

## Death, Illness, and Injury

### Death (Mortality)

In 2013, a total of 3,396 Hamilton County residents died. Of those deaths, persons over 85 years of age accounted for 30%, followed by the 75 to 84 age group (24%), the 65 to 74 age group (19%), and the 55 to 64 age group (14%). Figure 18 details age-specific deaths by age group and race. The percentage of infant deaths (under one year of age) are twice as high among African Americans in Hamilton County compared to their white peers, and deaths among African Americans are also higher than the county and white race for all age groups below 75 to 84.

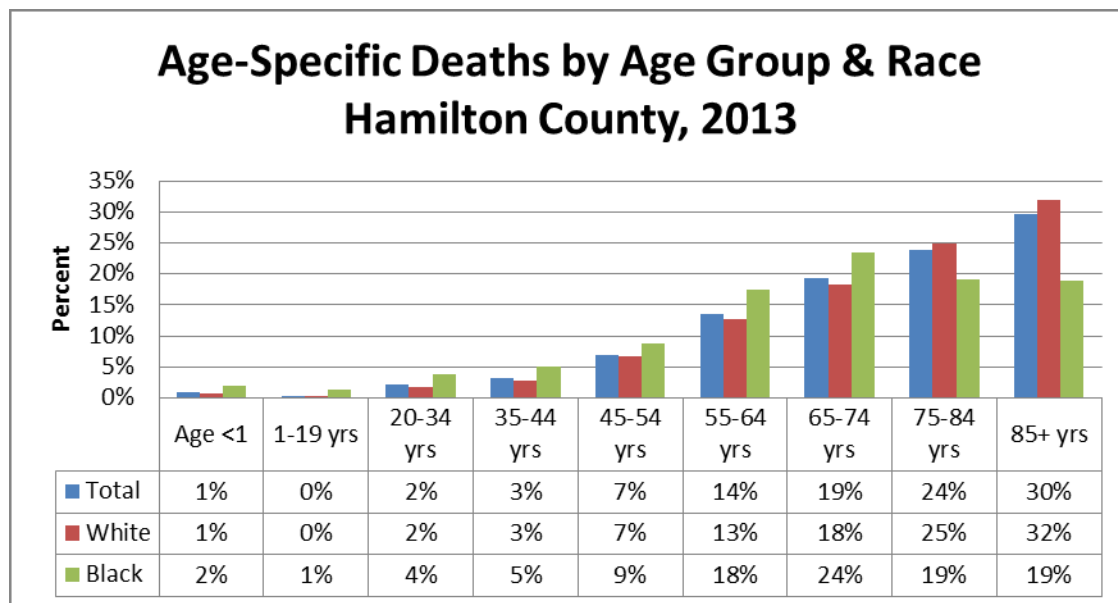
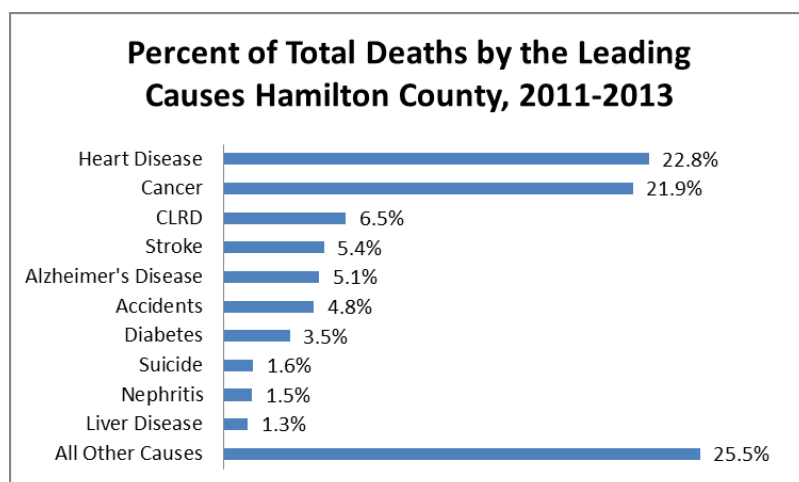


Figure 18 Source: Tennessee Department of Health, Division of Policy, Planning and Assessment

### Leading Causes of Death

As life expectancy has increased over the past hundred years, the leading causes of death have shifted from infectious diseases to chronic diseases associated with living longer. From 2011-2013, chronic diseases were responsible for over two-thirds of death in Hamilton County, most often from heart disease (22.8%) or cancer (21.9%). Other chronic illnesses among the leading causes of death are chronic lower respiratory disease (CLRD, 6.5%), stroke (5.4%), Alzheimer's disease (5.1%), diabetes (3.5%), nephritis (1.5%), and liver disease (1.3%) (Figure 19).



**Figure 19 Source:** Tennessee Department of Health, Division of Policy, Planning and Assessment

Table 15 summarizes age-adjusted mortality rates for the leading causes of death in comparison to Tennessee and the United States. Hamilton County age-adjusted mortality rates are higher than national rates for nine out of ten leading causes of death (all but nephritis). Hamilton County mortality rates are lower than statewide rates for all but two causes of death (Alzheimer's disease and diabetes).

**Table 15. Leading Causes of Death: Age-adjusted deaths per 100,000**

Rank	Cause of Death	Hamilton County 2011-2013	Tennessee 2011-2013	United States 2013
1	Heart Disease	177.1	202.7	169.8
2	Cancer	172.3	186.2	163.2
3	Chronic Lower Respiratory Disease	51.3	52.3	42.1
4	Accidents/Unintentional Injuries	44.3	51.3	39.4
5	Stroke	42.1	44.7	36.2
6	Alzheimer's Disease	39.6	37.4	23.5
7	Diabetes	28.0	25.1	21.2
8	Suicide	14.4	14.5	12.6
9	Nephritis	12.0	13.3	13.2
10	Liver Disease	10.7	12.9	10.2

Sources: Tennessee Department of Health, Division of Policy, Planning and Assessment and National Vital Statistics Reports, Volume 64, Number 2, CDC.

### Mortality Rate Trends

In examining trends for the top seven causes of death in Hamilton County, death rates for heart disease, cancer, chronic lower respiratory disease, stroke, and diabetes have decreased since 2000, while death rates for Alzheimer's disease and accidents have increased.

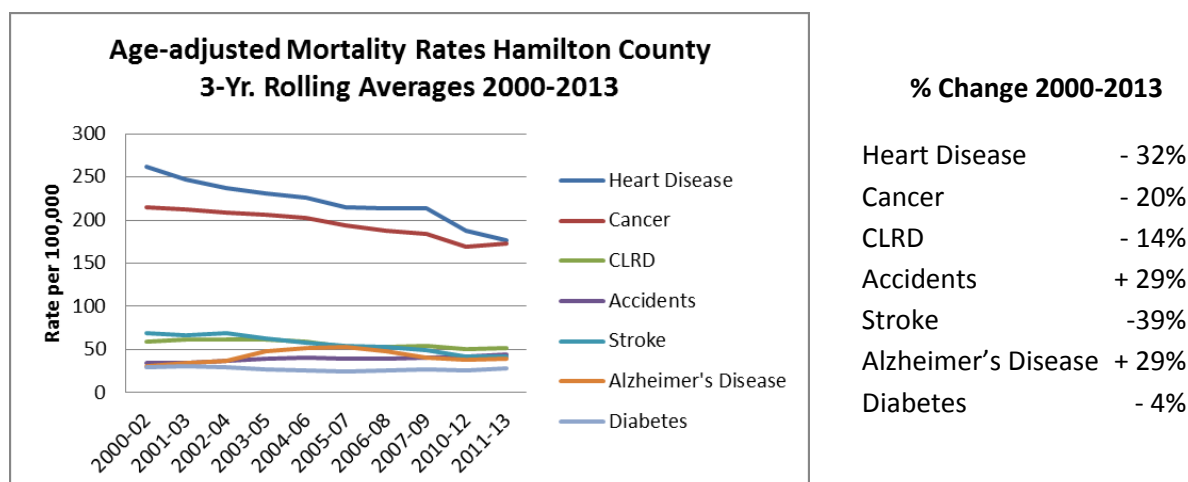


Figure 20 Source: Tennessee Department of Health, Division of Policy, Planning and Assessment

### Differences by Race

There are some marked differences in the death rates of African Americans and whites in Hamilton County. Table 16 details age-adjusted mortality rates for the leading causes of death by race. Note that nine out of ten leading causes are common to both African Americans and whites. However, suicide is 8<sup>th</sup> leading cause of death for whites and not among the top ten for African Americans, while homicide is the 9<sup>th</sup> leading cause of death among African Americans but not among the top ten for whites.

Among the notable differences, death rates among African Americans were significantly higher than among whites for the following causes:

**Homicide:** 8.2 times higher among African Americans than whites

**Nephritis:** 3.6 times higher among African Americans than whites

**Diabetes:** 2.7 times higher among African Americans than whites

**Stroke:** 32% higher among African Americans than whites

**Heart disease:** 19% higher among African Americans than whites

**Cancer:** 16% higher among African Americans than whites

Death rates among whites were significantly higher than among African Americans for the following causes:

**Suicide:** 3.4 times higher among whites than African Americans

**Accidents:** 46% higher among whites than African Americans

**Chronic lower respiratory disease:** 40% higher among whites than African Americans

**Liver disease:** 23% higher among whites than African Americans

African American and white death rates from Alzheimer's disease were similar.

**Table 16. Ten Leading Causes of Death in Hamilton County by Race**  
Age-adjusted Rates per 100,000 Population 2011-2013

	White		Black	
	Rate	Rank	Rate	Rank
Heart Disease	173.4	1 <sup>st</sup>	207.1	1 <sup>st</sup>
Cancer	170.1	2 <sup>nd</sup>	198.0	2 <sup>nd</sup>
Chronic Lower Respiratory Disease	54.4	3 <sup>rd</sup>	38.8	6 <sup>th</sup>
Accidents	48.6	4 <sup>th</sup>	33.2	7 <sup>th</sup>
Stroke	40.0	5 <sup>th</sup>	52.7	4 <sup>th</sup>
Alzheimer's Disease	39.9	6 <sup>th</sup>	41.8	5 <sup>th</sup>
Diabetes	22.5	7 <sup>th</sup>	60.9	3 <sup>rd</sup>
Suicide	17.1	8 <sup>th</sup>	5.1	*
Liver Disease	11.3	9 <sup>th</sup>	9.2	10 <sup>th</sup>
Nephritis (Kidney Disease)	8.9	10 <sup>th</sup>	31.7	8 <sup>th</sup>
Homicide	3.3	*	27.1	10 <sup>th</sup>
*Not among top ten for that race.				
Source: Tennessee Department of Health, Division of Policy, Planning and Assessment				

### Differences by Sex

Table 17 details age-adjusted mortality rates for the ten leading causes of death by sex. Mortality rates are higher among men than women for all leading causes of death except Alzheimer's disease, where rates were 43% higher among women. Among the notable differences, age-adjusted mortality rates among males were significantly higher than among females for the following causes:

- Suicide:** 5.2 times higher among males than females
- Homicide:** 3.2 times higher among males than females
- Accidents:** 85% higher among males than females
- Liver disease:** 74% higher among males than females
- Heart disease:** 59% higher among males than females
- Cancer:** 51% higher among males than females
- Nephritis (Kidney Disease):** 49% higher among males than females
- Chronic Lower Respiratory Disease:** 29% higher among males than females

**Table 17. Ten Leading Causes of Death in Hamilton County by Sex**  
Age-adjusted rates per 100,000 population 2011-2013

	Male		Female	
	Rate	Rank	Rate	Rank
Heart Disease	224.8	1 <sup>st</sup>	141.5	2 <sup>nd</sup>
Cancer	216.9	2 <sup>nd</sup>	143.9	1 <sup>st</sup>
Chronic Lower Respiratory Disease	60.0	3 <sup>rd</sup>	46.5	3 <sup>rd</sup>
Accidents	58.4	4 <sup>th</sup>	31.6	6 <sup>th</sup>
Stroke	43.9	5 <sup>th</sup>	39.7	5 <sup>th</sup>
Alzheimer's Disease	30.7	6 <sup>th</sup>	44.0	4 <sup>th</sup>
Diabetes	30.2	7 <sup>th</sup>	25.5	7 <sup>th</sup>
Suicide	25.4	8 <sup>th</sup>	4.9	10 <sup>th</sup>
Liver Disease	13.6	9 <sup>th</sup>	7.8	9 <sup>th</sup>
Nephritis (Kidney Disease)	14.9	10 <sup>th</sup>	10.0	8 <sup>th</sup>
Source: Tennessee Department of Health, Division of Policy, Planning and Assessment				

## Chronic Diseases

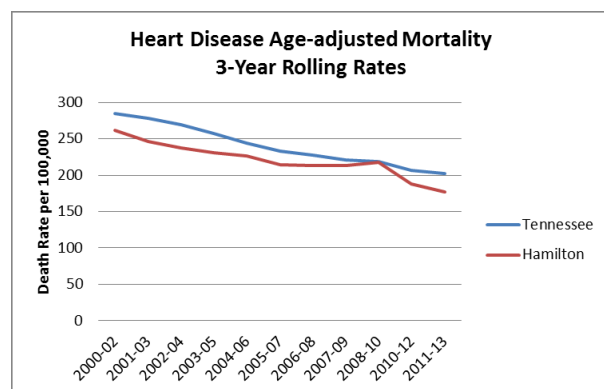
Chronic diseases, such as heart disease, cancer, stroke, chronic lower respiratory disease (CLRD), and diabetes are the leading causes of death and disability in the United States. Nationwide, 86% of our health care dollars goes to treatment of chronic diseases. Chronic diseases are generally characterized by multiple risk factors, long development period, prolonged course of illness, and increased onset with age. Although chronic diseases are among the most common and costly health problems, they are also among the most preventable. Adopting healthy lifestyle habits such as eating nutritious foods, engaging in physical activity, and avoiding tobacco use can prevent or control the devastating effects of these diseases.<sup>xxvi</sup>

## Heart Disease and Stroke

### Heart Disease

Cardiovascular or heart disease includes specific heart conditions, including coronary heart disease which can lead to heart attacks. Heart disease is the leading cause of death in the U.S. and is a major cause of disability. The mortality rate of heart disease in the U.S. was 169.8 in 2013. Tennessee ranked seventh in the nation for deaths from heart disease in 2013.

According to 2011-2013 Behavioral Risk Factor Surveillance Survey (BRFSS) data, 5% of Hamilton County adults have ever been told by a health care practitioner that they have had a heart attack, compared to 6% in Tennessee and 4% nationwide. Similarly, 6% of adults in both Hamilton County and Tennessee had ever been diagnosed with angina or coronary heart disease, compared to 4% nationwide.

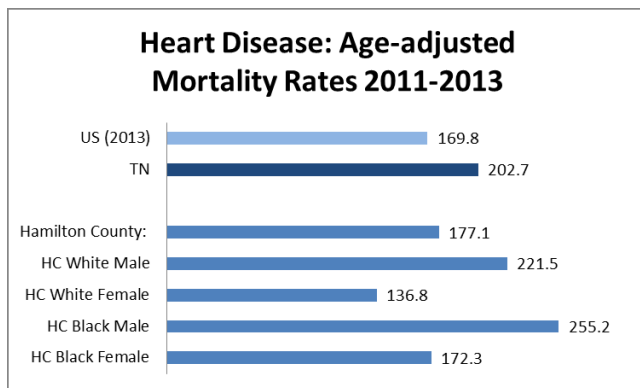


### Trends

*Three-year age-adjusted mortality rates for heart disease have decreased by 32% between 2000 and 2013 (from 26.1 to 177.1 per 100,000)*

*Heart disease mortality rates have been lower than state rates except for 2008-2010, when they were equal.*

Figure 21 Tennessee Department of Health, Division of Policy, Planning and Assessment



**Figure 22 Tennessee Department of Health, Division of Policy, Planning and Assessment**

- In Hamilton County, heart disease is the leading cause of death for men and women, responsible for 23% of deaths and over 2,200 hospitalizations.
- The 2011-2013 age-adjusted mortality rate for heart disease in Hamilton County was 177.1 per 100,000 population.
- Males have higher mortality rates than females regardless of race. Black males had the highest mortality rate among four gender-race groups while white females had the lowest.

## Stroke

Stroke is the 5th leading cause of death in the U.S. and in Hamilton County. The mortality rate from stroke in the U.S. was 36.2 in 2013. Tennessee ranked sixth in the nation for deaths from stroke in 2013. The *Healthy People 2020* objective is to reduce the stroke rate to 45.5 deaths per 100,000. According to 2011-2013 BRFSS data, 4% of Hamilton County adults have ever been told by a health care practitioner that they have had a stroke, compared to 4% in Tennessee and 3% nationwide.

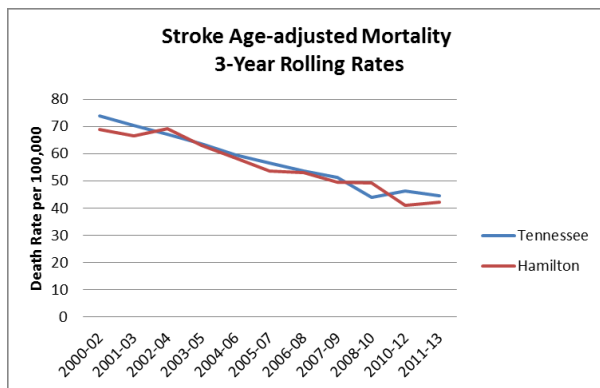


Figure 23 Tennessee Department of Health, Division of Policy, Planning and Assessment

### Trends

*Three-year age-adjusted stroke mortality decreased by 39% between 2000 and 2013 (from 68.9 to 42.1 per 100,000).*

*Stroke mortality rates in Hamilton County track closely with state rates.*

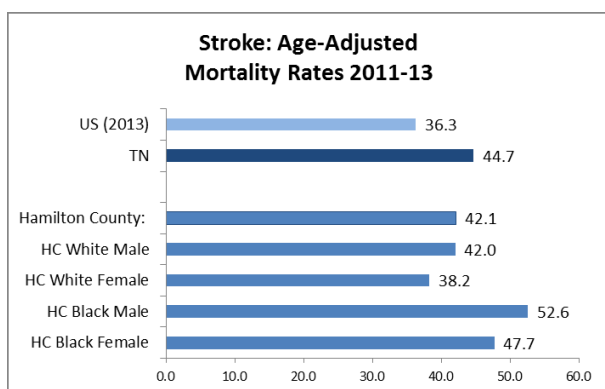


Figure 24 Source: Tennessee Department of Health, Division of Policy, Planning and Assessment

- In Hamilton County, stroke is responsible for responsible for 5% of deaths.
- The 2011-2013 age-adjusted mortality rate for stroke in Hamilton County was 42.1 per 100,000 population.
- Males have higher mortality rates than females regardless of race. Black males had the highest mortality rate among four gender-race groups while white females had the lowest.

## Cancer

Cancer is the second leading cause of death for residents of Hamilton County, responsible for 22% of all deaths. The 2011-2013 age-adjusted mortality rate for cancer in Hamilton County was 172.3 per 100,000 population, which was 7.5% lower than the state rate and 5.5% higher than the 2013 U.S. rate of 163.2 per 100,000. Tennessee ranked 7<sup>th</sup> in the nation for deaths due to cancer in 2013. The *Healthy People 2020* objective is to reduce the age-adjusted mortality rate for all cancers to 161.4 per 100,000

According to 2011-2013 BRFSS data, 7% of Hamilton County adults have ever been told by a health care practitioner they had cancer other than skin cancer, which mirrors state and national rates (7%).

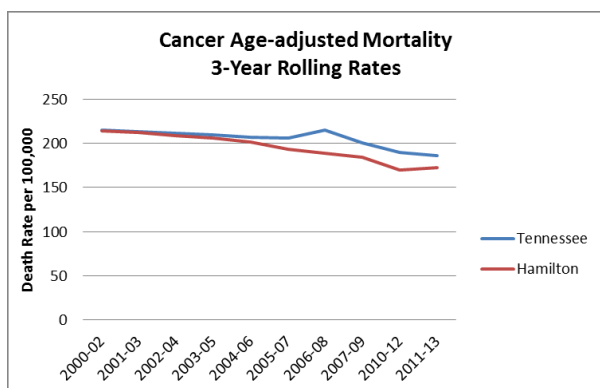


Figure 25 Tennessee Department of Health, Division of Policy, Planning and Assessment

### Trends

*In Hamilton County, three-year age-adjusted mortality rates for all cancers decreased by 19.6% between 2000 and 2013, from 214.4 to 172.3 per 100,000.*

*Cancer mortality rates in Hamilton County mirrored the state rates from 2000 and 2006, and have since run approximately 10% below state rates.*

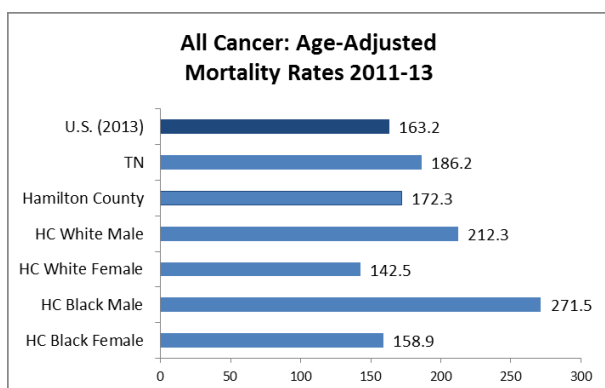


Figure 26 Source: Tennessee Department of Health, Division of Policy, Planning and Assessment

- In Hamilton County, deaths from all cancers comprise 22% of all deaths.
- The 2011-2013 age-adjusted mortality rate for all cancers was 172.3 per 100,000.
- Males have higher mortality rates than females regardless of race. Black males had the highest mortality rate among four gender-race groups while white females had the lowest.

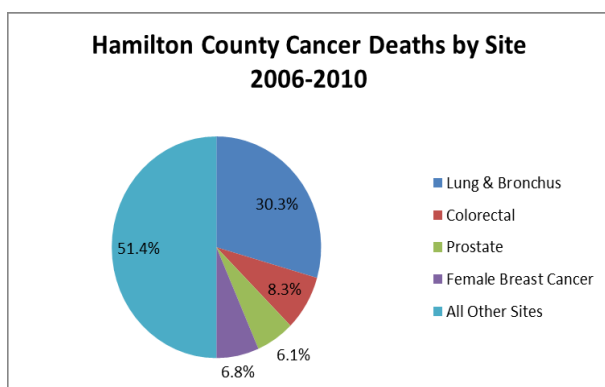


Figure 27 Source: Tennessee Department of Health, Division of Policy, Planning and Assessment

### Cancer by Site

Lung, colon, breast, and prostate cancer account for almost half of the cancer deaths in Hamilton County.

## Lung and Bronchus Cancer

Lung cancer is the leading cause of cancer death in Tennessee. According to the Tennessee Cancer Registry, there are nearly 5,500 new cases of lung cancer and over 4,300 lung cancer deaths in Tennessee. Tennessee had the third highest incidence rate and the 7<sup>th</sup> highest mortality rate in the U.S. in 2013. The *Healthy People 2020* objective is to reduce the lung cancer mortality rate to 45.5 deaths per 100,000.

Risk factors for lung cancer primarily include tobacco, radon, and asbestos. In Tennessee, 76% of lung cancers were diagnosed at advanced stages.<sup>xxvii</sup>

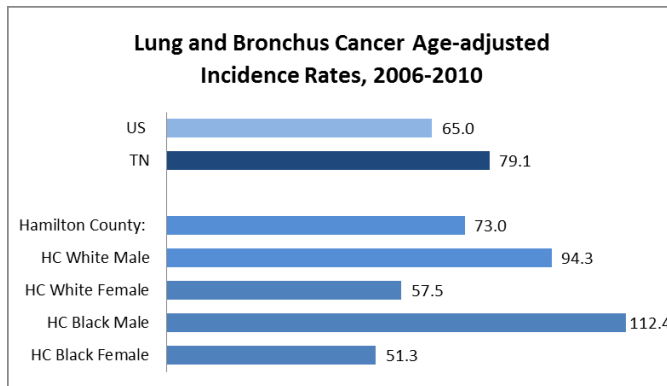


Figure 28 Source: Tennessee Department of Health, Cancer in Tennessee 2006-2010; National Cancer Institute

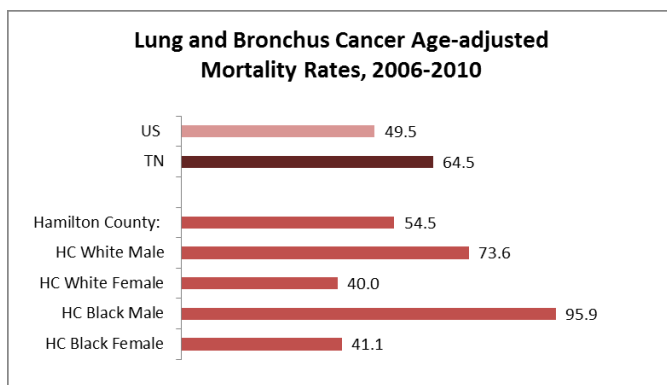


Figure 29 Source: Tennessee Department of Health, Cancer in Tennessee 2006-2010; National Cancer Institute

- There were 1,427 cases of newly diagnosed lung cancer cases between 2006 and 2010 in Hamilton County, and the age-adjusted incidence rate was 73 per 100,000. The age-adjusted lung cancer incidence rate was lower than the state and higher than the nation.
- During the same time period, 1,041 Hamilton County residents died from lung cancer, and the age-adjusted mortality rate was 54.5 per 100,000. The age-adjusted lung cancer mortality rate was lower than the state and higher than the nation.
- Males had higher incidence and mortality from lung cancer than females. Black males had higher incidence and mortality rates than white males. Among women, there was little difference in incidence and mortality rates by race.

## Colorectal Cancer

Colorectal cancer is the third most common cancer found in men and women in the U.S. According to the Tennessee Cancer Registry, there are more than 3,000 new colorectal cancer cases and almost 1,200 deaths each year in Tennessee. Tennessee had the 20<sup>th</sup> highest incidence rate and the 9<sup>th</sup> highest mortality rate in the U.S. for colorectal cancer in 2010.

Mortality rates from colorectal cancer in Tennessee have generally been decreasing over the five year period, which is largely attributed to colorectal cancer screening techniques. The *Healthy People 2020* objective is to reduce the colorectal cancer mortality rate to 14.5 deaths per 100,000.

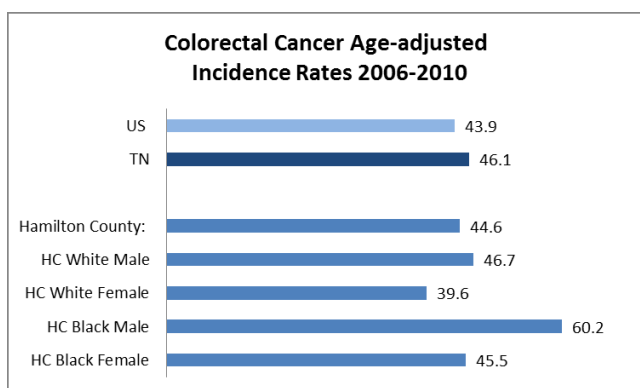


Figure 30 Source: Tennessee Department of Health, Cancer in Tennessee 2006-2010; National Cancer Institute

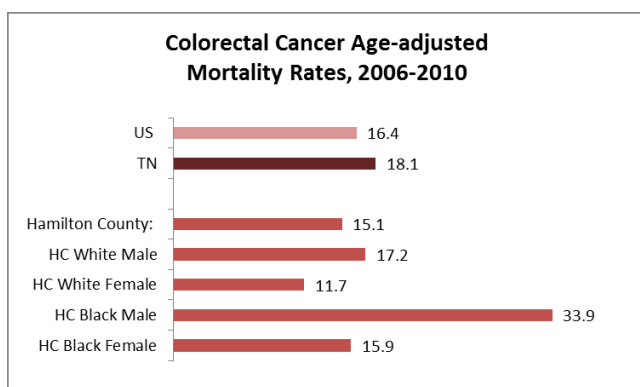


Figure 31 Source: Tennessee Department of Health, Cancer in Tennessee 2006-2010; National Cancer Institute

- In Hamilton County, a total of 858 new colorectal cancer cases were diagnosed from 2006 to 2010, and the age-adjusted incidence rate was 44.6 per 100,000.
- During the same time period, 284 Hamilton County residents died from colorectal cancer, giving an age-adjusted mortality rate of 15.1 per 100,000.
- Incidence and mortality rates were similar to state and national rates.
- In Hamilton County, the colorectal cancer mortality rate among black men is approximately double the rates for black women and white men and triple the rate for white women.

## Prostate Cancer

Prostate cancer is the most common cancer among men in Tennessee.<sup>xxviii</sup> Approximately 4,500 new prostate cancer cases and 600 prostate cancer deaths were reported to the Tennessee Cancer Registry from 2006 and 2010. Tennessee had the 18<sup>th</sup> highest incidence rate and the 15<sup>th</sup> highest mortality rate in the U.S. in 2010. The *Healthy People 2020* objective is to reduce the prostate cancer mortality rate to 21.8 per 100,000.

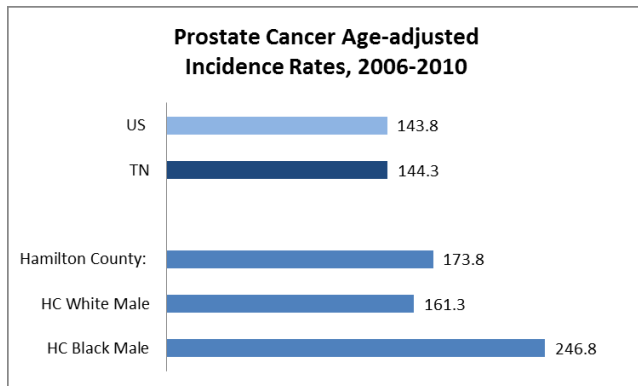


Figure 32 Source: Tennessee Department of Health, Cancer in Tennessee 2006-2010; National Cancer Institute

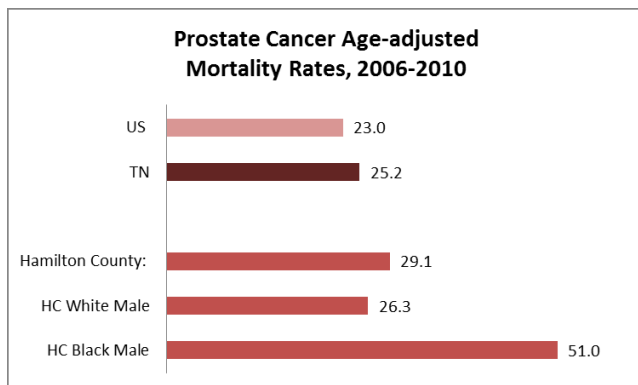


Figure 33 Source: Tennessee Department of Health, Cancer in Tennessee 2006-2010; National Cancer Institute

- In Hamilton County, a total of 1,533 new prostate cancer cases were diagnosed from 2006 to 2010, and the age-adjusted incidence rate was 173.8 per 100,000.
- During the same time period, 210 Hamilton County men died from prostate cancer, giving an age-adjusted mortality rate of 29.1 per 100,000.
- Prostate cancer incidence and mortality rates in Hamilton County are significantly higher than statewide rates.
- Black males are disproportionately affected by prostate cancer than white males; black men experience a mortality rate that is double that for white men.

### Female Breast Cancer

Breast cancer is the most common cancer among women in Tennessee.<sup>xxix</sup> Each year, nearly 4,400 cases of female breast cancer and 871 breast cancer deaths were reported to the Tennessee Cancer Registry. Tennessee had the 34<sup>th</sup> highest incidence rate and the 22nd highest mortality rate in the U.S. for female breast cancer in 2010. The *Healthy People 2020* objective is to reduce the female breast cancer mortality rate to 20.7 per 100,000.

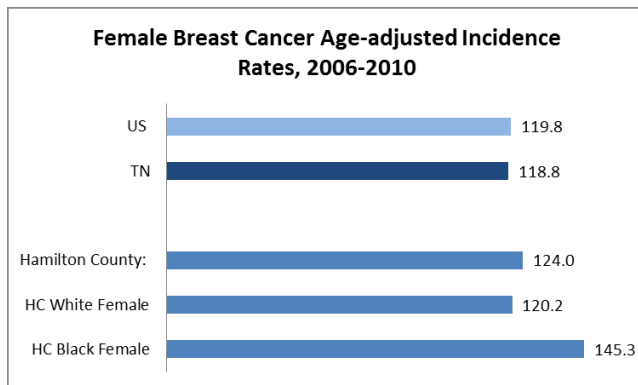


Figure 34 Source: Tennessee Department of Health, Cancer in Tennessee 2006-2010; National Cancer Institute

- In Hamilton County, a total of 1,306 new breast cancer cases were diagnosed from 2006 to 2010, and the age-adjusted incidence rate was 124.0 per 100,000.
- During the same time period, 232 Hamilton County women died from breast cancer, giving an age-adjusted mortality rate of 21.5 per 100,000.

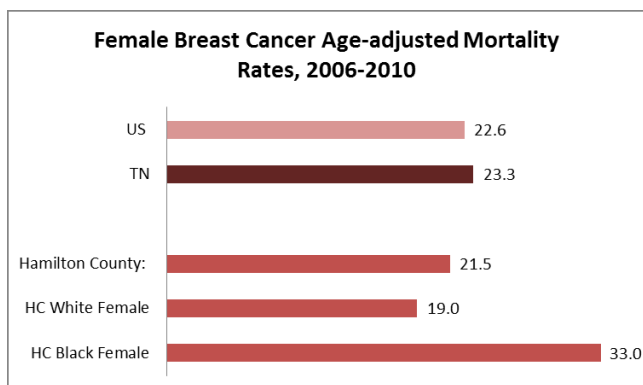
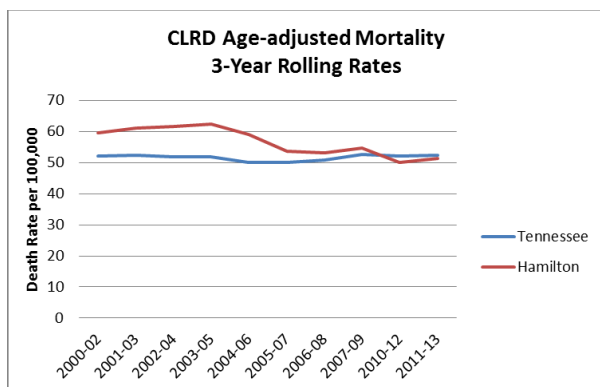


Figure 35 Source: Tennessee Department of Health, Cancer in Tennessee 2006-2010; National Cancer Institute

- Incidence and mortality rates were similar to state and national rates.
- Black women are disproportionately affected by breast cancer, compared to white women. Among black women in Hamilton County breast cancer incidence rates were 21% higher and mortality rates were 74% higher than among white women.

## Chronic Lower Respiratory Disease and Asthma

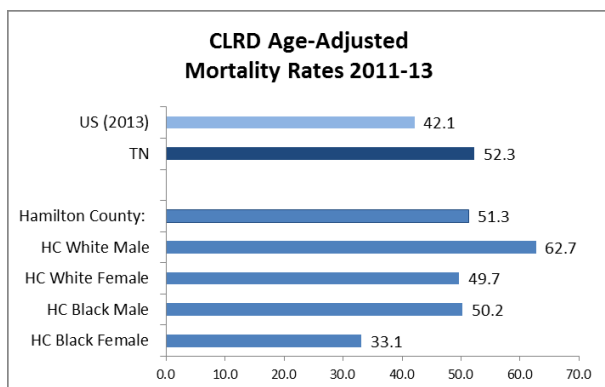
Chronic lower respiratory disease (CLRD) is the 3<sup>rd</sup> leading cause of death in the U.S. and in Hamilton County. CLRD is a group of diseases that causes airflow blockage and breathing-related problems and includes emphysema, chronic bronchitis, and asthma. The mortality rate of CLRD in the U.S. was 42.1 in 2013. Tennessee ranked 10<sup>th</sup> in the nation for deaths from CLRD in 2013.



### Trends:

*Historically, death rates from CLRD have been higher than the state; however, Hamilton County rates started trending down beginning in 2003 and equaled the state rate for 2011-2013.*

Figure 36 Source: Tennessee Department of Health, Office of Policy, Planning and Assessment



- White males had the highest mortality rate among four gender-race groups, while black females had the lowest.
- Cigarette smoking causes almost 8 out of 10 cases of emphysema and chronic bronchitis.<sup>xxx</sup> Age-adjusted mortality rates for CLRD are similar to those for lung cancer, another disease associated with cigarette smoking.

Figure 37 Source: Tennessee Department of Health, Office of Policy, Planning and Assessment

## Asthma

Asthma is a chronic inflammatory disorder of the airways. During an asthma attack, airways become inflamed causing wheezing, breathlessness, chest tightness, and nighttime or early morning coughing. Asthma can be triggered by a variety of environmental causes, including second hand smoke, dust mites, outdoor air pollution, cockroach allergens, pets, and mold.

The CDC reports that the number of people in the U.S. diagnosed with asthma grew by 4.3 million from 2001 to 2009. The greatest rise in asthma rates was among black children (almost a 50% increase) from 2001 through 2009. Asthma was linked to 3,447 deaths (about 9 per day) in 2007. Asthma costs in the U.S. grew from about \$53 billion in 2002 to about \$56 billion in 2007, about a 6% increase.<sup>xxxi</sup>

## Asthma Prevalence

Asthma prevalence estimates are derived from the Behavior Risk Factor Surveillance System (BRFSS) for the adult population and from the Youth Risk Behavior Survey (YRBS) for the high school student population. Lifetime prevalence of asthma is the percentage of the population who had ever been diagnosed with asthma, and current asthma prevalence is the percentage of the population who had been diagnosed with asthma and had asthma at the time of the survey.

Based on 2011-2013 BRFSS data, the estimated lifetime asthma prevalence among adults was 10% in Hamilton County, compared to 11% statewide and 14% nationwide. The estimated prevalence of current asthma among adults is 6% in Hamilton County, compared to 7% in Tennessee and 9% nationwide (Table 18).

Among school-aged children, asthma is one of the most common causes of school absenteeism. Children with asthma miss 2.5 more days of school than their peers, according to national data.<sup>xxxii</sup> According to the 2011 Youth Risk Behavior Survey (YRBS), the lifetime prevalence of asthma among high school students in Hamilton County was 26%, compared with 21% in Tennessee and 23% nationwide. The prevalence of current asthma among high school students was 14% in Hamilton County, compared with 10% in Tennessee and 12% nationwide.<sup>xxxiii</sup> Within Hamilton County public schools, 3,891 students were identified by their parents as having asthma in the 2014-2015 school year. School officials note that the actual number of students with asthma is probably higher, as some parents do not report medical conditions.

In addition, the Tennessee Department of Health report *Childhood Asthma in Tennessee 2003-2012* detailed the three-year prevalence of asthma among children enrolled in TennCare by the 14 Tennessee Health Department regions. At 21.3%, the childhood asthma prevalence among TennCare enrollees in Hamilton County was the highest of all regions. The prevalence rate for the other Tennessee Health Department regions ranged from 11.6% to 15.7%.<sup>xxxiv</sup>

**Table 18. Asthma Prevalence**

	Hamilton County	TN	U.S.
Adult	2011-2013	2011-2013	2011-2013
--- Ever Diagnosed	10%	11%	14%
--- Current Asthma	6%	7%	9%
Youth, Grades 9-12	2011	2011	2011
--- Ever Diagnosed	26%	21%	23%
--- Current Asthma	14%	10%	12%
TennCare Enrollees (2010-2012)			
--- Prevalence, ages 1-17	21%	14%	n/a
Sources: Centers for Disease Control, TN Department of Health, Division of Planning and Assessment, 2011 Hamilton County YRBS			

### Asthma Hospitalizations and Emergency Department Visits

Asthma hospitalizations and emergency department (ED) visits are considered an indicator for problems accessing primary care, finding affordable medications, correct use of medications, and home treatment equipment. *Healthy People 2020* has established objectives for emergency department visits and hospitalizations for asthma in three age categories: children under 5, ages 5 to 64, and ages 65 and older, as detailed in Table 19.

According to the Tennessee Department of Health Hospital Discharge Data System (HHDDS), 207 Hamilton County residents were hospitalized for asthma in 2012. This translates to an age-adjusted hospitalization rate of 5.7 per 10,000 residents, which was 40% lower than the Tennessee rate of 9.5 per 10,000. Tennessee HHDDS data for 2012 indicates that, 2,159 Hamilton County residents visited ED with a primary diagnosis of asthma. This translates to an age-adjusted ED visit rate of 66.4 per 10,000 residents, which was almost equal to the state rate of 65.6 per 10,000.

**2014 Asthma Capitals:** Every year, the Asthma and Allergy Foundation ranks the nation's 100 largest cities (as "Capitals") according to how challenging it is to live there for people who have asthma. Rankings are based on 12 factors associated with asthma prevalence, risk factors for persons with asthma, and medical factors. Chattanooga was ranked sixth, down from 2<sup>nd</sup> in 2013. One other Tennessee city, Memphis made the top ten (second). ([www.asthmacapitals.com](http://www.asthmacapitals.com))

**Table 19. Asthma Inpatient Hospitalization and Emergency Department Visit Rates**

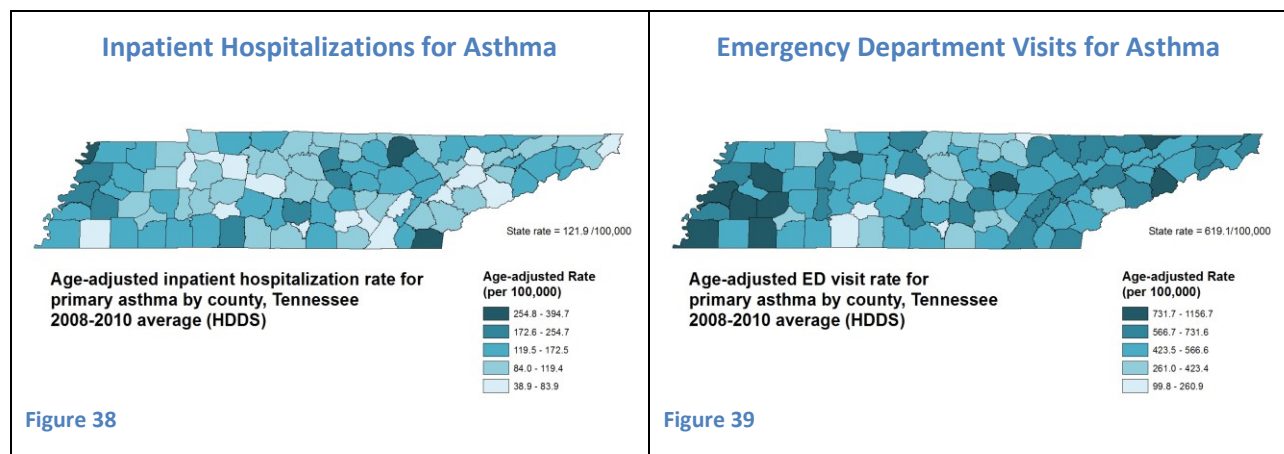
	Hamilton County # 2012	Hamilton County 2012 Rate per 10,000	Tennessee 2012 Rate per 10,000	U.S. Rate per 10,000 ‡	<i>Healthy People 2020</i> Rate per 10,000
<b>Inpatient</b>	<b>207</b>	<b>5.7</b>	<b>9.5</b>	<b>15.4</b>	<b>N/A</b>
-- Ages 1-4	11	6.6	22.9	40.6	18.2
-- Ages 5 to 64	149	4.2	6.1	10.5	8.7
-- Ages 65 +	47	1.2	2.1	25.5	20.1
<b>Emergency Dept.</b>	<b>2,159</b>	<b>66.4</b>	<b>65.6</b>	<b>69.7</b>	<b>N/A</b>
-- Ages 1-4	334	119.9	189.4	138.3	95.7
-- Ages 5 to 64	1,667	51.5	51.6	61.8	49.6
-- Ages 65 +	158	3.8	3.5	31.6	13.7

‡ U.S. data years: Years- Inpatient total (2009), inpatient ages 0-4 (2009), ages 5-64 and 65+ (2010); Emergency Department total (2009), age categories (2008-2010); Note: youngest reported age group U.S (0 to 4), TN (1 to 4).

Rates are age-adjusted rates except for ages 1 to 4 rates, which are crude rates.

Sources: Tennessee Department of Health, Division of Policy, Planning and Assessment (Hospital Discharge Data and Vital Statistics), HealthyPeople.gov, CDC National Hospital Ambulatory Medical Care Survey.

Tennessee Department of Health hospital discharge data consistently show Hamilton County as having among the lowest inpatient hospitalization rates and among the highest emergency department visit rates.<sup>xxxv</sup>



**Table 20. Asthma Inpatient and Emergency Department Visit Rates 2008-2010**

	Hamilton	Tennessee	Davidson	Knox	Shelby
<b>Inpatient Hospitalization Rate</b>	77.8	121.9	113.0	83.9	168.3
<b>Emergency Dept. Visit Rate</b>	676.8	619.1	591.1	595.2	1039.5

Source: Tennessee Department of Health, Division of Policy, Planning and Assessment

## Diabetes

Diabetes is the seventh leading cause of death for both the U.S. and Hamilton County. Diabetes is a serious public health risk because it increases the risk of heart disease and stroke and can cause complications such as kidney failure, blindness, amputations, nerve damage, and premature death. Diabetes is one of the most costly of all chronic diseases. In 2012, diabetes costs the nation \$176 billion in direct medical costs and \$69 billion in indirect costs associated with disability, work loss, and premature death (total \$245 billion). Average medical expenditures among people with diagnosed diabetes were 2.3 times higher than people without diabetes.<sup>xxxvi</sup>

The prevalence of diabetes has been increasing over the past several years. The increased prevalence of diabetes is linked to rising obesity, a major risk factor for Type 2 diabetes. In 2012, an estimated 589,696 (10.9%) adult Tennessee residents 18 years and older were living with the disease.<sup>xxxvii</sup> Tennessee had the 5<sup>th</sup> highest prevalence rate in 2012 and the 9<sup>th</sup> highest mortality rate in the nation for diabetes in 2013. The mortality rate of diabetes in the U.S. was 21.2 in 2013.<sup>xxxviii</sup>

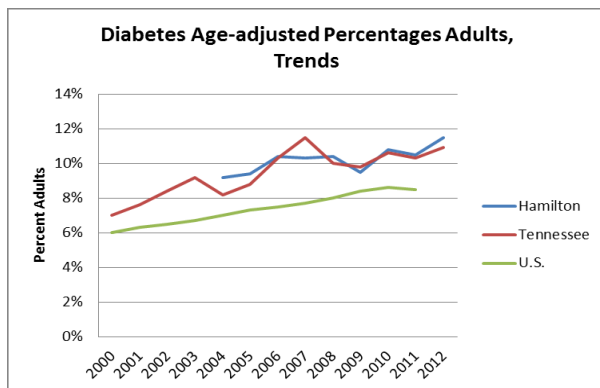


Figure 40 Source: Centers for Disease Control, Diabetes Atlas

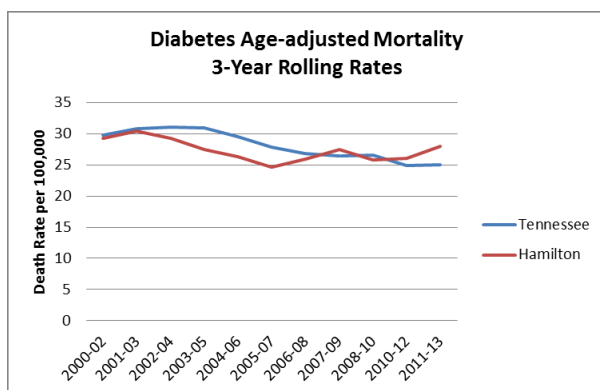


Figure 41 Source: Tennessee Department of Health, Office of Policy, Planning and Assessment

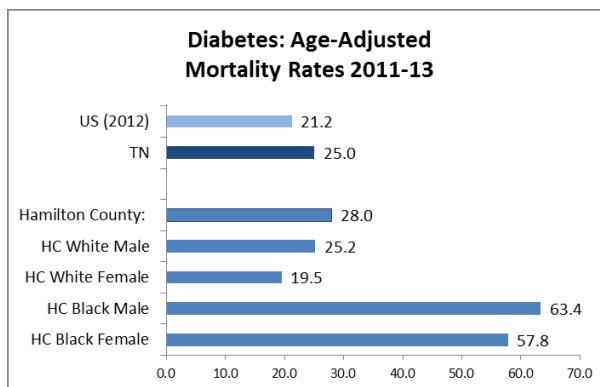


Figure 42 Source: Tennessee Department of Health, Office of Policy, Planning and Assessment

- In Hamilton County, an estimated 33,286 adults (11.5%) were living with diabetes in 2012. The prevalence of diabetes was similar to the state and higher than the 2011 national rate of 8.5%.<sup>xxxix</sup>
- The prevalence of adult diabetes has increased by 25% since 2004 (from 9.2% in 2004 to 11.5% in 2012).
- The 2011-2013 age-adjusted mortality for diabetes in Hamilton County was 28 per 100,000 population. This rate was 11.6% higher than the Tennessee rate and 32.1% higher than the national rate for 2012.
- Blacks are disproportionately affected by diabetes compared to whites. Mortality rate among black men is 2.3 times higher than the Hamilton County rate and three times the national rate. Among black women, diabetes mortality is double the Hamilton County rate and 2.7 times the national rate.

## Risk Factors for Chronic Disease

The Centers of Disease Control reports that up to 39% of premature deaths (before age 80) in the U.S. are preventable, based on a study published in 2014. The analysis looked at the states with the lowest rates of premature deaths by cause and calculated the number of deaths that could be avoided if all states had the death rates equal to the states with the lowest rates. The study showed that if all states had the same mortality rates as the lowest states, it would be possible to prevent:

- 34% of premature deaths from heart disease
- 21% of all cancer deaths
- 39% of deaths from chronic lower respiratory diseases
- 33% of all stroke deaths, and
- 39% of deaths for unintentional injuries<sup>xi</sup>

The study indicated that modifiable risk factors are largely responsible for many premature deaths. Modifiable risk factors include tobacco use, obesity, poor diet and physical inactivity, hypertension, high cholesterol, lack of seat belt use, and alcohol abuse. The Behavior Risk Factor Surveillance Survey (BRFSS) measures the prevalence of these modifiable risk factors among adults and the Youth Risk Behavior Survey (YRBS) measures the prevalence among high school students.

*The “Big Three” behavioral risk factors influence at least seven of the top ten leading causes of death in Tennessee.*

Cause	Tobacco	Obesity	Physical Activity
Heart Disease			
Cancer			
Chronic Lower Respiratory Disease			
Accidents			
Stroke			
Alzheimer’s Disease			
Diabetes			
Suicide			
Kidney Disease <sup>4</sup>			
Liver Disease			



Strong evidence

Suggestive evidence

Source: Tennessee Department of Health, Division of Policy, Planning and Assessment

<sup>4</sup> The two leading causes of kidney failure are diabetes and high blood pressure, according to the National Kidney Foundation.

## Tobacco Use

Tobacco use is the most preventable cause of premature mortality and morbidity in the United States and Tennessee. Smoking is a major risk factor for lung cancer, stroke, heart disease, and emphysema, while smokeless tobacco can increase the risk of oral and esophageal cancers. Second-hand smoke is associated with increased risk of lung cancer and heart disease in non-smoking adults and causes low birth weight, acute respiratory infections, ear problems, and more frequent and severe asthma attacks in children.<sup>xli</sup> Tennessee ranked 5<sup>th</sup> for adult smoking and 11<sup>th</sup> for youth smoking in 2013 (7<sup>th</sup> for youth in 2011).

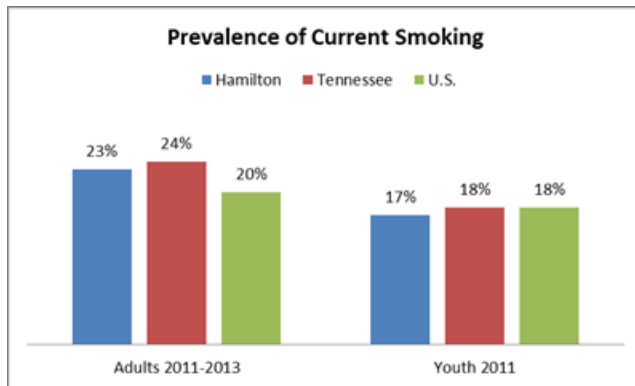


Figure 1 Sources: 2011-2013 BRFSS, 2011 YRBS

- The *Healthy People 2020* objectives are to reduce cigarette smoking to 12% among adults and to 16% among youth.
- Adult smoking rates in both Hamilton County and Tennessee are higher than in the U.S.
- County rates for youth smoking are similar to state and national rates.

Smokeless tobacco causes a number of serious oral health problems, including cancer of the mouth, gums, pharynx, and esophagus, periodontitis, and tooth loss. Use of smokeless tobacco increases the risk for heart disease and stroke and can lead to nicotine addiction. Tennessee ranked 7<sup>th</sup> among teens (2013) and 22<sup>nd</sup> among adults (2012) for smokeless tobacco use.

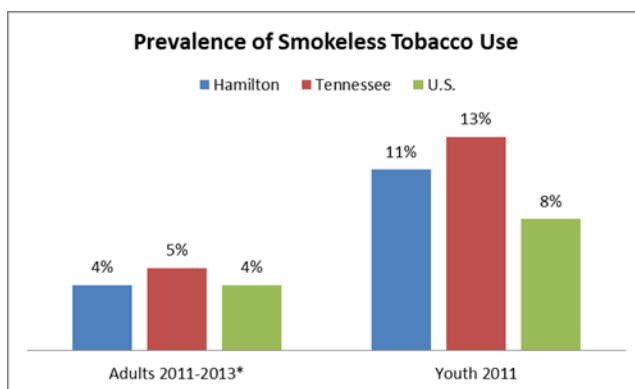


Figure 42 Sources: 2011-2013 BRFSS, 2011 YRBS

\* U.S. Adult is 2012 only

- The *Healthy People 2020* Objectives are to reduce smokeless tobacco use to 0.3% among adults and 8% among youth.
- High school students are two to three times more likely to use smokeless tobacco than adults.
- Among adults, smokeless tobacco use is similar across the county and U.S. and slightly lower than the state.
- Among youth, smokeless tobacco use was higher in Hamilton County and Tennessee than in the U.S.

**Economic Impact** Hamilton County residents' state and federal tax burden from smoking-related government expenditures are estimated at \$148 million annually. A 2015 report from the Campaign for Tobacco Free Kids estimates that the state and federal tax burden of Tennessee residents is \$1,092 per household. When this per household figure is applied at the county level, it translates to a \$148 million state and federal tax burden for smoking-related expenditures in Hamilton County.<sup>xlii</sup>

## Overweight and Obesity

Having and maintaining a healthy weight is a goal to reduce the burden of chronic illness and loss of quality of life. Overweight and obesity have been linked to increased risk for heart disease, stroke, several types of cancer, type 2 diabetes, hypertension, high cholesterol, osteoarthritis, and other chronic conditions. The American Society of Clinical Oncology recently announced that obesity is implicated in as many as 1 in 5 cancer deaths and is quickly overtaking tobacco as the leading cause of cancer.<sup>xliii</sup> The prevalence of obesity continues to increase across the United States. BRFSS data from 2013 indicate that the South had the highest prevalence of obesity (30.2%), followed by the Midwest (30.1%), the Northeast (26.5%), and the West (24.9%). No state had a prevalence of obesity less than 20%.<sup>xliv</sup> Tennessee ranked 4<sup>th</sup> for among adults and 8<sup>th</sup> among youth for obesity in 2011.

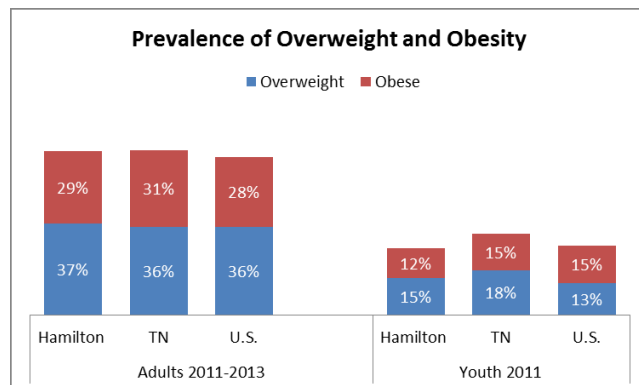
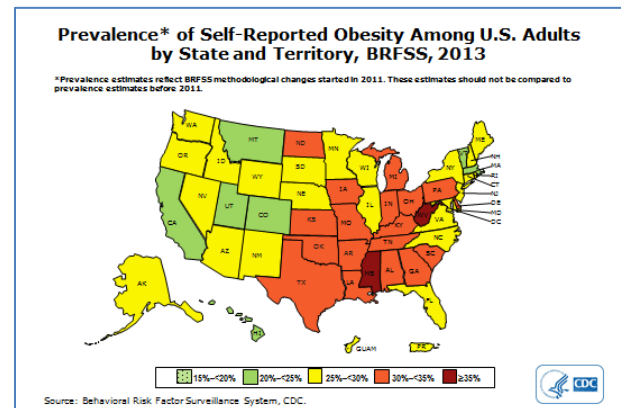


Figure 43 Sources: 2011-2013 BRFSS, 2011 YRBS

- In Hamilton County, 66% of adults were either overweight or obese, according to self-reported height/weight.
- Twenty-seven percent of high school students in Hamilton County were either overweight or obese, according to self-reported height and weight.
- The Healthy People 2020 objective is to reduce the prevalence of obesity to 31% among adults and 16% among children 12

**Economic Impact** A 2012 research report in the Journal of Health Economics found that per capita medical spending was \$2,741 higher for obese individuals than for individuals who were not obese – a 150 percent increase. When applied to the estimated number of obese adults in Hamilton County, this translates to an additional \$205.7 million in annual costs related to direct medical expenses.<sup>xlv</sup>

**Defining Overweight and Obesity**  
**BMI**=Body Mass Index is a relationship between height and weight that is associated with body fat.  
**Overweight:**  
 Adults- BMI of 25 to 29  
 Youth – 85<sup>th</sup> BMI percentile  
**Obese:**  
 Adults- BMI of 30 or more  
 Youth – 95<sup>th</sup> BMI percentile

<sup>5</sup> The *Healthy People 2020* objectives are to reduce obesity to 30.5% among adults ages 20 and older and 16.1% among youth ages 12 to 19. These goals represent a 10% improvement over baseline measures (adults: 33.9%; youth: 17.9%) from the 2005-2008 National Health and Nutrition Examination Survey (NHANES). The NHANES obtains measured weights in examination gowns and heights without shoes. Obesity data in this report are based on self-reported height and weight and not comparable to NHANES data. The most recently available obesity rates from the NHANES (2009-2012) were 35.3% for adults and 16.1% for youth.

## Hypertension

Hypertension, often called high blood pressure, is the leading cause of heart disease and stroke. Almost one in three adults in the U.S. (about 67 million) has high blood pressure and over half of them (about 36 million) do not have it under control.<sup>xlvi</sup> (Blood pressure control means having a systolic blood pressure less than 140 mmHg and a diastolic blood pressure less than 90 mmHg, among people with high blood pressure.) In 2013, Tennessee ranked 6<sup>th</sup> for hypertension.

Tennessee in 2013, the prevalence of hypertension was 45% among African American adults and 39% among white adults. The prevalence of hypertension increased with age, increasing from 18% among Tennesseans 25 to 34 years old to 70% among Tennesseans aged 65 and older.<sup>xlvi</sup>

### Hypertension

#### At Risk (prehypertension):

Systolic: 120-139 mmHg

Diastolic: 80-89 mmHg

#### High:

Systolic: 140 mmHg or higher

Diastolic: 90 mmHg or higher

#### Desirable:

Systolic: less than 120 mmHg

Diastolic: less than 80 mmHg

## High Blood Cholesterol

High levels of cholesterol and triglycerides increase the risk of heart disease, the leading cause of death in Hamilton County. A 10% decrease in total blood cholesterol levels can reduce the incidence of heart disease by as much as 30%.<sup>xlvi</sup>

In 2013, Tennessee ranked 21<sup>st</sup> for high cholesterol. Nationwide, the prevalence of high LDL or “bad,” cholesterol among adults aged 40 to 74 decreased from 59% to 27% from the late 1970s through 2007-2010.<sup>xlvi</sup>

### High Total Cholesterol

**High:** 240 mg/dl or greater

**Borderline high:** 200-239 mg/dl

**Desirable:** less than 200 mg/dl

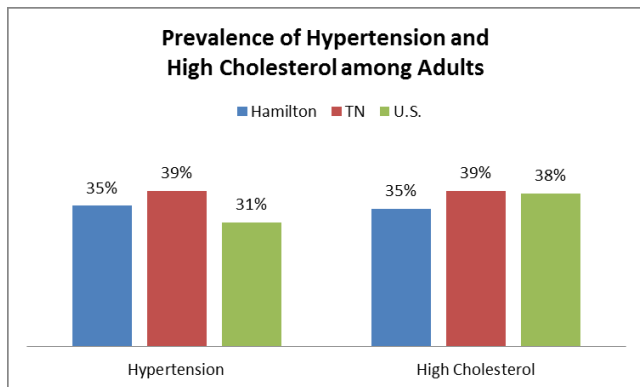


Figure 44 Source: 2011-2013 BRFSS

- The *Healthy People 2020* objectives are to reduce the adult prevalence of hypertension to 27% and high blood cholesterol to 14%.
- In Hamilton County, 35% of adults were told by a health care provider that their blood pressure was high, compared to 39% in Tennessee and 31% nationwide.
- In Hamilton County, 35% of adults who have had their cholesterol checked in the past five years were diagnosed with high cholesterol, compared to 39% in Tennessee and 38% nationwide.

## Physical Inactivity

Regular physical activity and exercise can help reduce the risk of cardiovascular disease, type 2 diabetes, colon and breast cancers, and osteoporosis. Physical activity strengthens bones and muscles, improves mental health and mood, improves ability to do daily activities and helps prevent falls among older adults. The CDC recommends adults achieve either a minimum 2 hours and 30 minutes of moderate physical activity every week and muscle strengthening activities 2 or more days a week that work all major muscle groups (legs, hips, back, abdomen, chest, shoulders, and arms). For children and adolescents, the CDC recommends 60 or more minutes of daily physical activity and muscle and strengthening activities at least 3 days per week. Despite the proven benefits of physical activity, the CDC reports that more than 50% of American adults do not get enough physical activity to provide health benefits, and one-quarter of adults are not active at all in their leisure time.

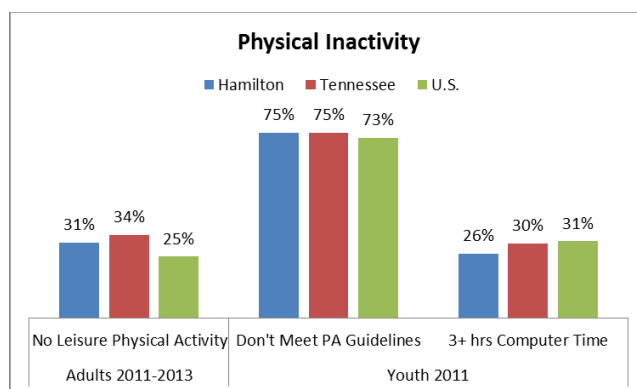


Figure 45 Sources: 2011 BRFSS, 2011 YRBS

- Approximately 31% of Hamilton County adults were inactive in their leisure time in 2011-2013, compared to 34% in Tennessee and 25% nationwide.
- Approximately 3 out of 4 adolescents local, state, and nationwide do not meet physical activity guidelines for youth.
- 26% of Hamilton County high school students have three or more hours a day of screen time outside of school work (computer or video games).
- The *Healthy People 2020* goal is to reduce the proportion of adolescents with three or more hours screen time to 17%.
- The *Healthy People 2020* objective is to reduce the proportion of adults who engage in no leisure-time physical activity to 33%.<sup>6</sup>

<sup>6</sup> Progress towards meeting this *HP2020* objective is tracked through the National Health Interview Survey (NHIS), which is a different survey with different methodology than the BRFSS. The 2013 percentage of U.S. adults with no physical activity in the NHIS was 30.5%. The 2008 national baseline was 36.2%. ([healthypeople.gov](http://healthypeople.gov))

**Table 21. Summary of Chronic Disease Risk Factors**

	Hamilton County	Tennessee	United States
<b>Adult Risk Factors (Year)</b>	<b>2011-2013</b>	<b>2011-2013</b>	<b>2011-2013</b>
Current Smoker	23%	24%	20%
Smokeless Tobacco User	4%	5%	N/A
Overweight or Obese (BMI 25+)	66%	67%	64%
Obese (BMI 30+)	29%	31%	28%
No Leisure Physical Activity	31%	34%	25%
5+ Daily Servings Fruits/Vegetables	13%	9%	N/A
Hypertension	35%	39%	31%
High Blood Cholesterol	35%	39%	38%
Binge Drinker	10%	10%	17%
<b>Youth Risk Factors (Year)</b>	<b>2011</b>	<b>2011</b>	<b>2011</b>
Current Smoker	17%	22%	18%
Smokeless Tobacco User	11%	13%	8%
Overweight or Obese (BMI $\geq$ 85th percentile)	27%	33%	28%
Obese (BMI $\geq$ 95th percentile)	12%	15%	15%
Insufficient Aerobic Physical Activity <sup>§</sup>	75%	75%	73%
Over 2 hrs. non-school related computer/computer games per day	26%	30%	31%
5+ Daily Servings Fruits/Vegetables	20%	22%	
Binge Drinker	18%	19%	22%
Rarely/Never Wear Seatbelt	7%	11%	8%
Rode w/driver under influence	21%	20%	24%
Physical Fight past 12 months	32%	31%	33%

<sup>§</sup>HHP 2020 cholesterol objective is the percentage of all adults 18+, rather than the percentage of those checked.  
<sup>\*</sup>State and national data come from the 2009 YRBS due to questionnaire changes in the 2011 state and national surveys for this measure.  
 Sources: Adult Risk Factors - Tennessee Department of Health, Division of Health Statistics. Hamilton County and Tennessee BRFSS data reflect the average over 3 years. U.S. BRFSS data reflect the 3-year average of median percentage (of 50 states plus D.C.) for 2011-2013. (Hypertension and cholesterol figures for U.S. are for 2011-2012.) Youth Risk Factors – Hamilton County 2011 YRBS; CDC - Tennessee and National YRBS, 2011 and 2009<sup>§</sup>.

## Injury and Violence

Injuries are the leading cause of death for Americans ages 1 to 44, and a leading cause of disability for all ages. Nationwide, injuries were responsible for more than 192,900 deaths, an estimated 31 million emergency department visits, and 2.5 million hospitalizations in 2013.<sup>1</sup> The majority of deaths from injuries in the U.S. are unintentional injuries, such as unintentional falls and motor vehicle crashes. Suicide and homicide are examples of intentional injuries. The majority of deaths from injuries were from poisonings, firearms, motor vehicle crashes, and falls. One of the goals of *Healthy People 2020* is to prevent unintentional injuries and violence, and reduce their consequences.

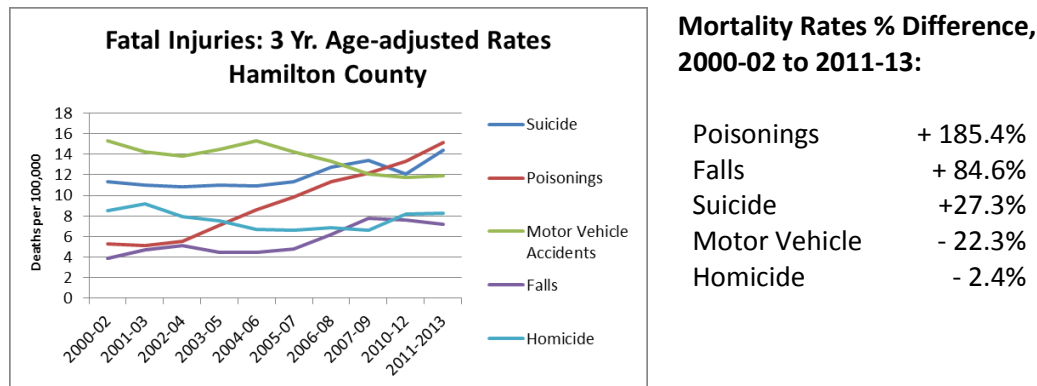


Figure 46: Source: Tennessee Department of Health, Division of Health Statistics

## Poisonings

In Hamilton County, poisonings were the leading cause of fatal injury in 2011-2013. Three-year age-adjusted poisoning mortality rates have almost tripled over the last 13 years, rising from 5.3 to 15.1 per 100,000 between 2000 and 2013. This reflects national trends and is linked to a rise in prescription drug abuse.

In 2012, there were 749 Emergency Department (ED) visits, 376 hospitalizations, and 75 deaths from poisonings in Hamilton County. Of the 75 poisoning deaths, 66 (88%) were due to drug overdose. Adults aged 45 to 54 experienced the greatest number of overdose deaths (24 or 36.4%), followed by adults aged 35 to 44 (19 or 28.8%).

Table 22. Poisoning Data for 2012

	Hamilton County Number	Hamilton County Age Adj. Rate	Tennessee Age Adj. Rate	US Age Adj. Rate 2011
Emergency Department Visits	749	229.53	305.3	N/A
Hospitalizations	339	98.1	100.5	121.2
Fatalities	75	22.6	18.9	14.6
Fatalities - Overdose	66	19.7	17.0	13.2

Source: Tennessee Department of Health, Division of Health Statistics (Hospital Discharge Data and Vital Statistics)

## Motor Vehicle Crashes

Three year age-adjusted death rates for motor vehicle crashes decreased by 22% in Hamilton County between 2000 and 2013 (from 15.3 to 11.9 deaths per 100,000).

In 2012, there were 4,203 Emergency Department (ED) visits, 263 hospitalizations, and 31 deaths from motor vehicle accidents in Hamilton County. Motor vehicle accidents were the leading cause of injury hospitalizations for individuals ages 15 to 24.

**Table 23. Motor Vehicle Crash Data for 2012**

	Hamilton County Number	Hamilton County Age Adj. Rate	Tennessee Age Adj. Rate	US Age Adj. Rate 2011
<b>Emergency Department Visits</b>	4,203	1,245.1	1,205.6	N/A
<b>Hospitalizations</b>	263	75.5	76.1	N/A
<b>Fatalities</b>	31	8.2	14.0	11.2

Source: Tennessee Department of Health, Division of Health Statistics (Hospital Discharge Data and Vital Statistics)

While overall mortality from automobile accidents has fallen in recent years, the rate of automobile crashes has risen. Tennessee Department of Safety and Homeland Security data suggest that distracted driving, including inattentive drivers and use of personal electronic devices, may have contributed to higher automobile crash rates.<sup>7</sup> Between 2008 and 2013, Hamilton County's overall automobile crash rate increased by 38.5% (from 36.8 to 51 crashes per 1,000 licensed drivers). Over the same time frame, distracted driver crash rates doubled (from 1.7 to 3.6 crashes per 1,000 licensed drivers), while rates of alcohol related crashes and injury crashes remained stable (Figure 47).

<sup>7</sup> The Tennessee Department of Safety and Homeland Security defines distracted driver as inattentive, texting/PDA/blackberry, GPS, cellular in use, computer, fax, printer, on-board navigation system, other electronic device, two way radio, head up display, other-inside vehicle, other-outside vehicle." Crash data excludes parking lot and private property crashes as well as crashes with less than \$400 damage.

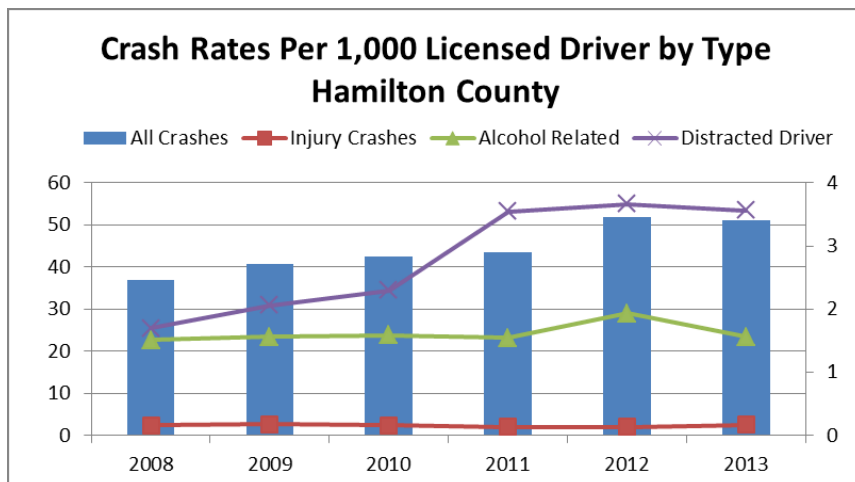


Figure 47 Source: Tennessee Department of Safety and Homeland Security

### Young Drivers

Crash rates among young drivers, ages 15 to 24, increased by 28% from 2008 to 2013 (from 126.8 to 162.6 per 1,000 licensed drivers).

In 2013, young drivers contributed to 5,206 motor vehicle crashes in Hamilton County, which was approximately 41% of all crashes. Hamilton County had the highest young driver crash rate in 2013 of all 95 Tennessee counties. Young driver crash rates for Tennessee's four largest metro counties in 2013 are detailed below.

Table 24. 2013 Hamilton County Ranking (of 95 Counties in Tennessee) for Young Driver Crashes

County	Number Crashes Drivers Aged 15-24	Crash Rate per 1,000 Drivers 15 to 24	State Rank (1=Worst, 95=Best)
Hamilton	5,206	162.6	1
Davidson	7,467	151.9	2
Shelby	12,105	151.8	3
Knox	5,855	138.6	7

Source: Tennessee Department of Safety and Homeland Security

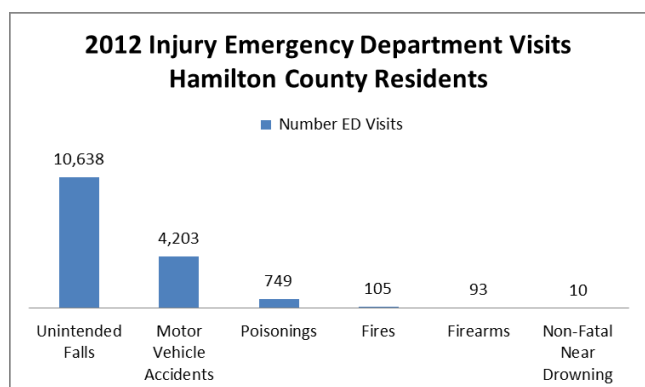
## Unintentional Falls

Three year age-adjusted death rates for unintentional falls have increased by 85% in Hamilton County from 2000 to 2013 (from 3.9 to 7.2 deaths per 100,000). In 2012, there were 10,638 Emergency Department (ED) visits, 986 hospitalizations, and 26 deaths from unintentional falls in Hamilton County.

**Table 25. Unintentional Falls Data for 2012**

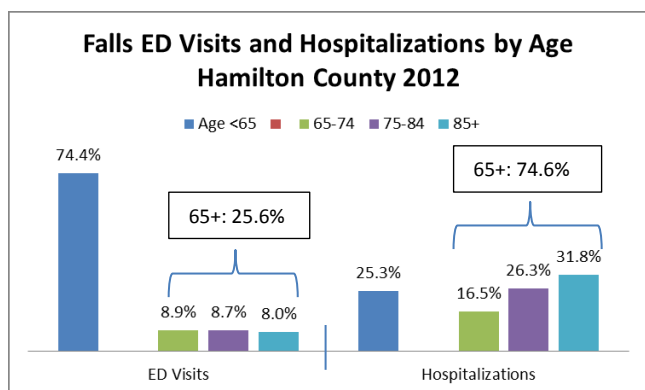
	Hamilton County Number	Hamilton County Age Adj. Rate	Tennessee Age Adj. Rate	US Age Adj. Rate 2011
<b>Emergency Department Visits</b>	10,638	3045.37	3305.71	N/A
<b>Hospitalizations</b>	986	240.84	254.52	283.71
<b>Fatalities</b>	26	5.8	8.6	8.0

Source: Tennessee Department of Health, Division of Health Statistics (Hospital Discharge Data and Vital Statistics)



**Figure 48 Source: Tennessee Department of Health, Division of Policy, Planning and Assessment**

- The leading cause of emergency department injury visits, unintentional falls accounted for more than twice the number of ED visits for motor vehicle accidents, poisonings, firearms, fires, and drowning combined.



**Figure 49 Source: Tennessee Department of Health, Division of Policy, Planning and Assessment**

- Unintentional falls are particularly worrisome for older adults who are more likely to require hospitalization for their injuries. While individuals 65 and older comprise 26% of ED falls visits, they make up 75% of hospital admissions for falls.
- In 2012, the average charge per hospital admission for a fall was \$38,051. These charges do not include emergency medical services, physician costs, or rehabilitation.

## Assault

After a downward trend from 2001 (9.2 per 100,000) to 2009 (6.6 per 100,000), three year age-adjusted death rates due to assault (homicide) increased to 8.3 per 100,000 by 2013.

In 2012, there were 1,531 Emergency Department (ED) visits, 74 hospitalizations, and 25 deaths from assault in Hamilton County. Of the 1,531 individuals visiting the ED for assault, 61% were between the age of 15 and 34.

**Table 26. Assault Data for 2012**

	Hamilton County Number	Hamilton County Age Adj. Rate	Tennessee Age Adj. Rate	US Age Adj. Rate 2011
Emergency Department Visits	1531	464.4	437.5	N/A
Hospitalizations	74	21.2	21.4	40.6
Fatalities (Homicide)	25	7.7	7.2	5.3

Source: Tennessee Department of Health, Division of Health Statistics (Hospital Discharge Data and Vital Statistics)

## Domestic Violence

Domestic, or partner, violence is defined as “the willful intimidation, physical assault, battery, sexual assault, and/or other abusive behavior perpetrated by an intimate partner against another.”<sup>li</sup> A 2013 report on the impact of domestic violence in the Tennessee economy stated that known domestic violence cases were responsible for over \$886 million in annual service cost and productivity loss.<sup>lii</sup> According to data from the Tennessee Bureau of Investigation annual report in 2013, there were 77,540 reported incidents of domestic violence across the state. In 2013, there were 2,883 reports of domestic violence among 12 reporting jurisdictions in Hamilton County<sup>liii</sup> (Table 27). By comparison, there were 3,409 reports of domestic violence among 12 reporting jurisdictions in Hamilton County in 2008.<sup>liv</sup>

**Table 27. Domestic Violence Offenses in Hamilton County, 2013**

Offense	Reported
Simple Assault	2,035
Aggravated Assault	663
Intimidation	81
Forcible Rape	27
Stalking	23
Forcible Fondling	22
Kidnapping/Abduction	18
Murder	4
Statutory Rape	4
Forcible Sodomy	2
Sexual Assault w/ Object	2
Incest	2
Total	2,883

Source: Tennessee Bureau of Investigation