visits per 1,000 person-years for 2011-2012. 58.1% of fall related ED visits are for males. Over a third (35.7%) of ED visits related to injury from falls are for the age group 1-4 years and another 27.5% are for ages 5-9 years. Over 90% of ED visits for fall related injury result in being discharged to home, with another 4.2% admitted to the hospital or transferred to another hospital. ED visits for fall related injury were slightly less likely to have Medicaid/Medicare as the expected source of payment (30.9%) than injury visits overall (32.8%) and slightly more likely to list private insurance as the source of payment (55.4% for falls, 51.2% overall). Table 23 presents specific types of Falls resulting in ED visits for Wake County children, 2006-2012. Almost one in five (18.4%) of fall injury related ED visits were the result of falls from slipping, tripping or stumbling, 14.3% were due to falls resulting in striking against another object, and 8.4% were coded as falls from playground equipment.

Falls are the leading mechanism of injury reported in the Wake County EMS Pediatric Trauma Toolkit for 2011-2012, accounting for 42% of EMS attended trauma calls for patients 0-15 years. “Fall Victim” was the Dispatch Complaint for 6% of *all* EMS calls for patients 0-17 years in Wake County, 2009-2012.

Table 23. Specific types of falls, Wake County children ages 0-17 years, ED visits, 2006-2012 (n=36,837).

<i>Fall Type</i>	<i>Frequency</i>	<i>Percent of Falls</i>
Slipping, Tripping, Stumbling	6,776	18.4
Unspecified	5,456	14.8
Fall Striking Against Other Object	5,252	14.3
From Playground Equipment	3,091	8.4
From One Level to Another	2,854	7.7
On or From Stairs/Steps	2,345	6.4
From Bed	2,077	5.6

#6 - Unintentional Suffocation

Unintentional suffocation resulted in 11 deaths to Wake County children during 2006-2012, making it the 5th leading cause of injury death. While Unintentional Suffocation was not a leading cause of hospitalization or ED visits, it was included on the top ten list of injury causes for Wake County children because of the high number of fatalities. Of the deaths from suffocation or other breathing threat, 55% were females and 73% were under 1 year of age.

There were 46 hospital discharges with an injury mechanism of unintentional suffocation during the years 2006-2011. Of these, 52.2% were female and 41.3% were ages 1-4 years, with another 23.9% under 1 year of age. These hospital stays resulted in a relatively low proportion (73.9%) of patients being discharged home, with another 15.2% discharge home on home healthcare support.

Of the 87 ED visits for unintentional suffocation during the years 2006-2012, 52.3% were male and 40.2% were under 1 year of age. Another 35.6% were ages 1-4 years, making 3 out of 4 children treated in the ED for suffocation under 5 years of age. Over half (51.2%) of the ED visits for unintentional suffocation resulted in admission to the hospital or transfer to another hospital; the proportion admitted or transferred is much higher than overall ED visits and may reflect the severity of these incidents. For almost half of these visits (48.4%), the expected source of payment was Medicaid/Medicare, with 3.6% expected to pay by private insurance and 11.0% coded as Self Pay.

#7 - Burns

Injury due to burns, including from fire, hot substances and objects, was a leading cause of injury related hospital discharges, accounting for 6.8% in the years 2006-2011 for Wake County children ages 0-17 years. Only 4 children died, all in building fires, in Wake County, 2006-2011. Of the 203 hospital discharges due to burn injury, 59.6% were males and 58.6% were for ages 1-4 years. While the most serious burns would likely be transferred to the regional burn center for further treatment, the vast majority (97.0%) of these hospitalized burn injuries were discharged home from the hospital. The median hospital charges reported for burn injury was \$12,525 and the median length of stay was 3 days.

Of the 1,521 burn injury related ED visits, 99.7% were coded as unintentional burns. Over half of these visits (50.2%) were for ages 1-4 years and 55% were for males. The overall rate of burn related ED visits for Wake County children, 2011-2012, was 0.84 visits per 1,000 person-years. Burn related ED visits were much more likely to be admitted to the hospital or transferred to another hospital (14.4%) than injury related ED visits overall (4.5%). Only 81.6% of burn related ED visits were discharged home. Burn related ED visits were more likely to have Medicaid/Medicare coded as the expected source of payment (44.9%) than injury ED visits overall (32.8%). Hot substances and objects accounted for 83% of burn injury related ED visits, with the largest sub-mechanism being other hot substances and objects (44.9%) (Table 24). Hot liquids and vapor (including steam), and hot tap water are the coded sub-mechanisms for 35.1% of burn related ED visits for Wake County children ages 0-17 years. Fires of one sort or another accounted for 10.7% of these burn injury related ED visits.

Table 24. Specific types of fire/burn injury, Wake County children ages 0-17 years, ED visits, 2006-2012 (n=1,516).

Fire/Burn Type	Frequency	Percent of Fire/Burns
Other Hot Substance or Object	681	44.9
Hot Liquid or Vapor (including steam)	416	27.4
Hot Tap Water	117	7.7
Caustic or Corrosive Substance	93	6.1
Conflagration (Fire)	55	3.6
Unspecified Fire	55	3.6
Unspecified Hot Substance or Object	45	3.0
Other Burning Materials	28	1.8
Controlled Fire	26	1.7

#8 - Struck By or Against

Unintentional injuries resulting from being struck by or striking against objects or persons, with or without subsequent falls, were the second leading injury cause for ED visits and the 5th leading injury cause of hospital discharge for Wake County children ages 0-17 years. This category includes *unintentional* injuries resulting from a variety of mechanisms, including being struck by or against another person in sports, struck by a falling object, or struck by or against furniture. These injuries can be caused by bumping into, colliding with, kicking against, stepping on, or being struck by a person or object, unintentionally. It does NOT include injury caused by a fall resulting in striking an object nor assaultive injuries due to being struck intentionally.

There were 162 hospital discharges for injury from being unintentionally struck by or against objects or persons for Wake County children during the years 2006-2011. Over 60% (62.4%) were for children ages 10-17 years and 81.5% were for males. The median reported hospital charge for discharges for struck by/against related injury was \$14,995 and the median length of stay was 2 days.

There were 25,766 ED visits due to struck by/against related injuries for children in Wake County, 2006-2012, with an overall rate of 14.61 struck by/against ED visits per 1,000 person years in 2011-2012. Over 2/3 of the ED visits for struck by/against injuries were for males (67.4%) and 10-14 year old children were the age group with the most ED visits in this category (32.9%). More than nine out of ten of these ED visits (94.1%) resulted in being discharged home, with only 1.6% admitted to a hospital. A higher proportion of these visits had an expected payment source of private insurance (56.4%) than injury ED visits overall (51.2%), while Medicaid/Medicare was expected as the source of payment for 29.0% and 9.2% were coded as self-pay (Table 25).

Table 25. Specific types of struck by/against, Wake County children ages 0-17 years, ED visits, 2006-2012 (n=25,766).

Struck By/Against Types	Frequency	Percent of Struck By/Against
Other, With or Without Fall	10,978	42.6
In Sports, With or Without Fall	8,942	34.7
By Other Stationary Object, With or Without Fall	2,304	8.9
By Furniture, With or Without Fall	2,131	8.3
By Falling Object	1,304	5.1

The leading sub-mechanism code for this group is “Other” with no further specification of the mechanism. The second leading sub-mechanism is in sports, with or without subsequent falls, accounting for 34.7% of all struck by/against injury ED visits. In fact, struck by/against in sports, with 8,942, is the second leading specific cause of injury related ED visits for Wake County children ages 0-17 years during the years 2006-2012 at the sub-mechanism level, behind only motor vehicle traffic crash - occupants.

#9 - Natural and Environmental Factors

The injury mechanism of Natural and Environment Factors includes a variety of injury sub-mechanisms. Various animal bites (including insects, spiders, snakes, dogs), excessive heat or cold (not man-made), exposure to extreme weather (including tornado, hurricane or cataclysmic storm), and other injury caused by natural and environmental factors (e.g. lightning, toxic reactions to plants, changes in air pressure) are all part of this mechanism. There were 6 child deaths in this category in Wake County, 2006-2011; 4 were due to a cataclysmic storm, one was due to excessive heat, and the other was exposure-unspecified.

There were 144 hospital discharges for Wake County children ages 0-17 years, during the years 2006-2011, due to natural and environmental factors. Over a third (35.4%) of these were for children ages 1-4 years and 50% were males. The median length of stay for these hospitalizations was 2 days with median hospital charges of \$8,227. No further breakdown of these visits at the sub-mechanism level was possible with the data available to us.

Natural and environmental factors were responsible for 7,250 ED visits for children in Wake County, 2006-2012. Of these, 55.5% were for males and 34.5% were for children ages 1-4 years of age, with another 28.2% for ages 5-9 years. While many of these injuries do not sound serious (e.g. insect bites), 3.8% of these ED visits required admission to a hospital and many have the potential to be life threatening (Table 26). A slightly higher proportion of ED visits due to injury from natural and environmental factors had an expected source of payment of Medicaid/Medicare (37.2%) and self-pay (13.9%) than for injury related ED visits overall (32.8% and 10.9%, respectively).

Table 26. Specific types of natural/environmental factors, Wake County children ages 0-17 years, ED visits, 2006-2012 (n=7,250)

<i>Natural/Environmental Factor Types</i>	<i>Frequency</i>	<i>Percent of Natural/ Environmental</i>
Non-Venomous Arthropods (Insects)	3,227	44.5
Dog Bite	1,948	26.9
Bite/Other Injury Caused by Animals (including snakes)	601	8.3
Sting of Hornets, Wasps, Bees	459	6.3
Venomous Spiders and Arthropods (Insects)	448	6.2
Excessive Heat/Cold, Exposure to Weather	294	4.1

Over 90% of ED visits for injury from natural and environmental factors involve bites, stings, and other injury from animals. Non-venomous arthropods account for 44.5% of these injuries, with stings of hornets, wasps and bees and venomous spiders and arthropods responsible for another 12.5%. Dog bites were responsible for 1,948 ED visits by Wake County children during this time period, averaging 278 such visits per year. Exposure to excessive heat or cold or extreme weather was responsible for fewer than 300 ED visits by Wake County children during this time period.

#10 - Pedal Cycle (Bicycle) Injury/Crashes

There was only one child death on a bicycle during the years 2006-2011 in Wake County and it involved a motor vehicle. We are unable to report how many hospital discharges occurred because we do not have access to the sub-mechanism codes for those data.

There were 3,007 ED visits for children in Wake County ages 0-17 years during 2006-2012 due to “Pedal Cycle” injury, which includes injuries from both bicycles and tricycles and other non-motorized pedaled vehicles. We refer to these injuries as bicycle injuries in this section. The overall rate for ED visits related to bicycle injury

for Wake County children, 2011-2012, was 1.55 ED visits per 1,000 person-years. It is important to note that these are injuries from bicycle crashes that do NOT involve a motor vehicle. Motor vehicle crashes that involve a bicycle are included in the section addressing injuries from motor vehicle crashes.

For ED visits with a code for a bicycle injury, 41.4% are for children ages 5-9 years old, another 36.8% are for ages 10-14 years old, and 12.5% are for ages 1-4 years. This probably reflects that few children under 1 year of age are exposed to this type of injury while those 15-17 years may decrease their use of bicycles as their use of motor vehicles, and their number of motor vehicle crash injuries, increases. Bicycle related injury ED visits are overwhelming for male children (70.8%). While 90.2% of these ED visits result in being discharged home, 5.5% are admitted to the hospital or transferred to another hospital. The proportion of these visits expected to be paid by private insurance is 51.5%, with 30.5% expected to be paid by Medicaid/Medicare and 11.6% coded as self-pay.

4. Other Important Cause of Childhood Injury – Poisoning

Poisoning was not one of the top 5 injury causes of death, hospitalization or ED visits for Wake County children, nor was it in the leading 10 causes of childhood injury overall. However, it is an area where we have additional data available from the Carolinas Poison Center to help us understand the extent of this issue in the community.

During the years 2006-2012, CPC handled 32,262 exposure calls for children ages 0-17 years who were residents of Wake County. 99.0% of these calls were for acute exposures and 92.1% were exposed through ingestion. More than 3 out of 4 of these calls (77.8%, 25,110) were classified as “Unintentional - General”, while only 3.0% (952) were classified as “Intentional – Suspected Suicide.” The majority of these calls were related to exposures in children 1-4 years of age (68.1%) and, overall, 52.5% were for males. Males accounted for over 50% of the calls in all age groups except ages 15-17 years, when 57.5% of the calls were for females. Most calls were made from the child’s own residence (83.2%), while 8.3% were made from a healthcare facility.

The most common substance group for exposures by Wake County children was “Cosmetics/Personal Care Products” (11.4%), followed by “Analgesics” (10.4%) and “Cleaning Substances (Household)” (7.3%). “Analgesics” was either the top or second leading substance group for every age group, ranging from 10.1% of exposures for children under 1 year of age to 21.4% of exposures for those ages 15-17 years. “Cosmetics/Personal Care Products” are the leading cause for ages 1-4 years (13.7%) and are one of the top 10 substance groups for all age groups under 15 years of age. The top 10 substance groups account for well over 50% of exposures in all age groups.

Fewer than 1 in 4 calls report a clinical effect of the exposure (22.5%), but of those, many have more than one clinical effect reported. The most common clinical effect category is “Gastro”, reported for 11.8% of all calls but for over half (51.4%) of calls with a reported clinical effect. The most common *specific* clinical effect reported was “Gastro-Vomiting”, reported for 24.3% of those with clinical effects. The specific effect “Neuro-Drowsy-Lethargy” was reported for 17.7% of those with a clinical effect, followed by “Cardio-Tachycardia” for 13.1% and “Ocular-Irritation-Pain” for 12.7%.

Most of these calls had no or very minor medical outcomes. Those reported as not followed due to nontoxic exposure of minimal clinical effect possible, no effect, minor effect, or unrelated effect accounted for 94.8% of the calls for Wake County children. Nonetheless, over 1,400 calls were for exposures resulting in moderate or major medical effects or death, or deemed potentially toxic but the CPC was unable to follow the patient.

During the years 2006-2011, only 3 Wake County children died from unintentional poisoning, all of them 15-17 years of age and from narcotics overdoses. During the same years, 157 (5.2%) hospital discharges were made for Wake County children 0-17 years of age for unintentional poisoning. This compared to 195 hospital discharges during this time for self-inflicted poisoning, which accounted for 71.7% of all self inflicted injury hospital discharges. While the median length of stay for self-inflicted poisoning was 3 days, it was only 1 day for unintentional poisoning.

For the years 2006-2012, there were 2,142 ED visits for children in Wake County for unintentional poisoning (1.6% of all ED injury related visits). Of these, 55.1% were for ages 1-4 years and 13.7% were for ages 15-17 years; 55.2% of the visits were for males. While most (84.0%) of ED visits for unintentional poisoning resulted in being discharged home, 12.7% of these visits were either admitted or transferred to another hospital, compared to 4.5% of injury related ED visits overall. A higher proportion of these visits were expected to be paid by Medicaid/Medicare (41.8%) and a lower proportion by private insurance (40.6%) than those overall but the same proportion was coded as self-pay (10.9%). As with the hospital discharge data, ED visits for self-inflicted poisoning looked very different from those for unintentional poisoning. Of the 605 ED visits for self-inflicted poisoning, 72.9% were for females, 73.7% were for the age group 15-17 years and 26.0% were for ages 10-14 years. Over three-quarters of the ED visits for self-inflicted poisoning resulted in admission or transfer to another hospital (77.9%), with only 16.3% of these visits being discharged home. A lower proportion of ED visits for self-inflicted poisoning were expected to be paid for by Medicaid/Medicare (23.0%) and a higher proportion by private insurance (55.4%) and self-pay (13.2%) than for unintentional poisoning visits.

C. Survey of Wake County Organizations Addressing Childhood Health and Safety

A total of 110 organizations participated in the John Rex Endowment Wake County Childhood Health and Safety Profile Survey (Response Rate=71%). Nine of the 110 organizations (9%) declined to have their organization identified in public reports; however their information is included in the summary of responses. The vast majority (99%) indicated a preference for ongoing and upcoming announcements from the John Rex Endowment.

The survey assessing Wake County Organizations Addressing Childhood Health and Safety included three categories of questions that assessed: 1) Organizational Demographics and Outreach; 2) Injury Prevention Focus of Organizations; and 3) Organizational Resources. Sub-sections C1-3 provide highlights of the survey results by these three categories. Detailed summary tables for all survey questions are included in Appendix L. Sub-Section C-4 provides a summary of estimated organization capacity and program impact.

1. *Organizational Demographics and Outreach*

a. Organization Type

Half (50%) of the responding organizations were small, with fewer than 10 full-time employees (Table L-1, Appendix L). Approximately one third (34%) were medium size; and 16% were large, with 50 or more employees (Table L-1, Appendix L). The median number of employees is 16 and the median number of full time employees is 10.5. Most (88%) of participating organizations reported having volunteers with a median of 24 volunteers.

Participating organizations were asked to identify what type(s) of entity(ies) best describe their organization. Almost three quarters (74%) of organizations selected ‘non-profit’ as their entity type, with another 18% being state or local government agency (Tables L-3, L-4 and L-5 Appendix L).

b. Geographical Service Areas

Organizations were asked to identify their geographical service areas; the majority of organizations selected Wake County, followed in descending order by the Greater Triangle Area, The City of Raleigh, The State of North Carolina and lastly, The United States (Table L-6). Half of the organizations (50%) selected only one area in which they were working (Table L-7).

c. Target Populations

Organizations were asked to identify whether they specifically targeted selected populations. Over half of the organizations indicated specifically targeting (from highest to lowest): low income (72%); African-American (52%); and Hispanic (51%); populations (Table 27, and Table L-8 in Appendix L). Organizations reported targeting (from lowest) refugees (13%), LGBT (18%), orphans (19%), and American Indians (28%) the least.

Table 27. Frequencies of organizations targeting specific populations (n=110). ^a		
Population	Organizations that indicated targeting population	
	N	%
Ethnicity		
African American	57	52%
American Indian	31	28%
Caucasian	45	41%
Hispanic	56	51%
Other ethnicities ^b	14	13%
Sex		
Female	47	43%
Male	46	42%
Geography		
Rural	49	45%
Urban	54	49%
Other Groups		
Low income	79	72%
Homeless	50	45%
Children/youth living with a disability	47	43%
Foster Children	38	35%
Orphans	21	19%
LGBT	20	18%
Other ^c	18	16%
Refugees	14	13%

^aCategories are not mutually exclusive.

^bOther ethnicities include: African, Arabic, Asians, mixed races, Indian and Russian.

^cOther Table L-8 in Appendix L

Organizations identified different types of population groups that their organization interacted with, including over half working directly with Children (85%), Parents/caregivers (78%), Teachers (67%), Policy Makers/ Decision Makers (64%), and medical professionals (58%) (Table 28, also in L-9 Appendix L). The majority of organizations identified working with four or more groups (Table L-9, Appendix L).

Table 28. Groups of people with which organizations work. ^a		
Groups	N	%
Children	93	85%
Parents/Caregivers	86	78%
Teachers	74	67%
Policy Makers/Decision Makers	70	64%
Medical Professionals (e.g. doctors, nurses, EMT)	64	58%
Public Safety (e.g. police, fire)	51	46%
Religious Leaders	44	40%
Other ^b	28	25%

^aCategories are not mutually exclusive

^bOther Table L-9 in Appendix L

2. Injury Prevention Focus of Organizations

Participants were asked to identify the level of importance relative to nine focus areas of their organizations. About half of the organizations identified education (71%), funding (55%), advocacy (54%) and program evaluation (49%) as very important to their work (Table 29, also in L-11 Appendix L).

Table 29. Level of organization importance relative to nine work focus areas.						
Work Focus Area	Somewhat Important (4)		Important (5)		Very Important (6)	
	N	%	N	%	N	%
Education (n=109)	4	4%	21	19%	77	71%
Funding (n=109)	12	11%	18	17%	60	55%
Advocacy (n=109)	6	6%	26	24%	59	54%
Program Evaluation (n=109)	9	8%	30	28%	53	49%
Other ^a (n=41)	1	1%	1	1%	39	36%
Counseling (n=109)	10	9%	27	25%	36	33%
Research/Data (n=109)	10	9%	44	40%	34	31%
Communication/Media (n=109)	15	14%	40	37%	34	31%
Writing Rules or Policies (n=109)	21	19%	35	32%	19	17%

^aOther types of focus included 48.8% Direct Services and 26.8% Community/Organizational Capacity; Table L-11 in Appendix L

Organizations were asked to rate how important childhood injury and violence prevention is to their organizational focus on a seven point scale of not at all important to extremely important. Almost all organizations (88%) indicated that childhood injury and/or violence prevention was somewhat to extremely important (Table L-11, Appendix L).

Each organization identified relevant types of injury or events related to their work focus. More than half (52%) of the organizations work in both intentional and unintentional injuries and events (Table 30). Almost one third (31%) work only in intentional injuries or events, and a minority work only in unintentional (11%). A few (6%) of the organizations who completed the survey indicated that they do not specifically work in intentional or unintentional injuries or events. Additional analysis of organizations that identified working in individual injury event categories were conducted, including the categories by injury types. A detailed summary is provided in Appendix M.

Table 30. Category of injury focus of organizations by order.		
Organizations by Injury Type	N	%
Both Intentional and Unintentional	56	52%
Intentional Only	33	31%
Unintentional Only	12	11%
Neither	6	6%
Total	107	100%

Tables 31 and 32 detail the organizations who identified working in an injury type by category.

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Table 31. Organizations with focus on intentional injury. ^a		
<i>Injury Type by Category</i>	<i>N</i>	<i>%</i>
Child Abuse/ Maltreatment (physical, sexual, emotional)	71	66%
Assault/Physical Violence	62	57%
Bullying	61	56%
Sexual Violence (e.g. assault, rape)	51	47%
Self Inflicted/Self Harm	50	46%
Human trafficking	17	16%
Other ^b	17	16%
None of the above	18	17%
Total Intentional	108	100%

^aCategories are not mutually exclusive.

^bOther Table L-14 in Appendix L

Table 32. Organizations with focus on unintentional injury. ^a		
<i>Injury Type by Category</i>	<i>N</i>	<i>%</i>
All Motor Vehicles	44	41%
Cars/trucks/buses	38	36%
Pedestrians	30	28%
Bicycles	29	27%
Motorcycles	19	18%
Other MVC	2	2%
None of the above	39	36%
Poisoning/overdose	27	25%
Bicycle injury/crashes (NOT involving a motor vehicle)	25	23%
Falls	25	23%
Environmental Factors (e.g. weather related)	24	22%
Firearm	20	19%
Other ^b	19	18%
Drowning/submersion	17	16%
Burns, including fire and scalds	15	14%
Suffocation	12	11%
Animal bites	11	10%
Total Unintentional Respondents	107	100%

^aCategories are not mutually exclusive.

^bOther Table L-14 in Appendix L

3. Organizational Resources

a. Organizational Capacity

Organizations reported their abilities to identify resources (e.g. locate evidence based practices; find childhood injury data; identify funding sources; and identify other local childhood injury and/or violence prevention networks) and integrate resources (e.g. use evidence based practices in injury prevention programs; use childhood injury data; obtain funding; and use existing local childhood injury and/or violence prevention network).

Respondents self-reported their capacity using a four point scale from high level of capacity to no capacity. Obtaining funding, identifying funding, researching evidence based programs and finding relevant data sources received the lowest scores for organizational capacity (Table 33, and in L-18 Appendix L). Using research about evidence based programs, identifying and using Wake County injury and/or violence networks, and using data for program planning and implementation received the highest scores.

Table 33. Organizational capacity to perform selected activities.						
Activities	Self Reported High Level of Capacity		Self Reported Medium Level of Capacity		Self Reported Low Level of Capacity	
	N	%	N	%	N	%
To Identify Specific Resources...						
Find relevant childhood injury data for prioritizing program development and planning (n=104)	22	21.2%	30	28.8%	28	26.9%
Research and identify evidence-based injury prevention programs, interventions, and strategies (n=103)	24	23.3%	25	24.3%	26	25.2%
Identify possible funding (n=104)	14	13.5%	36	34.6%	31	29.8%
Identify Wake County IVP entities (n=104)	33	31.7%	38	36.5%	21	20.2%
To Integrate Specific Resources...						
Use research about evidence-based injury prevention programs, in program development and planning (n=104)	44	42.3%	30	28.8%	13	12.5%
Use existing Wake County IVP networks to strengthen efforts within organization (n=102)	30	29.4%	41	40.2%	17	16.7%
Use childhood injury data for prioritizing program development and planning (n=102)	27	26.5%	30	29.4%	23	22.5%
Obtain funding (n=104)	13	12.5%	35	33.7%	29	27.9%

b. Data Sources

Survey respondents were asked to identify data sources used by their organization. Over half of the organizations identified using at least one source of national level data (66%), North Carolina state level data (70.9%) and Wake County level data (57.3%) (Table L-18). Over half (56%) of the organizations identified using four or more data sources. The data sources used most frequently were NC Division of Public Health (including the State Center for Health Statistics) (63.1%) and the Center for Disease Control and Prevention (59.2%). Only a small percentage (9.7%) reported not using data at their organization. Organizations who identified working in Burns reported using the greatest average of data sources (7.2), and organizations who identified working in sexual violence reported the lowest average of data resources (3.9) (Table M-8, Appendix M).

c. Funding Sources

Survey respondents were asked to identify the types of funding they received. The most common funding was received from private donors (43.1%) followed by NC funding Sources, such as North Carolina Foundations (John Rex Endowment, Kate B. Reynolds, The Duke Foundation) (36.3%), and the North Carolina Department of Health and Human Services (27.5%) (Table L-20). Most organizations (45%) identified receiving one to three funding sources and several organizations (22%) indicated that they did not receive funding from external sources (Table Q21b). Organizations who identified working in Human Trafficking reported the greatest average of funding sources (5.1) and organizations who identified as working in Motorcycles reported the lowest average of funding sources (2.7) (Table M-7, Appendix M).

d. Capacity Building Activities

Survey respondents were asked to rate on a four point scale how valuable specific capacity building activities are to their organizational work. The majority (81.2%) of organizations rated receiving resources related to childhood injury and violence prevention as very or somewhat valuable (Table 34, and in L-23 Appendix L). The majority also responded that networking with Wake County stakeholders (77.2%), receiving Wake County data reports (76.2%) and participating in information networking sessions (76.2%) were very or somewhat valuable.

Table 34. Organization respondent estimate of value of capacity building activities.

Activities	3 - Somewhat Valuable		4 - Very Valuable	
	N	%	N	%
Participate in informational networking sessions for identifying public and private funders (n=101)	20	19.8%	57	56.4%
Receive Wake County childhood IVP resources (n=101)	32	31.7%	50	49.5%
Network with Wake County childhood IVP stakeholders (n=101)	29	28.7%	49	48.5%
Attend trainings focused on building capacity in resource development (n=101)	26	25.7%	46	45.5%
Receive Wake County childhood injury data reports (n=101)	33	32.7%	44	43.6%
Attend trainings on evidence-based programs, interventions, and strategies (n=101)	31	30.7%	44	43.6%

4. Organization Characteristics by Organizational Capacity Levels

This section highlights results from the organizational capacity and estimated program impact analysis. Detailed summary tables are included in Appendix L. The majority of organizations (N=98 organizations), received a “capacity” index score based on self-reported responses to the survey. Some organizations (N = 12 organizations) did not complete the question correlating to the capacity index and therefore did not receive a capacity index score. The capacity index, ranging from a low of eight to a high of 32, was divided into three equal categories based on the frequency distribution. Categories were divided into High Capacity (greater than or equal to twenty-five), Medium Capacity (less than 25 and greater than or equal to 21) and Low Capacity (less than 21). Indicators for the organizational capacity sub groups were reviewed and we reported differences greater than 10% from the overall average.

a. Organizational Demographics and Outreach

High Capacity organizations reported the highest median for number of employees (29) and for number of full time employees (26). Low capacity organizations reported the lowest numbers for employees (12) and full time employees (6); however they reported the highest number of volunteers (45) (Table 35).

Table 35. Median staff and volunteers by organizational capacity level.

	<i>All Organizations</i>	<i>High Capacity</i>	<i>Medium Capacity</i>	<i>Low Capacity</i>
Employees	16	29	13	12
Full Time Employees	11	26	8	6
Volunteers	24	11	26	45

Organization Type by Organizational Capacity Level. High Capacity organizations were more likely to identify as state government entities (21%), less likely to identify as a non-profit (59%) and were the only organizations that identified as research/data organizations (2%) (Table 36). Medium Capacity organizations were more likely to identify as a non-profit (88%).

Table 36. Organization types respondents identified by organizational capacity level. ^a

<i>Organization Types</i>	<i>All Organizations</i>		<i>High Capacity^b</i>		<i>Med Capacity^c</i>		<i>Low Capacity^d</i>	
	<i>N</i>	<i>%</i>	<i>N</i>	<i>%</i>	<i>N</i>	<i>%</i>	<i>N</i>	<i>%</i>
Non-profit	81	74%	19	58%	29	88%	24	75%
Other ^b	16	15%	5	15%	3	9%	8	25%
State Government	12	11%	7	21%	1	3%	3	9%
Private	11	10%	2	6%	3	9%	5	16%
Local Government	8	7%	3	9%	2	6%	2	6%
Volunteer Organization	6	5%	2	6%	1	3%	3	9%
Hospital/Health Center	4	4%	1	3%	1	3%	1	3%
Religious Organization	4	4%	0	0%	1	3%	3	9%
Research	2	2%	2	6%	0	0%	0	0%
Committee/Task Force	0	0%	0	0%	0	0%	0	0%

^aCategories are not mutually exclusive.

^bHigh Capacity Organizations N= 33 with 110 programs

^cMedium Capacity Organizations N= 33 with 76 programs. ^dLow Capacity Organizations N= 32 with 46 programs

Geographically Served Areas by Organizational Capacity Level. Medium Capacity organizations were more likely (82%) to select the Wake County as their geographical area of service and less likely to select the Greater Triangle Area (33%) and the State of North Carolina (33%) (Table 37).

Table 37. Distribution of geographic service areas by organizational capacity level. ^a

<i>Area</i>	<i>All Organizations</i>		<i>High Capacity^b</i>		<i>Med Capacity^c</i>		<i>Low Capacity^d</i>	
	<i>N</i>	<i>%</i>	<i>N</i>	<i>%</i>	<i>N</i>	<i>%</i>	<i>N</i>	<i>%</i>
The City of Raleigh	47	43%	16	48%	15	45%	13	41%
Wake County	77	70%	24	73%	27	82%	20	63%
The Greater Triangle Area	48	44%	20	61%	11	33%	15	47%
The State of North Carolina	47	43%	15	45%	11	33%	13	41%
Nationally, The United States	14	13%	7	21%	3	9%	3	9%
Other (e.g. neighborhoods, cities, towns) ^e	7	6%	3	9%	3	9%	1	3%
Average	2.2	--	2.6		2.1		2.0	

^aCategories are not mutually exclusive.

^bHigh Capacity Organizations N= 33 with 110 programs

^cMedium Capacity Organizations N= 33 with 76 programs

^dLow Capacity Organizations N= 32 with 46 programs

^eOther: A Regional focus of 6+ counties was included for six (5%) organizations; International research organizations marked by one (1%) organization, Table L-6 in Appendix L

Target Populations by Organizational Capacity Level. High Capacity organizations were more likely to be working with several populations groups (Table 38), including: American Indian (48.5%), Hispanic (66.7%), females (54.5%), LGBT (33.3%), Rural (63.6%), and Urban (66.7%) populations. Medium Capacity organizations were less likely to target LGBT (3.0%) populations. Low Capacity organizations were less likely to target Hispanic (37.5%), Rural (21.9%) and Urban (34.4%) populations.

Table 38. Frequencies of organizations targeting specific populations by organizational capacity. ^a

Population	All Organizations		High Capacity ^b		Med Capacity ^c		Low Capacity ^d	
	Total Responses N= 110	%	N=33	%	N=33	%	N=32	%
African American	57	52%	20	60.6%	18	54.5%	15	46.9%
American Indian	31	28%	16	48.5%	7	21.2%	6	18.8%
Caucasian	45	41%	16	48.5%	14	42.4%	12	37.5%
Hispanic	56	51%	22	66.7%	19	57.6%	12	37.5%
Other ethnicities	14	13%	6	18.2%	4	12.1%	3	9.4%
Female	47	43%	18	54.5%	13	39.4%	12	37.5%
Male	46	42%	14	42.4%	16	48.5%	11	34.4%
LGBT	20	18%	11	33.3%	1	3.0%	6	18.8%
Rural	49	45%	21	63.6%	15	45.5%	7	21.9%
Urban	54	49%	22	66.7%	16	48.5%	11	34.4%
Homeless	50	45%	16	48.5%	16	48.5%	15	46.9%
Low income	79	72%	27	81.8%	24	72.7%	21	65.6%
Foster Children	38	35%	13	39.4%	12	36.4%	12	37.5%
Orphans	21	19%	9	27.3%	3	9.1%	9	28.1%
Children/youth living with a disability	47	43%	14	42.4%	16	48.5%	13	40.6%
Refugees	14	13%	5	15.2%	4	12.1%	4	12.5%
Other ^e	18	16%	4	12.1%	7	21.2%	7	21.9%

^aCategories are not mutually exclusive

^bHigh Capacity Organizations N= 33 with 110 programs

^cMedium Capacity Organizations N= 33 with 76 programs

^dLow Capacity Organizations N= 32 with 46 programs

^eTable L-8 in Appendix L

High Capacity organizations are more likely to work with Public Safety professionals (64%) than other organizations (Table 39). Low Capacity organizations are less likely to work with Teachers (56%), Medical Professionals (47%), and Public Safety professionals (31%) than other organizations.

Table 39. Groups of people with which respondents work by organizational capacity level. ^a

Groups	All Organizations		High Capacity ^b		Med Capacity ^c		Low Capacity ^d	
	N	%	N	%	N	%	N	%
Children	93	85%	28	85%	30	91%	26	81%
Parents/Caregivers	86	78%	27	82%	28	85%	24	75%
Teachers	74	67%	25	76%	23	70%	18	56%
Policy Makers/Decision Makers	70	64%	21	64%	23	70%	18	56%
Medical Professionals (e.g. doctors, nurses, EMT)	64	58%	22	67%	19	58%	15	47%
Public Safety (e.g. police, fire)	51	46%	21	64%	15	45%	10	31%
Religious Leaders	44	40%	16	48%	12	36%	11	34%
Other ^e	28	25%	8	24%	5	15%	12	38%

^aCategories are not mutually exclusive.

^bHigh Capacity Organizations N= 33 with 110 programs

^cMedium Capacity Organizations N= 33 with 76 programs

^dLow Capacity Organizations N= 32 with 46 programs

^eTable L-9 In Appendix L

b. Injury Prevention Focus of Organizations

Organizational Work Focus by Organizational Capacity Level. High Capacity organizations were more likely to report Program Evaluation (64%), Research/Data (42%) and Communication/Media (45%) as very important to their organizational work focus (Table 40). Medium Capacity organizations were less likely to report counseling as very important (21%), compared to Low Capacity who were more likely to report counseling as very important (47%). Low Capacity organizations were less likely to report program evaluation as important (38%).

Table 40. Organization work focus very important (6) by organizational capacity level.

Focus	All Organizations		High Capacity ^a		Med Capacity ^b		Low Capacity ^c	
	N	%	N	%	N	%	N	%
Education	77	71%	25	76%	24	73%	21	66%
Funding	60	55%	21	64%	17	52%	17	53%
Advocacy	59	54%	18	55%	15	45%	18	56%
Program Evaluation	53	49%	21	64%	16	48%	12	38%
Other ^d	39	36%	11	33%	14	42%	11	34%
Counseling	36	33%	12	36%	7	21%	15	47%
Research/Data	34	31%	14	42%	10	30%	7	22%
Communication/Media	34	31%	15	45%	9	27%	7	22%
Writing Rules or Policies	19	17%	6	18%	5	15%	6	19%

^aHigh Capacity Organizations N= 33 with 110 programs^bMedium Capacity Organizations N= 33 with 76 programs^cLow Capacity Organizations N= 32 with 46 programs^dOther Table L-11 in Appendix L

Organizational Injury Focus by Organizational Capacity Level. High Capacity organizations were more likely to work in Child Abuse/Maltreatment (79%), Self Inflicted/Self Harm (61%), and Firearms (30%), than other organizations (Table 41). Medium Capacity organizations were less likely to work in Sexual Violence (33%) and Self-Inflicted/Self Harm (33%). Low Capacity organizations were less likely to work in Poisoning/overdose (13%) and Bicycle injury/crashes (not involving a MVC (13%). Low Capacity organizations were more likely to identify as not working in any of the listed unintentional injuries provided in the survey (44%).

Table 41. Identification of organizations working in injury type(s) by organizational capacity level.

Injury Type	All Organizations		High Capacity ^a		Med Capacity ^b		Low Capacity ^c	
	N	%	N	%	N	%	N	%
Intentional								
Child Abuse/ Maltreatment (physical, sexual, emotional)	71	66%	26	79%	18	55%	22	69%
Assault/Physical Violence	62	57%	22	67%	18	55%	17	53%
Bullying	61	56%	20	61%	20	61%	16	50%
Sexual Violence (e.g. assault, rape)	51	47%	18	55%	11	33%	18	56%
Self Inflicted/Self Harm	50	46%	20	61%	11	33%	15	47%
Human trafficking	17	16%	8	24%	5	15%	4	13%
Other ^d	17	16%	3	9%	11	33%	3	9%
None of the above	18	17%	3	9%	5	15%	4	13%
Total Intentional	108	100%	33	100%	33	100%	32	100%

Table 41. Identification of organizations working in injury type(s) by organizational capacity level.

Injury Type	All Organizations		High Capacity ^a		Med Capacity ^b		Low Capacity ^c	
	N	%	N	%	N	%	N	%
Unintentional								
All Motor Vehicles	44	41%	15	45%	11	33%	11	34%
Cars/trucks/buses	38	36%	15	45%	9	27%	9	28%
Pedestrians	30	28%	12	36%	9	27%	6	19%
Bicycles	29	27%	11	33%	8	24%	6	19%
Motorcycles	19	18%	7	21%	5	15%	5	16%
Other MVC ^e	2	2%	1	3%	1	3%	0	0%
None of the above	39	36%	10	30%	9	27%	14	44%
Poisoning/overdose	27	25%	11	33%	10	30%	4	13%
Bicycle injury/crashes (NOT involving a motor vehicle)	25	23%	8	24%	10	30%	4	13%
Falls	25	23%	9	27%	9	27%	6	19%
Environmental Factors (e.g. weather related)	24	22%	9	27%	11	33%	4	13%
Firearm	20	19%	10	30%	8	24%	2	6%
Other ^f	19	18%	6	18%	8	24%	4	13%
Drowning/submersion	17	16%	7	21%	6	18%	3	9%
Burns, including fire and scalds	15	14%	6	18%	6	18%	3	9%
Suffocation	12	11%	6	18%	3	9%	2	6%
Animal bites	11	10%	4	12%	4	12%	2	6%
Total Unintentional Respondents	107	100%	33	100%	33	100%	32	100%

^aHigh Capacity Organizations N= 33 with 110 programs

^bMedium Capacity Organizations N= 33 with 76 programs

^cLow Capacity Organizations N= 32 with 46 programs

^{d,e,f}Table L-14 in Appendix L

Importance of Childhood Injury and/or Violence Injury Focus to Organization by Organizational Capacity Level. Almost all (87%) of the High Capacity organizations reported Childhood Injury and Violence Prevention as “Very Important” or “Extremely Important” to their organizational work focus, compared to Medium Capacity (69%) and Low Capacity (35%) (Table 42). Almost one fifth (18%) of Low Capacity organizations reported Childhood Injury and Violence Prevention as “Very Unimportant”, “Somewhat unimportant” or “Neither Important nor Unimportant” to their organizational work focus.

Table 42. Importance of focus on preventing childhood injury and prevention to respondents by organizational capacity level.

Category	All Organizations		High Capacity ^a		Med Capacity ^b		Low Capacity ^c	
	N	%	N	%	N	%	N	%
1 - Not at all Important	0	0%	0	0%	0	0%	0	0%
2 - Very Unimportant	4	4%	1	3%	0	0%	1	3%
3 - Somewhat Unimportant	3	3%	0	0%	0	0%	3	9%
4 - Neither Important nor Unimportant	6	6%	1	3%	1	3%	2	6%
5 - Somewhat Important	29	27%	2	6%	9	27%	15	47%
6 - Very Important	32	29%	14	42%	10	30%	6	19%
7 - Extremely Important	35	32%	15	45%	13	39%	5	16%
Average Importance	5.7	--	6.2		6.1		5.2	

^aHigh Capacity Organizations N= 33 with 110 programs

^bMedium Capacity Organizations N= 33 with 76 programs

^cLow Capacity Organizations N= 32 with 46 programs

c. Organizational Resources by Organizational Capacity Level

Data Sources by Organizational Capacity Level. High Capacity organizations were more likely to use all levels of data in some capacity (Table 43); National level (84.4%), North Carolina level (87.5%) and Wake County level (71.9%), in contrast to Low Capacity organizations who were less likely to use data at these levels; National level (53.1%), North Carolina level (56.3%), Wake County level (43.8%). Almost one fifth (18.8%) of Low Capacity organizations reported not using data.

Table 43. Identified data sources by organizational capacity level. ^a

Data Source	All Organizations		High Capacity ^b		Med Capacity ^c		Low Capacity ^d	
	N	%	N	%	N	%	N	%
Do not use data	10	9.7%	1	3.1%	1	3.0%	6	18.8%
National Level	68	66.0%	27	84.4%	22	66.7%	17	53.1%
Center for Disease Control and Prevention (CDC)	61	59.2%	25	78.1%	20	60.6%	12	37.5%
Kids Count Data Center	36	35.0%	15	46.9%	8	24.2%	12	37.5%
North Carolina State Level	73	70.9%	28	87.5%	25	75.8%	18	56.3%
NC Division of Public Health (including the State Center for Health Statistics)	65	63.1%	22	68.8%	23	69.7%	16	50.0%
UNC Injury Prevention Research Center	26	25.2%	14	43.8%	5	15.2%	7	21.9%
UNC Highway Safety Research Center	25	24.3%	11	34.4%	6	18.2%	7	21.9%
NC Department of Transportation	23	22.3%	9	28.1%	7	21.2%	6	18.8%
Carolinas Poison Control	18	17.5%	7	21.9%	6	18.2%	3	9.4%
NC Violent Death Reporting System	15	14.6%	6	18.8%	3	9.1%	5	15.6%
NC DETECT	10	9.7%	5	15.6%	3	9.1%	1	3.1%
Emergency Medical Service Performance Improvement Center (EMSPIC)	8	7.8%	5	15.6%	1	3.0%	1	3.1%
Wake County Level	59	57.3%	23	71.9%	23	69.7%	14	43.8%
Wake County Community Health Assessment	46	44.7%	16	50.0%	16	48.5%	13	40.6%
Wake County Safe Kids	44	42.7%	19	59.4%	14	42.4%	10	31.3%
Other^e	44	42.7%	16	50%	19	57.5%	8	25%
Total Respondents	103	--	32	n/a	33	n/a	32	n/a

^aCategories are not mutually exclusive

^bHigh Capacity Organizations N= 33 with 110 programs

^cMedium Capacity Organizations N= 33 with 76 programs

^dLow Capacity Organizations N= 32 with 46 programs

^eTable L-19 in Appendix L

Funding Sources by Organizational Capacity Level. High Capacity organizations were more likely to receive funding from each funding source listed in Table 44: National sources (56%); North Carolina sources (65.6%); and Wake County sources (28.1%). Whereas, Low Capacity organizations were less likely to receive funding from North Carolina sources (32.3%) and Wake County sources (6.5%).

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Table 44. Funding resources received by organizations by organizational capacity level. ^a

Funding Sources	All Organizations		High Capacity ^b		Med Capacity ^c		Low Capacity ^d	
	N	%	N	%	N	%	N	%
National Funding Sources	33	32%	18	56%	8	24%	7	23%
Federal Block Grant	13	12.7%	8	25.0%	2	6.1%	3	9.7%
Department of Justice, Office of Juvenile Justice and Delinquency Prevention (OJJDP)	12	11.8%	5	15.6%	4	12.1%	3	9.7%
National Foundations (The Robert Wood Johnson Foundation, Ford Foundation, Kaiser Permanente, etc)	12	11.8%	8	25.0%	1	3.0%	3	9.7%
Centers for Disease Control and Prevention (CDC)	9	8.8%	7	21.9%	1	3.0%	1	3.2%
National Highway Traffic Safety Administration (NHTSA)	8	7.8%	4	12.5%	1	3.0%	3	9.7%
Health Resources and Services Administration's (HRSA) Maternal and Child Health Bureau	6	5.9%	4	12.5%	1	3.0%	1	3.2%
North Carolina Funding Sources	48	47.1%	21	65.6%	18	54.5%	10	32.3%
North Carolina Foundations (John Rex Endowment, Kate B. Reynolds, The Duke Foundation)	37	36.3%	17	53.1%	14	42.4%	6	19.4%
North Carolina Department of Health and Human Services (NC DHHS)	28	27.5%	16	50.0%	8	24.2%	4	12.9%
North Carolina State Budget Allocation	12	11.8%	9	28.1%	2	6.1%	1	3.2%
Wake County Funding Sources	21	20.6%	9	28.1%	10	30.3%	2	6.5%
Wake County Department of Human Services	21	20.6%	8	25.0%	10	30.3%	2	6.5%
Wake County Cooperative Extension	3	2.9%	1	3.1%	0	0.0%	1	3.2%
Wake County Department of Justice	3	2.9%	2	6.3%	0	0.0%	1	3.2%
Private Donors	44	43.1%	15	46.9%	16	48.5%	12	38.7%
Corporate Sponsors	23	22.5%	9	28.1%	10	30.3%	4	12.9%
Other Government Funding (federal, state, or local)	20	19.6%	10	31.3%	7	21.2%	3	9.7%
Insurance Companies	13	12.7%	8	25.0%	3	9.1%	2	6.5%
Other Funding Sources^e	34	33.3%	14	43.8%	13	39.4%	7	22.5%
None of the above	22	21.6%	4	12.5%	6	18.2%	8	25.8%
Total Respondents	102	--	32	n/a	33	n/a	31	n/a

^aCategories are not mutually exclusive

^bHigh Capacity Organizations N= 33 with 110 programs

^cMedium Capacity Organizations N= 33 with 76 programs

^dLow Capacity Organizations N= 32 with 46 programs

^eTable L-21 in Appendix L

Capacity Building Activities by Organizational Capacity. Among six separate capacity supporting activities that JRE could offer to organizations working to provide injury and/or violence prevention, High Capacity organizations identified their leading activities as: 1) Network with Wake County childhood IVP stakeholders (68.8%); and 2) Participate in informational networking sessions for identifying public and private funders (68.8%) (Table 45). Medium Capacity organizations identified their leading activities as: 1) Receive Wake County childhood IVP resources (66.7%); and 2) Participate in informational networking sessions for identifying public and private funders (72.7%). Low Capacity organizations identified their leading activities as: 1) Receive Wake County childhood IVP resources (36.7%); and 2) Receive Wake County childhood injury data reports (36.7%).

Table 45. "Very Valuable" capacity building activities by organizational capacity level.

Activities	All Organizations		High Capacity ^a		Medium Capacity ^b		Low Capacity ^c	
	N = 110	%	N = 32	%	N = 33	%	N = 30	%
Participate in informational networking sessions for identifying public and private funders	57	56.4%	22	68.8%	24	72.7%	10	33.3%
Receive Wake County childhood IVP resources	50	49.5%	16	50.0%	22	66.7%	11	36.7%
Network with Wake County childhood IVP stakeholders	49	48.5%	22	68.8%	19	57.6%	8	26.7%
Attend trainings focused on building capacity in resource development	46	45.5%	18	56.3%	19	57.6%	8	26.7%
Receive Wake County childhood injury data reports	44	43.6%	16	50.0%	17	51.5%	11	36.7%
Attend trainings on evidence-based programs, interventions, and strategies	44	43.6%	16	50.0%	20	60.6%	8	26.7%

^aHigh Capacity Organizations N= 33 with 110 programs

^bMedium Capacity Organizations N= 33 with 76 programs

^cLow Capacity Organizations N= 32 with 46 programs

5. Program Descriptors Based on Frameworks

UNC coded all programs (N=243) for leading injury and violence prevention frameworks, including 1) Injury Prevention focus; 2) Prevention level; 3) Socio-ecological Framework; 4) Frieden's Health Impact Pyramid; and 5) Three E's of Injury Prevention. This section describes the programs by the indicators associated with the selected frameworks (Table 46). An in-depth summary was completed for these descriptors (Appendix N).

Intent: Almost half (45%) of the programs were focused on preventing intentional events or injuries. Almost a quarter (23%) were focused on preventing unintentional events or injuries. About one third (32%) of the programs address both intentional and unintentional events.

Prevention Level: Almost two thirds of programs (69%) were identified as addressing Primary Prevention causes and or activities. A small percentage of programs (11%) addressed tertiary prevention causes and/or activities or any combination of two or more prevention levels (15%) (e.g. primary and tertiary). Some (5%) of the coded programs addressed all three levels of prevention.

SEF: Half (50%) of the programs coded addressed Individual based behaviors and/or risk factors. One fifth (20%) of programs coded addressed relational based behaviors and or risk factors. Almost a quarter (23%) of programs coded addressed Community based behaviors and/or risk factors. A small percentage (7%) addressed Society level behaviors and/or risk factors.

Frieden's Health Impact: The largest distribution of programs, over half (51%), were coded as Education and Counseling. A minority (6%) of programs were coded as related to Clinical interventions. More than one third (33%) of programs were coded as Long Lasting interventions; these interventions included large scale media campaigns. A minority of programs (9%) was coded as Changing the Context, and none of the programs were coded as Socio-economic Status.

The 3Es of Injury Prevention: The largest distribution of programs, almost two-thirds (59%), were coded as Education only. The second largest distribution of coded programs (19%) identified programs that address all

three of the Three E's of Injury. A minority of programs (9%) addressed engineering only and the least amount of programs (3%) addressed only enforcement.

Table 46. Program descriptors for selected frameworks (n= 243 programs).		
<i>Frameworks</i>	<i>N</i>	<i>%</i>
Injury and/or Violence Prevention Intent		
Intentional Only	109	45%
Unintentional Only	57	23%
Both Intentional and Unintentional	77	32%
Prevention Levels		
Primary Prevention	167	69%
Secondary Prevention	1	0%
Tertiary Prevention	27	11%
Combination of any two	36	15%
All Levels of Prevention	12	5%
Socio-Ecological Framework		
1-Individual	122	50%
2-Relationship	49	20%
3-Community	56	23%
4-Society	16	7%
Freidan's Pyramid		
1- Education & Counseling	124	51%
2- Clinical	15	6%
3- Long Lasting	81	33%
4- Change Context	23	9%
5- SES	0	0%
The Three Es of Injury		
1- Education ONLY	143	59%
2- Enforcement ONLY	8	3%
2- Engineering ONLY	22	9%
3- Combination of any two	23	9%
4- ALL	47	19%

6. Organizational Capacity and Program Descriptors

a. Program Descriptors by Selected Frameworks and Capacity Levels

Organizational capacity scores were divided into High Capacity (greater than or equal to twenty-five), Medium Capacity (less than 25 and greater than or equal to 21) and Low Capacity (less than 21). High Capacity organizations listed more programs than other capacity levels, and provided almost half (47%) of the programs reviewed (Table 47). An in-depth analysis was conducted for program descriptors by capacity (Appendix N).

The majority of programs for all program descriptors were in the lowest levels of impact, Frieden's Education and Counseling (52%), Socio-Ecological Framework (50%), and Education (58%) (Table 47). The general distribution at the aggregate level (All Programs) is closely aligned with the distribution of the organizations by level of capacity. As organizational capacity levels decrease the number of programs decrease as well.

High Capacity organizations were more likely to have programs in higher levels of impact (e.g. community or societal levels of the SEF), than the medium and low organizational capacity. Overall, the approaches used by the reported programs were not in the higher levels of impact (0% Frieden's Socio-Economic Status, and 6% at the Society Level for the Socio-Ecological Framework) (Table 47).

b. Program Distribution

On average, organizations listed approximately two (2.2) programs, with Higher Capacity listing a higher averaged (3.3) of programs and Low Capacity listing the lowest average (1.3) (Table 47). Organizations were asked (question #16) “How many (#) childhood health and safety programs or activities related to the prevention of injury and violence does your organization implement?.” Participants provided a numerical response, in which High Capacity organizations reported the highest average (5.1) and the highest median (5).

Table 47. Program descriptors for selected frameworks by organizational capacity level. ^a

	All Programs N= 231		High Capacity ^b N=110		Med Capacity ^c N= 75		Low Capacity ^d N=46	
	N	% ^e	N	%	N	%	N	%
Prevention Level								
Primary	158	68%	66	28%	60	26%	32	14%
Secondary	1	0%	1	0%	0	0%	0	0%
Tertiary	26	11%	10	4%	8	3%	8	3%
Combination of any two	35	15%	25	11%	6	3%	4	2%
All Levels of Prevention	12	5%	8	3%	1	1%	2	1%
Total	231	100%	110	47%	75	33%	46	20%
Socio-Ecological Framework								
1- Individual	116	50%	45	19%	48	21%	23	10%
2- Relationships	48	21%	18	8%	16	7%	14	6%
3- Community	52	23%	36	16%	8	3%	8	3%
4- Society	15	6%	11	5%	3	1%	1	0%
Total	231	100%	110	48%	75	32%	46	20%
Frieden’s Health Impact Pyramid								
1- Education & Counseling	121	52%	50	22%	45	19%	26	11%
2- Clinical & Legal	15	6%	9	4%	2	1%	4	2%
3- Long Lasting	73	32%	34	15%	25	11%	14	6%
4- Changing the Context	22	10%	17	7%	3	1%	2	1%
5- SES	0	0%	0	0%	0	0%	0	0%
Total	231	100%	110	48%	75	32%	46	20%
The Three E’s of Injury								
1-Education	134	58%	55	24%	50	22%	29	13%
2-Enforcement	8	3%	4	2%	0	0%	4	2%
2-Engineering	21	9%	10	4%	7	3%	4	2%
3-Combination of any two	21	9%	15	6%	4	2%	2	1%
4 - All Three Es	47	20%	26	11%	14	6%	7	3%
Total	231	100%	110	48%	75	32%	46	20%
Program Distribution								
Average # Programs Listed (0-5; question 17)	2.2		3.3		2.3		1.3	
Average # Programs at organization (question 16)	3.2		5.1		3.4		1.5	
Range of Programs	0-25 ^e		0-25		0-22		0-5 ^e	
Median for Programs	2		5		2		1	

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^aCapacity index was created for organizations who completed the capacity questions on the organization survey, some organizations (N=12) did not complete capacity questions, this table includes programs listed by organizations who completed a capacity score (Total Programs = 231).

^bHigh Capacity Organizations N= 33 with 110 programs

^cMedium Capacity Organizations N= 33 with 76 programs

^dLow Capacity Organizations N= 32 with 46 programs

^eThree outliers greater than 100 were removed from program averages in order to provide a more accurate average.

7. Relationship among Leading Causes of Childhood Injury, Injury Prevention Focus, and Programmatic Approach

a. Organizations by Leading Injury Events and Capacity Levels

The secondary data analysis identified the leading injury causes for Wake County children; of these, two are intentional and eight are unintentional. More organizations identified working in intentional injuries and/or violence than unintentional injuries. For example, almost half of all organizations identified working in Assault (including Assaults/physical violence (57%), Child Abuse/Maltreatment (66%), Sexual Violence (47%)); or Self-Inflicted/Self-Harm (46%), more than any leading unintentional injury cause. In addition, across the leading injury causes, there are a greater percentage of High Capacity organizations working in intentional areas. As capacity levels decrease, the focus on unintentional injury causes also decreases.

Assault and Self-Inflicted/Self-Harm were identified as priority areas for organizations regardless of capacity levels. MVC Traffic- Occupant was identified as the leading cause for mortality and morbidity in Wake County; however, fewer than half of the organizations identified working in this field (Table 48). Across all eight unintentional leading causes, fewer than half of the organizations reported working within any unintentional injury cause.

Table 48. Organizations by leading injury events and organizational capacity level. ^a

Leading Injury Types	All Organizations		High Capacity ^b		Med Capacity ^c		Low Capacity ^d	
	N=110	%	N=33	%	N=33	%	N=32	%
1. MVC Traffic-Occupant	38	36%	15	45%	9	27%	9	28%
2. Assault								
a. Assault/Physical Violence	62	57%	22	67%	18	55%	17	53%
b. Child Abuse/ Maltreatment (physical, sexual, emotional)	71	66%	26	79%	18	55%	22	69%
c. Sexual Violence (e.g. assault, rape)	51	47%	18	55%	11	33%	18	56%
3. MVC Traffic-Pedestrian	30	28%	12	36%	9	27%	6	19%
4. Self-Inflicted/ Self-Harm	50	46%	20	61%	11	33%	15	47%
5. Falls	25	23%	9	27%	9	27%	6	19%
6. Unintentional Suffocation	12	11%	6	18%	3	9%	2	6%
7. Burns	15	14%	6	18%	6	18%	3	9%
8. Struck By or Against								
9. a. Natural/Environmental Factors	24	22%	9	27%	11	33%	4	13%
b. Animal bites	11	10%	4	12%	4	12%	2	6%
10. Bicycle Injury/Crashes	25	23%	8	24%	10	30%	4	13%

^aCapacity index was created for organizations who completed the capacity questions on the organization survey, some organizations (N=12) did not complete capacity questions, this table includes programs listed by organizations who completed a capacity score (Total Programs = 231).

^bHigh Capacity Organizations N= 33 with 110 programs

^cMedium Capacity Organizations N= 33 with 76 programs

^dLow Capacity Organizations N= 32 with 46 programs

b. Estimated Program Impact Index

A program impact index variable was derived from summing an organizations program's descriptor indicators for the Socio-Ecological Framework, Frieden's Health Impact Pyramid, and the Three E's of injury prevention. This index ranged from a low impact score of three to a high impact score of 13. Estimated program impact scores increased when programs were coded for higher levels on the Socio-Ecologic Framework, Frieden's Health Impact Pyramid, and the Three E's of injury prevention. Estimated program impact index ranged from 3 to 12, with an average of 5.8. For descriptive purposes, the estimated program impact index was divided into four groups, high impact (>7), medium impact (<7,>4); and low impact (<=4) (Table 49). Twenty-four organizations listed no programs.

Table 49. Estimated program impact index distribution.

<i>Impact Level</i>	<i>N</i>	<i>%</i>
High Impact (>7)	27	25%
Med Impact (<7, >4)	29	26%
Low Impact (<=4)	30	27%
No Programs Listed	24	22%

c. Estimated Program Impact Index by Injury Type and Organization Capacity Level

In addition to coding for the various impact frameworks, all programs were assigned an injury category code; intentional only, unintentional only, or both intentional and unintentional. High Capacity organizations had the highest averages for program impact. The highest program impact average is for high capacity unintentional injury programs (8.3) (Table 50).

Table 50. Average program impact index by injury intent and organization capacity level, range low (3) to high (13).

<i>Injury Type</i>	<i>All Programs N= 243</i>	<i>High Capacity^a N=110</i>	<i>Med Capacity^b N= 75</i>	<i>Low Capacity^c N=46</i>
Intentional Only	4.5	4.6	4.3	4.6
Unintentional Only	6.6	8.3	4.4	5.6
Both Intentional and Unintentional	6.9	8.1	6.5	5.8
All programs	5.8	6.3	5.5	5.6

^aHigh Capacity Organizations N= 33 with 110 programs

^bMedium Capacity Organizations N= 33 with 76 programs

^cLow Capacity Organizations N= 32 with 46 programs

d. Program Descriptors by Intent

Programs addressing intentional injury only (109 programs, 45%) are almost twice as common as programs addressing unintentional injury only (57 programs, 23%). Almost one third of programs address both intentional and unintentional injuries and/or violence issues and events.

The majority of programs for all Program Impact Descriptors were in the lowest levels of impact, Socio-Ecological Framework (50%), Frieden's Education and Counseling (51%), and Education (59%) (Table 51). This trend is consistent for intentional only programs, unintentional only programs and both intentional and unintentional programs.

Table 51. Program descriptors of selected frameworks by intent.^a

	<i>All Programs</i>		<i>Intentional</i>		<i>Unintentional</i>		<i>Both I/U</i>	
	N	%	N	%	N	%	N	%
Prevention Level								
Primary	167	68%	70	29%	52	21%	45	19%
Secondary	1	0%	0	0%	0	0%	1	0%
Tertiary	27	11%	16	7%	0	0%	11	5%
Combination of any two	36	15%	18	7%	4	2%	14	6%
All Levels of Prevention	12	5%	5	2%	1	0%	6	2%
Socio-ecological Framework								
1- Individual	122	50%	60	25%	33	14%	29	12%
2- Relationships	49	20%	34	14%	1	0%	14	6%
3- Community	56	23%	14	6%	18	7%	24	10%
4- Society	16	7%	1	0%	5	2%	10	4%
Frieden's Health Impact Pyramid								
1- Education & Counseling	124	51%	75	31%	22	9%	27	11%
2- Clinical & Legal	15	6%	11	5%	1	0%	3	1%
3- Long Lasting	81	33%	23	9%	23	9%	35	14%
4- Changing the Context	23	9%	0	0%	11	5%	12	5%
5- SES	0	0%	0	0%	0	0%	0	0%
The Three E's of Injury								
1-Education	143	59%	88	36%	23	9%	32	13%
2-Enforcement	8	3%	2	1%	1	0%	5	2%
2-Engineering	22	9%	5	2%	9	4%	8	3%
3- Combination of any two	23	9%	4	2%	11	5%	8	3%
4 - All Three Es of Injury	47	19%	10	4%	13	5%	24	10%
Total	243	100%	109	45%	57	23%	77	32%

^aSome percents do not add to 100% due to rounding

D. Survey of Wake County Coalitions Addressing Childhood Health and Safety

This section provides highlights of the coalition survey results. Detailed summary tables for all survey questions are included in Appendix O.

A total of 15 coalitions (response rate 83%) completed the John Rex Endowment Childhood Health and Safety Profile (Table O-1). The average size is 57 members per network; 60% are small networks (0-50 members) and 40% are large networks (50+ members).

Most (60%) meet on a monthly (27%) or quarterly (33%) basis. One network (7%) reported only meeting once a year (Table O-2). All coalitions communicate via email and most communicate through in person meetings (80%) (Table O-3). Over half of the coalitions identified North Carolina (60%) and Wake County (53%) as their geographic service area (Table O-4).

At least 60% of all coalitions identified specifically targeting African-American, Caucasian, Hispanic, urban and low income populations. The least targeted populations are LGBT (13%) and homeless (13%) populations (Table O-5)

Coalitions identified working with policy makers (80%) and public safety officials (80%) most often, followed by medical professionals (73%), parents/caregivers (60%), and children (53%). On average, the majority (53%) of coalitions work with 4—6 different groups of people (Tables O-6, O-7).

Coalitions were asked to identify on a seven point scale of not important to very important the degree to which their networks focus on specific activities. Almost all coalitions reported that education (87%) was very important to their work focus, followed by advocacy (67%) and research/data (60%) (Table O-8). Over half of the coalitions (53%) rated counseling as not important.

Almost one third (30%) of coalitions identified advocacy as a type of service provided, followed by direct services (21%), and research evaluation (18%). One (7%) coalition identified funding as a type of service provided (Table O-9).

The majority of coalitions reported that childhood injury and/or violence prevention was very to extremely important, with the average of 5.9, or very important (Table O-10).

Over half of the coalitions identified working in motor vehicle crashes (67%) and poisoning (53%) (Tables O-11, O-13). At least 20% of all coalitions identified working in all of the categories presented for intentional injuries or events. Only one coalition (7%) identified working in the areas of suffocation and injury related to environmental factors.

Coalitions were asked their ability to identify resources (e.g. locate evidence based practices; find childhood injury data; identify funding sources; and identify other local childhood injury and/or violence prevention networks) and integrate resources (e.g. use evidence based practices in injury prevention programs; use childhood injury data; obtain funding; and use existing local childhood injury and/or violence prevention network). Overall, most coalitions reported having medium to high levels of capacity on the indicators. The highest level of capacity was reported for the use of childhood injury data for prioritizing program development and planning (64%), followed by the ability to find relevant childhood injury data for prioritizing program development and planning. The ability to obtain funding is an area where few coalitions reported high capacity (8%) (Table O-13).

All of the coalitions reported using data. Almost all (80%) reported using at least one data source from North Carolina (Table O-14). Two thirds (67%) reported using at least one source of national level data and more than half (53%) reported using at least one form of Wake County data. The most commonly used data source is the NC Division of Public Health (including the State Center for Health Statistics).

Coalitions were each asked an open ended question to describe how their coalition is funded (Question #19, Appendix E); the majority (67%) responded. Funding sources include in-kind funding (2), WakeMed (2), JRE (2), Wake County (1), grants (1), private funders (1), and “voluntary basis” (1).

Coalitions’ responses for the value of capacity building activities varied. The capacity building activities reported as ‘somewhat valuable’ to ‘very valuable’ were attending trainings on evidence-based injury prevention programs, interventions, and strategies (39%), followed by attending trainings focused on building capacity in resource development (38%) and participating with Wake County stakeholders working in injury prevention to dialogue about childhood injury priorities and networking (37%) (Table O-15).

E. Summary of Evidence Based Practices

A total of 234 programs, interventions, and countermeasures were included in the Evidence-based Compilation developed for this project. Programs were coded for injury causes that address a combination of intentional and unintentional injury (Table 52) using our standardized terminology. The compilation of IP programs includes interventions from 16 registries. These registries provide public health practitioners with a varying degree of readily available information on a wide range of evidence-based programs. Criteria for classifying programs are not standardized across the registries. Several of the registries include the classification of “Unproven”, “Recommended Against”, or other terminology, suggesting that the reviewed program does not achieve the intended outcome. Currently, six (3 %) of the 234 programs would be not recommended or recommended against.

Programs addressing unintentional injury (Table 52) were the most common (50%) followed by programs that address intentional injuries (31%). The greatest number of programs identified addressed motor vehicle crashes (in general) with 68 programs (29%). Most frequent intentional injury prevention programs addressed Assault, with 52 programs (22%). Programs were not identified for several of the injury causes, including, human trafficking, Motor Vehicle Crashes – pedestrians, Motor Vehicle Crashes–bicycles, and environmental factors.

Group	Injury Type ^b	N	Group %	Total %
Intentional	Child Abuse/ Maltreatment (physical, sexual, emotional)	9	13%	4%
	Assault/Physical Violence	52	72%	22%
	Bullying	8	11%	3%
	Sexual Violence (e.g. assault, rape)	4	6%	2%
	Self Inflicted/Self Harm	16	22%	7%
	Human trafficking	0	0%	0%
	Total Intentional	72	100%	31%
Unintentional	Motor Vehicle Crashes (in general)	68	58%	29%
	Cars/trucks/buses	4	3%	2%
	Pedestrians	0	0%	0%
	Bicycles	0	0%	0%
	Motorcycles	1	1%	0%
	Poisoning/overdose	5	4%	2%
	Bicycle injury/crashes (NOT involving a motor vehicle)	3	3%	1%
	Falls	3	3%	1%
	Environmental Factors (e.g. weather related)	0	0%	0%
	Firearm	11	9%	5%
	Drowning/submersion	19	16%	8%
	Burns, including fire and scalds	17	14%	7%
	Suffocation	3	3%	1%
	Animal bites	1	1%	0%
	Total Unintentional	118	100%	50%

^aCategories are not mutually exclusive

^bBold type indicates a leading cause of injury for Wake County

Several of the programs included in NREPP addressed risk factors that relate to intentional and sometimes unintentional injuries (Table 53). These risk factors were included in the compilation to provide additional information on the prevention of injury and violence. The most common risk factor was alcohol (48%), followed by social functioning (31%) and drugs (27%).

Group	Risk Factor	N	Group %	Total %
Risk Factors	Alcohol	65	48%	28%
	Crime/Delinquency	35	26%	15%
	Drugs	37	27%	16%
	Mental Health	32	24%	14%
	Family Relationships	28	21%	12%
	Social Functioning	42	31%	18%
	Substance Abuse	13	10%	6%
	School Readiness/Academic Achievement	29	21%	12%
	Risky Sexual Behavior	11	8%	5%
	Risk Factor Totals	136	100%	58%

^aCategories are not mutually exclusive

Targeted age groups were identified for the programs based on categories from NREPP (Table 54). Age groups were considered ‘targeted’ when the program directly addressed a specific age group (e.g. age group is early childhood for Early Head Start programs) or if they were targeted for behavior change by an intervention (e.g. age groups are adolescent, young adulthood, and adult for Blood Alcohol Content Laws). The greatest number of programs targeted the adolescent age group (55%), followed by young adulthood (43%) and adults (41%). Adult programs were included in the Evidence-based Practices Compilation when the program had an impact on children/childhood safety by targeting adult behaviors (e.g. parenting classes). Universal settings are intended to reach all populations (i.e., they are not targeted to reach any particular environment, setting, or in some cases, age group).

Age Range	N	%
Early Childhood (0-5)	40	16%
Childhood (6-12)	92	38%
Adolescent (13-17)	133	55%
Young Adulthood (18-25)	105	43%
Adult (26-55)	100	41%
Universal (e.g. laws, mass media)	20	8%

^aCategories are not mutually exclusive

Table 55 provides injury intent and injury causes by age. The highest number of programs reviewed for intentional injuries were for Adolescents (43 programs), followed by Childhood (41 programs) and Adult (24 programs). The greatest number of programs address Assault/Physical Violence for the age groups of Childhood (35 programs) and Adolescents (34 programs). The highest number of programs reviewed for unintentional injuries were for Young Adulthood (80 programs) and Adult (77 programs). The highest number of programs were identified for Motor Vehicle Crashes (in general) for Young Adulthood (50 programs), Adult (46 programs) and Adolescent (42 programs). These programs target adult populations to prevent childhood injuries (e.g. education of proper use of child seats). Young Adulthood and Adult had several programs that address Burns (11 programs) and Drowning (11 programs), however, few of the programs reviewed addressed any of the other types of unintentional injuries. For example, no programs addressed Environmental Factors.

Table 55. Evidence-based programs addressing injury causes by age range (n=190). ^a						
Injury Type	Age Range					
	Early Childhood (0-5)	Childhood (6-12)	Adolescent (13-17)	Young Adulthood (18-25)	Adult (26-55)	Universal ^b
Intentional						
Child Abuse/ Maltreatment (physical, sexual, emotional)	8	4	5	6	8	0
Assault/Physical Violence	12	35	34	14	14	1
Bullying	0	6	5	0	0	0
Sexual Violence (e.g. assault, rape)	1	0	3	1	1	0
Self Inflicted/Self Harm	0	1	6	10	7	2
Human trafficking	0	0	0	0	0	0
Total Intentional Counts (Programs N=72)	17	41	43	23	24	3
Unintentional						
Motor Vehicle Crashes (in general)	2	4	42	50	46	6
Cars/trucks/buses	0	0	0	4	4	0
Pedestrians	0	0	0	0	0	0
Bicycles	0	0	0	0	0	0
Motorcycles	0	0	0	1	1	0
Poisoning/overdose	0	0	0	4	5	0
Bicycle injury/crashes (NOT involving a motor vehicle)	2	3	3	2	2	0
Falls	0	0	0	3	3	0
Environmental Factors (e.g. weather related)	0	0	0	0	0	0
Firearm	1	1	0	8	8	2
Drowning/submersion	4	2	3	11	11	6
Burns, including fire and scalds	4	4	4	11	11	5
Suffocation	1	0	0	3	3	0
Animal bites	1	1	0	0	0	0
Total Unintentional Counts (Programs N=118)	15	14	51	80	77	19

^aCategories are not mutually exclusive

^bE.g. laws and mass media campaigns

Table 56 provides risk factors by age. The highest number of programs reviewed for Risk Factors addressed Adolescents (100 programs), followed by Childhood (75 programs). The greatest number addressed Alcohol for Adolescents (56 programs) followed by Adolescence programs addressing Drug Use (31 programs). Crime/Delinquency programs addressed each age range.

Table 56. Evidence-based programs addressing risk factors by age range (programs n=136).^a

Risk Factor	Age Range					
	Early Childhood (0-5)	Childhood (6-12)	Adolescent (13-17)	Young Adulthood (18-25)	Adult (26-55)	Universal ^b
Alcohol	0	26	56	29	26	0
Crime/Delinquency	6	17	27	11	9	1
Drugs	0	25	31	7	7	0
Mental Health	12	22	22	5	9	0
Family Relationships	10	20	19	9	14	0
Social Functioning	14	37	22	11	12	0
Substance Abuse	1	12	9	1	1	0
Academic Achievement	7	21	17	6	6	0
Risky Sexual Behavior	0	7	10	5	3	0
Total Risk Factor Counts	23	75	100	46	41	1

^aCategories are not mutually exclusive

^bE.g. laws and mass media campaigns

Setting locations were identified for the programs based on categories from NREPP (Table 57). The greatest number of programs was identified for the school setting (92 programs), followed by other or unspecified (84 programs), universal (52 programs), and home settings (39 programs).

Table 57. Evidence-based compilation settings (not mutually exclusive, n=234 programs).

Setting	N	%
School	92	38%
Home	39	16%
Workplace	3	1%
Residential	7	3%
Outpatient	16	7%
Correctional	8	3%
Primary Care	14	6%
Other or Unspecified	84	35%
Universal (e.g. laws, mass media)	52	21%

Table 58 provides injury intent and injury causes by setting. The highest number of programs reviewed for intentional injury was in the school setting (41 programs) followed by Other or Unspecified (25 programs) and Home (19 programs). The most programs addressed Assault/Physical Violence in the School setting (35 programs). The highest number of programs reviewed for unintentional areas were Universal programs (52 programs), followed by Other or Unspecified (41 programs) and Primary Care (14 programs). The most programs addressed Motor Vehicle Crashes (in general) at the Universal level (36 programs).

Injury Type	Settings								
	School	Home	Workplace	Residential	Outpatient	Correctional	Primary Care	Other or Unspecified	Universal ^b
Intentional									
Child Abuse/ Maltreatment (physical, sexual, emotional)	2	7	0	1	4	1	0	5	0
Assault/Physical Violence	35	12	0	3	7	5	0	20	1
Bullying	8	0	0	0	0	0	0	0	0
Sexual Violence (e.g. assault, rape)	3	2	0	0	0	0	0	2	0
Self Inflicted/Self Harm	5	3	0	0	1	0	1	5	5
Human trafficking	0	0	0	0	0	0	0	0	0
Total Intentional Counts (Programs N=72)	41	19	0	3	9	5	1	25	5
Unintentional									
Motor Vehicle Crashes (in general):	6	2	1	0	0	1	5	18	36
Cars/trucks/buses	0	0	0	0	0	0	0	2	2
Pedestrians	0	0	0	0	0	0	0	0	0
Bicycles	0	0	0	0	0	0	0	0	0
Motorcycles	0	0	0	0	0	0	0	0	1
Poisoning/overdose	0	4	0	0	0	0	3	1	0
Bicycle injury/crashes (NOT involving a motor vehicle)	1	0	0	0	0	0	0	1	2
Falls	0	3	0	0	0	0	3	0	0
Environmental Factors (e.g. weather related)	0	0	0	0	0	0	0	0	0
Firearm	0	1	0	0	0	0	1	3	6
Drowning/submersion	1	5	0	0	0	0	3	15	0
Burns, including fire and scalds	1	5	0	0	0	0	6	3	9
Suffocation	0	2	0	0	0	0	3	0	0
Animal bites	1	0	0	0	0	0	0	0	0
Total Unintentional Counts (Programs N=118)	10	11	1	0	0	1	14	41	52

^aCategories are not mutually exclusive

^bE.g. laws and mass media campaigns

Table 59 provides injury risk factors by setting. The highest number of programs reviewed for Risk Factors were for School settings (81 programs), followed by Other Unspecified (50 programs) and Home (28 programs). The School setting was the most common setting for Alcohol (38 programs), followed by Drugs (30 programs) and Social Functioning (30 programs). School and the Home setting had programs for each Risk Factor.

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Table 59. Evidence-based programs addressing risk factors by setting (programs n=136). ^a									
Risk Factors	Setting								
	School	Home	Workplace	Residential	Outpatient	Correctional	Primary Care	Other or Unspecified	Universal ^b
Alcohol	38	10	2	2	5	4	0	19	13
Crime/Delinquency	21	10	1	6	5	6	0	16	0
Drugs	30	9	1	1	5	3	0	13	0
Mental Health	22	9	0	2	10	1	0	13	0
Family Relationships	22	13	0	0	6	0	0	16	0
Social Functioning	30	10	1	0	7	1	0	18	0
Substance Abuse	9	2	0	0	1	1	0	6	0
Academic Achievement	23	10	1	2	3	2	0	12	0
Risky Sexual Behavior	7	3	1	0	0	0	0	7	0
Total Risk Factor Counts (Programs N=136)	81	28	3	7	16	8	0	50	13

^aCategories are not mutually exclusive

^bE.g. laws and mass media campaigns

IV. DISCUSSION

This section includes discussion of: A) Secondary Data Sources; B) Leading Cause of Childhood Injury; C) Limitations of the Survey of Organizations; D) Comparison of Organizational Capacity for Injury Prevention and Interest in Capacity Building Activities; E) Relationship Among the Leading Causes of Childhood Injury, Injury Prevention Focus of Organizations, and Programmatic Approach; and F) Accessibility of Evidence Based-Practices.

A. Secondary Data Sources

1. *Mortality Data*

Mortality data for childhood injury in Wake County were accessed through publically available files on the NC State Center for Health Statistics website. The most recent year of data available through this site was 2011. However, 2012 mortality data are now available directly from the State Center for Health Statistics and could be requested through staff in the Injury and Violence Prevention Branch. We decided to use the publically available files to give us greater control over our analysis of these data.

The North Carolina Violent Death Reporting System (NC VDRS) was also queried for Wake County. To access county level data from the NC VDRS required a special request to staff at the Injury and Violence Prevention Branch, asking them to run tables for us. Having fatality data from both systems was useful; we were able to verify that we had information on all the violent deaths to children in Wake County for the years 2006-2011 from both data sources, providing the most detail available for these deaths.

There are, thankfully, few child injury deaths in Wake County, thus making it relatively easy to pull these data from publically available sources. That said, the publically available data are relatively limited in terms of details. Being able to access county level data through the NC VDRS provided more details for the child deaths from assault and suicide.

2. *Hospital Discharge Data*

The hospital discharge data are available through the North Carolina State Center for Health Statistics but are not readily available to individual researchers. Accessing these data required special requests to the Injury and Violence Prevention Branch (IVP) Branch staff of the NC Division of Public Health to obtain summary tables. We benefited from our long standing and ongoing relationship with the IVP Branch, allowing us to ask for and receive special reports that they could run for us on these data. Record level data were not available to us which greatly limited our ability to analyze these data at the injury sub-mechanism level.

The most recent year of data available for this data source was 2011. The NC Hospital Discharge data include only one mechanism of injury code (E-code). While the inclusion of only one E-code simplifies analyses, it limits the information we can glean about mechanism and circumstances of injury. As a result of our work on this project, working through colleagues at the IVP Branch, we have raised questions with the State Center for Health Statistics and the North Carolina Hospital Association to determine why there is only one E-code included in these data. We recommend the inclusion of up to five E-codes, to make these data comparable to the ED visit data and more useful for injury surveillance and descriptive analysis.

3. *Emergency Department Visit Data*

The ED visit data from NC DETECT provided a wealth of detailed injury information for this study. Wake County in general provides very thorough and complete data through this data source. The secondary nature of these data, however, does preclude the ability to validate the injury codes assigned by the hospitals and provided to NC DETECT.

One major hospital system in Wake County experienced data quality issues related to injury coding for their ED visits for part of 2010. This problem was large enough that we decided not to include 2010 in any year-based analysis of the data (e.g. calculations of rates). It should also be kept in mind that the overall frequencies of injury reported are thus an underestimate for the time period studied.

Due to the large number of injury related ED visits by Wake County children, we relied primarily on the ICD-9-CM coded diagnoses and external cause of injury codes. The use of ICD-9-CM coding sometimes limits the ability to pinpoint the exact cause of injury, particularly for intentional injury, where many of the mechanism and sub-mechanism categories are relatively vague and imprecise. NC DETECT captures up to five external causes of injury codes (E-codes). Many ED visit records in Wake County included multiple and contradictory mechanism of injury E-codes (e.g. fall and cutting/piercing instrument). This required individual review of each record to try to determine which code to use as the primary mechanism or sub-mechanism of injury code. This extensive coding and the level of detail included, however, are also strengths of these data.

Most ED visit records for childhood injury in Wake County include the triage note, as well as chief complaint. This additional textual information is invaluable when examining data at the record level for details about the injury event.

4. *EMS Data*

Wake County EMS is a large organization that has their own, well-respected data system which they use for research and evaluation projects. Due to the time constraints of this study, they were unable to provide data directly for our use. We were, however, able to obtain a Data Use Agreement to allow access to the Wake County EMS data available through the EMS Performance Improvement Center (EMSPIC) and NC DETECT.

Wake County EMS data in NC DETECT were available only for the years 2009-2012. The EMSPIC generated a standardized child injury report for Wake County, called the EMS Pediatric Trauma Care Toolkit, which covered children ages 0-15 and the years 2011-2012. The EMS data from NC DETECT had high levels of missing data for many key data elements necessary for identifying responses to injured children. In addition, several notable changes in the distributions of key data elements (e.g. disposition) were observed from one year to another in the EMS data from NC DETECT, with no readily available explanation. It was unclear if changes observed in the data were due to changes in coding practice or policy changes or something else. The Pediatric Trauma Care Toolkit report lacked clarity in data definitions and had high levels of not recorded or non-specific data categories.

The EMS data we were able to access were often incomplete for key variables. We suspect the EMS data are more complete at the local level than what we saw in the data obtained from state level data systems. The EMS data passed through several gate keepers before being made available for this study and the problems we observed could have been introduced at any one of those levels. Data auditing work, to track the provision and flow of data from Wake County EMS through EMSPIC and into NC DETECT, may lead to overall improvements in the EMS data provided to NC DETECT and would certainly improve our understanding of these data for Wake County.

5. Carolinas Poison Center Data

Data for calls to the Carolinas Poison Center (CPC) for Wake County children were obtained under a Data Use Agreement and provided through NC DETECT. These data have not been accessed through NC DETECT for a research project before so this was a learning experience for all involved. The poison control center call data available from the CPC are very complete and collected in a standardized method, thus resulting in high quality data for a secondary data source. The data are very well standardized before they are submitted to NC DETECT and are updated as additional information becomes available. Staff members at CPC make follow-up calls to caregivers of children with poisoning exposures to capture additional outcome measures over time. While we were provided with record level data, most of our analyses were able to use the data categories already assigned by CPC, including substances of exposure, clinical effects, and medical outcomes.

These data provide a wealth of information about calls to the poison control hotline for acute exposures to potentially harmful substances, as well as other types of injury in the community (e.g. bites). CPC fields calls from worried caregivers about many injury events besides typical poisoning, including animal, insect and human bites, burns, and food poisoning, thus providing a fairly broad based community level response to potentially injured children.

6. Other Data

Some of the injury issues of interest to JRE are addressed by community organizations not well identified through secondary healthcare data sources. The addition of data sources beyond healthcare sources is especially important when addressing specific causes of injury and examining them in a more in-depth manner. While Wake County presents a wealth of health related data that are useful for the study of childhood injury, other data sources could be considered for examination and evaluation (e.g., schools, social services, law enforcement).

B. Leading Cause of Childhood Injury

For the leading causes of childhood injury, Table 60 summarizes by injury type (e.g., Intentional and Unintentional), factors associated with secondary data, including: rank for morbidity and mortality leading causes; age distributions; sex distributions; injury location; and costs.

Table 60. Summary of leading causes of childhood injury in Wake County, NC by injury type.

Unintentional Injury

#1 Motor Vehicle Traffic Crash – Occupants

- f. There were twice as many male deaths than females deaths (Males=41, Females=20).
- g. Older children (age groups 10-14 and 15-17) are at highest risk of MVC-occupant injury.
- h. Many children injured or killed in MVCs are coded as “Unspecified.”
- i. MVCs are expensive injuries, with the second highest hospital charges reported in the hospital discharge data.
- j. A higher than expected proportion of MVC-occupant injury related ED visits were self-pay (18.2%).

#3 Motor Vehicle Traffic Crash – Pedestrian

- f. Child pedestrians hit by motor vehicles are likely to be fatalities (15 fatalities to 310 ED visits).
- g. Over 60% of child pedestrian fatalities (66.7%) and ED visits (61.8%) are males.
- h. Many (42.9%) pedestrian deaths were children under 5 years of age but 83.8% of ED visits for pedestrian injury were 5-17 years of age, with 33.8% in the 15-17 year age group (i.e. younger children are more vulnerable, more likely to die from these injuries).
- i. More than a quarter (25.7%) of the pedestrian injury ED visits were admitted to the hospital or transferred to another hospital.
- j. “Hot spots” for crashes involving child pedestrians have been identified in a previous JRE funded study.

Table 60. Summary of leading causes of childhood injury in Wake County, NC by injury type.

#5 Falls

- f. Falls are overwhelmingly the leading injury cause of hospital discharges (21.5%) and ED visits (26.7%) for Wake County children.
- g. Most fall injuries are to males (60.5% hospital discharge, 58.1% ED visits).
- h. All age groups have high numbers of fall related injury.
- i. There were over 3,000 ED visits for injury related to falling from playground equipment and over 2,000 ED visits for falls from bed.
- j. Many fall related ED visits do not have specific sub-mechanism codes assigned (14.8% are Unspecified Fall).

#6 Unintentional Suffocation

- f. Eleven children died due to unintentional suffocation or other breathing threats (e.g. choking), and eight were under 1 year of age.
- g. There were only 47 hospital discharges and 87 ED visits due to unintentional suffocation.
- h. More suffocation deaths were females (6 of 11, 54.5%) but 52.9% of ED visits due to suffocation were males.
- i. Almost half (48.8%) the ED visits due to suffocation listed Medicaid/Medicare as the expected payment source.
- j. Over half the ED visits due to suffocation resulted in admission to the hospital (51.2%).

#7 Burns

- f. Burns include injury from both fire and hot liquids, steam and other hot substances/objects. The vast majority (83.0%) of burn injuries treated in the ED were from hot liquids/steam/substances/objects.
- g. Burn injury was the 4th leading cause of injury related hospital discharges, responsible for 6.8%, and the 6th leading cause of injury related ED visits, with over 1,500 burn injuries identified in this study.
- h. Males accounted for 55% of the burn related ED visits.
- i. Over half the burn related ED visits (50.2%) were for children ages 1-4 years of age.
- j. Most burns did not require admission to the hospital, with 81.6% discharged home.

#8 Struck by or against

- f. This category includes being *unintentionally* struck by or striking against people or objects, with or without subsequent fall. About 43 percent (42.6%) of these are coded as “Other”, with no further information.
- g. Almost 26,000 ED visits (18.7%) were for injury resulting from being struck by or striking against something, thus being the second leading cause of injury related ED visits.
- h. 35% of these injuries are due to being struck or striking against something or someone in sports activity.
- i. 13.3% of these injuries involved furniture or falling objects.
- j. These injuries do not include injuries caused by falling and then striking against something.

#9 Natural and environmental factors

- f. This category includes a wide variety of injury mechanisms; most (92.2%) were due to injury involving animals or insects (e.g. dog bites, bee stings).
- g. Weather related injury (exposure to heat/cold, extreme weather) was responsible for only 4.1% of the ED visits due to natural and environmental factors but resulted in five child deaths, with four of these deaths from one cataclysmic storm.
- h. Dog bites resulted in an average of 278 ED visits for Wake County children per year.
- i. Children ages 1-4 years of age were most at risk, accounting for 34.5% of ED visits for injury from natural and environmental factors; children ages 5-9 represented 28.2%.
- j. Male children were the injured patient in 55.5% of the ED visits for this cause.

#10 Bicycle Injury

- e. Injuries from falls and crashes involving bicycles, not including those involving a motor vehicle, led to over 3,000 ED visits for Wake County children during the years 2006-2012.
- f. Bicycle injury related ED visits are overwhelmingly for male patients (70.8%).
- g. Children ages 5-9 are at highest risk of bicycle injury, followed by those ages 10-14.
- h. Bicycle injuries are responsible for 85.8% of all Other Transportation related injury, which include injuries related to animals being ridden, animal-drawn vehicles, other non-motorized road vehicles, railway transport, water transport and water craft, and other vehicles not elsewhere classifiable.

Table 60. Summary of leading causes of childhood injury in Wake County, NC by injury type.

Other - Poisoning

- h. More children are hospitalized and visit the ED for self-inflicted poisoning than for unintentional poisoning.
- i. Many ED visits for poisoning may be averted by calls to the Carolinas Poison Center hotline; over 32,000 calls to the poison control hotline were made for Wake County children ages 0-17 during the years 2006-2012.
- j. Most calls (68.1%) are for children ages 1-4 years.
- k. “Analgesics” (e.g. aspirin, acetaminophen, ibuprofen) were a leading substance of exposure for all age groups. “Cosmetics/personal care products” was the leading substance group for exposures by children ages 1-4 years.
- l. Most exposures reported through calls to the poison control hotline did not result in clinical effects or serious medical outcomes.
- m. Results highlight the importance of looking at unintentional and self-inflicted poisoning separately. While many prevention strategies may address both intentional and unintentional poisoning, these two sub-sets of childhood poisoning affect different groups of children and have different healthcare outcomes.
- n. Calls to the CPC for child exposures to potentially harmful materials are important to note because numbers are much higher than what we see for poisonings in the ED Visit data; calls to CPC may be keeping children at low risk from a potential poisoning exposure out of the ED.

Intentional Injury

#2 Assault

- f. Children under age five are at highest risk of death from assault.
- g. Children 15-17 years of age are most likely to be hospitalized or visit the ED for injuries related to assault.
- h. Over half the child deaths from assault were female while approximately two out of three hospital discharges and ED visits for assault were for males.
- i. ED visits for assault are more likely than other injury related ED visits to have Medicaid/Medicare as the expected payment.
- j. Firearm assault injuries had the highest reported median hospital charges of any injury type reported and a median hospital length of stay of five days.

#4 Self Inflicted / Self Harm

- h. Eight of the 14 child suicide deaths were for children 10-14 years old.
- i. Ten of the 14 child suicide deaths were from hanging.
- j. For hospital discharges and ED visits for self-inflicted injury, approximately 70% were for ages 15-17 years.
- k. Most suicide deaths (78.6%) were male but most hospital discharges (71.0%) and ED visits (70.3%) for self inflicted injury were females. Males tend to chose more lethal means to attempt self-harm.
- l. Non-fatal self inflicted injury was overwhelmingly due to poisoning (71.7% hospital discharges, 71.3% ED visits).
- m. Most ED visits for self-inflicted injury were admitted to the hospital or transferred to another hospital (70.5%).
- n. Anecdotally, we suspect that there may be a reluctance to code injuries as self-harm in children under 10 years old; these may be more likely to receive an “Undetermined” intent code.

C. Limitations of Childhood Injury and Violence Prevention Survey of Organizations

We identified several primary limitations to the Wake County Childhood Injury & Violence Prevention Survey.

1. *Organizational Demographics and Outreach:* The results from this assessment are limited to those agreeing to participate and have their survey data included in this technical report. As a result, the 110 responding organizations surveyed do not represent the work of *all* organizations that may be addressing childhood injury and violence prevention in Wake County, NC. However, a 71% response rate was a good indicator that our sampling frame identified many organizations in Wake County working in the area of childhood injury and violence prevention. Generally, we did not include schools or medical facilities on our initial list.
2. *Injury Prevention Focus of Organizations:* Terminology between professional entities varies. For example, hospital, clinics, insurance companies and organizations working to prevent injury and or violence often differ in their use of terminology to refer to injury events/incidents. We sought to identify terminology that would be understood by all entities involved with this project. Our goal was to align the multiple phrases through the use of similar terminology, guided by the terminology used by the Centers for Disease Control and Prevention (CDC) and the North Carolina Disease Event Tracking and Epidemiologic Collection Tool (NC DETECT) (Appendix A). The standardization of terminology allowed for consistent presentation, review, and discussion of similarities, differences, and gaps among the project activities completed for the *Wake County Childhood Injury Prevention Assessment Project*. This was more difficult to achieve than we originally expected.
3. *Survey Questions:* To collect information about the work being performed by Wake County organizations addressing childhood injury and violence prevention, we selected to use an online, self-reported survey. Use of this method presented some general limitations (e.g., respondents may have misunderstood the intent of questions), as well as specific limitations related to the indicators used in the questions that are described in Table 61.

Table 61. Survey limitations.

Category of Questions	Limitations
Organizational Demographics	Some individuals responded for their department and others for their agency. This appeared to be an issue for only one large organization.
Geographical Area Served	These three questions collected at the aggregate level for all services provided at an organization and therefore was not a direct link to specific programs and/or an injury prevention focus. Information detailing the geographical areas, targeted populations and groups would have been too complicated to collect for each individual program via a survey.
Populations Served	
Targeted Groups Served	
Organizational Work Focus	Respondents were asked to indicate how important (Not at all important (0) to Very Important (6)) various types of work were for their efforts to promote childhood health and safety through the prevention of injury and violence. This was originally intended to identify the type of work performed by the organization. However some respondents seemed to indicate how much an organization might rely on the types of work listed (e.g. funding) to function rather than using their response to indicate the extent to which they conducted the service. Perhaps because the question was poorly worded there was limited variability in responses and therefore the indicator was less helpful for understanding organizational work focus.
Intentional Injuries	Respondents self-reported if they addressed Intentional and/or Unintentional injuries. The wording of the question allowed for respondents to identify which injury events they believed they work in, however it may not account for the full extent of their work. In addition, entities that work on prevention of intentional and/or unintentional injuries may not self-identify

Table 61. Survey limitations.

Category of Questions	Limitations
Unintentional Injuries	because they may not think of their work as preventing such events or injuries. For example, the provision of job skill training may not have been associated for some respondents to the prevention of violence. Therefore, we may be underestimating the work organizations are doing. However, we believe the responding organizations are ones doing a lot of the IP work in Wake County since the organizations and coalitions responding to the survey strongly identified childhood injury and/or violence prevention as important to their work focus.
Childhood IVP Programs/ Activities	Organizations were asked how many (#) childhood health and safety programs or activities are provided by their organization and to name the ‘top five’ programs or activities. We did not provide detailed information to define what ‘top five’ means, nor did we ask them to link the programs they listed to specific injury events (assessed earlier in the survey). Due to the use of a self-reported survey, we did not ask questions to assess effectiveness, reach, extent of evaluation, implementation fidelity (i.e., program impact) about the programs submitted.
Name/description of “TOP FIVE” Programs and Activities	
Organizational Capacity	Respondents’ self-reported organizational capacity and as such, results are limited to individuals completing the survey and their beliefs about the organization’s capacity, which may not reflect actual capacity. Because we did not use a criterion reference indicator for capacity, High, Medium and Low categories were based on the frequency distribution of the responding organizations.
Capacity Building Activities	Respondents’ self-reported needs for capacity building are limited to individuals completing the survey and their beliefs about the organization’s needs, which may not reflect actual needs. In addition, the list of capacity building activities included six elements, so it may not reflect the full nature of capacity building needs at an organization. In the survey, respondents were provided the opportunity to list ‘other’ types of capacity building activities.
Estimated Program Impact Index (e.g., Socio-Ecological Framework, Freidan’s Health Impact Pyramid, and 3Es of Injury Prevention)	Estimated program Impact did not use a criterion based indicator, rather, higher scores on the index indicate the potential for having a population based impact. While this index provided a sense of the distributions based on several frameworks (e.g. individual level to societal level), the program impact measure would be enhanced by including indicators that would assess program reach and level of effectiveness. In addition, there is likely considerable variability among respondents’ ability to answer questions about other terms associated with ‘program effectiveness’ (e.g., reach, efficiency, implementation fidelity). This limited our ability in this project to study different measures of program impact.

D. Comparison of Organizational Capacity and Interest in Capacity Building Activities

Forty percent or more (range of 44% to 56%) of the organizations responding to the online survey rated all capacity building activities assessed as ‘very valuable’ (activities shown using ✓ symbols in Table 62). High Capacity and Medium Capacity organizations, in particular, expressed interest in all capacity building activities described in the survey. Information collected in the organization survey, however, does not allow us to determine why Low Capacity organizations were less interested in capacity building activities.

Table 62. Capacity Building Activity Interest (>40%) by Capacity Level.

Activities	All Organizations N = 110	High Capacity N = 32	Medium Capacity N = 33	Low Capacity N = 30
Participate in informational networking sessions for identifying public and private funders	✓	✓	✓	
Receive Wake County childhood IVP resources	✓	✓	✓	
Network with Wake County childhood IVP stakeholders	✓	✓	✓	
Attend trainings focused on building capacity in resource development	✓	✓	✓	
Receive Wake County childhood injury data reports	✓	✓	✓	
Attend trainings on evidence-based programs, interventions, and strategies	✓	✓	✓	

^aHigh Capacity Organizations N= 33 with 110 programs

^bMedium Capacity Organizations N= 33 with 76 programs

^cLow Capacity Organizations N= 32 with 46 program

The 15 coalitions who responded to the survey were also asked about their interest in capacity building activities. Compared to organizations, a lower proportion of coalitions indicated an interest in capacity building activities. Only 12%-22% of Coalitions indicated these activities were very valuable.

E. Relationship Among the Leading Causes of Childhood Injury, Injury Prevention Focus, and Programmatic Approach

1. Leading Cause of Injury and Injury Prevention Focus

When considering results from both secondary data and the organization survey conducted for this project, it is valuable to identify the degree to which organizations in Wake County are addressing childhood injury and violence prevention. To what degree are these organizations focused on the leading causes of childhood injury in Wake County? To examine this question, we identified two Tiers of Leading Injury Causes to investigate the distribution of effort across organizations and then to specifically assess if there are any differences in injury prevention focus by organizational capacity (Table 63).

The leading injury causes in Tier I appear to be appropriately addressed, with almost 50% of all organizations and 60% of High Capacity organizations addressing prevention in these leading injury causes. Fewer than 40% of Medium Capacity and coalitions identified working in these leading injury causes. Among all organizations (regardless of capacity level) and coalitions, additional emphasis on these leading causes of childhood injury would be beneficial.

With approximately 20% of All, High Capacity and Medium Capacity organizations, and coalitions, addressing the leading injury causes in Tier II, enhanced emphasis to address these leading causes of childhood injury seems warranted.

Table 63. Average Percentage of Organizations Working to Prevent Injuries by Ten Leading Injury Causes Tiers.

Leading Injury Event Tiers ^a	All Organizations	High Capacity	Medium Capacity	Low Capacity	Coalitions
	N = 110	N = 33	N = 33	N = 32	N=15
Tier I					
1. MVC Traffic-Occupant					
2. Assault					
a. Assault/Physical Violence					
b. Child Abuse/ Maltreatment (physical, sexual, emotional)	46.7%	57.2%	38.3%	45.3%	36.7%
c. Sexual Violence (e.g. assault, rape)					
3. MVC Traffic-Pedestrian					
4. Self-Inflicted/ Self-Harm					
Tier II					
5. Falls					
6. Unintentional Suffocation					
7. Burns					
8. Struck By or Against ^b	17.2%	21.0%	21.5%	11.0%	17.9%
9. a. Natural/Environmental Factors					
b. Animal bites					
10. Bicycle Injury/Crashes					

^a Leading Injury Event Tiers were created by reviewing the differences between leading causes of mortality leading causes of morbidity.

^b Struck By or Against was not collected in the organization survey.

2. Injury Prevention Focus and Programmatic Approach

Considering results from both secondary data and the organization survey conducted for this project, it is also important to identify the degree to which organizations in Wake County addressing childhood injury and violence prevention are appropriately applying a public health approach to their efforts to prevent childhood injury in Wake County, NC.

The field of injury prevention has significantly developed over the past sixty years. Years behind the field of chronic disease, it was not until 1981 when the first national conference on injury control was sponsored by the CDC at Johns Hopkins (Christoffel & Gallagher, 2000). This national conference was followed by a CDC publication in 1982 providing an Injury Control and Implementation Plan for State and Local Governments. In 1990, the first six states mandated E-coding as a standard practice. In 1993, President Bill Clinton declared injury a public health problem. In 1999, the Institute of Medicine published “Reducing the Burden of Injury” (Bonnie, Fulco, & Liverman, 1999), drawing attention and comprehensive research into the spotlight. These, among other pivotal events over the past six decades, have made significant strides in the public health contribution to the prevention of injury and/or violence.

The complexity of public health issues requires the implementation of multi-level approaches to address childhood injury (e.g. population based approaches, individual education approaches). Programs that are focused on individual knowledge, skills, and behavior (e.g. counseling and education), are necessary; however, additional interventions should address population-level factors (e.g. socioeconomic factors, environmental conditions, public policy changes). Population-level interventions will increase the public health impact, leading to a reduction in childhood injury mortality and morbidity (Frieden, 2010).

The estimated program impact index (Table 50), developed by coding programs listed by responding organizations, was based on several public health models, including: Socio-Ecological Framework; Frieden’s Health Impact; and the 3E’s of injury prevention (Environment, Education, Enforcement). Our estimated

program index measure for an organization represents the average estimated program impact index for the programs listed by the organization.

Application of this index identified a range from low impact (3) to high impact (13), with a 5.8 average program impact index score for all programs listed (n=243) by organizations completing the survey. The higher the score, the more likely the program was using some approach beyond education. Programs that focused on more comprehensive and/or population level-approaches received higher index scores. Among intentional injury prevention programs listed by survey respondents, there is a need to encourage increased use of population-level strategies. For example, the average program impact index for Intentional Only programs is 4.5 (Table 50), noticeably lower than the average for Unintentional Only (6.6) and for Both Intentional and Unintentional (6.9).

Our analysis reveals that self-reported capacity can make a difference, in that High Capacity organizations were more likely to have a higher estimated program impact index for programs addressing intentional injury (8.3) and for programs addressing both intentional and unintentional injury events (8.1). Our analysis also revealed that coalitions completing the survey (although we did not create an impact index for them) identified working with policy makers (80%) and public safety officials (80%) most often. This is in contrast with the programs submitted by organizations, which most frequently identified working with children (85%) and parents (78%).

F. Accessibility of Evidence-Based Practices

The accessibility of readily available and comprehensive evidence-based resources for intentional injuries and/or violence (including risk factors) was greater than the accessibility of comparable resources related to unintentional injuries. More effort was required to identify and compile programs and interventions which addressed unintentional injuries. Information about unintentional injuries was commonly found in the form of tips for individuals on safety practices, laws and policies, and environmental approaches to modify the physical environment. Many curriculums and programs are available to educate individuals about safe behaviors and safety practices; however, no comprehensive database exists to review supporting evidence of such interventions.

V. RECOMMENDATIONS

This section outlines recommendations for the John Rex Endowment and other stakeholders (e.g. funders, government entities, and other Wake County entities) to consider to foster learning and commitment, build capacity, and increase funding streams for childhood injury prevention. We present recommendations for: A) Foster Learning, Commitment, and Capacity among Organizations Addressing Childhood Injury & Violence Prevention in Wake County, NC; and B) Childhood Injury Secondary Data.

A. Foster Learning, Commitment, and Capacity among Organizations Addressing Childhood Injury & Violence Prevention in Wake County, NC

1. *Continued Engagement with Participating Organizations and Coalitions*

We support plans by JRE to: make available to the public the results from this project; provide follow-up technical assistance to organizations interested in increasing their capacity and program effectiveness; and promote discussion about the data collection methods and recommendations. The strategic use of the findings from this project will help to both increase awareness of injury and violence prevention in Wake County, as well as to influence the actions that can be taken by multiple stakeholders (e.g., local organizations/coalitions, state agencies, academic/research institutions) to further the efforts already underway to prevent childhood injury and violence in Wake County, NC.

2. *Enhancing Evaluation Methods to Improve Effectiveness*

The degree to which childhood injury or violence prevention organizations evaluate their programs is important as evaluation results can increase program effectiveness. A focused emphasis on evaluation could include assessing practices for formative, process, impact, and outcome evaluation. Such an assessment could include the degree to which organizations: a) develop measurements for short/medium/long-term indicators and logic models; b) collect data and use reliable data collection methods; and/or c) select appropriate data analysis methods. JRE could specifically identify and focus capacity building on evaluation components that relate to ‘program effectiveness’ and ‘program impact.’ We recommend addressing, on a programmatic level, the identification of the following topics: 1) Reach which includes: program frequency of contact; duration of contact; intensity of contact; and population groups targeted/reached by individual programs; 2) Identify whether they use Evidence-based Practices which includes: application of programs identified as *Recommended* and/or *Promising*; and 3) Fidelity of program implementation which includes: delivery schedule; meeting training requirements; determining if program messages were received by intended targets; and documentation through process evaluation.

3. *Capacity Building Courses and Evaluation Consultation*

Relevant entities could use multiple methods to deliver capacity building services to organizations addressing childhood injury and violence prevention in Wake County, NC.

- Short-courses: in collaboration with the NC Injury & Violence Prevention Branch, UNC Injury Prevention Research Center and/or Department of Health Behavior, mini-courses in program planning, implementation, and evaluation for childhood injury and violence prevention could be developed. These courses could be specialized one to three day courses that could be supported and tailored to those working in intentional or unintentional injuries, including the identification of best-practices.
- Fellowship-learning experience: organizations could be asked to nominate staff to attend a series of program planning, implementation, and evaluation training courses (e.g., over a year) to support a project identified specifically for the fellowship program. The fellows would receive guidance on their

project and have the opportunity to increase their knowledge and skill through a series of workshops held during the year long program.

- Implementing injury prevention programs and/or retaining or linking to program and evaluation consultants: to support organizations/coalitions implementing injury prevention programs, the services of program and evaluation consultants could be retained to ensure that evaluation is conducted. The quality of evaluation will be improved through the development of tailored evaluation plans. In addition, the capacity of local organizations to conduct evaluation will be enhanced.

4. Use Evidence-based Practice Compilation

We recommend that JRE consider the information summarized in this project's Compilation of evidence-based practice registries to: 1) prioritize JRE supported activities based on evidence; 2) identify effective program(s) for the leading cause of injury; 3) encourage (or require) injury prevention activities using high impact approaches; and/or 4) identify programs tailored for/in specific settings/populations. We provide examples of each below.

- Incorporate known evidence-based practices into JRE supported areas. Use of the evidence-based practice compilation could be used to shape how JRE funding announcements are worded, and could define the scoring criteria for funding applications when submitted. In addition, the Compilation could inform the extent to which funded programs are required to report and/or evaluate their progress.
- Identify effective program(s) for the leading causes of childhood injury. Programs that were reviewed by multiple institutions and that were judged 'effective' (based on generally agreed upon criteria) should be considered as *best practices*. Registries vary in their definitions, standards and criteria (Appendix I summarizes the definitions and criteria used to judge effectiveness for the 16 registries reviewed for this project). This compilation was developed to summarize the state of knowledge regarding evidence-based programs and moving forward, JRE could prioritize support for only those programs identified as 'effective' or 'best practice.'
- Encourage work in high impact areas. JRE can expand the Compilation to include additional coding for public health descriptor frameworks (e.g. the socio-ecological framework, Frieden's Health Impact Pyramid and the 3E's of Injury Prevention). Once completed, JRE could encourage (or require) that projects that have the potential to be effective may also have a greater impact (based on the frameworks studied for this project). The Compilation could be used to identify all effective interventions (for the leading causes of injury) that are known to address community and/or universal settings (i.e., high impact). Universal settings are intended to reach all populations; they are not targeted to reach a specific environment, setting, or, in some cases, age group. Emphasizing use of effective programs that focus on universal settings may increase the overall impact of JRE-funded projects to reduce the risk for or incidence of childhood injury. As an example, the registry describing evidence based practices for Motor Vehicle Crashes includes 68 programs, 36 of which address universal settings. In addition, the registry indicates that Assault includes 53 programs, with one program addressing a universal setting, and one program recommended against (e.g., Violence Prevention: Policies Facilitating the Transfer of Juveniles to Adult Justice Systems).
- Identify programs tailored for specific settings/populations. Programs in the evidence-based practices Compilation were coded for settings (e.g., school, home, primary care facility). This allows JRE staff to identify and recommend interventions for specific settings/populations, and future funding announcements could specify that organizations work with/in those settings/populations.

B. Childhood Injury Secondary Data

1. Further Analysis of Leading Cause of Childhood Injury Data

To further study causes of childhood injury in Wake County, NC, we provide several recommendations organized by the leading injury causes identified in this project by secondary data.

#1 - Motor Vehicle Traffic Crash – Occupants. Work with NC DOT to attempt to link crash report data with EMS and ED visit data. The IVP Branch is considering this idea should funds become available.

#2 – Assault. Apply Patty Schnitzer’s algorithm (Schnitzer, Slusher, Kruse, & Tarleton, 2011) for estimating child maltreatment and neglect based on *weighting* of diagnosis and mechanism of injury codes, as well as combinations of these. Meghan Shanahan, a public health researcher at the UNC Injury Prevention Research Center (IPRC), applied this method to two years of ED visits by Wake County children and identified 126 children who were likely to have experienced maltreatment, almost as many as identified by specific codes for the 7 years of ED visit data reported here. She concluded that the ED data may capture a somewhat different population of children who experience maltreatment than those identified through Child Protective Services (CPS) data, although the age distribution for each type of abuse is similar between the two data sources (Shanahan, Proescholdbell, Waller, & Deyneka, 2013).

#3 - Motor Vehicle Traffic Crash – Pedestrian. Work with NC DOT to try to link crash data with healthcare data for child pedestrian injury. JRE has previously funded a project that used NC DOT crash data to examine child pedestrian crashes in Wake County. An innovative project in Boston, MA, has utilized crash data, EMS data, and ED visits data to: examine the characteristics of pedestrian and bicycle crashes resulting in injury; develop and implement interventions; and evaluate the impact of those interventions.

#4 - Self Inflicted / Self Harm. Promote accurate hospital coding for poisoning to reduce “Undetermined” poisoning codes. Sharing the results of this project with hospitals in Wake County, including highlighting areas of potential improvement in data quality through hospital coding practices, may indirectly improve the accuracy of this coding in the future.

#5 – Falls: A detailed report of Fall related injuries resulting in ED visits and/or hospital admissions should be completed. Analysis of school and community based efforts to prevent fall injuries to children should be undertaken. Ways to determine severity of fall injury and outcomes should be found or developed. Falls are by far the leading cause of childhood injury *morbidity* in Wake County. Addressing childhood injury prevention in the county necessitates a better understanding of fall related injury.

#8 - Struck by or against. Struck by or against is a non-specific and diffuse cause of injury but accounts for a large proportion of childhood injury morbidity in Wake County. Many of these injuries are sports related, as are many fall injuries. We did not explore this area in great detail in this study. A detailed report of sports related injury to children should be undertaken which would investigate all the various codes related to injury in sports activities. By undertaking a project to specifically address sports related injury, including those identified through struck by or against codes, fall codes, activity codes, and place of occurrence codes, as well as through key word searches of chief complaints and triage notes, we can better describe these injuries and identify prevention strategies. Likewise, further investigation of the community organizations involved in childhood sporting activities and prevention of injuries during participation in those activities, would further our understanding of current and potential injury prevention efforts. The location of struck by or against injuries should be explored through the Place of

Occurrence code (when available) and chief complaint and triage note descriptions; this may identify other places where children are at high risk for this type of injury (e.g. schools, parks).

#10 - Bicycle Injury. Undertake a study of bicycle injury in Wake County that utilizes ED data, including details from chief complaints and triage notes, EMS responses, and NC DOT crash reports (for those involving a motor vehicle on a public road) to gain a deeper understanding of who is at risk and where to better inform prevention efforts. Such a study could be paired with that described for pedestrian injury, although addressing bicycle injury in this way also requires examination of data for crashes that do not involve a motor vehicle or are not on a public roadway and, thus, will not have a NC DOT crash report. It may also be important to investigate existing policies regarding bicycle safety (e.g. NC statute requiring bicycle helmet use for children 15 years and younger) and how they are, or are not, enforced.

Other - Poisoning. Expand the exploration of poisoning injury in Wake County children through deeper analysis of the poisoning codes used in the ED visit and hospital discharge data, as well as the CPC call data. This is currently an area of intense public health interest nationally and in North Carolina, offering opportunities to partner and leverage resources.

2. Additional Analysis of E-Code Mechanism and Sub- Mechanism Data

To further inform what has been learned about the leading causes of injury in Wake County for this project, we suggest additional detailed analysis, at the mechanism and sub-mechanism level utilizing the depth of E-coding available in the Wake County ED visit data. Conducting such an analysis would increase understanding for some of the leading causes of injury and better inform injury prevention efforts in the community. Detailed reports should be run using newly introduced (2010 and later) “Activity” E-codes, which describe the activity that the patient was doing at the time of the injury. Since these codes are new, they haven’t been fully implemented in Wake County hospital data systems yet, but their use has been increasing since 2010. Wake County is one of the few counties in NC that is showing widespread use of these codes in their ED visit data. Such an investigation should be combined with other detailed data reports for specific causes of injury in Wake County. For example, if Falls is determined to be a child injury prevention priority for Wake County, a more detailed understanding of falls could be gleaned from this type of deeper analysis.

Examples of additional analysis include:

- A special analysis into sports related injuries in Wake County children is warranted, if this becomes an area of injury identified as a priority for prevention efforts in Wake County. Such an analysis would use all codes related to sports activity, from various mechanisms (e.g. struck by/against, falls) as well as activity and place of occurrence codes, to identify these injuries and describe further the circumstances of injury and the population experiencing these injuries. Such a report should ideally include information about community organizations addressing sports injury prevention and their efforts.
- Expand the record level review of injury related ED visits with multiple mechanism of injury codes, using the text information available in the triage notes and chief complaints, for those causes of injury determined to be priorities for prevention in Wake County. This will allow more detailed understanding of certain injury mechanisms, such as falls, self-inflicted, or pedestrian injury.
- Conduct analyses utilizing ZIP code level data for leading causes of injury in the ED visit data. This is a challenging task because 5-digit ZIP code is the most granular place of residency variable available in the ED visit data, however, ZIP codes do not conform nicely to geographic boundaries in Wake County. We still think this is a worthwhile way to further explore the data, particularly within specific priority injury causes.
- The entire coding scheme for diagnosis and intent/mechanism of injury in both hospital discharge and ED visit data will change in 2014, from ICD-9-CM to ICD-10-CM. The potential for detailed coding of

circumstances of injury will expand, as will the potential for miscoding. This change in the secondary data available should be monitored and its impact on local data for surveillance and evaluation examined. This will be taking place at the state level through ongoing work at NC DETECT.

3. *Secondary Injury Data*

a. Mortality Data

The ability to readily generate a multi-year child injury mortality report at the county level would be a welcome addition to the tools currently available through the State Center for Health Statistics (SCHS) website. This would make it much easier for community organizations to generate county specific injury mortality data to inform injury prevention efforts. Changes to the SCHS website will require time and effort from employees of the State Center, for whom these changes may not be a high priority. Sharing the results of from this project with NC DPH, including information about how many Wake County community organizations rely on data available from the State Center for Health Statistics and the Injury and Violence Prevention Branch, may increase the likelihood that improving the availability of the data via the website becomes a priority.

b. Hospital Discharge Data

Making hospital discharge data readily available, to projects such as this one, should be considered by the State Center for Health Statistics. This possibly could be done through a data use agreement with NC DPH, as is done for the ED visit data. This may be a challenging issue due to the mechanism by which these data are provided to the State Center for Health Statistics by the North Carolina Hospital Association. However, using these data under the current constraints is difficult and places demands on the IVP Branch staff. As with the mortality data, perhaps sharing the results of this JRE project with NC DPH, emphasizing the reliance of Wake County community organizations on data accessed via the SCHS, could emphasize the utility of greater data access for informing injury prevention efforts at the county level.

c. Emergency Department Visit Data

The ED visit data for childhood injury in Wake County were generally very good. Continued monitoring of data completeness for E-codes is necessary to insure high quality data for Wake County. NC DETECT staff currently monitor these data and provide an annual update on E-code completeness by hospital to NC DPH. If stakeholders request this information by county from either IVPB or CCHI/NC DETECT directly, this information could be added to the annual updates.

Many ED visit records in Wake County include multiple codes for mechanism of injury. Improving the specificity of the codes used and decreasing the incidence of conflicting codes (e.g. motor vehicle crash – driver and motor vehicle crash – passenger) would be helpful to anyone attempting to use these data for program planning and evaluation. Not every visit that receives an injury diagnosis code also receives an E-code. In these data, 13% of visits with an injury diagnosis did not receive an E-code; there is room for improvement by decreasing missing E-codes for ED Visits and increasing the use of specific, detailed codes rather than general and unspecified codes. The timeliness of the data provided to NC DETECT (twice a day) often results in missing data at the time of initial submission, with the expectation that records will be completed through updates to the data. While most data elements are very complete for Wake County, any measureable level of missing data can be problematic. The completeness of the data could and should be improved. By sharing the results of this project with area hospitals, including the prevalence of missing and non-specific codes, it can help educate the data providers of the importance of coding as completely and accurately as possible.

Additional textual information in triage notes of most ED visit records is invaluable when examining data at the record level for details about the injury event. Expanding the provision of triage notes in these data would help when there are questions about the coding and when specific injury causes need to be examined further. Most hospitals in Wake County provide triage notes for most ED visits to NC DETECT. By sharing the results of this project with area hospitals and, in particular, organizations based in the hospitals and addressing injury prevention efforts, it will help educate all the ED data providers in Wake County about the utility and importance of triage notes to the examination of injury details.

d. EMS Data

The EMS data we were able to access (in NC DETECT) were often incomplete for key variables (e.g. Provider Primary Impression = “Not Recorded” or “Not Applicable” for at least 40% of records each year; ZIP Code is missing for 18% - 27% each year). Improving the completeness of these variables will be necessary to use these data to identify injured children in Wake County.

We recommend working closely with Wake County EMS to improve the quality and the use of the EMS data. They know their data, are interested in using them, and should be encouraged to participate in efforts to address childhood injury prevention in Wake County. Working directly with Wake County EMS to determine what, if any, explanations are available for the instability we observed in some variables, would involve documenting data flows, coding practices and policy changes that may impact the quality of key data elements. To undertake this type of data quality assurance project would require external funding.

e. Carolinas Poison Center Data

Carolina Poison Center (CPC) data provide a fairly broad based community level response to potentially injured children. Most calls to CPC do not result in the child being referred to the ED or other medical care yet each call is made due to concern about a potentially dangerous exposure. These data provide insight into the types of exposures and risks children experience in the community that do not reach a threshold of requiring immediate medical attention. More use of CPC data at the county level, especially for large counties such as Wake, is encouraged. Community organizations interested in addressing childhood poisoning, either unintentional or self-inflicted, could use the CPC data as one source of information to inform their poisoning prevention efforts.

f. Other Data

Additional study of data from the Wake County Public Schools, Department of Social Services and Child Protective Services, and local law enforcement may shed light on other/additional important injury areas in Wake County, including: bullying behavior not necessarily resulting in physical injury; injuries in the school environment; sexual assault; sports related injuries; and child maltreatment. For example, an in-depth look at childhood injury from falls would benefit from pulling in additional data from schools (e.g. falls from playground equipment and in sports) and organizations running youth sports programs (e.g. Parks and Recreation Department and YMCA). Likewise, a detailed examination of assault related injury in children and youth would benefit from inclusion of data from law enforcement about reports of physical and sexual assault and Child Protective Services about the number of investigations for child maltreatment. In addition, an in-depth assessment of youth bullying could align recent efforts (January 2014) by the Centers for Disease Control and Prevention to develop a uniform definition of youth bullying to lay the foundation for improved bullying data (<http://www.cdc.gov/violenceprevention/pdf/bullying-definitions-final-a.pdf>).

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Wording required by NC DETECT ED visit data DUA

The ED visit data were obtained from NC DETECT under a Data Use Agreement with the North Carolina Division of Public Health. The NC DETECT Data Oversight Committee does not take responsibility for the scientific validity or accuracy of methodology, results, statistical analyses, or conclusions presented.

Wording required by CPC call data DUA

The Carolinas Poison Center call data from NC DETECT were provided under a Data Use Agreement with the Carolinas Poison Center.

Wording required by Wake County EMS response data DUA

The Wake County EMS response data from NC DETECT and the Wake County Pediatric Trauma Toolkit report from EMSPIC were provided under a Data Use Agreement with the Wake County EMS Data System. The Wake County EMS Data System supports, maintains, and monitors EMS service delivery, patient care, and disaster preparedness for the Wake County, NC community at large. This report was not prepared in collaboration with investigators of the Wake County EMS Data System and does not necessarily reflect the opinions or views of the Wake County EMS System or the community partners participating in the Wake County EMS Data System.

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