

# Wake County Human Services Public Health Report

## Injuries 2017

Revised December 5, 2017



Walk to School Day 2017  
Horton's Creek Elementary School



Regina Petteway, Human Services Director  
Sue Lynn Ledford, Public Health Division Director  
Editor-in chief: Edie Alfano–Sobsey, Public Health Epidemiologist  
Content Editor: Ramsay Hoke, Human Services Program Specialist



## Table of Contents

Overview	3
Leading Causes of Hospitalizations and Emergency Department Visits, 2016 Only	4
Leading Causes of Death	4
Motor Vehicle Traffic	5
Falls	6
Poisonings	7
The Opioid Crisis	7
Impact on Child Welfare	11
Synergy with Hepatitis B and C	13
Endocarditis and the Effect on the Healthcare System	14
Drowning	15
Animal Exposures	18
Dog Bites	20
Pedestrian/Bicycle Injuries	22
Pedestrian Crashes	22
Bicycle Crashes	23
Pedestrian and Bicycle Safety Promotion	24
References	26
Acknowledgements	27

## Overview

This report describes injuries and their impact on the health of those who live, work, play and learn in Wake County. It addresses the types of injuries, both intentional and unintentional, that lead to emergency department (ED) visits, hospitalizations and, in the worst outcome, death.

The term "intentional" is used to refer to injuries resulting from purposeful human action, whether directed at oneself or others. Intentional injuries include self inflicted and interpersonal acts of violence intended to cause harm.

"Unintentional" is used to refer to injuries that were unplanned and can be defined as events in which:

- the injury occurs in a short period of time (seconds or minutes)
- a harmful outcome was not sought
- the outcome was the result of one of the forms of physical energy in the environment or normal body functions being blocked by external means (1).

Also described in the report are measures taken by Wake County Human Services, Wake County and community partners to prevent and limit the impacts of injury.

The 2017 Injuries Report differs from previous reports in one key way: no year-by-year trend analysis can be done for hospitalizations and ED visits. In October 2015 there was a transition in the International Classification of Diseases (ICD) from ICD-9 to ICD-10. This transition led to changes in coding definitions as well as a new set of categories for injury. In the absence of guidance on analysis of data during the transition, 2015 data is currently not being analyzed. Pre-transition data (2014 and before) is not comparable to post-transition data (2016 and after); as a result, only the leading causes of injury hospitalizations and ED visits in 2016 are discussed in this report.

This report analyzes the three leading causes of injury death in Wake County (which continue to be motor vehicle traffic (MVT), falls and poisonings) in significant detail. Since poisonings have surpassed falls and MVT as the number one cause of injury death in 2016, this report focuses extensively on the opioid epidemic at the national, state and local levels. Also examined is the manner in which the opioid crisis has negatively impacted outcomes in areas as diverse as child welfare, hepatitis B and C and endocarditis.

The report closes with epidemiological analyses of three areas not previously discussed in public health reports on injuries: drowning, animal bites and pedestrian/bicycle safety.

## Leading Causes of Hospitalization and ED Visits by Injury, 2016 Only

Table 1 shows “Falls-Unintentional” and “MVT-Unspecified-Unintentional” continued to lead ED visits and hospitalizations in 2016, albeit with much lower numbers than in previous years due to new case definitions and categories under ICD-10.

**Table 1**

TOP 5 CAUSES OF INJURY HOSPITALIZATIONS AND ED VISITS WAKE COUNTY, 2016				
RANK	HOSPITALIZATIONS		ED VISITS	
	INJURY	CASES	INJURY	CASES
1	Falls-Unintentional	1,833	MVT-Unspecified - Unintentional	10,111
2	MVT Occupant-Unintentional	319	Fall - Unintentional	7,796
3	Poisoning: Drug-Unintentional	276	Bite and Stings-Nonvenomous - Unintentional	2,082
4	Poisoning: Drug-Self-Harm	234	Other Specified Foreign Body - Unintentional	1,524
5	Unspecified-Unintentional	118	Unspecified - Assault	1,004

Source: NCDHHS, Division of Public Health, Injury and Violence Prevention Branch, 8/4/17 and 8/9/17.

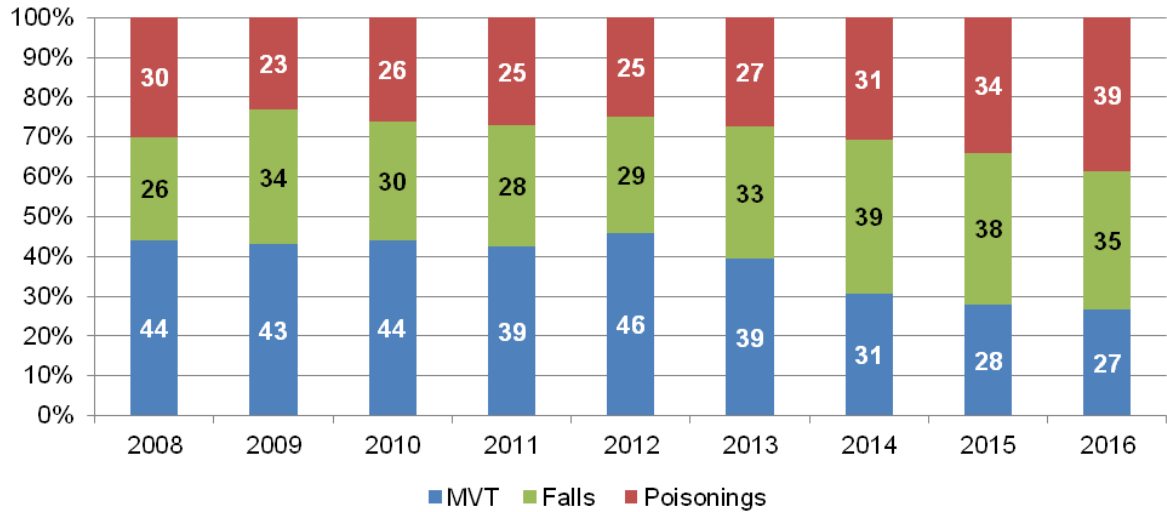
## Leading Causes of Death

The top three causes of injury death in Wake County have not changed in the previous eight years, but the proportion of deaths due to poisonings and falls compared to MVT has changed. As Figure 1 shows, MVT no longer dominates injury deaths; since 2008, the proportion of poisoning and fall deaths has risen while the proportion of MVT deaths has fallen.

The death rate from falls in Wake County is higher in 2016 than in 2015, and so it remains a concern to injury practitioners and advocates (see Figure 2). The most alarming data point in Figure 2 is the 2016 poisoning death rate; it is almost triple what it was in 2012 (11.1 to 4.1 per 100,000). The poisoning death rate increased by 48% in a single year (2015 to 2016). A more detailed analysis of Wake County’s opioid epidemic (a major driver of increased poisoning deaths) can be found on page 7 of this report.

**Death Percentages for the Top 3 Causes of Injury,  
Wake County 2008-2016**

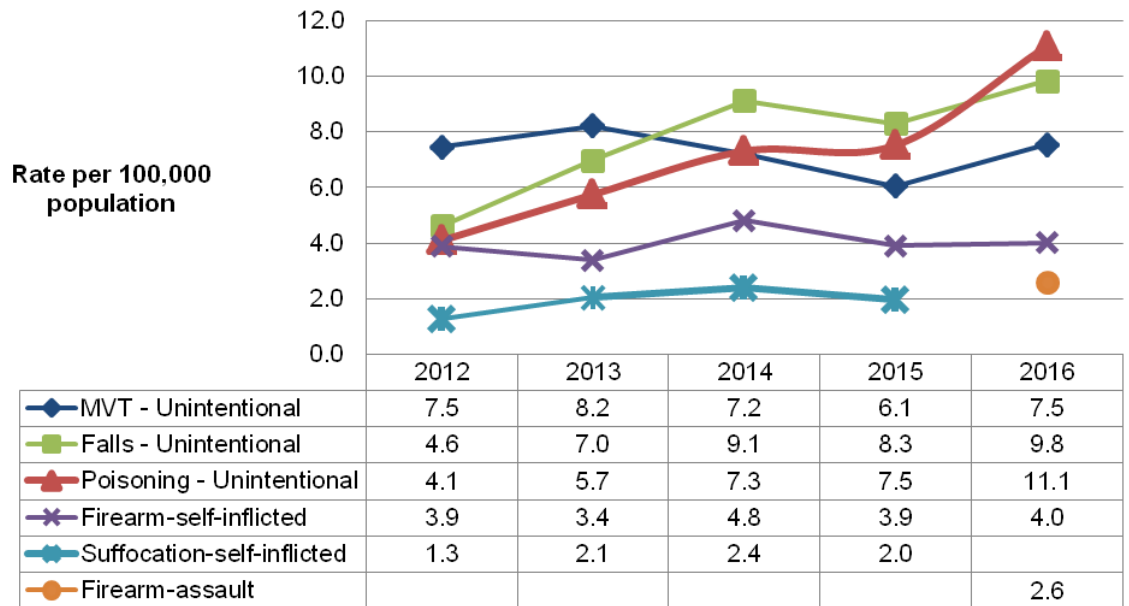
**Figure 1**



Source: NCDHHS, Division of Public Health, Injury and Violence Prevention Branch, 8/4/17.

**Death Rates, Top 5 Causes of Injury Death  
Wake County, 2012-2016**

**Figure 2**



Source: NCDHHS, Division of Public Health, Injury and Violence Prevention Branch, 8/4/17

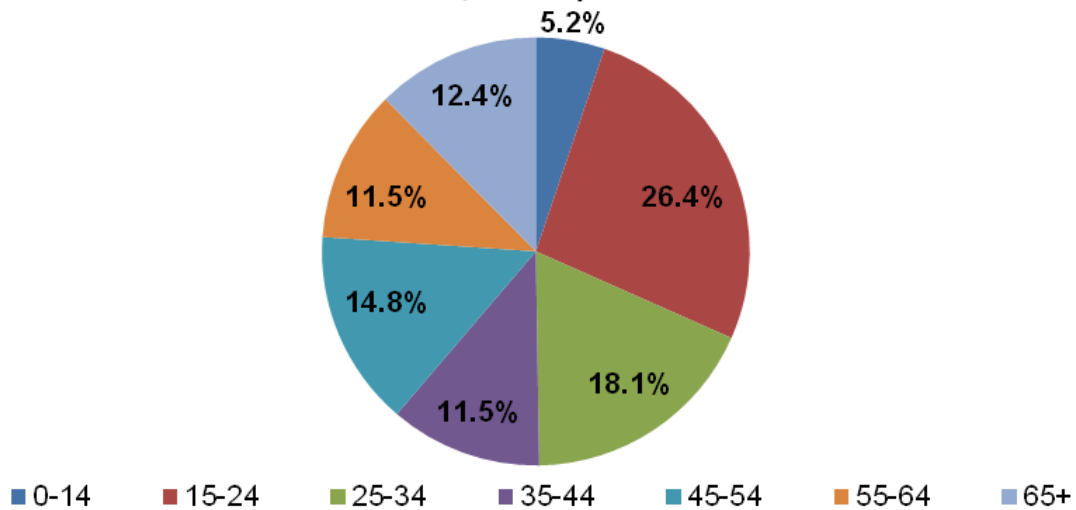
### Motor Vehicle Traffic (MVT)

MVT deaths retained a similar distribution pattern as in previous years; most significantly, Figure 3 shows that the 15-24 age group had the highest percentages of MVT deaths.

The 15-24 age group death rate was 14.2/100,000, more than 1 ½ times higher than any other age group; rate data is not shown in Figure 3. As in previous years, black non-Hispanics died at higher rates from MVT than whites (10.5/100,000 compared to 6.6/100,000. Males died at a rate of 10.9/100,000 much higher than the female death rate of 3.9/100,000.

**Figure 3**

**Percentage of Motor Vehicle Traffic Deaths by Age Group  
Wake County, 2012-2016  
(N=364)**



Source: NCDHHS, Division of Public Health, Injury and Violence Prevention Branch, 8/4/17.

## Falls

There were 391 fall deaths in Wake County from 2012-2016. Like MVT deaths, fall deaths from 2012-2016 were distributed in similar fashion to previous years: there were evenly split percentages of male and female deaths, and overwhelming percentages of white non-Hispanic and age 65+ deaths (data not shown). Apart from this similar distribution pattern, fall death rates went up for many groups from 2011-15 to 2012-16 (see Table 2).

**Table 2**

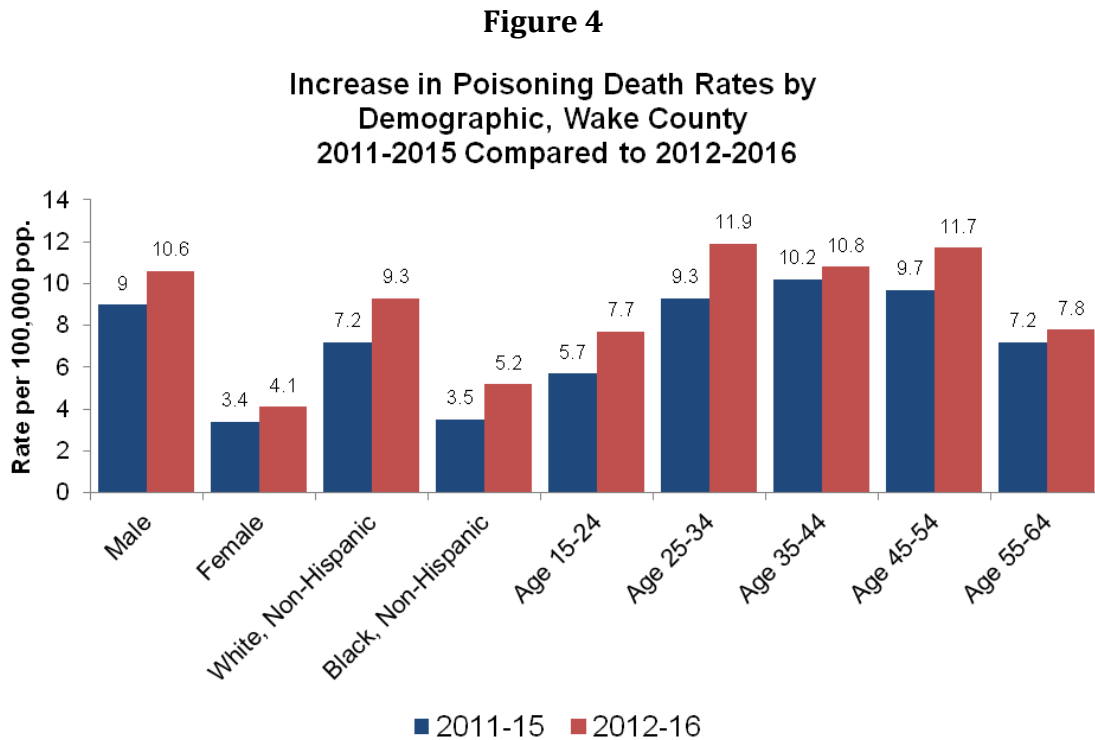
FALL DEATH RATES (PER 100,000) WAKE COUNTY		
Demographic	2011-2015	2012-2016
Males	6.9	7.9
Females	6.8	7.8
White non-Hispanic	8.6	10.8
Black non-Hispanic	3.1	4.4
Age 45-54	2.3	2.9
Age 65+	59.6	65.7

Source: NCDHHS, Division of Public Health, Injury and Violence Prevention Branch, 8/4/17. 2016 data is provisional.



## Poisonings

Poisoning deaths are arguably Wake County's current public health issue of chief concern. There were 361 poisoning deaths in Wake County in 2012-2016, up from 298 in 2011-15. The demographic distribution of poisoning deaths was similar to previous years. The highest percentages are in males, white non-Hispanics and people ages 25-54 (data not shown). Figure 4 shows a sharp increase in the death rates from 2011-15 to 2012-16 among all demographic groups.



Source: NCDHHS, Division of Public Health, Injury and Violence Prevention Branch, 8/4/17. 2016 data is provisional

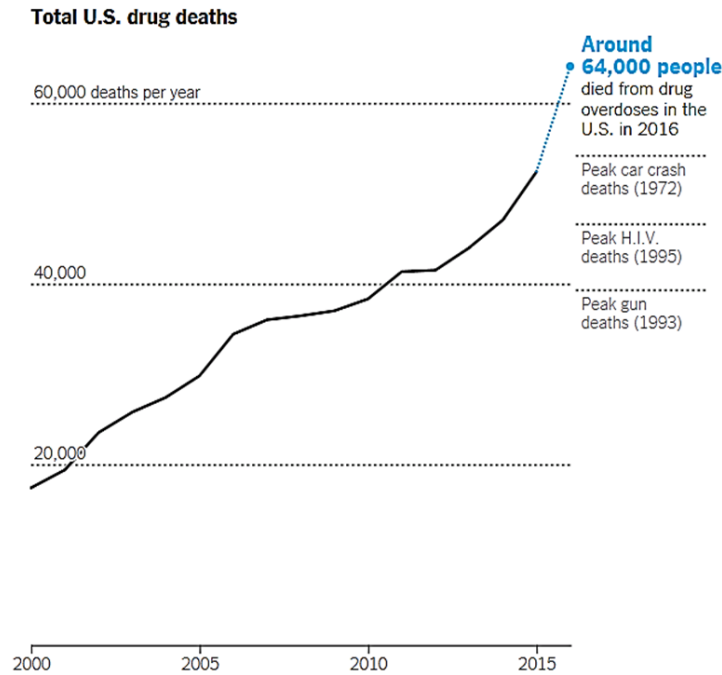
## The Opioid Crisis

Drug overdoses are a major public health issue at the national, state and local levels. More people died from drug overdose in the US in 2016 (~64,000) than can fit in Kenan Stadium in Chapel Hill (62,980—Figure 5). The 2016 overdose death figure is higher than deaths from motor vehicle crashes, HIV and firearms at their respective peaks (see Figure 6).



**Figure 5**

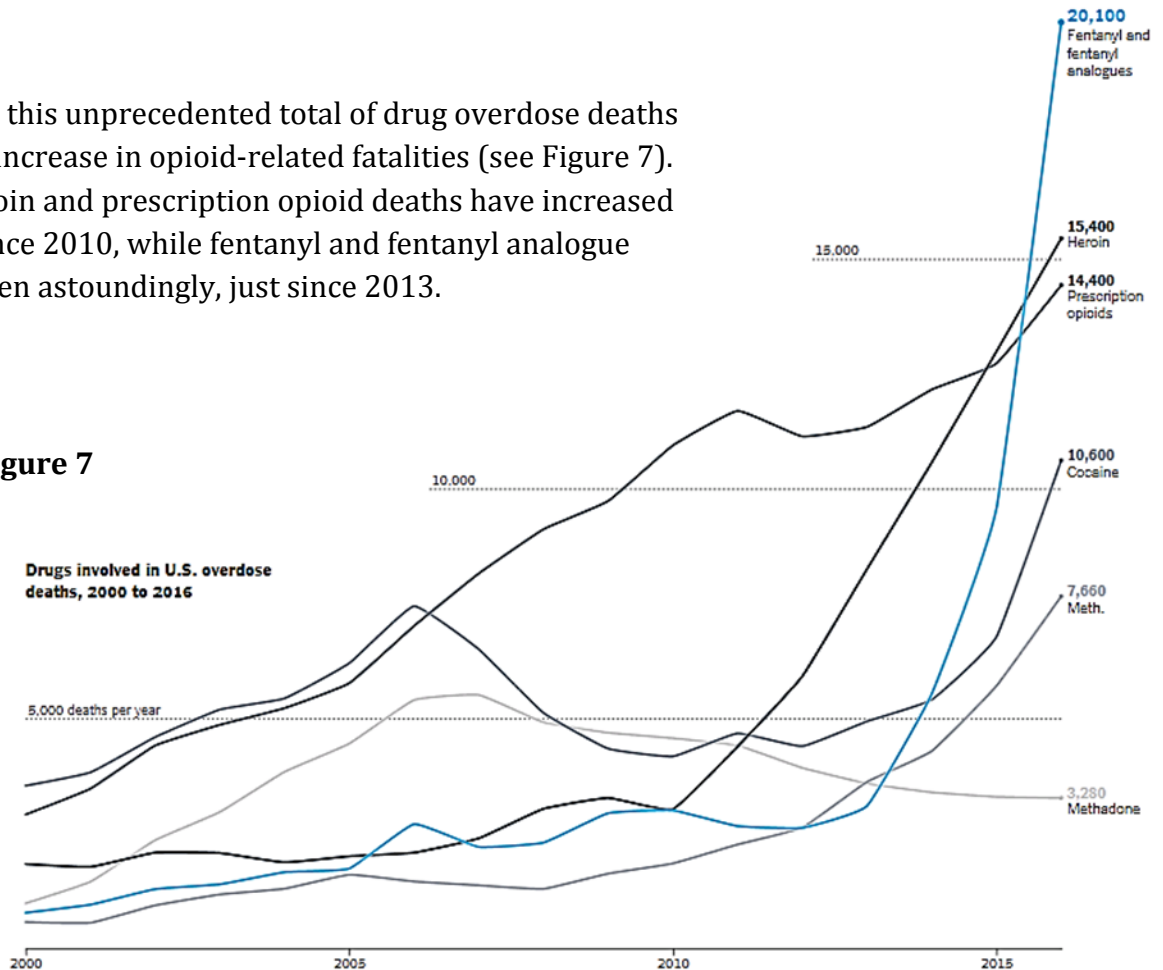
**Figure 6**



Source: The New York Times. <https://www.nytimes.com/interactive/2017/09/02/upshot/fentanyl-drug-overdose-deaths.html>, 9/5/17.

What is driving this unprecedented total of drug overdose deaths is a staggering increase in opioid-related fatalities (see Figure 7). Nationally, heroin and prescription opioid deaths have increased significantly since 2010, while fentanyl and fentanyl analogue deaths have risen astoundingly, just since 2013.

**Figure 7**



Source: The New York Times. <https://www.nytimes.com/interactive/2017/09/02/upshot/fentanyl-drug-overdose-deaths.html>, 9/5/17



Table 3 shows Wake County's unintentional drug overdose deaths (and death rates, where applicable) by four drug types and key demographic. Deaths overwhelmingly occurred among whites and males for all four drug types. Overall:

- Females died from commonly prescribed opioids at a higher rate than other drug types
- Blacks died most often from cocaine
- 25-34 year-olds had the highest death rates from heroin and other synthetic narcotics
- 45-54 year-olds died at much higher rates from cocaine and commonly prescribed opioids

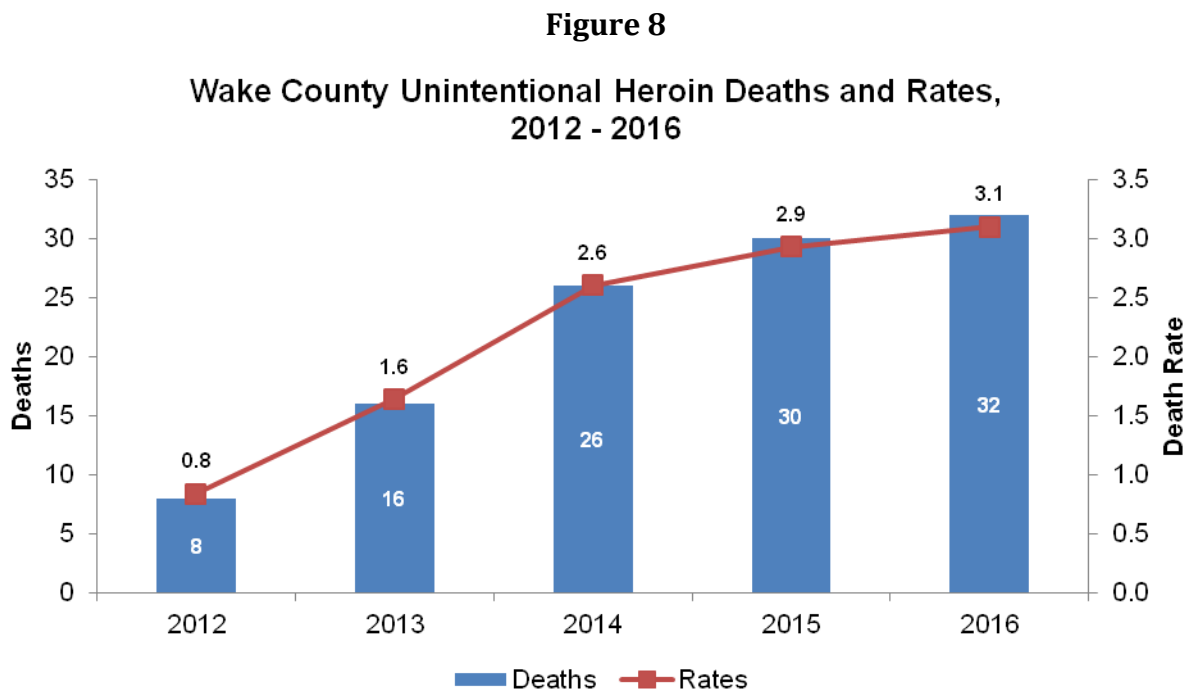
**Table 3**

UNINTENTIONAL OVERDOSE DEATHS AND DEATH RATES BY DRUG TYPE, GENDER, RACE/ETHNICITY AND AGE GROUP, WAKE COUNTY, 2012-16									
		Cocaine		Heroin		Other Synthetic Narcotics		Commonly Prescribed Opioids	
		Deaths	Rate	Deaths	Rate	Deaths	Rate	Deaths	Rate
Gender	Female	21	0.8	26	1.0	28	1.1	41	1.6
	Male	62	2.5	86	3.5	57	2.3	68	2.8
Race/ Ethnicity	White non-Hispanic	50	1.9	97	3.1	72	2.3	95	3.1
	Black non-Hispanic	28	3.2	8	**	9	**	11	1.0
	American Indian non-Hispanic	0	0.0	0	0.0	0	0.0	1	**
	Asian non-Hispanic	0	0.0	0	0.0	1	**	0	0.0
	Hispanic	4	**	4	**	1	**	1	**
	Other/Unknown	1	**	3	**	2	**	1	**
Age Group	0-14	0	0.0	0	0.0	0	0.0	0	0.0
	15-24	4	**	19	2.8	19	2.8	14	2.1
	25-34	18	2.4	38	5.2	29	3.9	25	3.4
	35-44	20	2.6	32	4.1	18	2.3	28	3.6
	45-54	31	4.3	17	2.3	12	1.7	28	3.9
	55-64	7	**	4	**	6	**	13	2.4
	65+	3	**	2	**	1	**	1	**
Total		83	1.7	112	2.2	85	1.7	109	2.2

Source: NC DPH Injury and Violence Prevention Branch, 11/20/17.

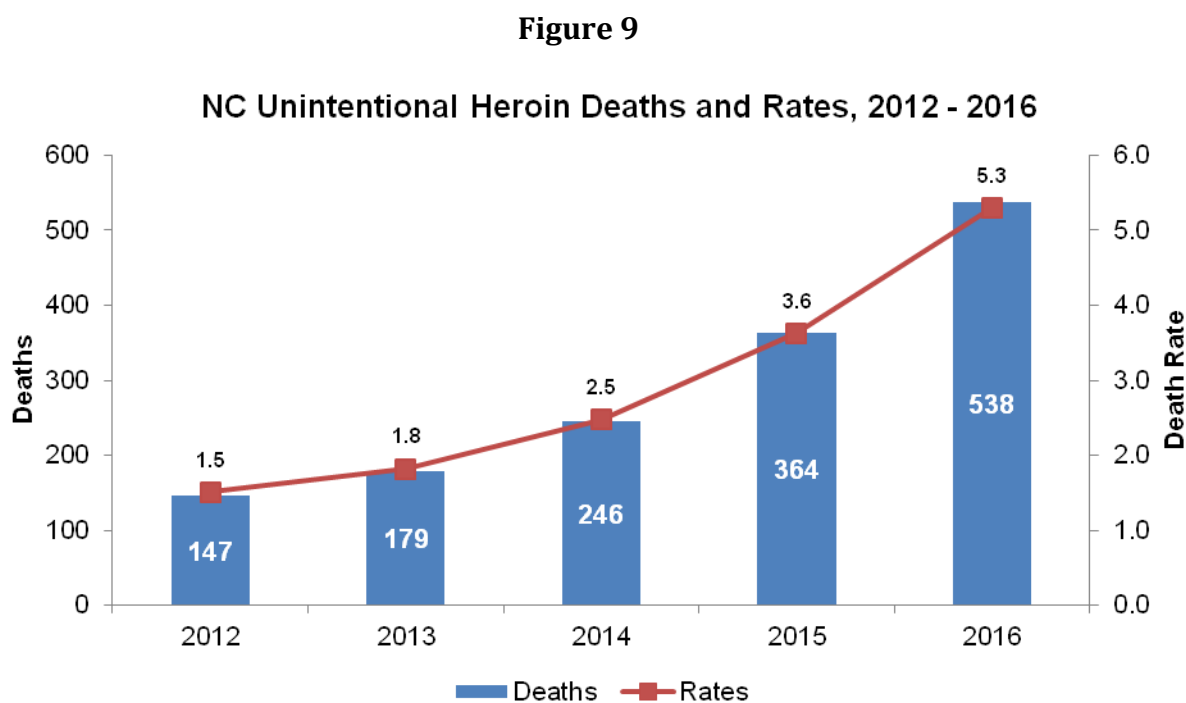
\*\* Number of deaths too small to calculate death rate.

At the state and local levels, Wake County's heroin deaths and death rates have reached a plateau while the state's have not (see Figures 8 and 9).



Source:

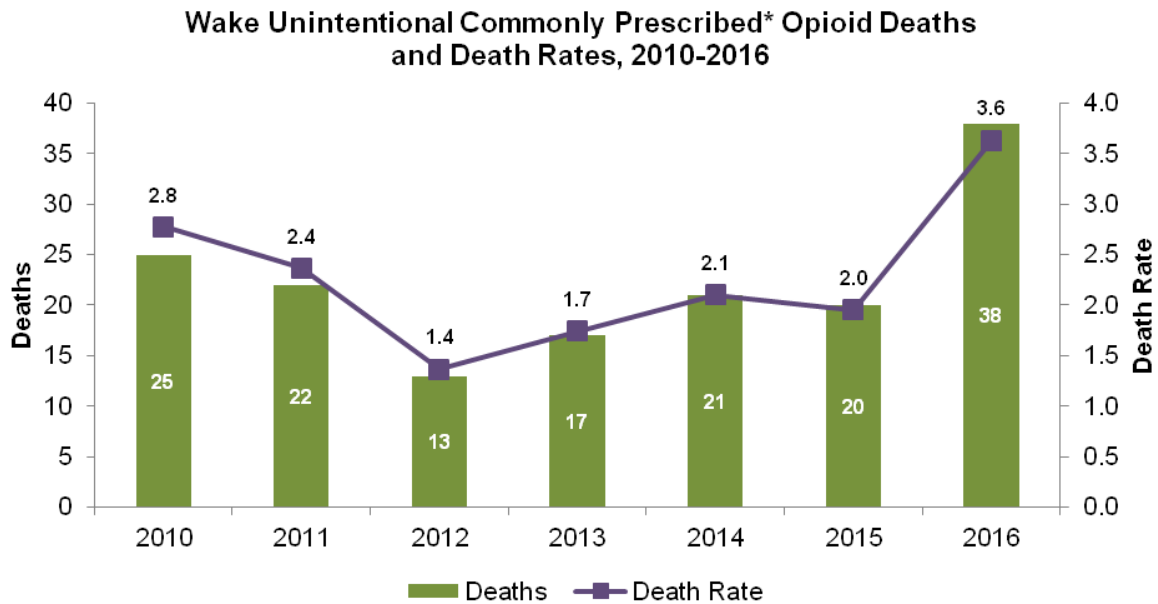
NCDHHS, Division of Public Health, Injury and Violence Prevention Branch, 9/19/17.



Source: NCDHHS, Division of Public Health, Injury and Violence Prevention Branch, 9/19/17.

Figure 10 shows that deaths from commonly prescribed opioids (such as oxycodone, hydrocodone and morphine) jumped significantly from 2015 to 2016. Figure 11 shows, since 2013, a significant increase in Wake County's deaths and death rates due to other synthetic opioids such as illegally manufactured fentanyl.

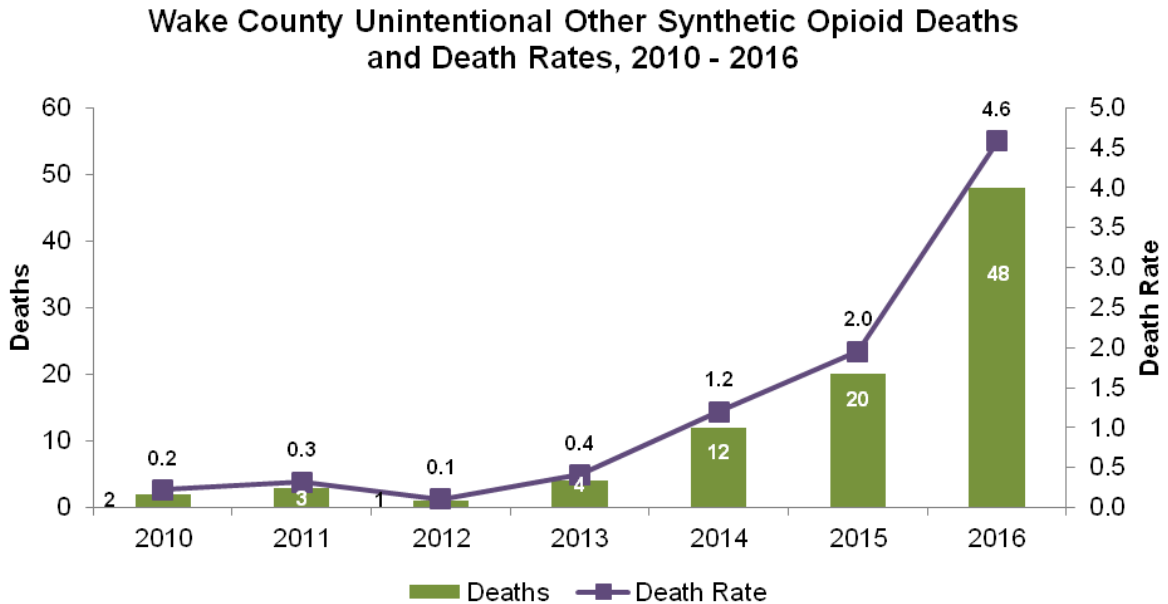
**Figure 10**



Source: NCDHHS, Division of Public Health, Injury and Violence Prevention Branch, 9/19/17.

\*Includes ICD-10 codes T40.2 (Other Opioids) and T40.3 (Methadone)

**Figure 11**



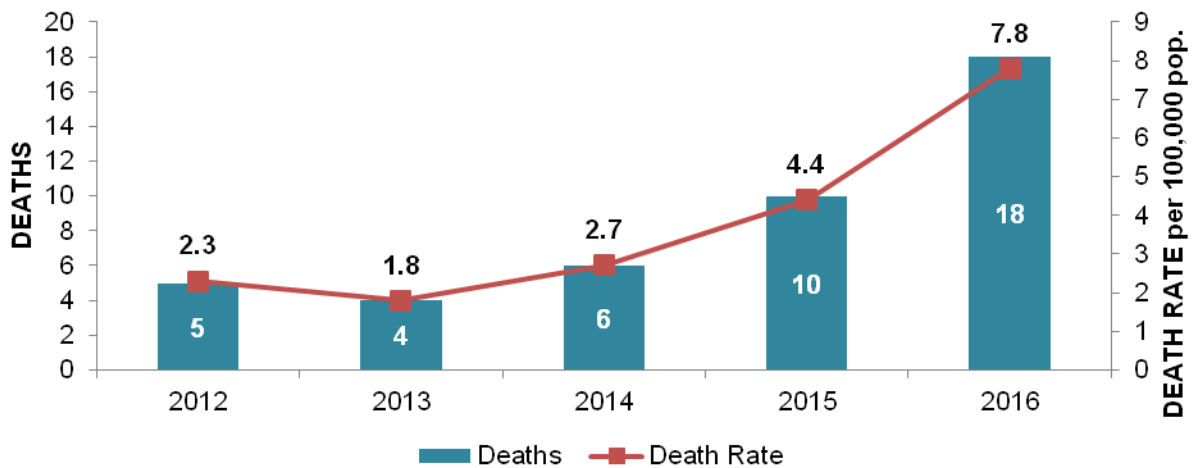
Source: NCDHHS, Division of Public Health, Injury and Violence Prevention Branch, 9/19/17

### Impact on Child Welfare

Drilling down into Wake County's rising opioid death rate, a key demographic group in which there is an alarming trend is women of childbearing age (15-44). Figure 12 shows a rapid increase in deaths and the death rate for this group in just two years (2014 to 2016).

Figure 12

Unintentional Opioid Deaths and Death Rates in Women of Childbearing Age (15-44), Wake County 2012-2016



Source: NC DPH Injury and Violence Prevention Branch, 8/15/17.

Given that deaths represent merely the tip of the injury iceberg, this increase is an ominous sign for the well-being of not just these women but also the health of their children and families.

Figure 13 illustrates the far-reaching impact of the epidemic in the rise of hospitalizations associated with drug withdrawal in newborns in North Carolina. Neonatal Abstinence Syndrome (NAS) is a drug withdrawal syndrome that occurs in infants after in utero exposure to opioids or other substances. Opioids inhibit the release of norepinephrine from nerves to the brain, so when opioids are removed from the system, large amounts of norepinephrine are released and cause withdrawal symptoms. While the long-term prognosis for an exposed infant is good, NAS leads to extended hospital stays with corresponding high treatment costs. NAS can occur due to maternal prescription opioid use, medication-assisted treatment or non-medical opioid use.

Rate of Hospitalizations Associated with Drug Withdrawal - in Newborns, North Carolina Residents, 2004-2015

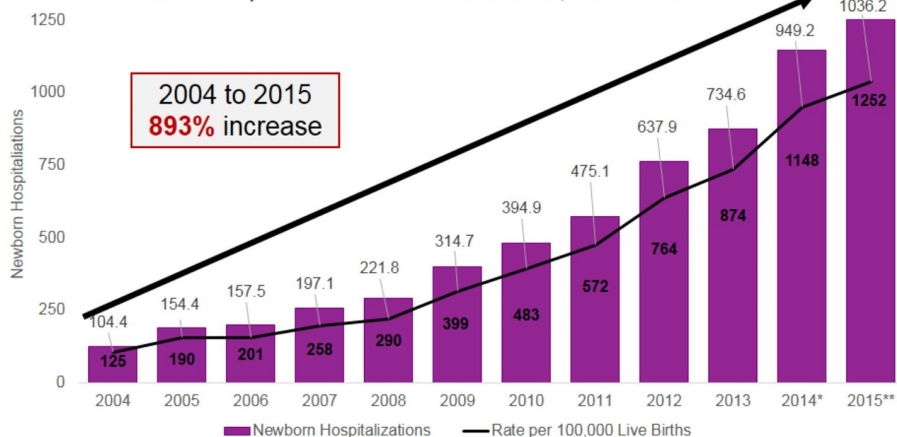


Figure 13

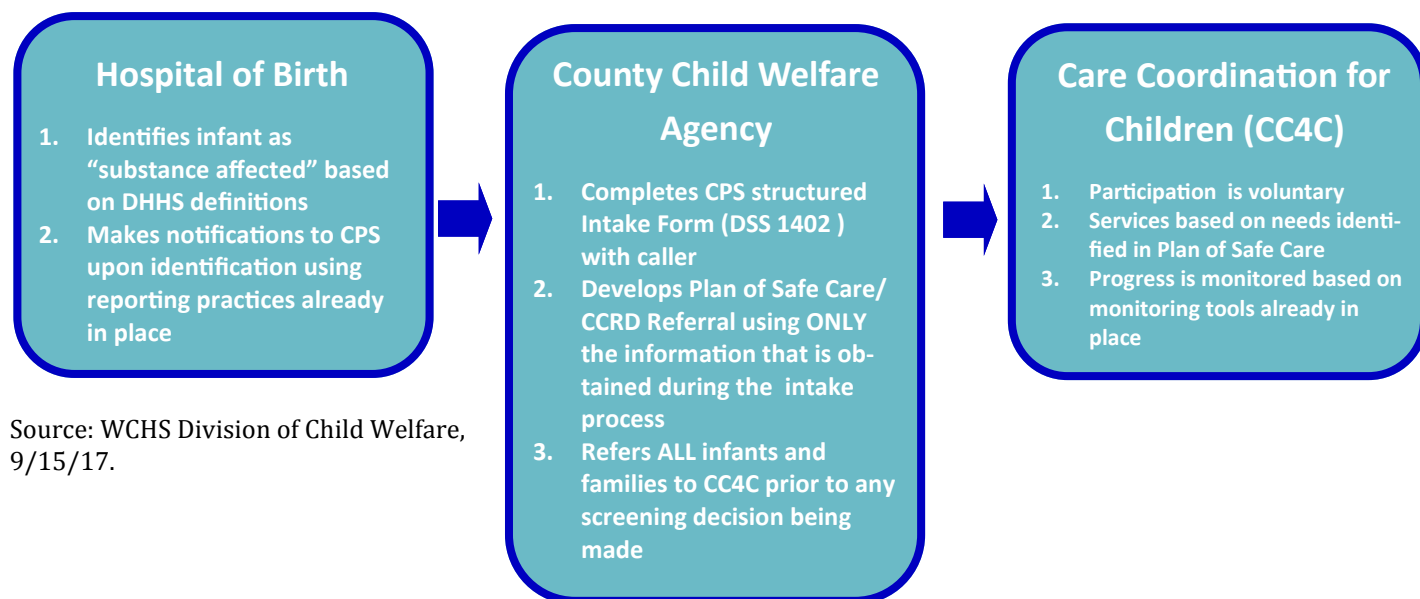
\* 2014 data structure changed to include up to 95 diagnosis codes. It is unclear the overall impact of this change.

\*\*2015 ICD9 CM coding system transitioned to ICD10 CM. Impact unclear.

Source: NC State Center for Health Statistics, Hospital Discharge Dataset, 2004-2015 and Birth Certificate records, 2004-2015 Analysis by Injury Epidemiology and Surveillance Unit

In 2016, there were changes to federal law that will have significant policy implications for state and local child welfare agencies regarding infants with prenatal substance exposures. The *Comprehensive Addiction and Recovery Act* (CARA) and the *Child Abuse Prevention and Treatment Act* (CAPTA) led the NC Division of Social Services to mandate health care provider reporting of “substance affected infants” to county child welfare agencies, which are then responsible for developing plans of safe care. Figure 14 demonstrates the reporting flow for the plan of safe care.

**Figure 14**  
**Plan of Safe Care—Phase 1**

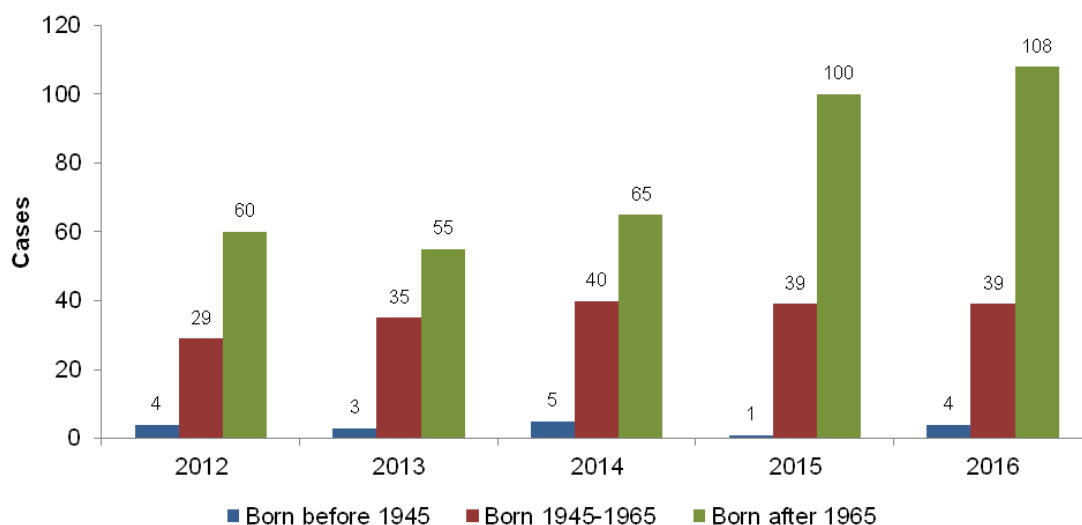


Source: WCHS Division of Child Welfare, 9/15/17.

### Synergy with Hepatitis B and Hepatitis C

Coinciding with the enormous increases in statewide heroin and synthetic opioid deaths from 2012-2016 (see Figure 9) are increases in statewide acute hepatitis B and C cases over the same period, particularly among people born after 1965 (see Figures 15 and 16).

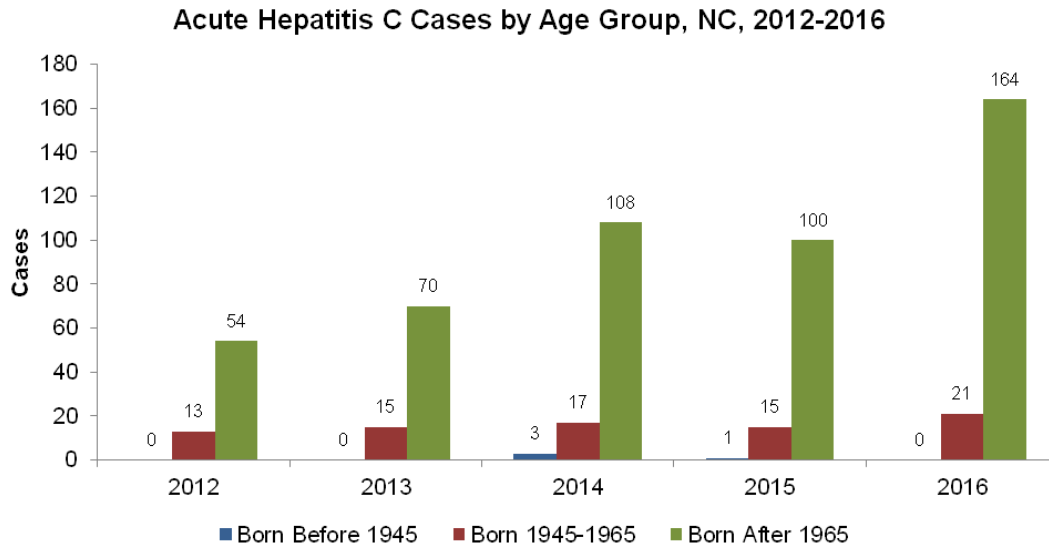
**Acute Hepatitis B Cases by Age Group, NC, 2012-2016**



**Figure 15**

Source: NC CD Branch, HIV/STD/ Hepatitis Surveillance Unit, 9/21/17.

**Figure 16**



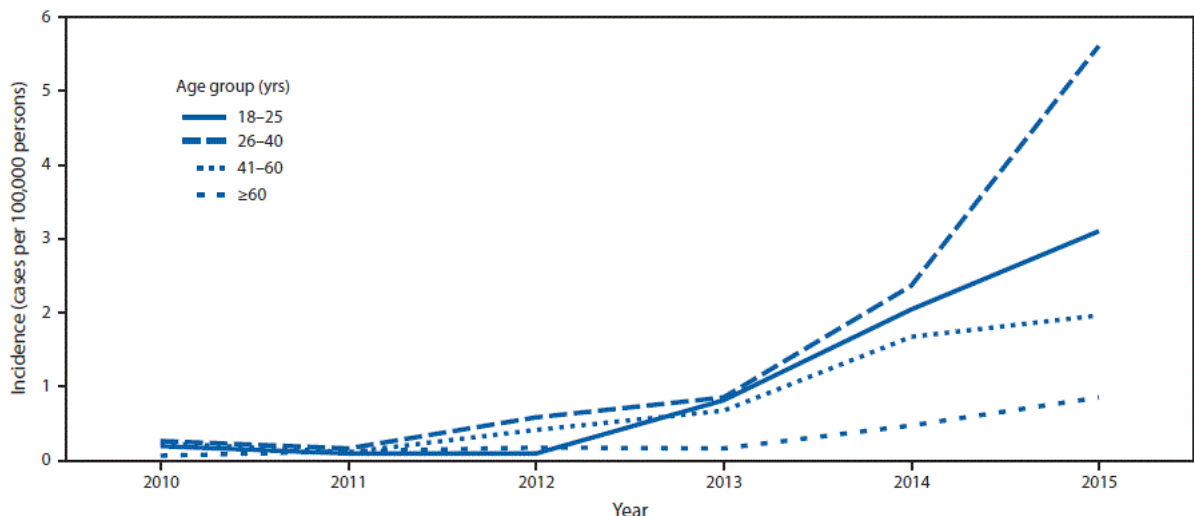
Source: NC CD Branch, HIV/STD/Hepatitis Surveillance Unit, 9/21/17.

Wake County had very few acute hepatitis B (N=18) and acute hepatitis C (N=18) cases from 2012 to 2016, but the risk of an outbreak is very real as risky drug use behaviors show no signs of abating.

### Endocarditis and It's Impact on the Health Care System

Another ancillary effect of the opioid epidemic has been a huge increase in drug dependence-associated endocarditis. Endocarditis is an infection of the inner lining of the heart valves and chambers. It occurs when bacteria enter the bloodstream, often as a result injecting drugs with contaminated needles, and damage the heart valves. Though no county-level data exist, a June 2017 study that reviewed discharge data from all 128 hospitals in North Carolina found rising incidence of endocarditis across age groups from 2010-2015, especially among 26-40 year olds (see Figure 17).

### **Incidence of Drug Dependence –Associated Endocarditis Hospitalizations by Age Group, NC, 2010-2015**



**Figure 17**

Source: Fleischauer AT, Ruhl L, Rhea S, Barnes E. Hospitalizations for Endocarditis and Associated Health Care Costs Among Persons with Diagnosed Drug Dependence — North Carolina, 2010–2015. MMWR Morbidity and Mortality Weekly Report 2017;66:569–573. DOI: <http://dx.doi.org/10.15585/mmwr.mm6622a1>



In the same study, the authors found the following: “The median hospital charge for drug dependence–associated endocarditis hospitalization was \$54,281; total costs of hospitalizations for drug dependence–associated endocarditis increased eighteen fold during 2010–2015, from \$1.1 to \$22.2 million. In 2015, 42% of patients with drug dependence–associated endocarditis were either uninsured or on Medicaid, accounting for a total of \$9.3 million in health care costs compared with only \$481,000 in 2010” (2).

Despite the enormity of the task, Wake County continues to mount an effective response to the opioid crisis. When the state developed its response in June 2017, “North Carolina’s Opioid Action Plan: 2017–2021,” the WCHS Public Health Division quickly followed suit. The county’s integrated Alcohol/Tobacco/Overdose (ATOD) response plan will become operational in FY 2017–18. The county plan incorporates many of the same metrics as the state plan (reducing the oversupply of prescription opioids, limiting the diversion/flow of illegal drugs, increasing access to naloxone, expanding treatment and recovery programs). It also expands into the areas of child welfare and tobacco cessation. The current version includes 38 metrics.

The work of the Wake County Overdose Prevention Coalition, begun in November 2015, will continue with the hiring of a coalition coordinator by Wake County Human Services. With the onboarding of certified peer support specialists, clients with substance use disorders will be linked more quickly to treatment and recovery. These peer support specialists will act as client navigators to help clients access services and supports. Additionally, they will help law enforcement officers and emergency service providers link clients to care.

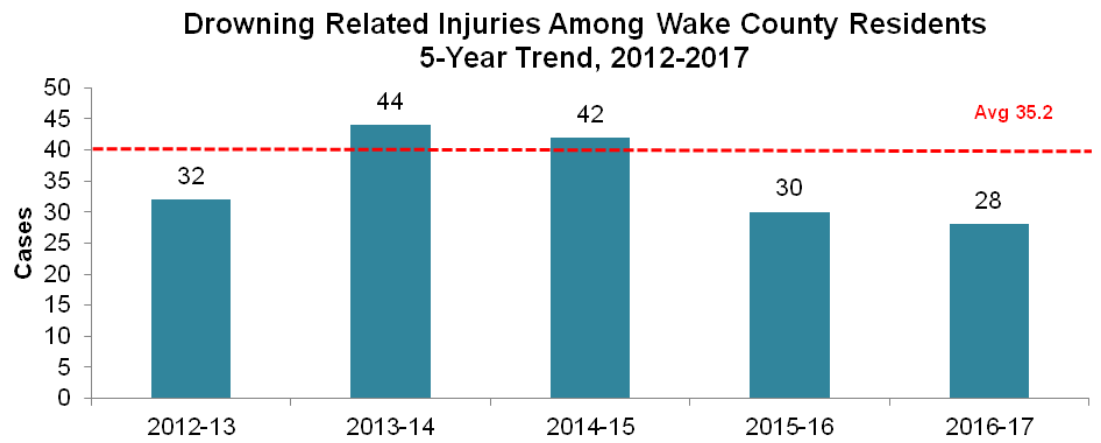
## Drowning

The World Health Organization (WHO) and the CDC define drowning in the following way: “the process of experiencing respiratory impairment from submersion or immersion in liquid.” As such, drowning can be fatal or non-fatal.

An analysis of NC DETECT data in Figures 18–23 show there were 176 drowning cases among Wake County residents from 7/1/2012 through 6/30/2017 (the overwhelming majority of them were non-fatal. See Table 3 for analysis of drowning fatalities). For those cases seen in emergency departments, Wake County averaged 35.2 cases per year (see Figure 18).

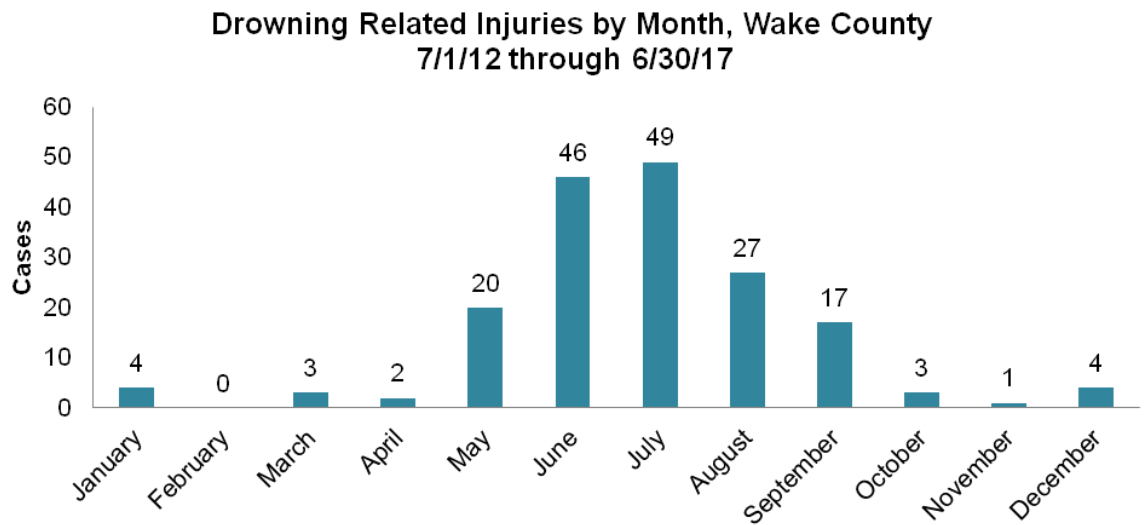
Over 90% of drownings occurred during the summer months (May–September), with June and July being the peak drowning months (see Figure 19). Almost half of all drownings (44.9%) occurred on weekends (Saturday or Sunday—see Figure 20).

**Figure 18**



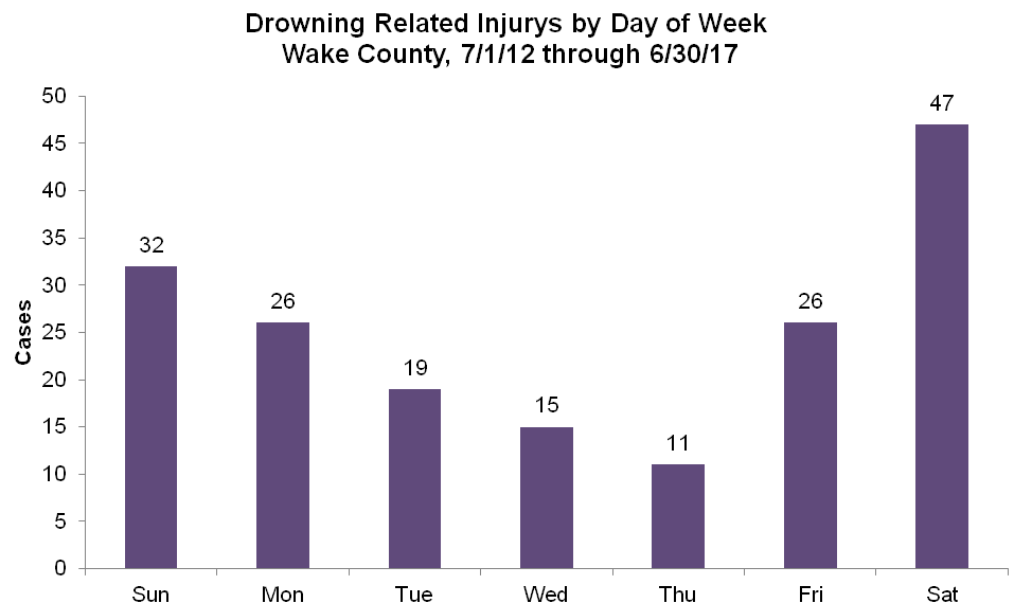
Source: NC DETECT, 7/21/17

**Figure 19**



Source: NC DETECT, 7/21/17

**Figure 20**



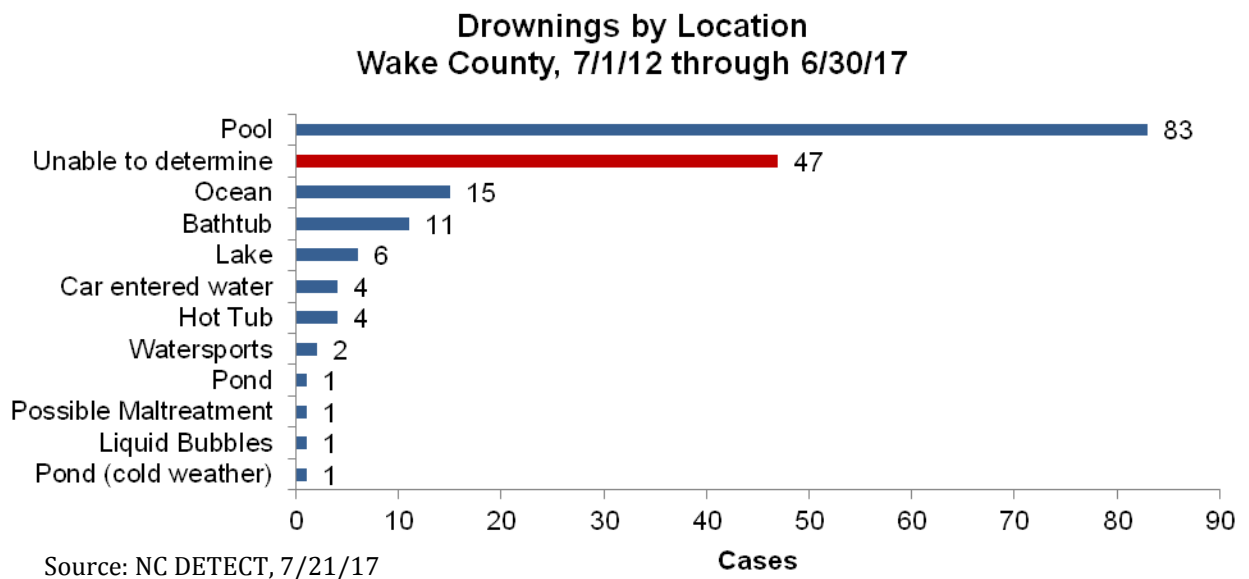
Source: NC DETECT, 7/21/17

The most common known location of drowning in Wake County residents between July 1, 2012 and June 30, 2017 was pools, followed by the ocean (see Figure 21) . One limitation of the data here is the drowning location could not be determined in 26.7% of the cases.

More toddlers (2-4 year olds) drowned than any other age group (see Figure 22). Thirty seven (37) out of 54 toddlers drowned at pools (data not shown).

Ocean swimming safety education provided by Wake County would be valuable, since many Wake residents vacation at the beach with some ending up in the ED with drowning related injuries.

**Figure 21**



**Figure 22**

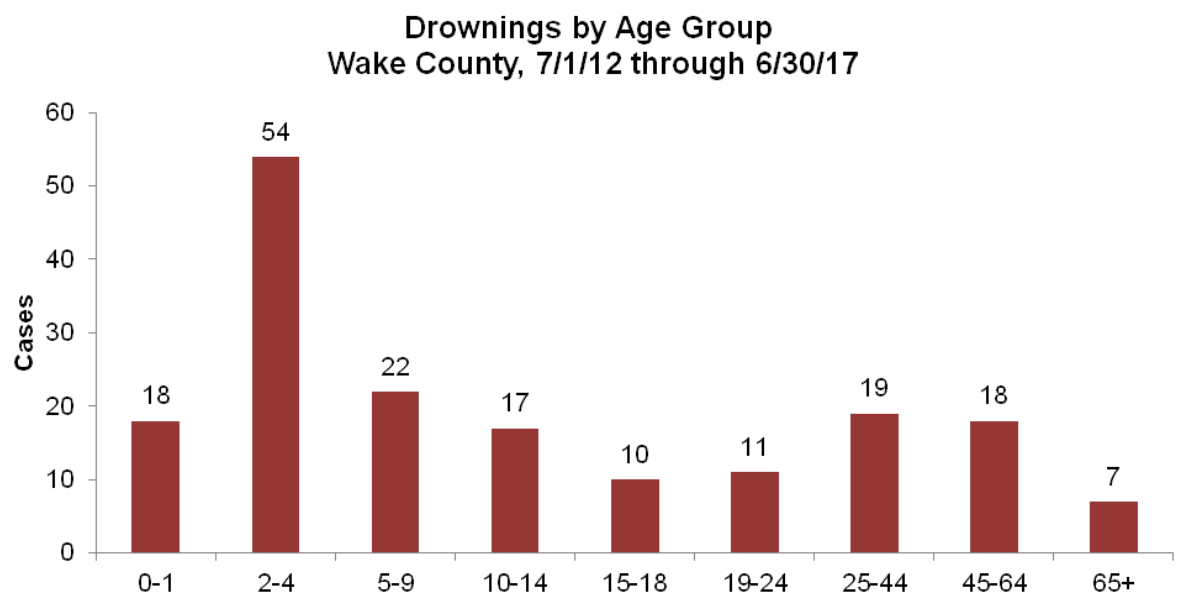


Table 4 provides a demographic analysis of drowning fatalities (N=35) in Wake County from 2012-2016. While there is not enough information in Table 3 to determine fatality risk for drowning type, the data show that black Non-Hispanics, males and children ages 5-14 had the highest percentages of fatalities due to drowning in Wake County.

**Table 4**

Wake County Drowning Deaths (N=35) 2012-2016			
Category		Deaths	Percentage
Type	Unintentional, natural water	9	26%
	Unintentional, swimming pool	4	11%
	Unintentional, unspecified	14	40%
	Unintentional, other	2	6%
	Self-inflicted (suicide)	4	11%
	Other	2	6%
Gender	Male	22	63%
	Female	13	37%
Race	Black, Non-Hispanic	21	60%
	White, Non-Hispanic	9	26%
	Other	5	14%
Age	<1	0	0%
	1-4	3	9%
	5-14	9	26%
	15-24	6	17%
	25-34	7	20%
	35-44	1	3%
	45-54	3	9%
	55-64	3	9%
	65-74	2	6%
	75-84	1	3%
	84+	0	0%

Source: NC SCHS, 8/17/17

## Animal Exposures

There are anywhere from 3-6 million animal bites each year in the US:

- 80-90% are dog bites
- 5-15% are cat bites
- 2-5% are rodent and other small animal bites (3).

NC law requires all animal exposures to be reported to the local health department. An animal exposure occurs when:

- the skin is broken by the teeth of an animal
- scratches, abrasions, open wounds or mucous membranes are contaminated with saliva or other potentially infectious material (brain, nervous tissue) (4)

WCHS Communicable Disease (CD) Program (in conjunction with Wake County Animal Control) investigates all reported exposures to determine the:

- extent of wounds
- need for treatment and tetanus vaccine
- vaccination status of the animal
- need for rabies post-exposure prophylaxis (PEP).

From January 1, 2016 through September 21, 2017, the CD Program investigated 798 animal exposures. Table 5 breaks down exposures by animal type.

**Table 5**

<b>Exposure Investigations by Animal Wake County, 1/1/16 through 9/21/17</b>	
<b>Dog</b>	642
<b>Cat</b>	85
<b>Bat</b>	56
<b>Raccoon</b>	7
<b>Fox</b>	4
<b>Ferret</b>	1
<b>Unknown</b>	3
<b>TOTAL</b>	<b>798</b>

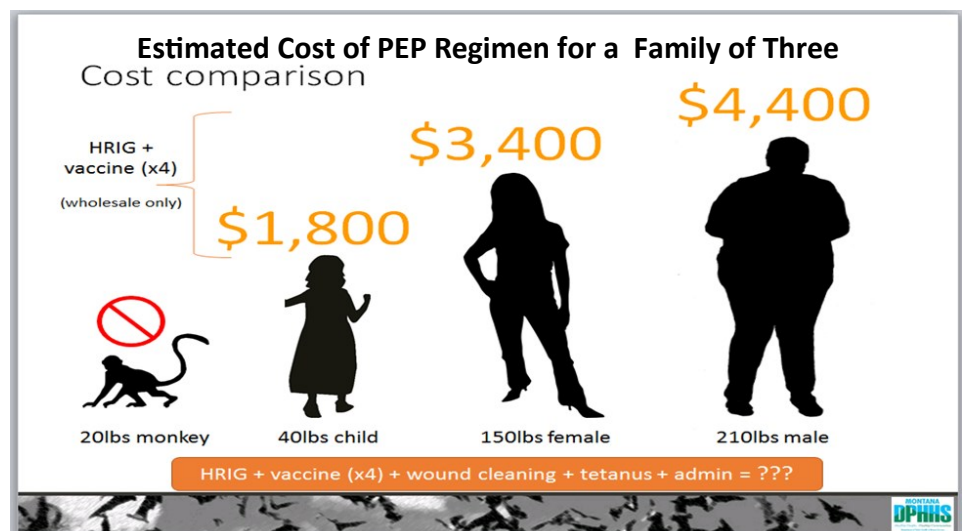
Source: WCHS CD Program, 9/21/17

NC Division of Public Health (DPH) guidelines specify that unvaccinated exposure victims receive rabies vaccine as well as human rabies immune globulin (HRIG) when exposed to animals:

- known to have rabies
- suspected of having rabies but are unable to be tested

While lifesaving, PEP can be very costly. The HRIG dose administered is based on a person's body weight. Figure 23 shows the estimated cost of the PEP regimen for a family of three.

**Figure 23**

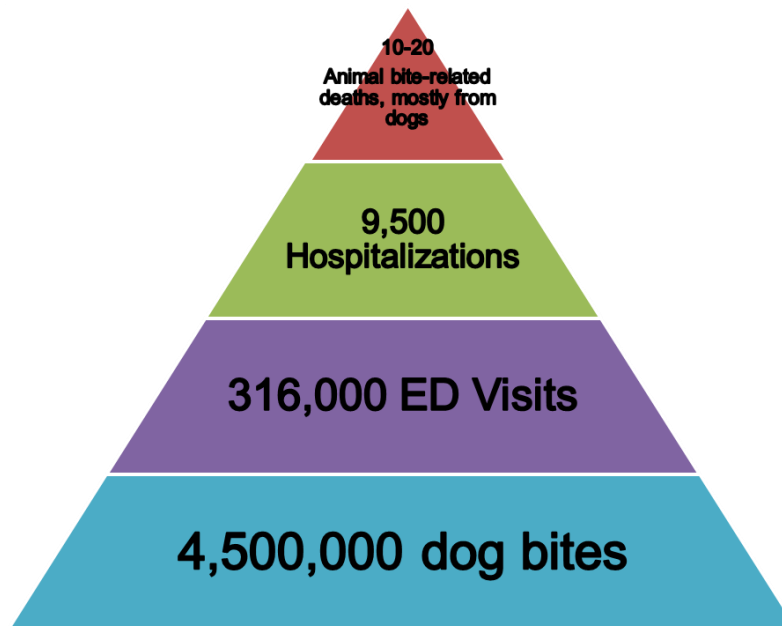


Source: To PEP or Not to PEP?  
DPHHS, Montana Communicable  
Disease Epidemiology Program.  
<http://montana.gov/search.aspx?q=Rabies%20for%20Roadshow%202016&via=homepage&cx=013380590290877010950%3A3ubczas3i44&cof=FORID%3A11&ie=UTF-8>  
Accessed 10/12/17

## Dog Bites

Dog bites alone account for 1% of annual injury-related emergency department (ED) visits and \$53.9 million in inpatient costs in the US (5). The dog bite injury pyramid (Figure 24) shows very few deaths but an enormous number of hospitalizations and ED visits.

**Figure 24**  
**Annual Injury Impact of Dog Bites in US**



Source: Dog and Cat Bites. American Family Physician. <http://www.aafp.org/aafp/2014/0815/p239.html>, accessed 7/31/17

Dogs, because of their rounded teeth and strong jaws, can cause crush wounds through their bites. An adult dog can exert pressure 200 pounds per square inch (psi) from its bite; larger dogs can exert up to 450 psi. Consequently, a dog bite not only causes pain and skin lacerations but can damage bones, vessels, tendons, muscles and nerves (3). Another possible consequence of dog bites is infection.

A number of factors can increase this risk:

- bites to extremities with lymphatic involvement
- bites involving the hand
- bites near/in a prosthetic joint
- delayed presentation to medical care
  - > than 6-12 hours for bites to arm or leg
  - > than 12-24 hours for bites to face and
- immunosuppressive conditions (5)

There are a number of pathogens that can be spread via animal bites (e.g., *Staphylococcus sp.*, *Streptococcus sp.* and *Neisseria sp.*). Antibiotic prophylaxis is recommended for all high-risk bites (head and neck area) and those wounds requiring closure. More serious is the possibility of contracting tetanus and the rabies virus.



Children ages 5-9 have the highest incidence of dog bites(6). Because of their shorter stature, they are most often bitten in the head and neck area (as opposed to the extremities like the hand or leg in adults). A bite by a rabid dog to the face or neck of a child means the rabies virus can reach the brain much faster than a bite lower on the body.

North Carolina public health law requires owners to vaccinate their dogs against rabies thus lowering the risk of rabies occurring in dogs. There is, however, still some risk because:

- dogs cannot be vaccinated until they are 4 months old
- pet owners don't always vaccinate and revaccinate their animals on schedule and
- pets and unvaccinated strays can be exposed to rabid wildlife.

Aside from the potentially high costs of medical care and rabies vaccines, dog bites also result in expensive insurance claims. Table 6 shows how the cost of US dog bite claims rose dramatically from 2003-2014.

**Estimated Number and Cost of Dog Bite Claims  
(and Other Dog-related Injuries) 2003—2014**

**Table 6**

Year	Value of claims (\$ millions)	Number of claims	Average cost per claim
2003	\$324.20	16,919	\$19,162
2004	318.9	15,630	20,406
2005	321.1	14,295	22,464
2006	322.4	14,661	21,987
2007	356.2	14,531	24,511
2008	387.0	15,823	24,461
2009	412.0	16,586	24,840
2010	412.6	15,770	26,166
2011	490.8	16,695	29,396
2012	489.7	16,459	29,752
2013	483.7	17,359	27,862
2014	530.8	16,550	32,072
% change, 2013-2014	9.70%	-4.70%	15.10%
% change, 2003-2014	63.70%	-2.20%	67.40%

Source: Insurance Information Institute, State Farm®.

(<http://www.iii.org/press-release/dog-bites-accounted-for-more-than-one-third-of-all-homeowners-liability-pay-outs-last-year-as-cost-per-claim-soars-051315>, accessed 8/1/17):

The majority of dog bites, more that 70%, are from a dog that is known to the victim. About 50 % are self-reported as unprovoked (5). There are emotional costs of dog bites that cannot be easily measured; a traumatic encounter with a dog early in life can affect a person into adulthood.

Since the majority of dog bites occur to children (6) education for parents and children about interacting with dogs is important to creating a safe, beneficial and healthful environment for all. Wake County Human Services adopted a curriculum and developed a dog bite prevention coloring book (translated into six languages) for children ages 5-9.

## Pedestrian and Bicycle Injuries

### Pedestrian Crashes

Table 7 provides an epidemiological overview of pedestrian crashes (crashes with motor vehicles that are reported to police) in Wake County from 2011-2014 (the latest year for available data).

**Table 7**

Pedestrian Crashes in Wake County, 2011-2014 (N=1,219)			
CATEGORY		CRASHES	PERCENTAGE
AGE	0-18	224	18.3%
	18 and older	995	81.8%
RACE/ ETHNICITY	White	544	44.6%
	Black	515	42.2%
	Hispanic	91	7.5%
	Other	28	2.3%
	Asian	24	2.0%
	Unknown	11	0.9%
	Native American	6	0.5%
GENDER	Female	521	42.7%
	Male	691	56.7%
	Unknown	7	0.6%
TYPE	Crossing Roadway - Vehicle Not Turning	225	18.5%
	Unusual Circumstances	194	15.9%
	Crossing Roadway - Vehicle Turning	179	14.7%
	Off Roadway	165	13.5%
	Backing Vehicle	135	11.1%
	Dash / Dart-Out	85	7.0%
	Walking Along Roadway	66	5.4%
	Crossing Driveway or Alley	51	4.2%
	Pedestrian in Roadway - Circumstances Unknown	48	3.9%
	Working or Playing in Roadway	23	1.9%
	Other / Unknown - Insufficient Details	19	1.6%
	Bus-Related	12	1.0%
	Multiple Threat / Trapped	8	0.7%
	Crossing Expressway	7	0.6%
	Unique Midblock ??	2	0.2%

Source: NC Pedestrian and Bicycle Crash Data Tool, [http://www.pedbikeinfo.org/pbcat\\_nc/](http://www.pedbikeinfo.org/pbcat_nc/), 9/19/17.

Pedestrian crashes are more likely to take place in the fall and early winter months, especially January (131 crashes), and least likely to take place in summer months, especially July (78 crashes). Pedestrian crashes are more likely on Fridays (209 crashes) and dramatically less likely to happen on Sundays (118 crashes). In addition, pedestrian crashes are more common between the hours of 1:00 PM and 10:00 PM, peaking around 6:00 PM and falling off dramatically between 10:00 PM and 7:00 AM (data not shown) (7). Of the 1,219 pedestrian crashes in Wake County, between 2011-2014, 1,083 (88.8%) were known to cause some type of injury. There were 51 pedestrian fatalities (see Table 8).

**Table 8**

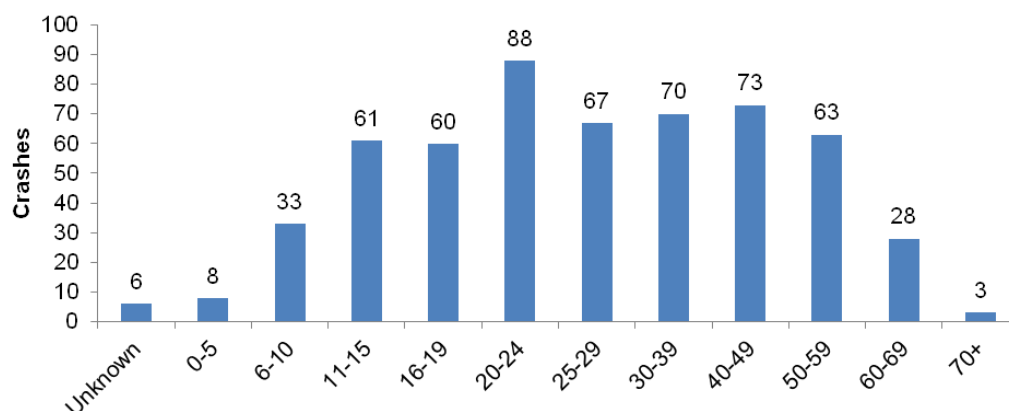
Pedestrian Crash Data by Pedestrian Injury Severity Wake County 2011 - 2014		
Injury Severity	Crashes	Percentage
Disabling Injury	64	5.3%
Evident Injury	453	37.2%
Possible Injury	515	42.2%
Killed	51	4.2%
No Injury	110	9.0%
Unknown Injury	26	2.1%
<b>Total</b>	<b>1,219</b>	<b>100%</b>

Source: NC Pedestrian and Bicycle Crash Data Tool, [http://www.pedbikeinfo.org/pbcat\\_nc/](http://www.pedbikeinfo.org/pbcat_nc/), 9/19/17

## Bicycle Crashes

Figure 25 shows the number of bicycle crashes (crashes with motor vehicles that are reported to police) by age group in Wake County from 2011-14; notably, 28.9% of bicycle crashes occurred in children ages 0-19.

**Bicycle Crashes (N=560)  
by Age Group,  
Wake County, 2011-2014**

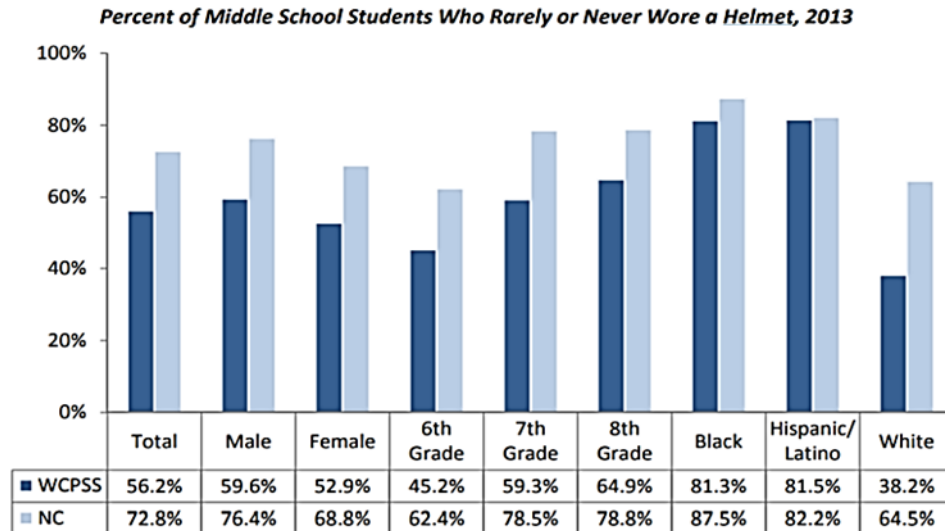


**Figure 25**

Source: NC Pedestrian and Bicycle Crash Data Tool, [http://www.pedbikeinfo.org/pbcat\\_nc/](http://www.pedbikeinfo.org/pbcat_nc/), 9/19/17

Figure 26 shows the percentage of Wake County Public School System (WCPSS) middle schoolers who rarely/never wore a bicycle helmet, broken down by demographic group for 2013.

**Figure 26**



Source: [North Carolina Youth Risk Behavior Survey: 2013 WCPSS Middle School Results](#) by Megan Townsend (Sept 2014). NOTE: 2013 is the most recent year for which Youth Risk Behavior Survey data was available for WCPSS. Similar data for WCPSS high schools could not yet be found.

Wake County's middle schoolers performed better than the state's middle schoolers across the board. However, the racial/ethnic disparity between whites on one hand and blacks and Hispanics on the other was more pronounced in Wake County than in North Carolina (see Figure 27).

## **Pedestrian and Bicycle Safety Promotion**

Active Routes to School is a project of North Carolina's Safe Routes to School (SRTS) Program and represents a unique partnership between the North Carolina Department of Transportation (NCDOT) and the North Carolina Division of Public Health (NCDPH). The goal of the project is to increase the number of students who safely walk and bike to school. This work makes our communities safer for everyone. The Active Routes to School program is organized into 10 regions across NC and Wake County is in Region 5. The project is grant-funded and ten regional coordinators are based at local health departments across the state.

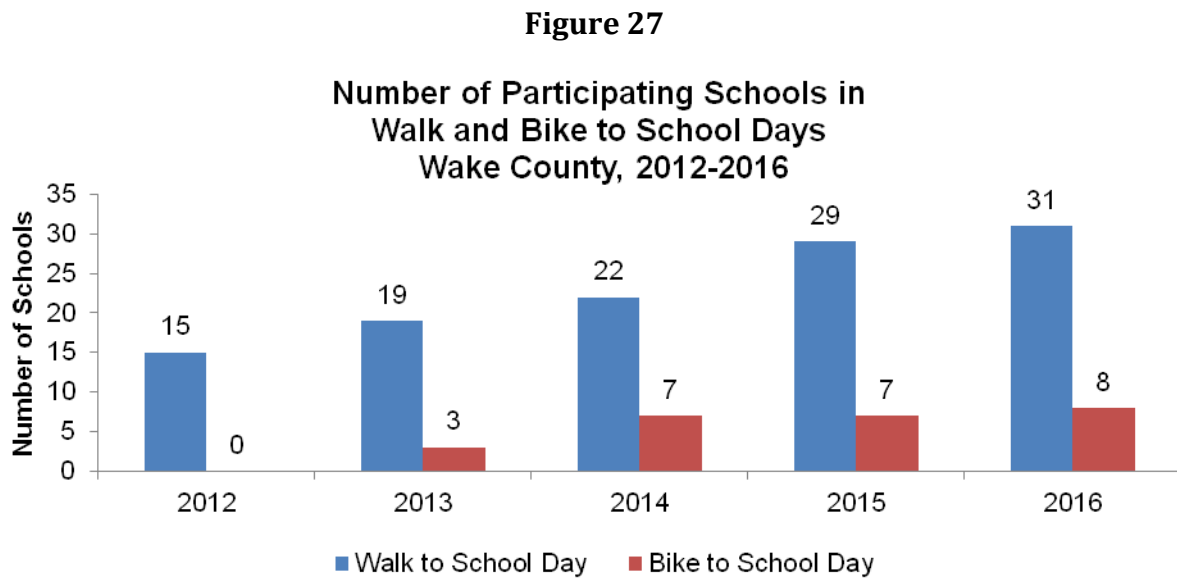
Through Active Routes to School (Wake County's SRTS model), Wake County Government is a partner in the Wake County Model Safe Routes to School Project. The project is funded by the John Rex Endowment (JRE) as a four-year implementation project building on the research conducted through the JRE funded-WakePedNet research project.

The Region 5 project coordinator is housed at Wake County Human Services in the Health Promotion Chronic Disease Prevention Unit. The coordinator works with nine counties including Alamance, Caswell, Chatham, Durham, Guilford, Orange, Person, Rockingham, and Wake.

They work directly with schools, PTAs, and other partners to increase:

- participation in Walk and Bike to School Day events
- ongoing walk and bike to/at school programs
- training opportunities
- the number of policies and physical environment improvements that support walking and biking to school

Walk and Bike to School Day events often serve as a school's first attempt to actively encourage walking and bicycling to school. These events also build school community, help identify safety issues, increase awareness, and can lead to safety and policy improvements. Figure 27 shows the number of participating schools is gradually increasing. National Bike to School Day was first held in 2012. Active Routes to School started in Wake County in 2014.



Source: Active Routes to School Region 5 Coordinator.

## References

1. Unintentional Injury (2013). Maine Center for Disease Control and Prevention. Retrieved 10/9/17 from (<http://www.maine.gov/dhhs/mecdc/population-health/inj/unintentional.html>).
2. Fleischauer AT, Ruhl L, Rhea S, Barnes E. Hospitalizations for Endocarditis and Associated Health Care Costs Among Persons with Diagnosed Drug Dependence — North Carolina, 2010–2015. *Morbidity and Mortality Weekly Report (MMWR)*. June 9, 2017;66:569–573. Web. 10/9/17. DOI: <http://dx.doi.org/10.15585/mmwr.mm6622a1>.
3. Garth, Alisha P. MD and Harris, N. Stuart MD, MFA< FACEP. Animal Bites in Emergency Medicine. *Medscape*. May16, 2017. Web. 10/9/17. <http://emedicine.medscape.com/article/768875-overview#a5>.
4. Evaluating Human Rabies Risk from Animal Bites: Domestic Dogs, Cats and Ferrets. NC Communicable Disease Branch-Veterinary Public Health Program. November 2012. Web. 10/3/17. [http://epi.publichealth.nc.gov/cd/lhds/manuals/rabies/docs/algorithm\\_human\\_wild.pdf](http://epi.publichealth.nc.gov/cd/lhds/manuals/rabies/docs/algorithm_human_wild.pdf).
5. Dog and Cat Bites. *American Family Physician*. August 15, 2014. Web. 10/9/17. <http://www.aafp.org/afp/2014/0815/p239.html>.
6. Rhea, S. . Animal Bite Injuries in North Carolina: Emergency Department Visits and Risk Factors for Hospitalization. Carolina Digital Repository. 1/1/2013. Web. 10/9/17. <https://cdr.lib.unc.edu/record/uuid:6e9dc574-50da-4332-8f5b-a07569748f62>.
7. NC Pedestrian and Bicycle Crash Data Tool. NC Department of Transportation. No date. Web. 10/9/17. [http://www.pedbikeinfo.org/pbcat\\_nc/](http://www.pedbikeinfo.org/pbcat_nc/).



## Acknowledgements

For contributions to this report:

Lisa Cauley, WCHS Child Welfare Division

Mary Beth Cox, NC DPH Injury and Violence Prevention Branch

Jennifer Delcourt, WCHS Health Promotion and Chronic Disease Promotion Program

Shana Geary, NC DPH Injury and Violence Prevention Branch

Sherani Jagroep, NC DPH Injury and Violence Prevention Branch

Ruth Lassiter, WCHS Communicable Disease Program

Nancy Phillips, WCHS Communicable Disease Program

Carla Piedrahita, WCHS Communicable Disease Program

Scott Proescholdbell, NC DPH Injury and Violence Prevention Branch

Michelle Ricci, WCHS Communicable Disease Program