HAMILTON COUNTY
PUBLIC HEALTH

PREVENT. PROMOTE. PROTECT.

Hamilton County Injury Surveillance System

2005 Report

Published: November 2008

Hamilton County
Injury Surveillance Report 2005

Hamilton County Public Health
Department of Community Health Services

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Suggested Citation:
Simon K, Folgers T. *Hamilton County Injury Surveillance System - 2005 Report*. Hamilton County, Ohio: Hamilton County Public Health. November 2008. http://hamiltoncountyhealth.org/en/resource_library/reports.html.

Introduction

The role of injury surveillance in public health is central to the fundamental tenet of public health practice: *prevention*. Injury surveillance is used to identify the types and distribution of problems that exist in our communities. Implementation of injury prevention programs requires reliable collection and analysis of surveillance data.

The goal of the Hamilton County Injury Surveillance System (HCISS) – 2005 Report is to present an analysis of injury trends and current statistics to show how injuries affect the health of Hamilton County residents. This analysis, in turn, can be used to pose questions about current and emerging problems, hypothesize why these problems occur, and formulate solutions to reduce the impact of injury.

Injury statistics in this report are of Hamilton County residents who died or who were treated in hospitals that provided data to the HCISS. Injuries are examined separately according to estimated injury severity based on outcome: deaths, hospitalizations and emergency department (ED) visits. For example, sports injuries are a common cause of ED visits, but do not often cause death. Data are also classified by mechanism group and intent. Full descriptions of data sources, classifications, and analyses can be found in the appendices.

Unless otherwise noted, figures and statistics represent data collected for 2005 only in order to better clarify trends or changes from previous years, which may indicate areas of need. In addition, analysis on a yearly basis helps to identify the effectiveness of existing interventions. All rates are crude rates unless otherwise noted. When assessing demographic groups, adequate numbers must be available in order to perform appropriate rate comparisons (n>20 per group). If these numbers are not available, demographic groups are excluded; for example, “other” race cannot be included when broken down by age group due to insufficient numbers.

Overview

Nationwide, it is estimated that injury accounts for over 33 million ED visits, hospitalizations or deaths, resulting in billions of dollars in health care costs and lost productivity (CDC, 2007). One way to assess the impact of injury in Hamilton County is to compare local statistics to those on a national and state level. In addition, the *Healthy People 2010* goals from the U.S. Centers for Disease Control and Prevention offer long-term goals for Hamilton County to measure success and progress.

Health People 2010 is a comprehensive set of national disease prevention objectives designed to measure the nation's progress over time. Critical, injury specific health objectives have been identified. Most objectives are not specific for adults, so the objectives are shown for the total population. Selected objectives are shown in **Table 1**. The national baseline, Hamilton County's rate/percent for the most current year, and the 2010 national target rate/percent, are provided for each objective for the total population.

Obj #	Objective	United States Baseline Percent/Rate* (yr)	U.S. 2005 Percent/Rate**(yr)	Hamilton Co. 2005 Percent/Rate * (yr)	2010 Target Percent/Rate*
2010 Injury Health Objectives					
15-01	Reduce hospitalizations for non-fatal head injuries	60.6 (1998)	NA	31.5	45
15-02	Reduce hospitalizations for nonfatal spinal cord injuries	4.5 (1998)	NA	1.5	2.4
15-03	Reduce firearm-related deaths	11.3 (1998)	10.3	13.4	4.1
15-05	Reduce nonfatal firearm-related injuries	24.0 (1997)	23.4	61.6	8.6
15-07	Reduce nonfatal poisonings	348.4 (1997)	279.9	264.4	292
15-08	Reduce deaths caused by poisonings	6.8 (1998)	10.95	14.6	1.5
15-12	Reduce hospital emergency department visits caused by injuries	131 per 1,000 persons (1997)	91.1 per 1,000	82.6 per 1,000	126 per 1,000 persons
Unintentional Injury Prevention					
15-13	Reduce deaths caused by unintentional injuries	35.0 (1998)	39.06	34.2	17.5
15-15	Reduce deaths caused by motor vehicle crashes	15.6 (1998)	15.22	7.3	9.2
15-16	Reduce pedestrian deaths on public roads	1.9 (1998)	1.64	1.2	1
15-17	Reduce nonfatal injuries caused by motor vehicle crashes	1,181 (1998)	882.4	1075.0	933
15-18	Reduce nonfatal pedestrian injuries on public roads	26 (1998)	47.5	55.0	19
15-19	Increase use of safety belts	69%	NA	77%[1]	92%
15-25	Reduce residential fire deaths	1.2 (1998)	1.25	0.5	0.2
15-27	Reduce deaths from falls	4.7 (1998)	6.6	11	3
15-29	Reduce drowning	1.6 (1998)	1.4	1	0.9
15-30	Reduce hospital emergency department visits for nonfatal dog bite injuries	151.4 (1997)	106.6	110.3	114
Violence and Abuse Prevention					
15-32	Reduce homicides	6.5 (1998)	6.1	11.2	3
Objective 18 Mental Health Disorders					
18-1	Reduce the suicide rate	11.3 (1998)	10.9	10.4	5

Table 1: Selected *Healthy People 2010* Injury-Specific Health Objectives

1 – DUI Task Force (Source observation study conducted by the Hamilton County Sheriff DUI task force
* Rates are per 100,000 persons unless otherwise noted
** Rates were obtained from WISQARS (www.cdc.gov/ncipc/wisqars/)
Orange shading indicates Hamilton County 2005 rate significantly above the US 2005 rate.
Green shading indicates Hamilton County 2005 rate significantly below the US 2005 rate.

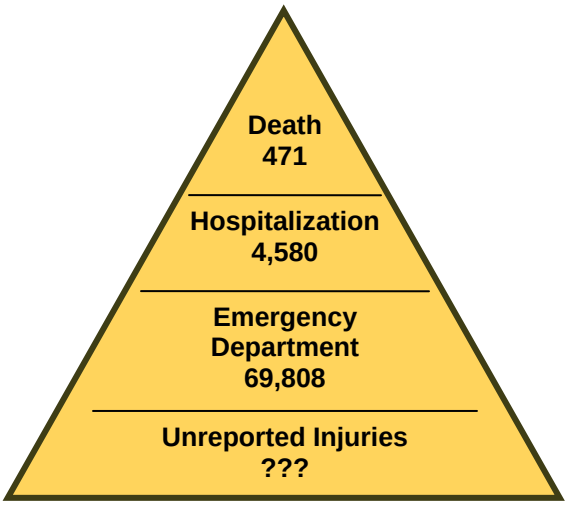

Figure 1: Injury Pyramid 2005

In 2005, there were 74,859 injuries reported in Hamilton County: an average of 205 injuries per day. This represents a decrease since 2004, when an average of 211 injuries per day was reported among Hamilton County residents. A breakdown of the number of injuries resulting in death, hospitalization, or emergency department visits can be seen in **Figure 1**.

When comparing age-specific rates of overall injury, individuals 1-4 years and those older than 85 years had the highest rate of injury; in general, injury rates are elevated for children and young adults (age 1-29), decrease through middle age, then increase in persons over the age of 85. (**Figure 2**). The factors that influenced these age-specific rates will be explored in further sections of this report. Overall, males have a higher rate of injury than women (9,700 vs 8,086 per 100,000).

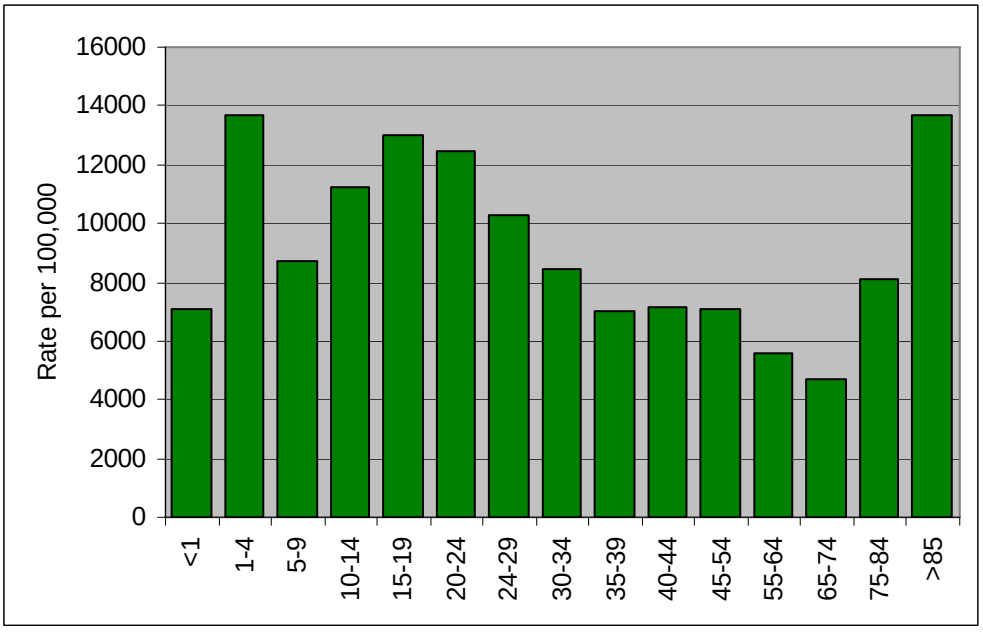

Figure 2: Age-specific Injury Rates, 2005

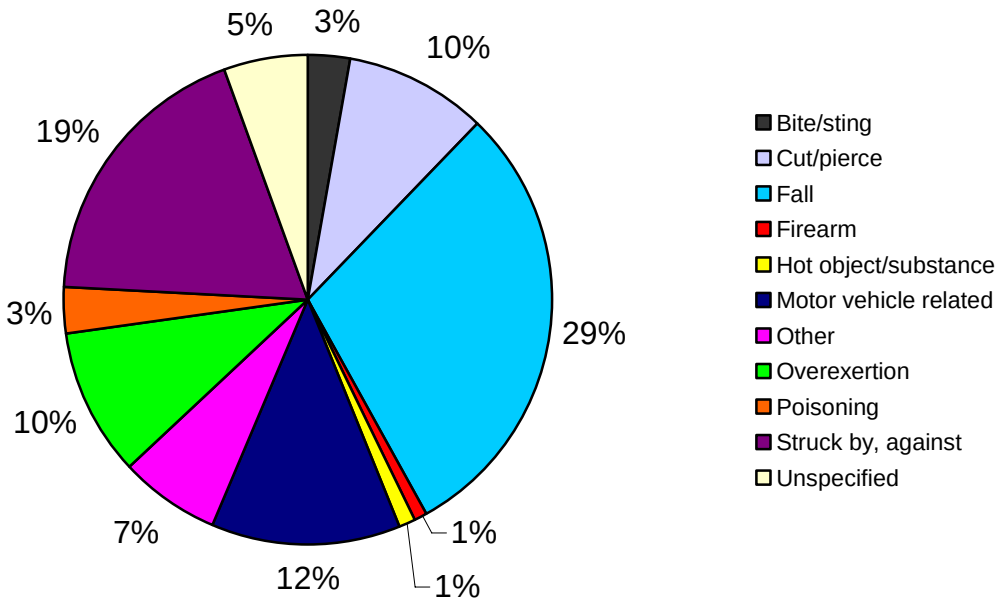

Figure 3: Mechanism of All Injury Types, 2005

When considering all injuries, the top three specified mechanisms in 2005 were falls; struck by, against injuries; and motor vehicle related injuries (**Figure 3**). Falls were among the top three mechanisms of injury for deaths, hospitalizations, and ED visits. Struck by, against injuries are those due to being hit by a falling object, striking objects or people (including sports injuries), fights, rapes, and assault with a blunt object; most of these injuries resulted in ED visits only. Motor vehicle related injuries include motor vehicle accidents involving occupants, motorcyclists, bicyclists, and pedestrians. Motor vehicle injuries were one of the top three mechanisms for both injury hospitalizations and ED visits, but not deaths. Trends specific to these mechanisms are discussed in this report as well.

Section I
Injury Emergency Department Visits

Emergency department (ED) visits, which for this report are discharged visits, represent the least severe injuries in our surveillance system; these injuries did not result in subsequent hospitalization or death. We have seen a decrease of over 10,000 visits since 1999, hence leading to a significant downward trend in rates (**Figure 4**, p=0.02). However, injuries still accounted for 69,808 ED visits in 2005.

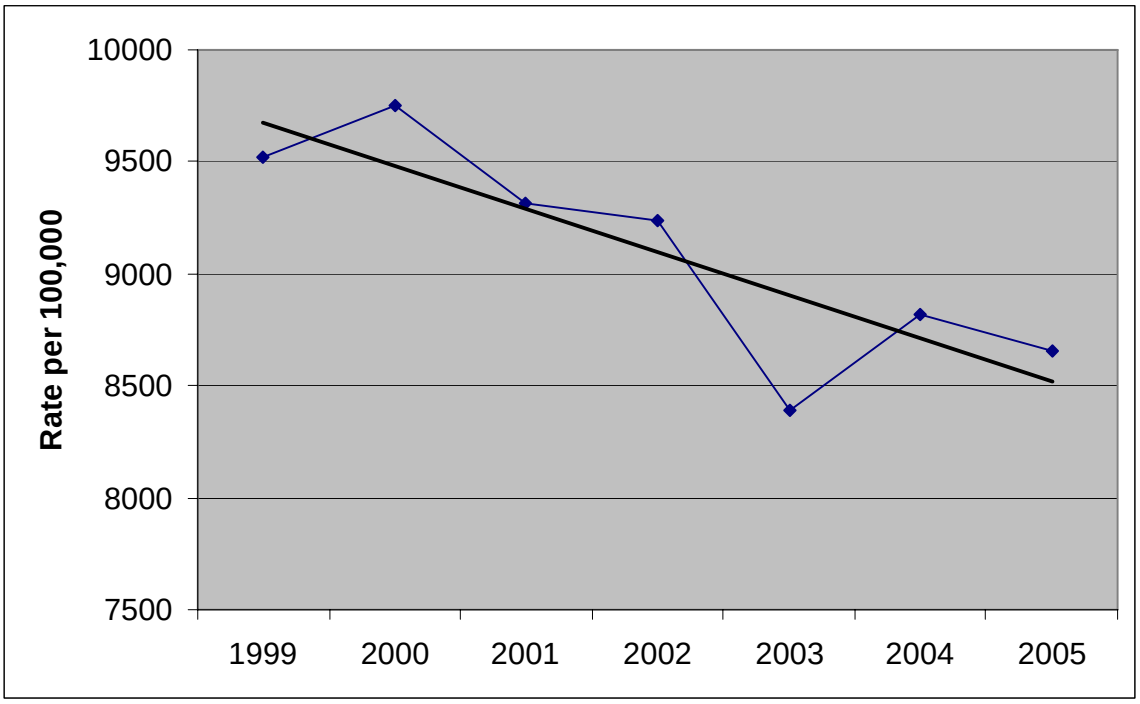

Figure 4: Injury ED Rates, by Year, 1999-2005

* Inadequate numbers available to calculate rates for “other” race group

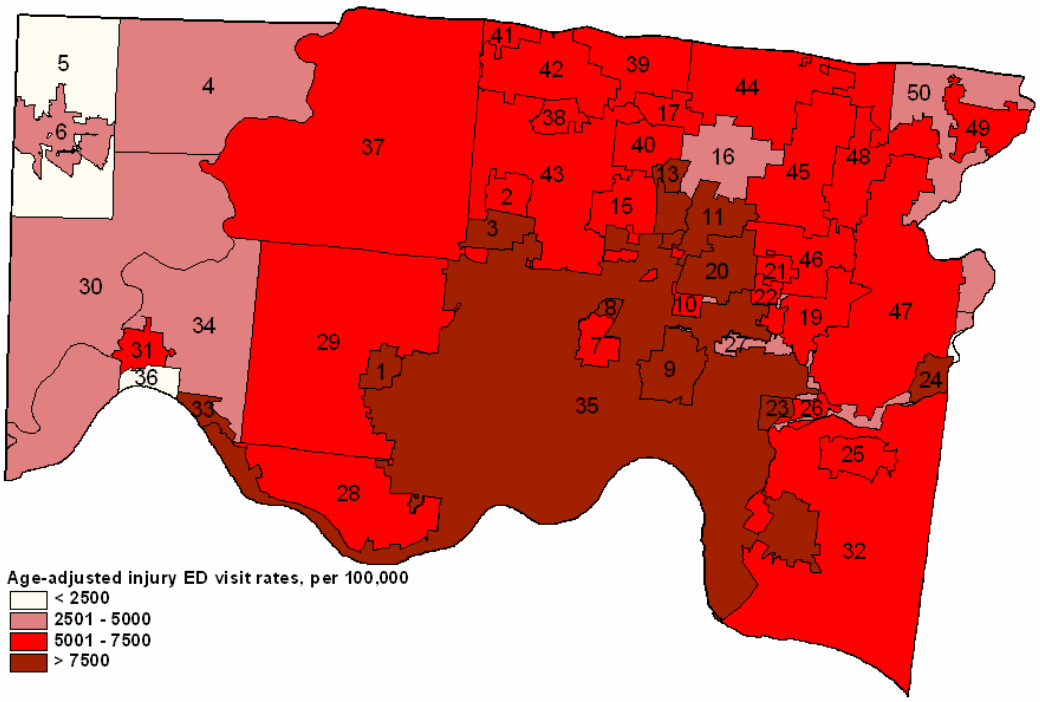

Figure 5: Map of Age-Adjusted ED Injury Rates by Municipality, 2005

1	CHEVIOT	11	READING	21	DEER PARK	31	CLEVES	41	FAIRFIELD
2	MOUNT HEALTHY	12	ARLINGTON HEIGHTS	22	SILVERTON	32	ANDERSON TOWNSHIP	42	FOREST PARK
3	NORTH COLLEGE HILL	13	LINCOLN HEIGHTS	23	FAIRFAX	33	ADDYSTON	43	SPRINGFIELD TOWNSHIP
4	CROSBY TOWNSHIP	14	LOCKLAND	24	TERRACE PARK	34	MIAMI TOWNSHIP	44	SHARONVILLE
5	HARRISON TOWNSHIP	15	WYOMING	25	NEWTOWN	35	CINCINNATI	45	BLUE ASH
6	HARRISON	16	EVENDALE	26	MARIEMONT	36	NORTH BEND	46	SYCAMORE TOWNSHIP
7	SAINT BERNARD	17	GLENDALE	27	COLUMBIA TOWNSHIP	37	COLERAIN TOWNSHIP	47	INDIAN HILL
8	ELMWOOD PLACE	18	MILFORD	28	DELHI TOWNSHIP	38	GREENHILLS	48	MONTGOMERY
9	NORWOOD	19	MADEIRA	29	GREEN TOWNSHIP	39	SPRINGDALE	49	LOVELAND
10	GOLF MANOR	20	AMBERLEY VILLAGE	30	WHITEWATER TOWNSHIP	40	WOODLAWN	50	SYMMES TOWNSHIP

Differing community populations can sometimes mask the actual burden of injury. Using age-adjusted rates per Hamilton County municipality standardizes our comparison so that the rate for any community is not biased by its underlying population (e.g., an older than average population (**Appendix B**). However, these rates should be interpreted with caution, as they represent a only one year of injury data. Comparing age-adjusted rates (**Figure 5**), the municipalities with the highest ED injury rates were Elmwood Place(11,221 per 100,000), Addyston (10,383 per 100,000), and Arlington Heights (9983 per 100,000). Falls were the most common mechanism of ED injuries in these jurisdictions.

* Inadequate numbers available to calculate rates for “other” race group

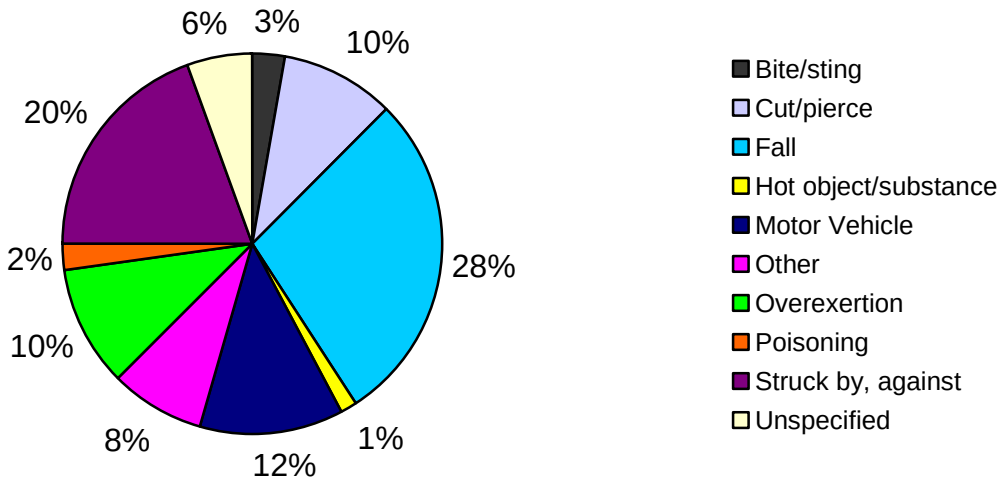

Figure 6: ED Injury Mechanisms, 2005

The three highest causes of ED visits due to injury were: falls (n=19,766, 28%); struck by,against injuries (n=13,620, 20%); and motor vehicle related injuries (n=8534, 12%) (**Figure 6**). These have remained the top three mechanisms of ED injury since 1999, although the counts have since decreased. Since 1999, counts of ED visits for all mechanism categories have decreased with the exception of firearms: the number of these visits has increased steadily, from 101 in 1999 to 351 in 2005.

Over two-thirds (68.5 %) of ED injuries did not have a place of injury specified, indicating that places of injury are undercounted. However, of those that did list a specific place of injury, the most likely locations were home (n=7147, 15.7 %), street or highway (n=5432, 11.9%), and place of recreation/sport (n=3530, 7.7%). The vast majority (91.8%) of ED visit injuries were unintentional in intent.

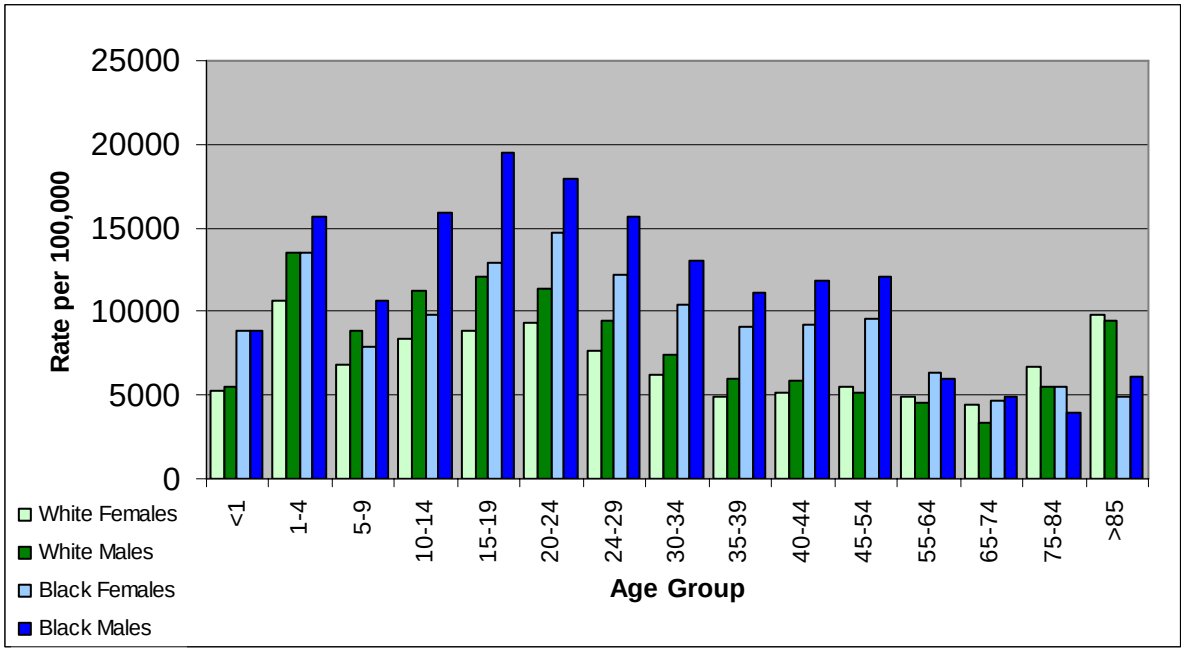

Figure 7: Group-Specific ED Injury Rates, by Age, Race* and Sex, 2005

Black males between the ages of 10 and 29 had the highest rates of ED visits caused by injury; within this group, 30% of the ED visits were due to struck by, against injuries, 14% due to falls, and 13% due to motor vehicle accidents. Black males and females consistantly had higher ED rates than their white counterparts between the ages of 10 and 54 (**Figure 7**). The rate difference between races in this age range was partially caused by a significantly higher rate of "unspecified or other specified" injuries (1,905 per 100,000 for black versus 845 per 100,000 for white populations, $p<0.001$). Over the age of 85, the trend was reversed, and the white population had a higher ED rate than the the black population (**Figure 7**). The difference was likely caused by a higher rate of falls (7,536 per 100,000 for white versus 3,407 per 100,000 for black populations, $p<0.001$).

* Inadequate numbers available to calculate rates for "other" race group

ED Injury Visits: Falls

Falls remained the top mechanism for ED injury visits in 2005; however, a significant downward trend was observed from 1999-2005 (**Figure 8**, p =0.01).

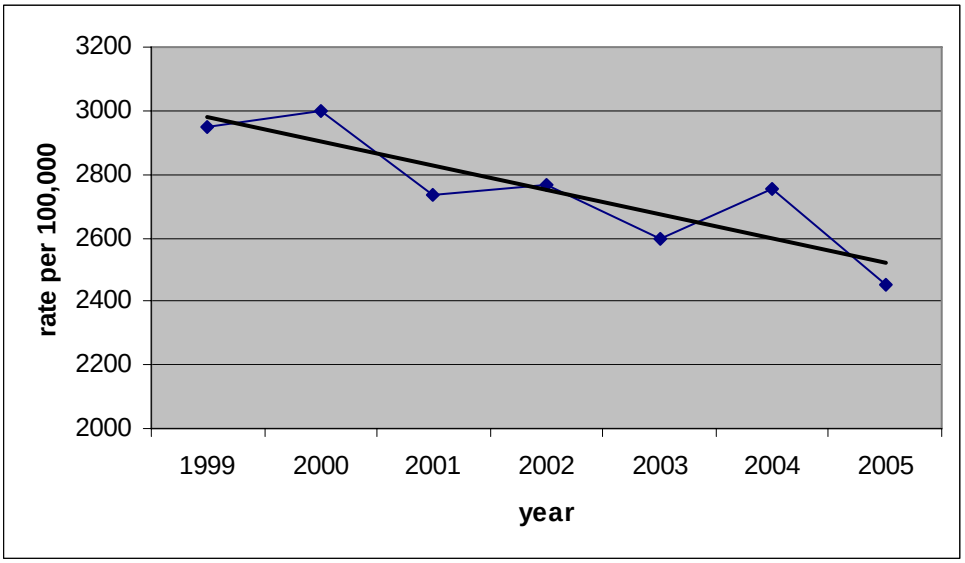

Figure 8: ED Falls Rates, Per Year, 1999-2005

The highest rate of falls occurred in the persons over the age of 85. Differences between white and black populations* may be influenced by fracture rates, as will be discussed with hospitalizations due to falls (**Figure 22**).

Children, from age zero to 14, also had high rates of falls. When place of injury was specified, the percentage of children who fell at a place of "recreation or sport" was over twice that of all others in the population (11.1% versus, 4.5%); however, a lower percentage of their falls occurred at home (children: 10.4% verus other pop: 29.0%). However, these differences may reflect coding differences at facilities that are more likely to treat children.

* Inadequate numbers available to calculate rates for "other" race group

ED Injury Visits: Struck by / Against

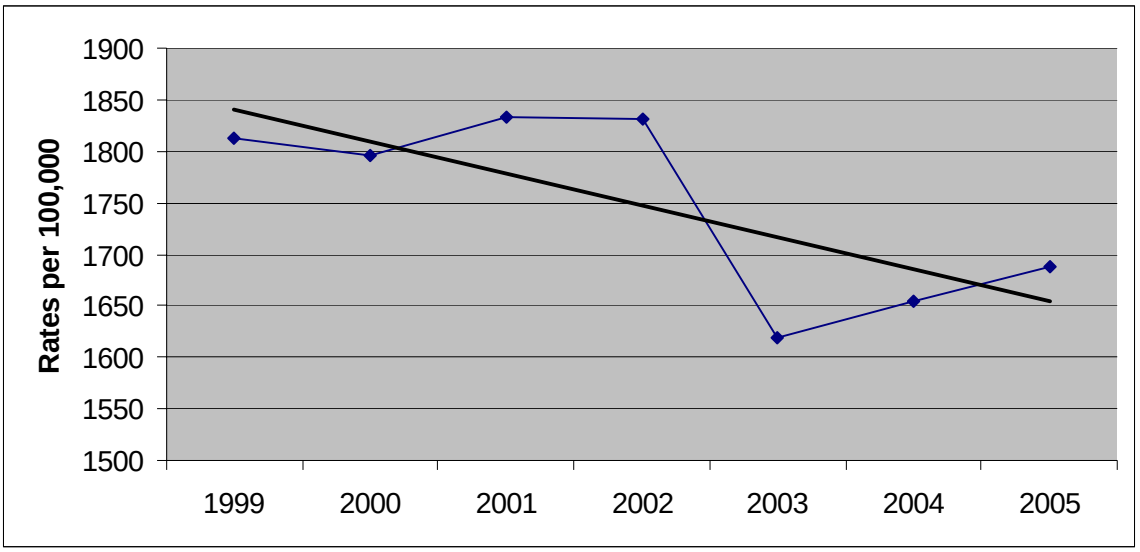

Figure 9: ED Rates, Struck by, against, per Year, 1999-2005

Struck by, against injuries are those due to being hit by a falling object, striking objects or people (including sports injuries), fights, rapes, and assault with a blunt object. ED Injuries in the struck by, against category decreased from 1999 to 2005 (**Figure 9**, p=0.05). The largest drop off in the struck by, against category was seen between 2002 and 2003. Between these two years, sprains and strains saw the greatest percent decrease, dropping by 24%.

When specified, the most common place that struck by, against injuries occured was at a place of "recreation and sport."

* Inadequate numbers available to calculate rates for "other" race group

Struck by, against injuries were distributed evenly on weekdays and peaked on weekends. (**Figure 10**). While some of this may be due to medical access issues (i.e., not being able to see a primary physician on the weekend), these numbers may also reflect real differences between weekday versus weekend activities. Injuries in all categories of stuck by, against increased on the weekends, but fights, brawls and other assaults increased the most. The average number of injuries resulting from fights, brawls and other assaults was 44% higher than the average for Monday through Friday. Adult (age 20-64) struck by, against injuries increased by an average of 201 visits on the weekends, versus an average increase of 82 for children age 0-19.

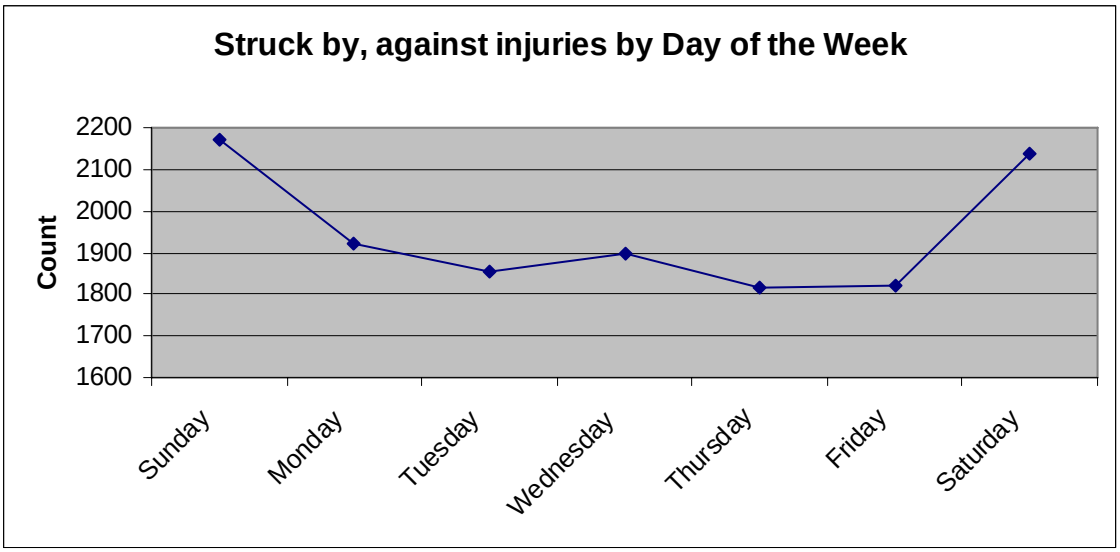

Figure 10: Struck by, against injuries by Day of the Week, 2005

* Inadequate numbers available to calculate rates for “other” race group

ED Injury Visits: Motor Vehicle Related

Motor vehicle related ED injuries have decreased significantly since 1999 (**Figure 11**, $p<0.001$). Residents between the ages of 15 and 29 had the highest rate of motor vehicle injuries recorded in the ED category (**Figure 12**). Data from the Ohio Department of Public Safety indicate this age group is also less likely to wear seatbelts (82% usage versus 89% for drivers over 35). Drivers in this age group who crashed were also more likely to be impaired by alcohol (2.3% of crashes versus 1.3% for drivers over 35). Overall, males and females had nearly identical rates of motor vehicle injury- 1,064 per 100,000 for females versus 1,034 per 100,000 for males. This differs from motor vehicle hospitalizations, where the majority of injuries were to males, suggesting males are involved in more severe motor vehicle accidents.

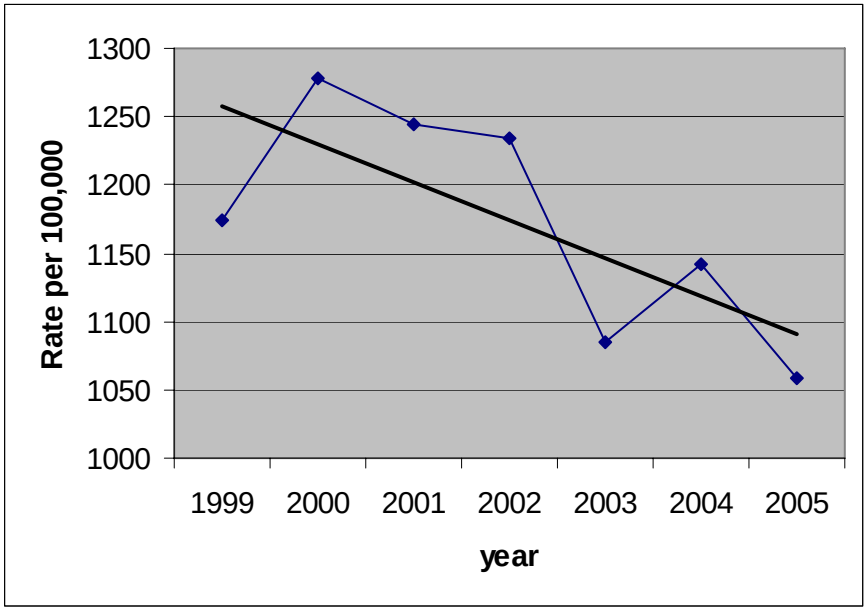

Figure 11: ED Rates, Motor Vehicle Related, per Year, 1999-2005

When comparing specific rates for age, race,* and sex, black males and females between 20 and 35 had the highest rates per 100,000. Rates for motor vehicle injuries to blacks were statistically higher than that for whites ages 20 through 84 ($p<0.001$ for all age group comparisons).

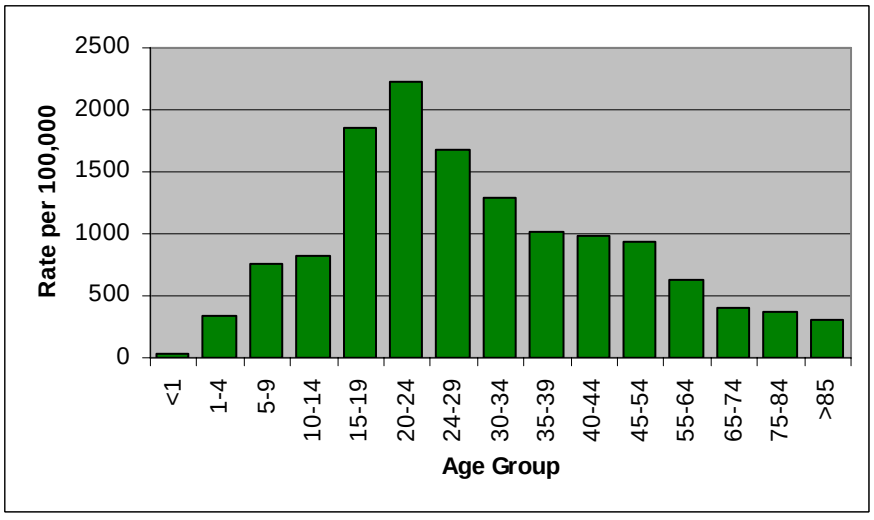

Figure 12: Age-Specific Rates, ED Motor Vehicle Injuries, 2005

* Inadequate numbers available to calculate rates for "other" race group

Injury Hospitalizations

The next level of severity is injury hospitalization; these are patients that were hospitalized for their injuries. There were 4,580 hospitalizations due to injury in 2005. Since 1999, rates of injury hospitalization have shown a slight upward, though insignificant, trend. (**Figure 13**, p>0.5).

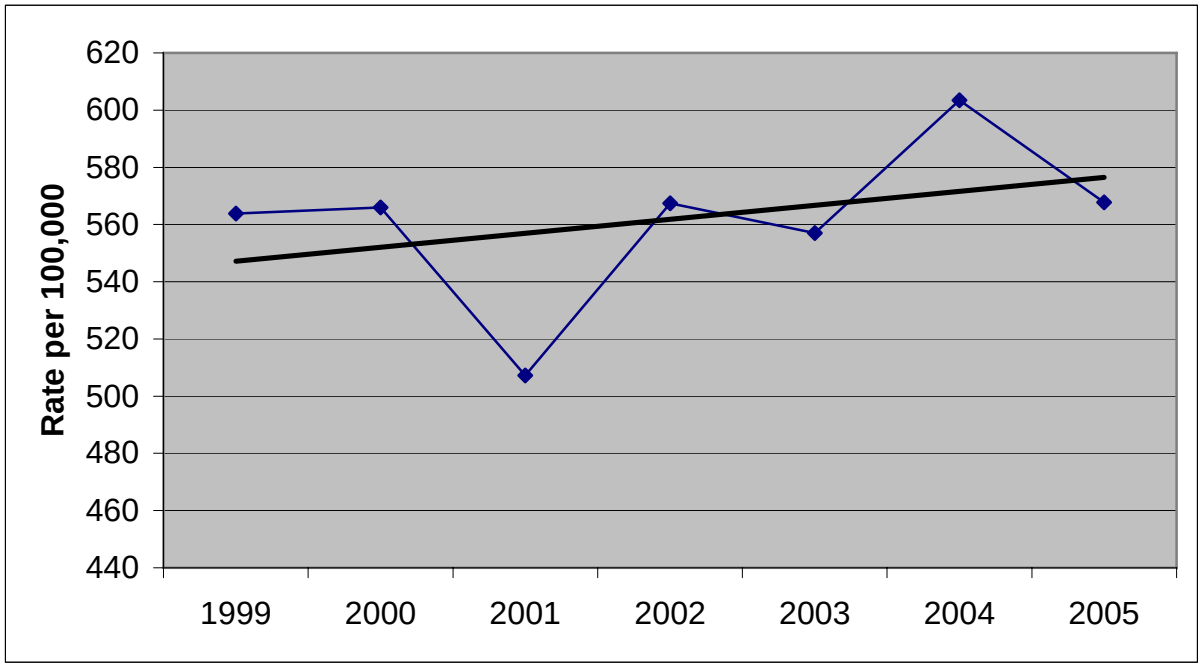

Figure 13: Injury Hospitalization Rate, per Year, 1999-2005

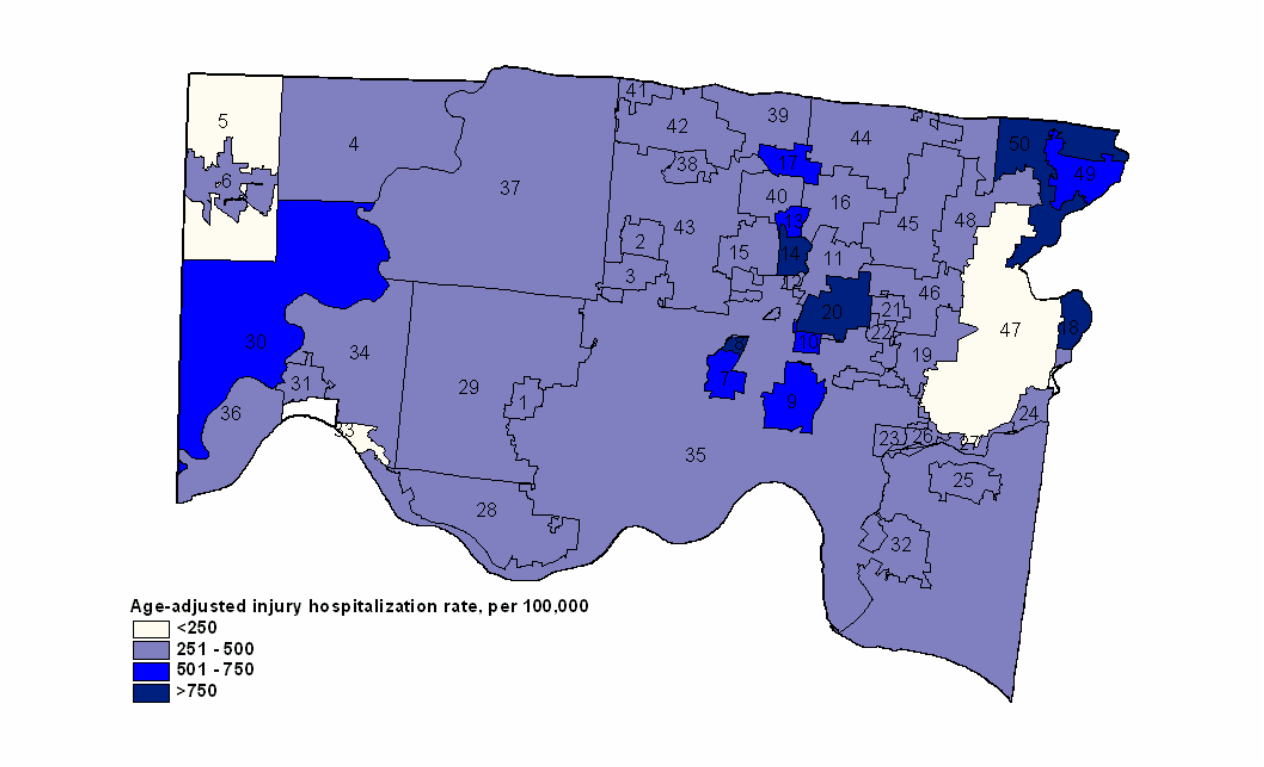

Figure 14: Map of Age-adjusted Injury Hospitalization Rates by Municipality, 2005

1	CHEVIOT	11	READING	21	DEER PARK	31	CLEVES	41	FAIRFIELD
2	MOUNT HEALTHY	12	ARLINGTON HEIGHTS	22	SILVERTON	32	ANDERSON TOWNSHIP	42	FOREST PARK
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9	NORWOOD	19	MADEIRA	29	GREEN TOWNSHIP	39	SPRINGDALE	49	LOVELAND
10	GOLF MANOR	20	AMBERLEY VILLAGE	30	WHITEWATER TOWNSHIP	40	WOODLAWN	50	SYMMES TOWNSHIP

Amberley Village (1,244 per 100,000), Lockland (852 per 100,000), and Elmwood Place (814 per 100,000) had the highest age-adjusted injury rates in Hamilton County. Falls were the most common injuries requiring hospitalization for each of these jurisdictions. Age-adjusted rates for 2005, while good for comparison of one year, should be interpreted with caution as they represent a relatively short time frame.

Falls were the most likely mechanism of injury hospitalizations (n=2,143), followed by poisonings (n= 827) and motor vehicle related accidents (n=553, **Figure 15**). 77.8 percent of all injury hospitalizations were unintentional.

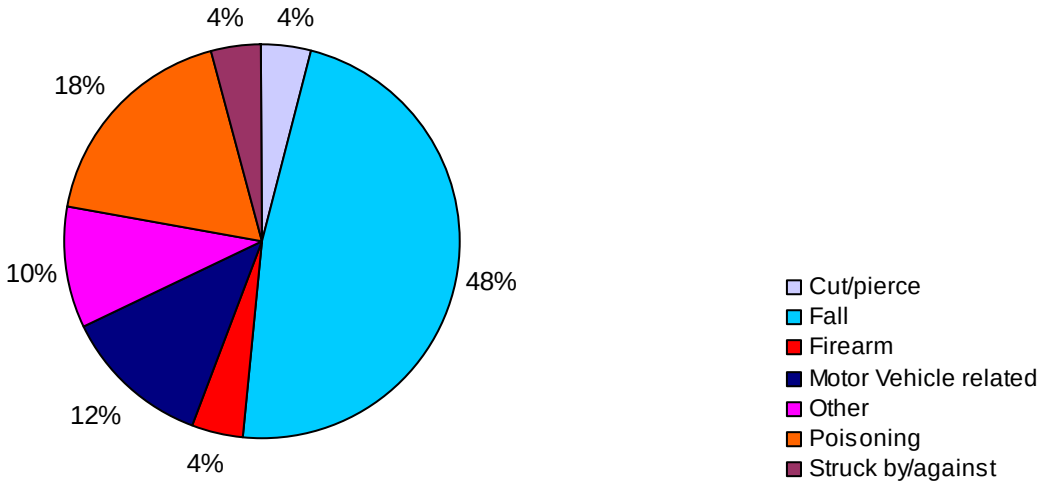

Figure 15: Mechanism of Injury Hospitalizations, 2005

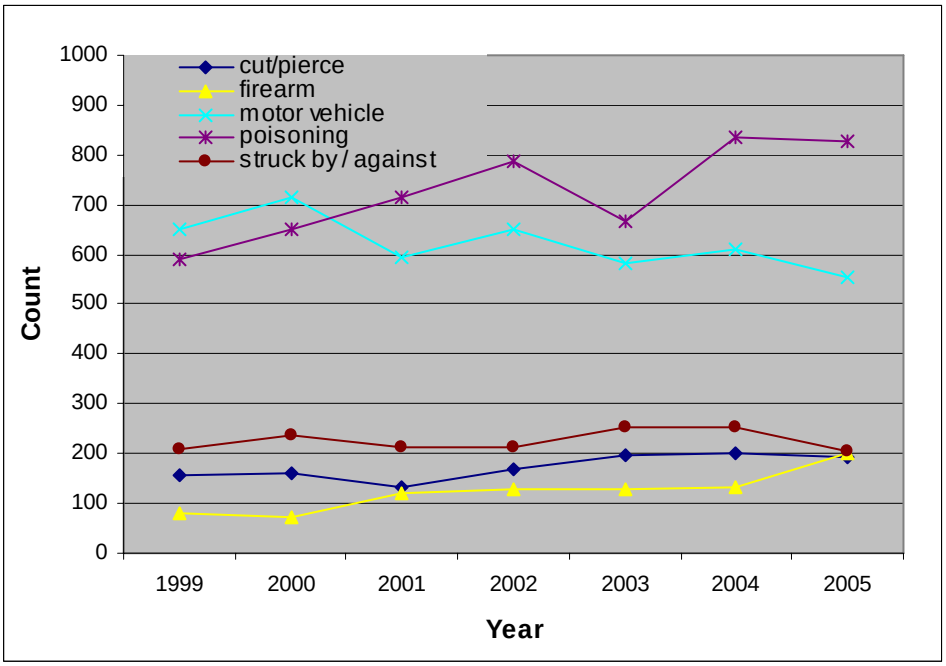

Figure 16: Mechanism of Injury Hospitalizations, by Year, 1999-2005

Falls have consistently been the number one mechanism of injury hospitalization (falls are not included in the above chart as they would minimize the scale of other mechanism trends). However, the rate of falls hospitalizations decreased from 1999 to 2005, as can be seen in **Figure 18**. Conversely, hospitalizations caused by firearm and poisoning injuries have increased in the same time period (**Figure 16**). Injury hospitalizations due to motor vehicle crashes decreased, and hospitalizations due to cut/pierce and struck by, against injuries remained steady.

Home was the most common place for injuries to occur that required hospitalization. The majority of the injuries that did occur in the home were falls (n=1,021, 63.6% of injuries in the home).

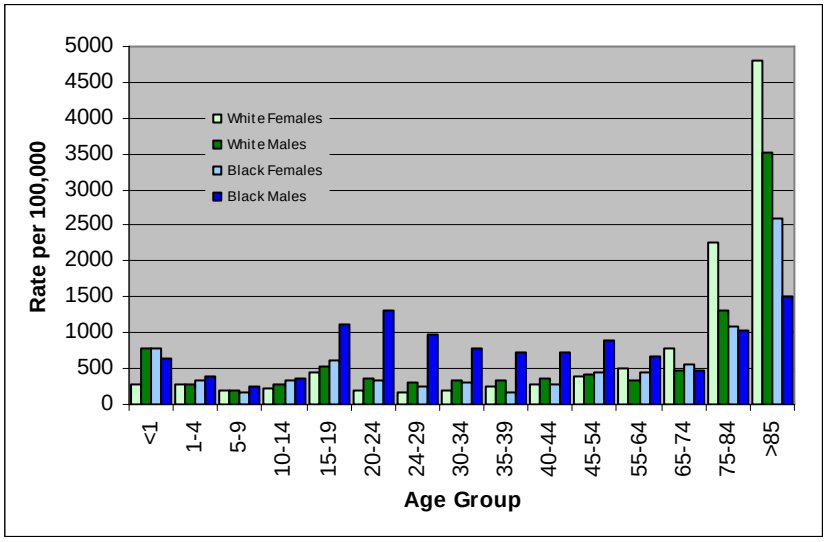

Figure 17: Group-specific Rates of Injury Hospitalization, by Age, Race* and Sex, 2005

The age-specific rate of injury hospitalizations is highest for white women over the age of 85 (**Figure 17**). In general, white males and females over the age of 65 had a higher rate of injury hospitalizations than black males and females over 65*. This may be due to higher falls injury hospitalizations in those groups (see **Injury Hospitalization: Falls** in subsequent section)

Black males between the ages of 15 and 55 also had high rates of injury hospitalization. In this demographic, the most common mechanism for hospitalization was firearm (n=145), followed by poisoning (n=89) and motor vehicle related injuries (n=62).

* Inadequate numbers available to calculate rates for “other” race group

Injury Hospitalizations: Falls

Injury hospitalizations due to falls decreased significantly from 1999 to 2005. (**Figure 18**, $p<0.01$).

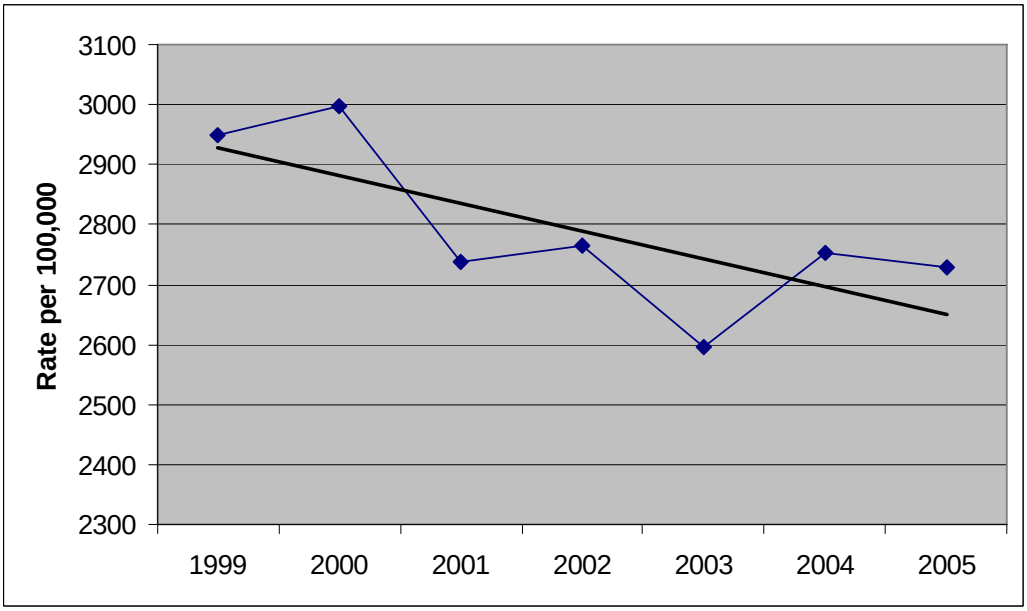

Figure 18: Hospital Falls Rates, by Year, 1999-2005

Falls hospitalizations disproportionately affect older adults; this trend will also be seen in deaths. As seen in **Figure 17**, the rate of injury hospitalizations for white males and females over the age of 85 was higher than black males and females over 85*. Higher fracture rates for white women over the age of 85 clearly contribute to the rate differences (**Figure 19**).

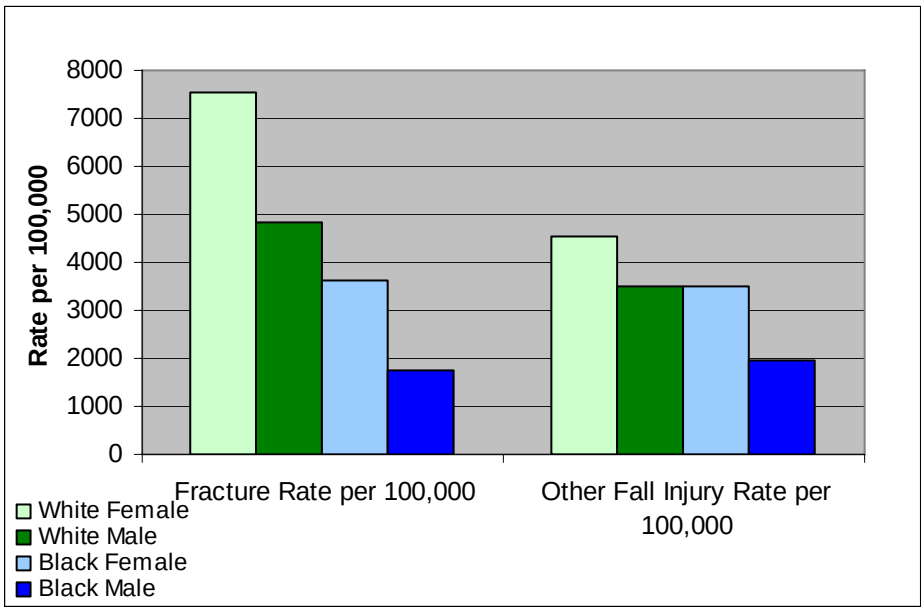

Figure 19: Rates of Fracture Injuries versus Other Injuries as the Result of a Fall, by Race* and Sex, 1999-2005

* Inadequate numbers available to calculate rates for "other" race group

Injury Hospitalizations: Poisonings

Hospitalizations due to poisonings constituted 20% of all injury hospitalizations in 2005. These hospitalizations could have been for medical or psychiatric reasons (e.g., for psychiatric evaluation following suicide attempt). Moreover, the number of hospitalizations due to poisoning has shown a significant upward trend since 1999 (See **Figure 16**; $p<0.01$). The majority of the poisoning hospitalizations were self-inflicted (**Figure 20**), indicating that these injuries were different than deaths from poisoning, which are mainly unintentional. The top three substances identified in self-inflicted poisoning hospitalizations are tranquilizers (n=188), analgesics/painkillers (n=120), and other specified drugs (n=101).

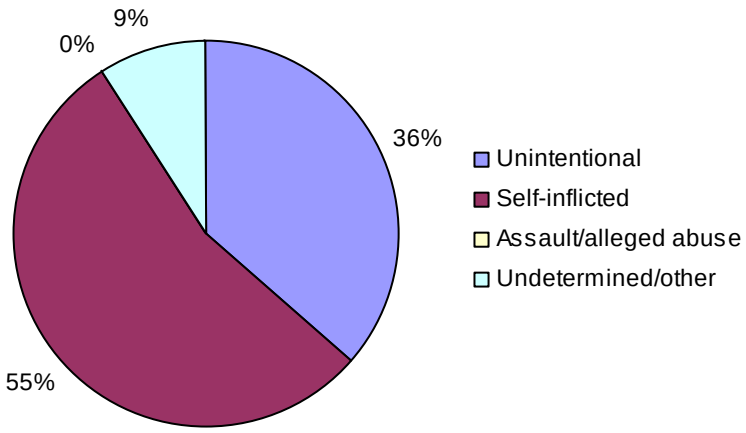

Figure 20: Poisoning Hospitalizations by Intent, 2005

Residents between the ages of 15 and 19 had the highest rate of hospitalizations caused by poisonings (**Figure 21**). Within this age group, 87% (n=101) of the hospitalizations were self-inflicted. The most common substances identified were analgesics/painkillers and tranquilizers.

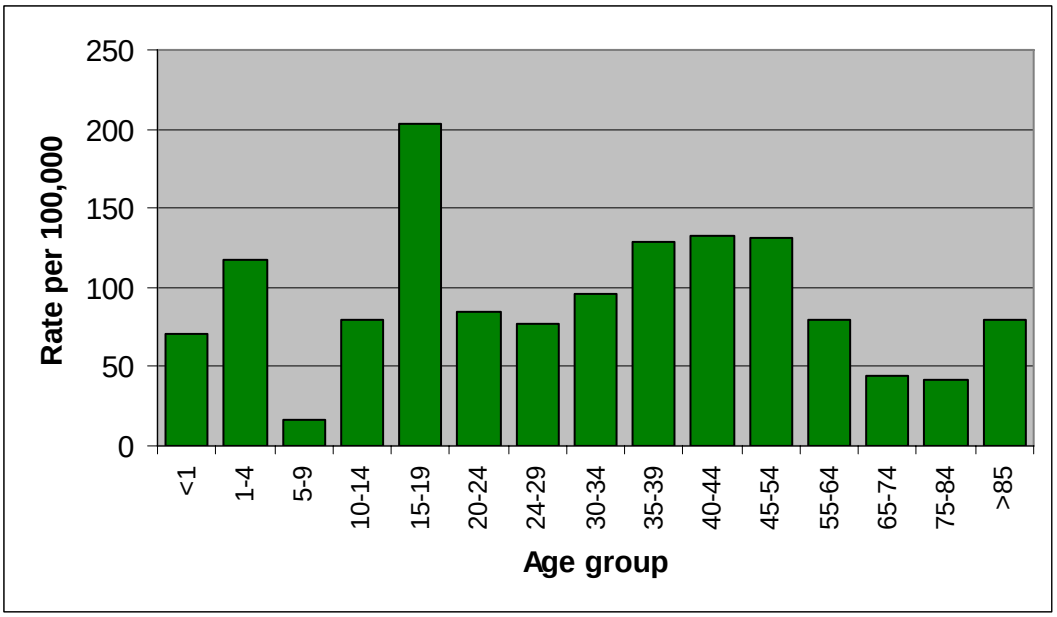

Figure 21: Hospitalizations due to Poisoning, Age-Specific Rates, 2005

Injury Hospitalizations: Motor Vehicles

Motor vehicles incidents were the third leading cause of injury hospitalizations for 2005. As shown in **Figure 17**, hospitalizations due to motor vehicle injury have decreased since 1999. An increase in age-specific rates can be seen starting in the 5-9 age group; age-specific rates for motor vehicle hospitalizations were highest for 20-24 and 15-19 year olds (**Figure 22**). Males accounted for the majority (61.7%) of motor vehicle hospitalizations.

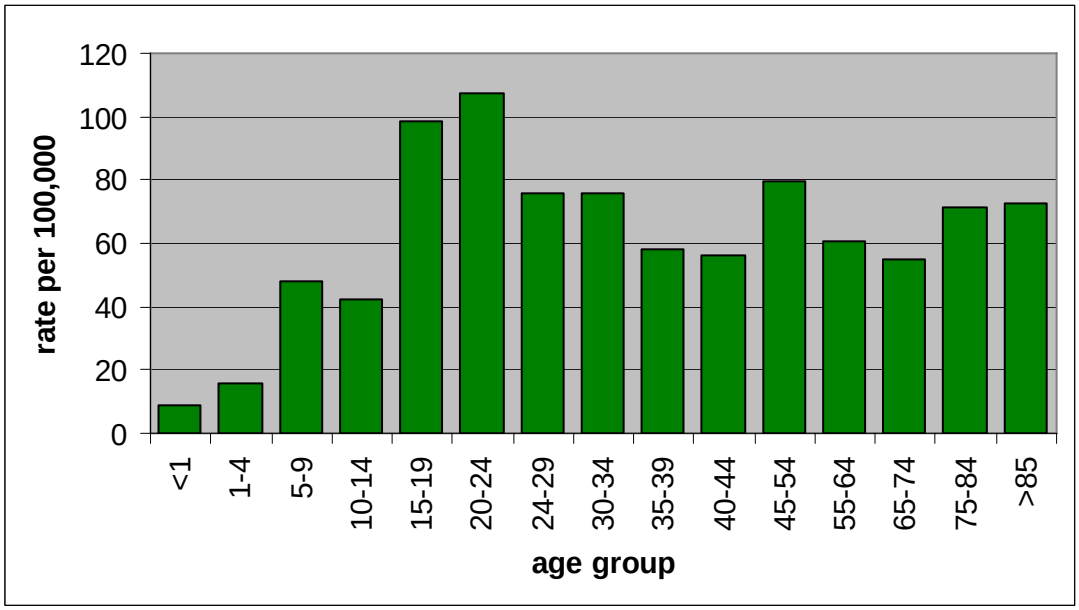

Figure 22: Motor Vehicle Hospitalizations, Age-Specific Rates, 2005

With the exception of the months September and October, 2005 saw fewer than average motor vehicle hospitalizations per month (average for years 1999-2004, **Figure 23**).

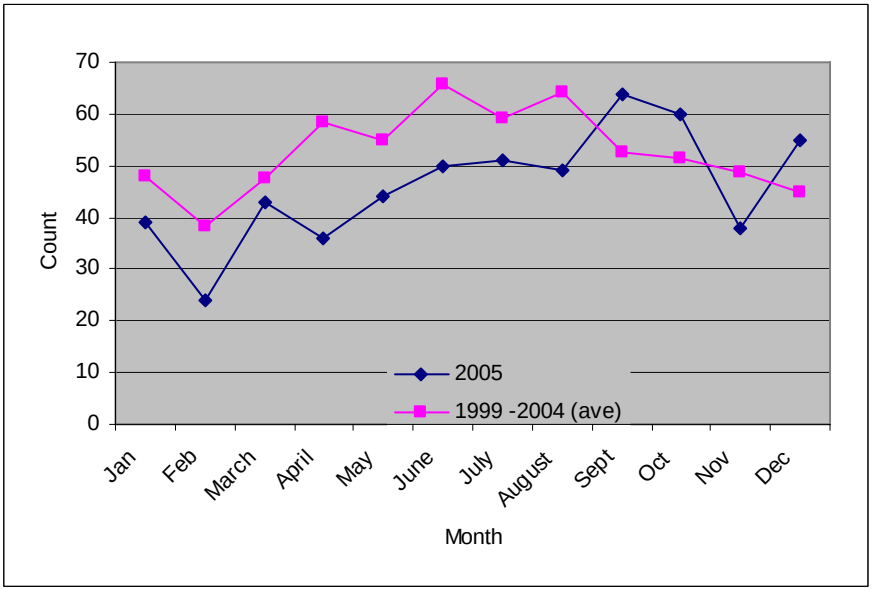

Figure 23: MV Hospitalizations by Month, 2005 and 1999-2004 (average)

Injury Deaths

Rank	Cause	Number
1	All Malignant Cancer	1,559
2	Heart Disease	1,143
3	**Injury**	**1,103**
Total No. of Deaths Under Age of 65		6,175
Percent of All Deaths Under Age of 65 due to injuries		**17.9%**

Table 2. Top Three Leading Causes of All Deaths in Persons Under 65 Years of Age – Hamilton County, Ohio, 2004-2006 (Ohio Department of Health)

Although injury deaths represent a small proportion of all injuries (**Overview, Figure 1**), they still contribute greatly to mortality in Hamilton County. Injury is the third leading cause of death for Hamilton County residents under the age of 65 (**Table 2**). The resulting mortality rate from injury is higher than the injury mortality rate for the state of Ohio, and shows an upward (although statistically insignificant) trend since 1999 (**Figure 24**, p = 0.13).

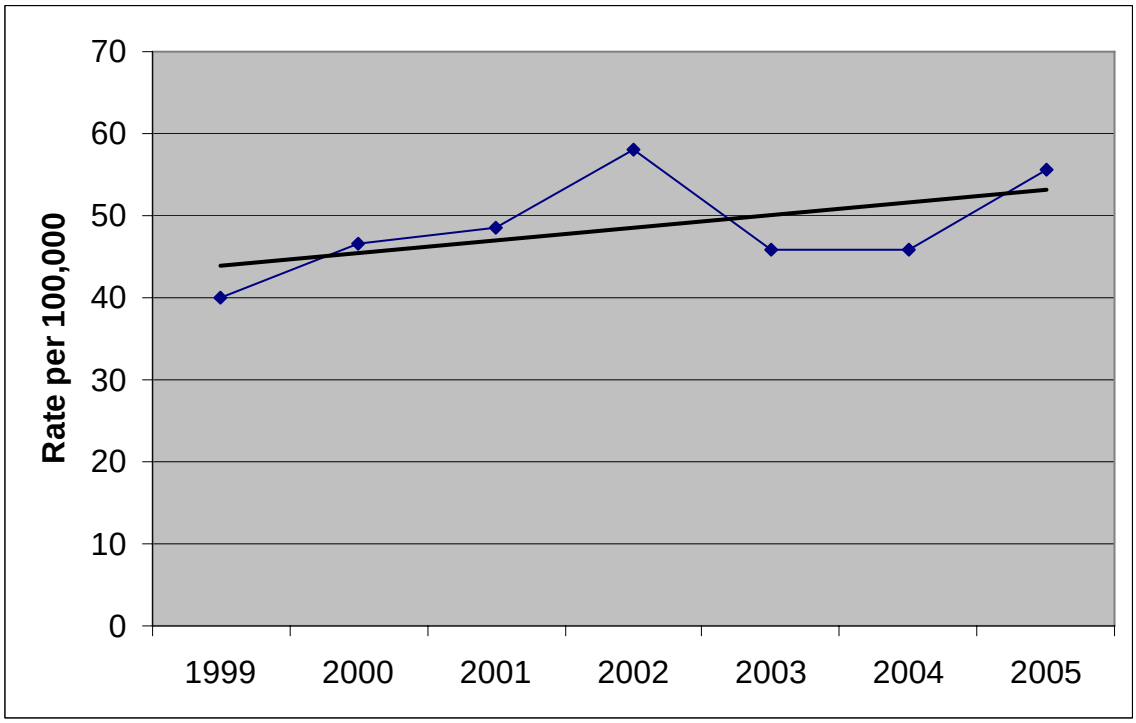

Figure 24: Mortality Rate due to Injuries per Year, 1999-2005

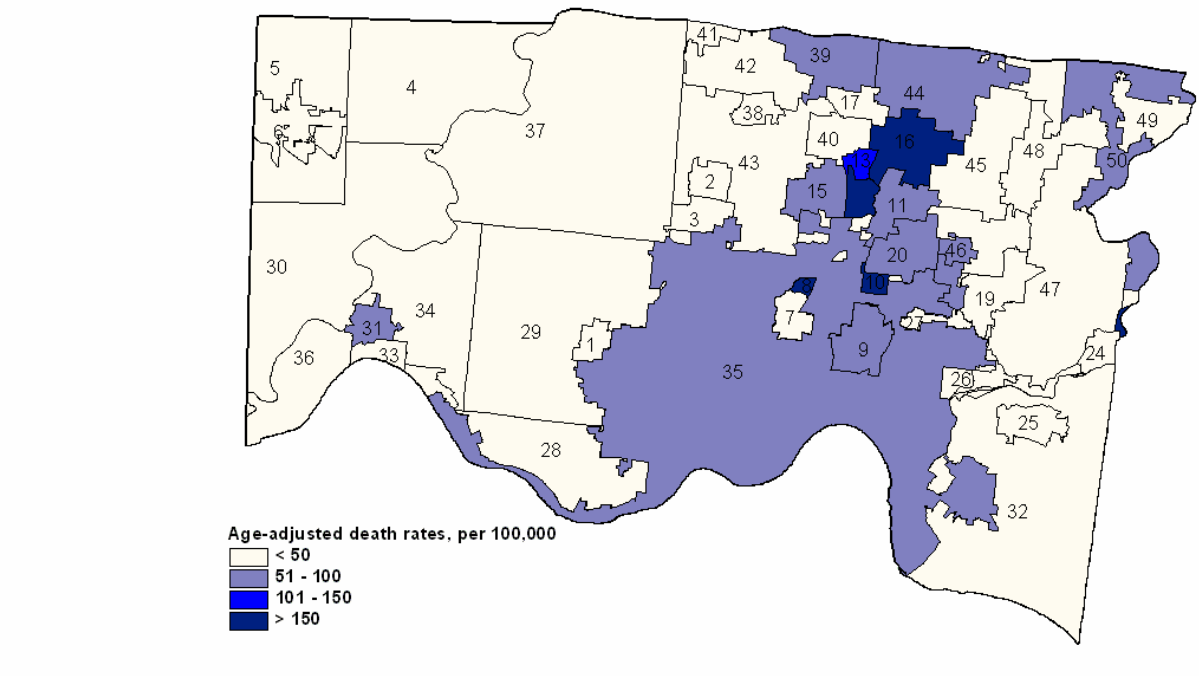

Figure 25: Map of Age-adjusted Injury Death Rates, by Municipality, 2005

1	CHEVIOT	11	READING	21	DEER PARK	31	CLEVES	41	FAIRFIELD
2	MOUNT HEALTHY	12	ARLINGTON HEIGHTS	22	SILVERTON	32	ANDERSON TOWNSHIP	42	FOREST PARK
3	NORTH COLLEGE HILL	13	LINCOLN HEIGHTS	23	FAIRFAX	33	ADDYSTON	43	SPRINGFIELD TOWNSHIP
4	CROSBY TOWNSHIP	14	LOCKLAND	24	TERRACE PARK	34	MIAMI TOWNSHIP	44	SHARONVILLE
5	HARRISON TOWNSHIP	15	WYOMING	25	NEWTOWN	35	CINCINNATI	45	BLUE ASH
6	HARRISON	16	EVENDALE	26	MARIEMONT	36	NORTH BEND	46	SYCAMORE TOWNSHIP
7	SAINT BERNARD	17	GLENDALE	27	COLUMBIA TOWNSHIP	37	COLERAIN TOWNSHIP	47	INDIAN HILL
8	ELMWOOD PLACE	18	MILFORD	28	DELHI TOWNSHIP	38	GREENHILLS	48	MONTGOMERY
9	NORWOOD	19	MADEIRA	29	GREEN TOWNSHIP	39	SPRINGDALE	49	LOVELAND
10	GOLF MANOR	20	AMBERLEY VILLAGE	30	WHITEWATER TOWNSHIP	40	WOODLAWN	50	SYMMES TOWNSHIP

The highest age-adjusted mortality rates due to injury were in Evendale (219 deaths per 100,000), Golf Manor (213 per 100,000) and Elmwood Place (204 per 100,000, **Figure 25**). In Evendale and Elmwood Place, falls and MV related injuries were the cause of most injury deaths, while in Golf Manor the main mechanisms were MV and firearms. While a useful tool for comparison, these rates should be interpreted with caution as they represent just one year of data.

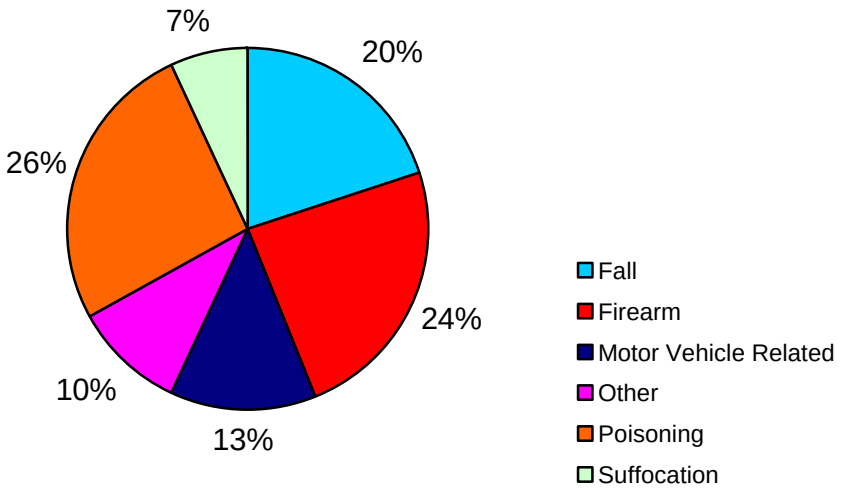

Figure 26: Percent of Injury Deaths by Mechanism, 2005

Injury deaths occur via many mechanisms, as shown in **Figure 26**. The most common mechanisms of injury death were poisoning, firearm, and falls; these have been the top three mechanisms of death since 1999, though not necessarily in that order (**Table 3**). Poisoning has been steadily increasing since 1999, and has been the leading cause of injury death since 2003. This, coupled with the steady increase in firearm deaths, suggests that the increase in injury deaths may have been influenced by a change in population social factors. These factors should be studied further within Hamilton County communities.

Rank (N)	1999	2000	2001	2002	2003	2004	2005
1	Fall (93)	Fall (111)	Fall (102)	Fall (117)	Poisoning (91)	Poisoning (108)	Poisoning (123)
2	Poisoning (57)	Poisoning (75)	Firearm (91)	Poisoning (107)	Firearm (91)	Firearm (106)	Firearm (113)
3	Firearm (56)	Firearm (70)	Poisoning (72)	Firearm (107)	Fall (69)	Fall (63)	Fall (93)

Table 3. Rank and Count of Top Three Mechanisms of Injury Death, 1999-2005

Poisoning Deaths

Deaths by injury represent the most severe injuries, and their patterns and trends are often different than less severe injuries. In 2005, poisoning remained the top mechanism of injury death in Hamilton County, and accounted for 26% of injury deaths (n=123). Residents between the age of 40 and 64 accounted for two-thirds of all poisoning deaths. Poisoning deaths for 2005 continued an upward trend overall; this trend has been largely driven by unintentional poisonings (**Figure 27**). This differs from poisoning hospitalizations and ED visits, which are primarily self-inflicted. Data indicated that part of the increase may be related to methadone use, as the percentage of methadone poisoning increased from 3.5 to 14.6% of all unintentional poisoning deaths between 1999 and 2005.

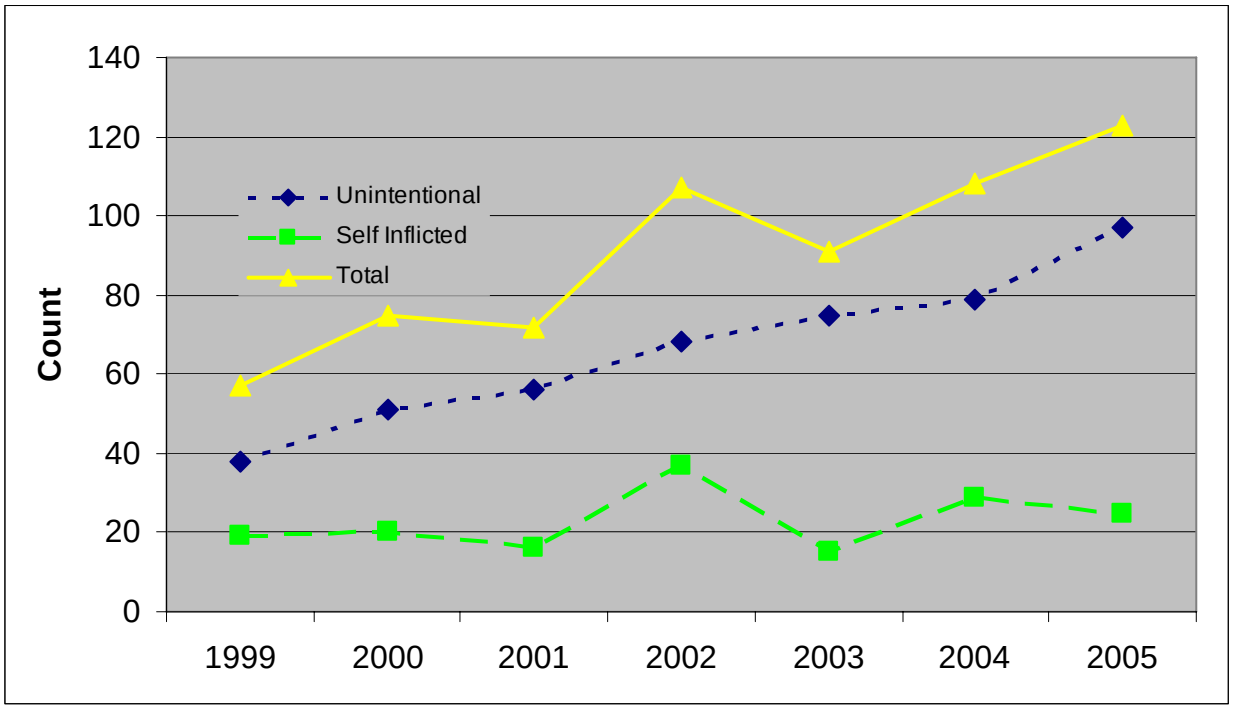

Figure 27: Poisoning Deaths per Year, by Intent, 1999-2005

Firearm Deaths

Deaths due to firearms accounted for 24% of total injury deaths; a plurality of firearm deaths occurred between the ages of 15 and 29 (n=48, 42% of all firearm deaths). An upward trend in firearm deaths was also observed from 1999 to 2005, similar to the trend observed in poisoning deaths. The trend has been driven by deaths caused by assault/abuse. In 2005, 62% of firearm deaths were due to assault. The number of deaths by assault overtook self-inflicted deaths in 2001 (**Figure 28**).

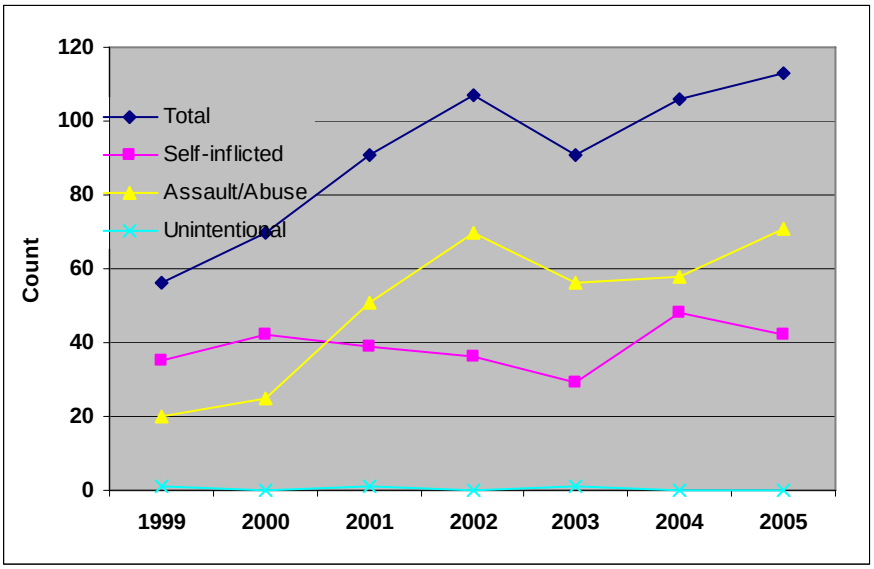

Figure 28: Firearm Deaths per Year, by Intent, 1999-2005

When examining the intent (self-inflicted versus assault/abuse) of firearm deaths, there was a marked difference between races as shown in **Table 4**.

	Race			
Intent	White	Black	Other	Total
Self-Inflicted	34.5	2.7	0	37.2
Assault/Abuse	6.2	51.3	5.31	62.8

Table 4: Percent of All Firearm Deaths by Race and Intent, 2005

The difference in age distribution for assault/abuse versus self-inflicted firearm deaths translated to a difference in the average age of firearm deaths between races: for the black population, the mean age of death from firearms was 29, for the white population it was 50 (**Figure 29**). The number of firearm deaths for other races was too small to calculate reliable statistics.

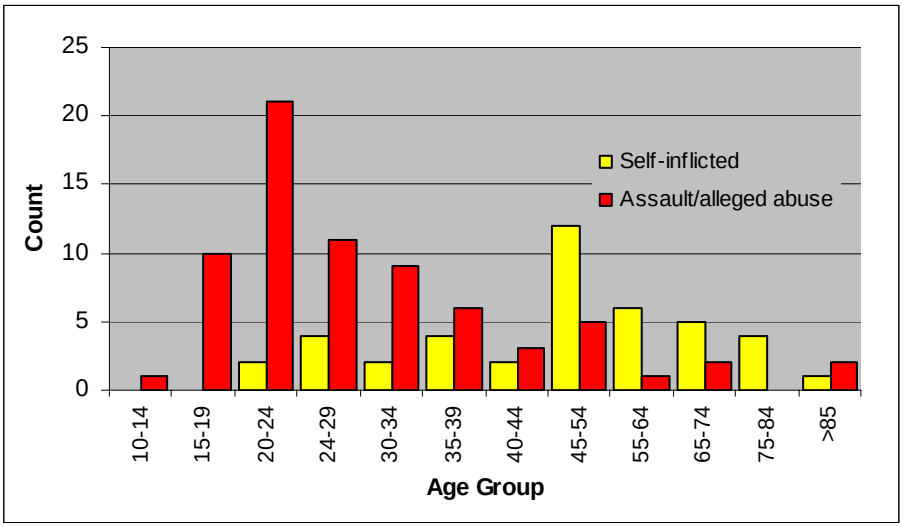

Figure 29: Firearm Deaths, by Intent and Age, 2005

Falls Deaths

Deaths caused by falls in 2005 were the same as in 1999 (**Figure 30**, N=93). Persons over the age of 65 continued to make up a disproportionate amount of deaths due to falls; although this age group constitutes only 13.5% of the total population, 72% of fall deaths are in persons over the age of 65 (**Figure 31**). The most common place for falls deaths to occur was in the home (n=21, 63.6%).

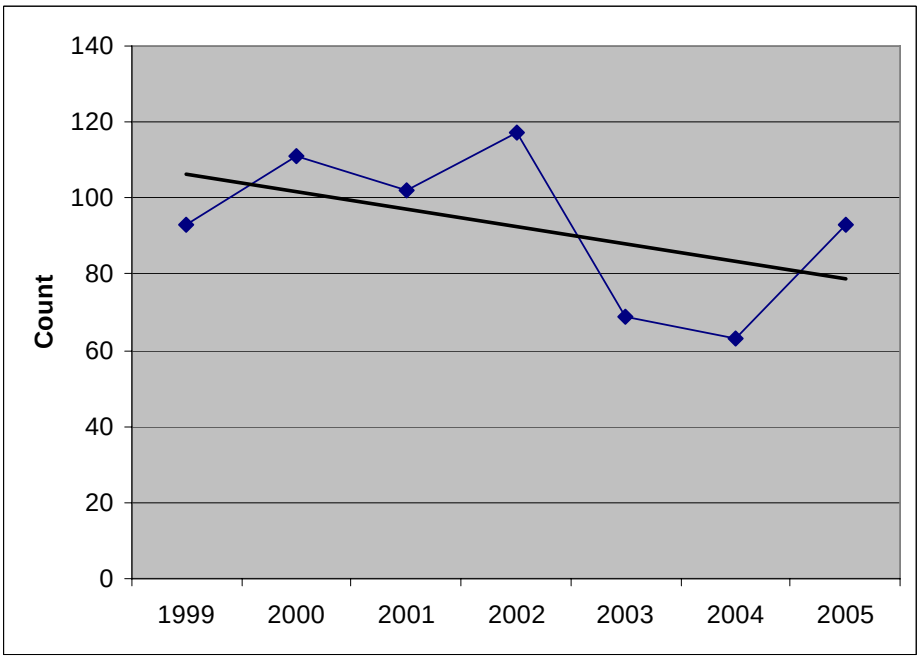

Figure 30: Falls Deaths per Year, 1999 – 2005

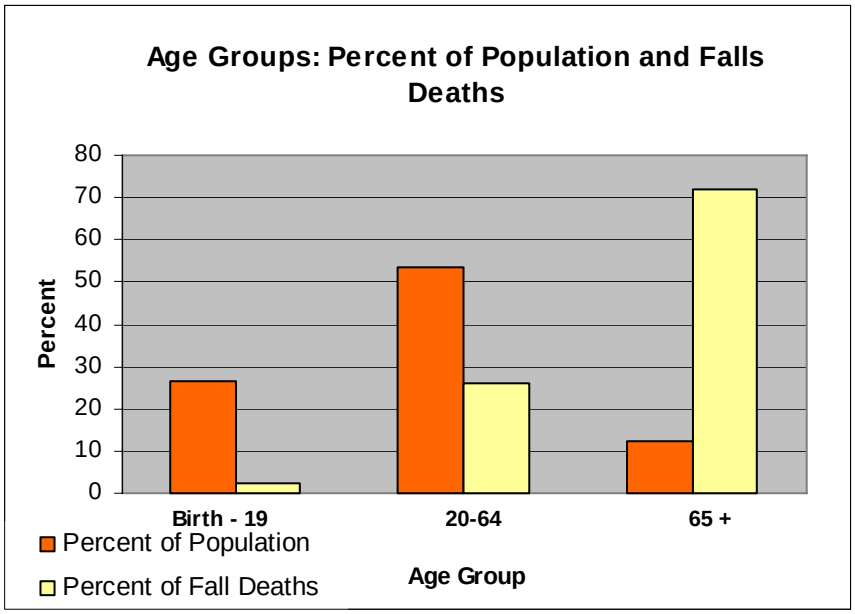

Figure 31: Age Groups: Percent of Population and Falls Deaths, 2005

Conclusion

In studying the analysis of 2005 HCISS data, several themes emerge. Less severe injuries, such as those that would be treated in the ED, appear to be decreasing in Hamilton County; however, this decrease could be due to reporting or care utilization issues and not actual injury trends. At the same time, mortality from injury has increased significantly since 1999. The trend in injury mortality is troubling; the cause is largely driven by an increase in poisoning and firearm injuries.

Falls still constitute a sizable amount of injuries. However, the rate of falls has decreased or remained constant for all injury outcome categories (deaths, hospitalizations, and ED visits) since 1999. Furthermore, since 2002 falls have dropped from the leading cause of injury mortality to the third leading cause of injury mortality. Continuing the decrease in fall injuries will be important as the population ages. Because falls disproportionately affect the very old, falls have the potential to become a sizable public health problem.

Motor vehicle related and struck by, against injuries still contribute greatly to the amount of injuries (particularly ED visits and hospitalizations), but have declined since 1999. Injuries in the struck by, against category sharply decreased between 2002 and 2003. Within the struck by, against category, sprains and strains within the "sports injury" code saw a marked drop between 2002 and 2003; this could represent a decrease in sprain and strain injuries, a decrease in ED utilization for these types of injuries, or data reporting changes. Meanwhile, motor vehicle injuries have been decreasing at a more gradual rate, suggesting improved motor vehicle safety among Hamilton County residents. However, the rate of nonfatal motor vehicle injuries are still above U.S. rates and the *Healthy People 2010* goals.

The incidence of poisoning mortality has increased markedly since 1999, a trend that has also been seen at the national level (CDC, 2007). Poisoning, in fact, has been the mechanism to overtake falls and become the leading cause of injury mortality in Hamilton County. The increase in mortality appears to be driven by a rise in "unintentional" poisonings. In particular, the number of unintentional poisonings due to methadone has more than quadrupled in Hamilton County since 1999. These trends and associations warrant further investigation. The drug category "anesthetics," which includes cocaine, has also seen an increase since 1999. Poisonings resulting in hospital admissions and ED visits (not shown) have also increased; the reason for this change, however, appears to be due more to self-inflicted injuries. Since the causes of poisoning death versus hospital and ED visits appear to be different, various interventions may be necessary to fully control the poisoning problem.

Firearm deaths are increasing as well, displaying a trend nearly identical to poisoning deaths. Given the historical association of violence and drug use, it may be that this relationship is more than coincidental. Further investigation into this occurrence may reveal some underlying cause of these injuries, which might lend itself to prevention.

Appendix A – Glossary

E Code
The external cause of injury is defined by the World Health Organization's International Classification of Disease, 9th Revision Clinical Modification (ICD-9-CM). The E Code describes the environmental events, circumstances and conditions as to the cause of injury or poisoning.

Injury
Damage to the body from exposure to thermal, mechanical, electrical or chemical energy or from the absence of essentials such as heat or oxygen. Injury causes are classified by mechanism and intent.

Injury Frequency
Number of times an event or characteristic occurs in a given time.

Injury Type
The nature of the injury as defined by ICD-9-CM codes. It identifies the medical condition associated with the injury and describes the body part involved.

Injury Rate
Statistical measure that allows comparisons between different populations, such as geographical area or age group. An injury rate is calculated by dividing the number of people injured in a given time by the size of the population from which they are drawn. The number is then multiplied by 100,000 to obtain a standard rate.

Intent
Whether or not the injury was purposeful. Three categories of intent are used in this report:

1 Intentional Injuries
Deliberate injury, categorized as:

Assault/alleged abuse: inflicted by one person on another.
Considered *homicide* when the outcome is death.
Self-inflicted: purposefully inflicted by a person on his/herself.
Considered *suicide* when the outcome is death.

2 Unintentional Injuries
Occurs without purposeful intent to harm.

3 Undetermined
Intent is not known or could not be identified.

Mechanism
Mechanism describes the cause of the injury. Explained as the agent, instrument or activity involved in the incident, such as fall or poisoning. See Appendix B for mechanism definitions.

Miscellaneous
A category for injury mechanism classification that represents a combination of

several groupings for simplicity in reporting. In the injury matrix, “other” is used to describe specific causes of injury and cannot be used as a general category.

Surveillance

The collection, analysis, and interpretation of hospital injury data used to monitor the distribution and causes of injuries in the population.

Appendix B - Methodology and Calculations

Case Selection

Selection Criteria

Cases in this report included Hamilton County residents admitted to a hospital within Hamilton County, including Mercy Hospital Clermont, Mercy Hospital Fairfield, and/or who were seen by the coroner with a primary diagnosis of injury (see below). Individuals treated or injured in Hamilton County but who were not residents of Hamilton County were excluded.

Injury Classification

Primary medical diagnosis was coded by medical records organization's (WHO) *International Classification of Disease, Ninth Revision, Clinical Modification (ICD-9)* coding system. This system is designed to promote international comparability in the collection, processing, classification, and presentation of health data. The *ICD-9* N codes are used as the primary medical diagnosis and describe the nature of the injury and the body part involved. Further classification of these injury diagnoses into external cause of injury, or *ICD-9* E Codes, describe the event, or how the injury occurred, and make it possible to distinguish among injury mechanisms. For example, an E Code could tell if a broken femur resulted from a fall or from a motor vehicle crash. The E Code matrix in Appendix C is grouped into mutually exclusive categories to describe the mechanism (cause) and intent (purposefulness) of an injury (Fingerhut, 1997.)

Injury Definition

Cases with a primary discharge diagnosis *ICD-9* N code in the 800 to 995.89 range were included in the data collection. Injuries due to medical or surgical complications were **excluded** from analysis by *ICD-9* E Codes:

- **Misadventures in medical care:** E870 - E879.9
- **Drug's adverse effects in therapeutic use:** E930 - E949.9
- **Late effects:** E929.0 - E929.9, E959, E969, E977, E989, E999

Duplicate Case Deletion

Any duplicate records for the same individual, and/or for the same injury which resulted in death or hospitalization within a two-week time period, were deleted from the database. For ED visits, a four-day time frame was used. Cases were matched within and between institutions. The record representing the most serious injury was kept for analysis (e.g., a case that was hospitalized and then died became a death, an ED visit that was then hospitalized became a hospitalization).

Data Sources

Mortality Data

Starting in 1999, national mortality data have been coded using the *International Classification of Disease - 10th Revision (ICD-10)* mechanism and cause of injury coding. This classification system replaced the *Ninth Revision (ICD-9)* which was used from 1979 through 1998. Due to this change from *ICD-9 to ICD-10*, causes of death from 1999 to 2001 are directly comparable, but not to prior years (NCHS 2005). Hospital admissions resulting in deaths examined by the Hamilton County Coroner's office provided information on the mechanisms of death for those county residents whose cause of death was injury (suicide, homicide, unintentional or undetermined).

Hospital Admission and Emergency Department Data

In the Hamilton County Injury Surveillance Report 2005, data from ED visits is not directly comparable to national estimates of ED visits. The national data looks only at first time visits to the ED and counts those who died or were admitted. Data from the HCISS considers ED visits of those treated and released and may include people who are seen more than once throughout the year. Information from hospital discharge data were provided by individual institutions for all patients whose primary diagnosis was that of injury admitted from Jan. 1- Dec. 31, 2005. In some cases, the institution providing data was unable to provide records based on the date of admission. In this instance, records were obtained based on discharge date, which was consistent with case ascertainment in previous years.

Records were classified according to the type of patient visit – inpatient, 23-hour observation, or ED visit. For data analysis, patients with non-fatal injuries classified as inpatient or 23-hour observation were considered hospitalized. Non-fatal ED visits, or those treated and released, were analyzed separately. Data were provided in electronic format by the following hospitals: Cincinnati Children's Hospital Medical Center; Deaconess Hospital; Health Alliance - Christ Hospital; Health Alliance - Jewish Hospital Kenwood; Health Alliance - University Hospital; Mercy Franciscan Hospital Mount Airy; Mercy Franciscan Hospital Western Hills; Mercy Hospital Anderson; Mercy Hospital Clermont; Mercy Hospital Fairfield; TriHealth, Inc. - Bethesda North Hospital; and TriHealth, Inc. - Good Samaritan Hospital.

Completeness of Records

Of the records collected with *ICD-9* N codes denoting medical treatment for an injury, 11 percent were not E Coded. Therefore, the extent of the injury problem within Hamilton County may be under-reported.

2000 Census Data

Census data for 2000 were obtained from the U.S. Census Bureau Web site. Data for Hamilton County include the population of all 49 political jurisdictions and only the Hamilton County portion of populations from the communities of Loveland, Milford and Sharonville.

Hamilton County Geographic Data

The full data file is batch geo-coded using enhanced TIGER files providing the state and county FIPS code based on city, name and ZIP code. For more accurate coding, Cincinnati Area

Geographical Information System (CAGIS) street files were used on the probable Hamilton County data for jurisdiction assignment. TIGER files supplemented addresses known to be in Hamilton County, but not included in the CAGIS files because of private street address. A total of 11, 210 records were not matched to a political jurisdiction (15%).

Statistics

Reporting of Percentages

It should be noted that the percentages in this report have been rounded to a whole number within one percentage point of the actual figure. Due to this rounding, the exact number of events cannot be accurately calculated by taking a percentage of the total "n" reported. In addition, percentages do not add to 100 in all cases. Numbers cited in the text as exact counts represent the true number of cases.

Rate Calculation

A rate is a summary statistic used to obtain a standard by which comparisons to other groups or geographic areas can be made. Rates are calculated by dividing the number of people who were injured during a given time period by the size of the population from which they were drawn. The number is then multiplied by 100,000 to show a whole number instead of a fraction. Rates based on the actual number of events in the total population during the given time period are known as crude rates. Per standard CDC practice, rates were not calculated in categories with counts less than 20, as this results in statistically unreliable rates that are difficult to interpret.

Age-adjustment of rates was performed for the maps seen in Figures 5, 14, and 28 using the method outlined in Friis and Sellers.

Correlation statistics for upward or downward trends were performed using Microsoft Excel.

It should be noted that comparison of Hamilton County to State and National data should be interpreted with caution, as differences between various datasets may account for some of the differences.

Quality Assurance

Checks were performed on the electronic data fields used for statistical analysis to determine accuracy in recording and transferring data.

Appendix C – E Code Matrix for Mortality and Morbidity Data

Mechanism Cause	Description	Manner/Intent				
		Unintentional	**Self-inflicted**	**Assault**	**Undetermined**	**Other**[1]
Cut/pierce	Cut and pierced by instruments or objects.	E920.0-.9	E956	E966	E986	E974
Drowning/submersion	Injury caused by a lack of oxygen resulting from insufficient air and ingestion of water. May occur with or without involvement of watercraft.	E830.0-.9, E832.0-.9 E910.0-.9	E954	E964	E984	
Fall	Falls from different levels or same level (such as tripping, stumbling, or fainting). Includes self-inflicted falls (jumping from high place) and assault falls (pushed from high place).	E880.0-E886.9, E888	E957.0-.9	E968.1	E987.0-.9	
Fire/flame/burn[3]	Injuries caused by fire and flames, including those from smoke inhalation.	E890.0-E899, E924.0-.9	E958.1,.2,.7	E961, E968.0,.3, **E979.3**	E988.1,.2,.7	
Hot object/substance	Injuries caused by hot liquids, steam, and chemicals.	E924.0-.9	E958.2,.7	E961, E968.3	E988.2,.7	
Firearm[3]	Injuries caused by the discharge of a handgun, rifle, etc.	E922.0-.3,.8, .9	E955.0-.4	E965.0-4, **E979.4**	E985.0-.4	E970
Machinery	Injuries associated with machinery used in various industrial and occupational activities.	E919 (.0-.9)				
Occupant	Driver or passenger.	E810-E819 (.0,.1)				
Motorcyclist	Driver or passenger of motorcycle.	E810-E819 (.2,.3)				
Pedal cyclist	Includes all injuries among bicyclists involving and not involving motor vehicle traffic incidents. Includes: hit by a motor vehicle, hit by train, hit by other bicyclist, or hit by motor vehicle while not in traffic.	E810-E819, E800-807(.3), E820-825 (.6), E826.1, .9, E827-E829(.1)				
Pedestrian	Pedestrian hit by a motor vehicle where the collision did or did not occur in traffic, hit by a train, or another means of transportation.	E810-E819 (.7) E800-807(.2) E820-E825 (.7) E826-829(.0)				
Unspecified	When injured person was coded as unspecified person. Occupant of vehicle other than above, occupant of streetcar, person on railway train, unauthorized rider of motor vehicle. Rider of animal; occupant of animal drawn vehicle.	E810-E819 (.9)				
Transport, other	Injuries associated with other means of transportation: railway, off road and other motor vehicles not in traffic, other surface transport, water, and aircraft.	E800-E807 (.0,.1,.8,.9) E820-E825 (.0-.5,.8,.9) E826.2-.8	E958.6		E988.6	

Mechanism Cause	Description	Manner/Intent				
		E827-E829 (.2-.9), E831.0-.9, E833.0-E845.9				
Natural/environmental	Injuries caused by excessive heat or cold, lightning, disastrous storms or land movements, other environmental factors.	E900.0-E909, E928.0-.2	E958.3		E988.3	
Bites and stings[3]	Bites by animals or stings/bites by insect.	E905.0-.6,.9 E906.0-.4,**.5**,.9				
Overexertion	Injuries caused by excessive physical or strenuous movements.	E927				
Poisoning	Overdose of drugs (prescription or street drugs) and other solids, liquids, gases, or vapors. Does not include injuries resulting from "drugs or medicinal and biological substances causing adverse effects in therapeutic use."	E850.0-E869.9	E950.0-E952.9	E962.0-.9, **E979.6,.7**	E980.0-E982.9	E972
Struck by, against	Hit by blunt object or person, i.e., injuries resulting from: falling objects, sport activities, fight or brawl.	E916-E917.9		E960.0; E968.2		E973, E975
Suffocation	Inhalation and ingestion of food or other objects that block respiration, and other mechanical means that hinder breathing (plastic bay over nose or mouth, suffocation by bedding, unintentional or intentional hanging or strangulation).	E911-E913.9	E953.0-.9	E963	E983.0-.9	
Other specified (classifiable and not classifiable)	Injuries not assigned to specific categories within the matrix.	E846-E848, E914-E915 E918, E921.0-.9, **E922.4,.5** E923.0-.9, E925.0-E926.9 **E928(.3-.5)**, E928.8,E929.0-.5, E929.8	E955.5,**.6**,.**7**,.9 E958.0,.4. E958.8, E959	E960.1, E965.5-.9 E967.0-.9, E968.4,**.6, .7 E979 (.0-.2,.5,.8,.9) E968.8, E959, E99.1**	E985.5,**.6,.7** E988.0,.4 E988.8, E989	E971, E978, E990-E994, E996 E997.0-.2 E977, E995, E997.8, E998, E999
Unspecified		E887, E928.9, E929.9	E958.9	E968.9	E988.9	E976, E997.9

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