

1st Leading Cause: Falls

Falls were the leading cause of injury hospitalizations in Los Angeles County by a significant margin, with an average of 27,000 reported each year. Between 2000 and 2006, for every hospitalization due to a motor vehicle traffic collision (the second leading cause of injury hospitalization), there were more than 3 fall-related hospitalizations. Falls were also the leading cause of injury hospitalizations statewide. In California, there were 597,100 fall-related hospitalizations between 2000 and 2005 (statewide data are not yet available for 2006); 28% of these hospitalizations occurred in Los Angeles County.

Trends

There were 194,028 fall-related hospitalizations in Los Angeles County during the seven years of this report. The number of hospitalizations increased 13% from 1997 to 2006; however the rate of fall-related hospitalizations actually decreased slightly during this period (Figure 1).

Intent

The vast majority of fall-related hospitalizations were unintentional, resulting from tripping, stumbling, or other activities causing a loss of balance. Intentional falls, such as from suicide attempts or as a result of assaults, and injuries of undetermined intent, together accounted for less than one half of one percent of all fall-related hospitalizations.

Types of Falls

Coding for fall injuries allows for remarkable detail in describing the specifics of how falls occur (Table 1). Despite the capacity

Figure 1: Fall-Related Hospitalization Rate per 100,000 Population by Year, Los Angeles County

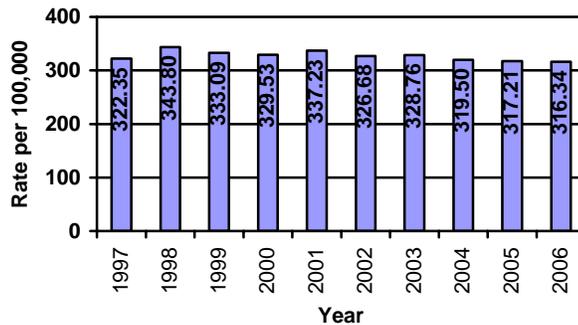


Table 1: Types of Falls Resulting in Hospitalization, Los Angeles County, 2000-2006

Type of Fall	Number
Fall From Stairs/Steps	9,429
Escalator	102
Sidewalk curb	913
Other stairs/steps	8,414
Fall From Ladder/Scaffolding	4,718
Ladder	4,389
Scaffolding	329
Fall From Building or Other Structure	2,630
Fall Into Hole or Other Opening	348
Dive/Jump Into Water (Pool)	138
Storm drain or Manhole	19
Other hole/opening	191
Other Fall From One Level to Another	25,347
Playground Equipment	2,252
Cliff	190
Chair	3,193
Wheelchair	2,310
Bed	7,940
Other Furniture	860
Toilet	885
Other	7,717

Table 1 is continued on the next page.

to code the details of falls, a plurality of fall-related hospitalizations were still coded as “unspecified” or “other” for type (40% of all hospitalizations). The remaining types of unintentional falls can generally be grouped into two broad categories: 1) falls on the same level, such as from tripping or stumbling (38% of hospitalizations); and 2) falls between levels, such as down stairs or out of bed (22% of hospitalizations).

Age

Falls accounted for less than 10% of injury hospitalizations among 18-20 year olds, but for more than 75% of all injury hospitalizations among people 80 years old and older (data not shown). The average age of people hospitalized with a fall-related injury was 64 years, while the average age of people hospitalized for all other types of injury was 41 years. The overall number of fall-related hospitalizations peaked among people in their late 70s and early 80s (Figure 2), while hospitalization rates peaked among people in their 90s (Figure 3).

Table 1 (cont.): Types of Falls Resulting in Hospitalization, Los Angeles County, 2000-2006

Type of Fall	Number
Fall From Slipping, Tripping, Stumbling	70,870
Non-motorized scooter*	280
Roller or in-line skates	608
Skateboard	1,515
Skis	356
Snowboard	490
Other	67,621
Fall From Collision, Pushing, or Shoving	1912
Sports	1131
Other/Unspecified	781
Other/Unspecified Fall	78,085
Fall Results in Striking Sharp Object**	11,251
Fall Results in Striking Other Object**	2,220
Other/Unspecified	64,614
Suicide Attempt; Jump from High Place	383
Residential Premises	133
Other Manmade Structure	191
Other/Unspecified***	59
Assault by Pushing from High Place	52
Undetermined Intent	254
Residential Premises	93
Other Manmade Structure	88
Other/Unspecified***	73

** This code went into effect in 2002, during 2000-2001 these injuries were included in the “other” category.
 ** These codes went into effect in 2001, during 2000, sharp object falls were included as cut/pierce injuries and other object falls were in the other/unspecified category.
 *** The categories for falls from natural sites (both suicide attempts & undetermined intent) contained fewer than 6 hospitalizations; therefore these falls were combined with those in the “other/unspecified” category for each intent.*

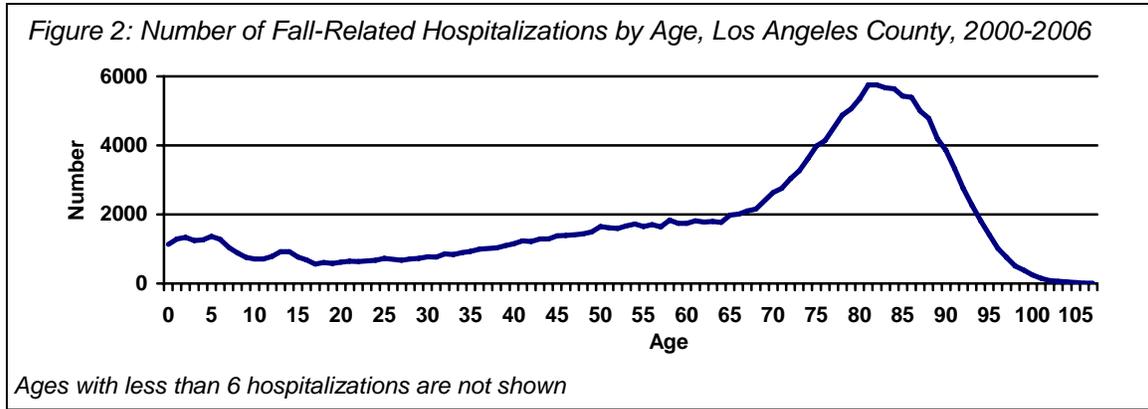
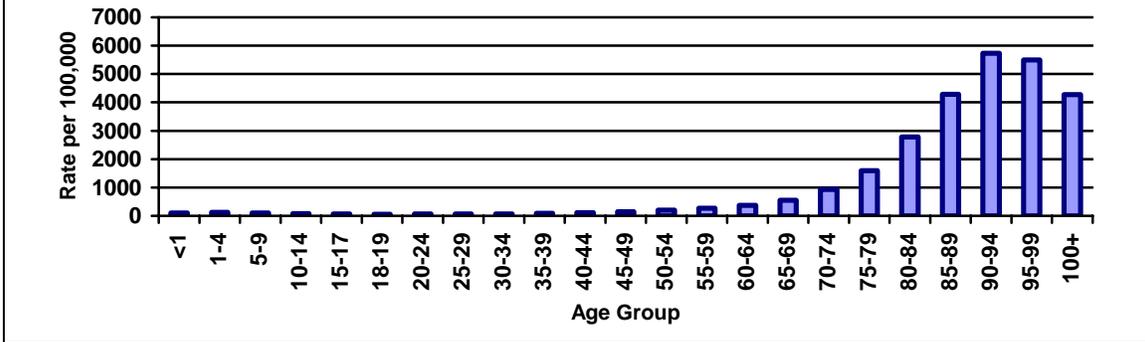


Figure 3: Fall-Related Injury Hospitalization Rates by Age Group, Los Angeles County, 2000-2006



Fall-related hospitalization rates were less than 100 visits per 100,000 population for people between the ages of 5 and 39. Rates were lowest for 18-19 year olds, and increased for each age group until peaking among 90 to 94 year olds. Hospitalization rates also varied by the type of fall that caused the injury (Table 2). Although falls between levels accounted for only 22% of all fall

Table 2: Age Specific Fall Hospitalization Rates by Type of Fall, Los Angeles County, 2000-2006

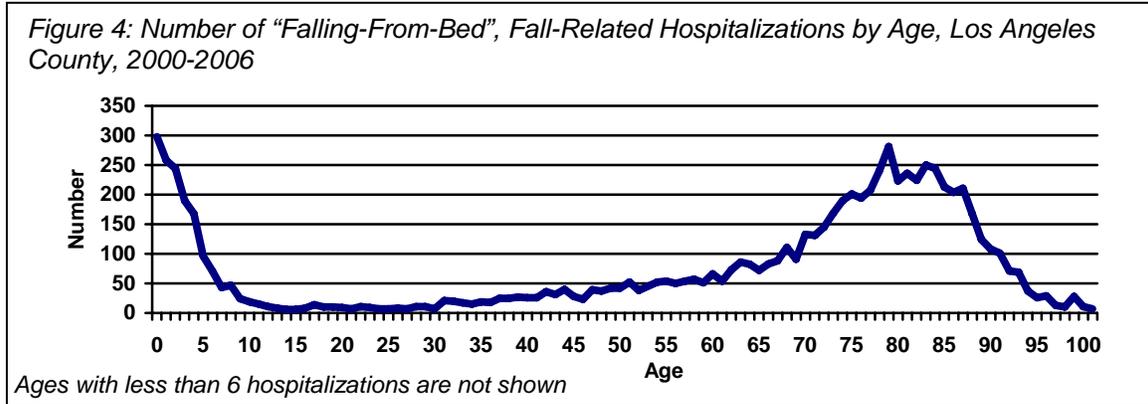
Age Group	Between Levels	Same Level	Other/Unspec.
<1 Year	82.75	6.48	16.50
1-4 Years	76.18	20.23	24.46
5-9 Years	53.33	23.29	20.12
10-14 Years	18.83	36.95	17.56
15-19 Years	18.21	29.33	14.40
20-24 Years	26.35	22.39	14.81
25-29 Years	25.56	23.19	17.01
30-34 Years	28.10	22.67	20.31
35-44 Years	37.16	31.28	31.85
45-54 Years	49.47	58.37	62.87
55-64 Years	71.88	111.37	124.22
65+ Years	240.37	699.95	795.68

All rates are per 100,000.

Note: This chart only includes unintentional injuries.

hospitalizations, they resulted in the highest hospitalization rates for young children (0-9 year olds), and also for many adults (20-44 year olds), when compared to rates in the other two categories. Among older adults (45+ year olds), hospitalization rates were highest for other & unspecified falls. Among adolescents (10-19 year olds) rates were highest for falls on the same level, a category that includes many falls from athletic endeavors including skiing, skateboarding, and sports. As might be expected from these hospitalization rates, people who were injured while falling from one level to another were younger (average age of 50 years) than people injured while falling on the same level (67 years) or those injured in an unspecified fall (70 years). More specifically, people injured on playground equipment were very young (average age of 7.2 years), while the average age of hospitalized victims was more than 70 years for falls from wheelchairs (70.8 years), toilets (75.2 years), other slips/trips/stumbles (70.2 years), and unspecified falls (71.2 years).

Falls from bed, while not an overwhelming cause of fall-related hospitalizations, had an interesting bimodal pattern, with hospital visits occurring most frequently among the youngest (0-5 years) and oldest (70 years and older) age groups (Figure 4).



Gender

Women accounted for 59% of all unintentional fall-related hospitalizations. This is one of only two injury mechanisms for which more females than males were hospitalized (the other is poisoning). The gender disparity varied both by intent and type of injury and age of the person injured. While intentional injuries made up only a very small fraction of all fall-related hospitalizations, the victims of suicide attempts, assaults, and injuries of undetermined intent were largely male (Table 3). Males also made up the majority of patients hospitalized for falls from ladders & scaffolding (84% male), from buildings (83% male), and falls into holes or openings (67% male). Many of these falls among males may be job-related; certain occupations that place employees at high risk for on-the-job falls tend to be dominated by males (e.g., construction). Occupation-related falls among males are also suggested by the much younger age at which males (average age of 55 years) were hospitalized in comparison to females (average age of 71 years).

Table 3: Gender Distribution of Fall Hospitalizations by Intent, Los Angeles County, 2000-2006

Intent	% Male	% Female
Unintentional	41%	59%
Suicide Attempt	63%	37%
Assault	65%	35%
Undetermined Intent	74%	26%

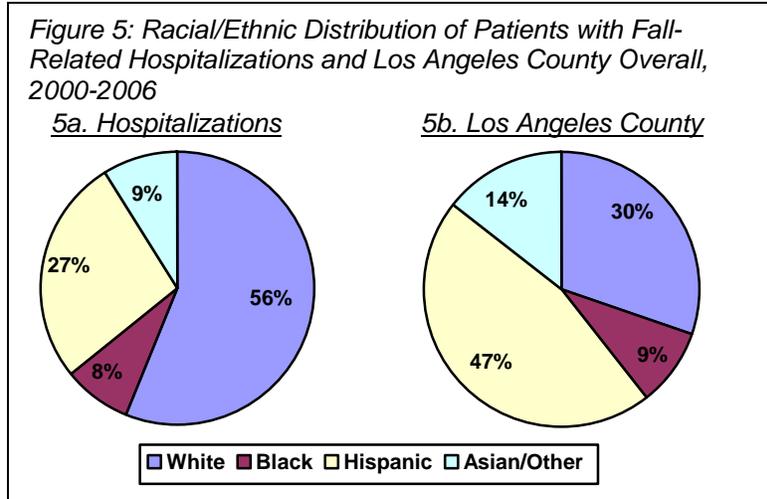
Race/Ethnicity

Racial/ethnic group was unknown for 1.8% of all fall-related hospitalizations; all statistics presented in this section only include those records for which race/ethnicity was reported. Over half of all hospitalizations for fall-related injuries were among Whites (56%), even though Whites accounted for just 30% of the Los Angeles County population (Figure 5). Whites also had the highest age-adjusted hospitalization rate for falls (391 per 100,000) followed by Latinos

(260 per 100,000), Blacks (257 per 100,000) and Asians/Others (196 per 100,000).

On average, White patients were older than those from any other racial/ethnic group when admitted to a hospital for a fall related injury. The average age of a White patient was 72 years, followed by Asian/Other patients (67 years),

Blacks (58 years), and Latinos (50 years). This difference in ages was closely linked to the type of falls most often experienced by the different racial/ethnic groups. The percentage of falls attributable to the two largest categories of falls (falls from slipping, tripping, or stumbling and other/unspecified falls) closely follows the age distribution: 81% of falls among Whites were from one of those two categories, followed by Asians/Others (79%), Blacks (74%), and then Latinos (67%). The two categories of falls with the largest percentage of Latino victims were falls from buildings (55% Latino) and falls from collisions, pushing, or shoving (46% Latino); these were the categories with the lowest average age at hospitalization (33.4 years for falls from buildings and 32.8 years for falls from collisions, pushing, or shoving).



Geography

While the greatest number of fall-related hospitalizations was found in the San Fernando SPA, this was also the SPA with the largest population. Generally, there was not much variation between SPAs in the rate of fall-related hospitalizations (Table 4). The lowest rates were found in the San Gabriel and the South Bay SPAs and the highest rate was in the Metro SPA.

Certain groups of fall-related injuries showed more variation between SPAs. While suicide attempts, assaults and injuries of undetermined intent made up only a tiny fraction of all hospitalizations for falls, they were concentrated in certain areas of the county. The Metro

Table 4: Total Number of Fall Hospitalizations and Average Annual Age Adjusted Hospitalization Rate by SPA, Los Angeles County, 2000-2006

SPA	Number	Rate
SPA 1: Antelope Valley	5,886	333.7
SPA 2: San Fernando	42,759	334.2
SPA 3: San Gabriel	34,767	303.5
SPA 4: Metro	25,608	354.1
SPA 5: West	15,662	338.4
SPA 6: South	16,443	311.2
SPA 7: East	23,823	311.0
SPA 8: South Bay	29,065	303.5
Unknown SPA	15	---
Los Angeles County Total	194,028	322.8

Note: Rates are per 100,000 population.

and the South SPAs accounted for 37% of these fall hospitalizations but just 22% of unintentional fall hospitalizations and about 22% of the county's total population.

Table 5: Average Annual Age Adjusted Fall Hospitalization Rate by Race/Ethnicity and SPA, Los Angeles County, 2000-2006

SPA	Rate			
	Black	Latino	As/Oth	White
SPA 1: Antelope Valley	256.5	237.4	157.7	378.1
SPA 2: San Fernando	254.6	236.2	215.9	368.7
SPA 3: San Gabriel	226.7	255.7	177.4	404.7
SPA 4: Metro	328.7	300.3	219.3	469.4
SPA 5: West	289.9	219.9	209.9	367.7
SPA 6: South	283.4	291.6	419.7	991.6
SPA 7: East	305.8	281.7	176.5	377.5
SPA 8: South Bay	202.4	249.0	191.4	378.2
Los Angeles County Total	256.5	259.9	195.7	391.1

Note: Rates are per 100,000 population.

When looking at rates by

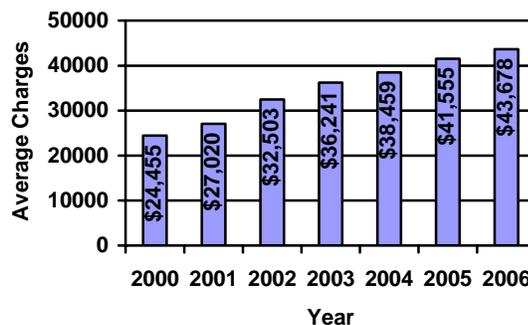
racial/ethnic group and SPA, some distinct patterns emerged (Table 5). Whites had the highest rate of fall-related hospitalizations in each SPA. Asians/Others had the lowest rate in seven of the eight SPAs; Blacks had the lowest rate in the South SPA. Among Whites, hospitalization rates ranged from 367.7 to 469.4 per 100,000 for seven of the eight SPAs; the rate in the South SPA (991.6 per 100,000) was more than double that of the next highest SPA. A similar pattern was seen for Asians/Others; the rate in the South SPA was almost twice the rate seen in any other SPA. Among Blacks and Latinos, there was no SPA with exceptionally high rates. Fall-related hospitalization rates were highest in the Metro SPA (328.7 per 100,000 for Blacks and 300.3 per 100,000 for Latinos) and lowest in the South Bay SPA for Blacks (202.4 per 100,000) and in the West SPA for Latinos (219.9 per 100,000).

The South SPA was the only SPA in which males (307 per 100,000) had a higher rate of fall-related injuries than females (303 per 100,000). The female-to-male rate ratio ranged from 0.99 in the South SPA to 1.38 in the Antelope Valley SPA. For males, the highest rate was found in the Metro SPA (327 per 100,000) and the lowest rate was found in the San Gabriel (258 per 100,000). Among females, the highest rate was found in the Antelope Valley (378 per 100,000) and the lowest was found in the South SPA (303 per 100,000).

Medical Charges

During the seven years included in this report, the average charge for a fall-related hospitalization was \$34,940. The average annual charge increased dramatically during this time, from \$24,455 in 2000 to \$43,678 in 2006 (Figure 6).

Figure 6: Average Medical Charges for Fall Hospitalizations by Year, Los Angeles County



for children under 15 years old were less than \$20,000, while charges for people 30 years and older were more than \$35,000. Average charges were lowest among Latinos (\$31,532), followed by Whites (\$35,715), Blacks (\$36,925), and Asians/Others (\$38,380). Charges were slightly higher for males (\$36,677) than females (\$33,725).

Comparison to Mortality Data

While falls were the leading cause of injury hospitalizations in Los Angeles County, between 2000 and 2005, they were only the 4th leading cause of injury death (after firearms, motor vehicle traffic collisions, and poisonings). During this period, there were 75 fall related hospitalizations for each fall fatality in Los Angeles County

Fatal injury data are currently only available through 2005, so the mortality and hospitalization data presented in this section and in Table 6 only include 2000-2005 data. Both fatal and non-fatal falls were almost always unintentional; less than one percent of fall-related hospitalizations were *not* classified as unintentional. However, while the majority of fatalities were also unintentional, suicides accounted for nearly ten percent of fall-related deaths. The racial/ethnic distribution and average age of victims of fatal falls and non-fatal fall hospitalizations were nearly identical. By contrast, the gender distribution is quite distinct. Female victims of falls accounted for 59% of injury hospitalizations, but only 38% of fatalities.

Table 6: Demographics of Fatal Falls and Non-Fatal Fall Hospitalizations, Los Angeles County 2000-2005

	Deaths	Hosps
Total Number	2,208	165,661
Intent (%)		
Unintentional	89.4%	99.6%
Suicide/Sui Attempt	9.7%	<1%
Homicide/Assault	<1%	<1%
Legal Intervention	<1%	<1%
Undetermined	1%	<1%
Race/Ethnicity (%)		
Black	7.4%	7.9%
Latino	25.1%	26.5%
White	55.8%	55.2%
Asian/Other	11.3%	8.4%
Unknown	<1%	1.9%
Gender (%)		
Male	62.2%	41.1%
Female	37.8%	58.9%
Average Age (Years)	68.1	64.1

Falls Discussion

These data show that falls are a significant cause of injury and hospitalization for all age groups in Los Angeles County. Among people 35 years and older, falls were the primary cause of injury hospitalizations from 2000-2006 (see Appendix VI). A few general strategies for preventing falls include, age- and ability-appropriate physical activity, monitoring the effects of taking multiple medications, and creating safe environments at home.

Regular physical activity: For adults of all ages, insufficient physical activity is a risk factor for falling. Lack of physical activity causes lower extremity weakness, poor endurance and stamina, muscle and joint stiffness, slower reaction times to sudden changes in balance, and slow walking speeds.^{1,2} Regular physical activity has been shown to prevent falls by improving strength, balance, gait stability and velocity, and endurance.³ Physical activity enhances health and reduces risk for all-cause mortality.⁴ Among older adults, Tai Chi is a popular type of exercise that can reduce the risk of falls.⁵ Tai Chi classes are often offered at local community recreation centers.

Medication effects: Medications can have side effects that impair walking and balance, especially in older adults. Older adults are also the population most likely to take multiple medications at the same time for different conditions. Medications can interact and produce undesired side effects. Therefore, it is important to review all prescription and over-the-counter medications, and discuss fall histories with doctors or pharmacists to assess how regimens may increase the risk of fall-related injuries.⁶

Safe home environments: Many falls occur in the home, and environmental factors may contribute to almost half of all home falls.⁷ Older adults and their families should be aware of hazards in the home and correct them to reduce the risk of falling. To make living areas safer, remove throw rugs and obstacles in walkways that are tripping hazards, use non-slip mats and grab bars in showers and bathtubs, install handrails on stairways, and improve direct and ambient lighting in the home.⁸ Also be aware that certain balance disorders, such as benign paroxysmal positional vertigo (BPPV) or labyrinthitis, can cause loss of balance when getting up from bed.

Fall risks for young children often include inappropriately high beds, beds with no side rails, and poor supervision of children using the bed for play.⁹ Children's beds should be set at the lowest height position, side rails should be used to prevent children from rolling out of bed, and children should not be allowed to use beds for play.⁹ While falling from bed is usually unintentional, when infants sustain injury from reportedly falling out of bed, child abuse or neglect should always be ruled out as possible causes.

¹ American Geriatrics Society, British Geriatrics Society, Academy of Orthopedic Surgeons Panel on Falls Prevention. Guideline for the Prevention of Falls in Older Persons. *J Am Geriatr Soc.* 2001;49:664-772.

² Prevalence of No Leisure-Time Physical Activity—35 States and the District of Columbia, 1988-2002. *Morb Mortal Wkly Rep.* 2004;53(04):82-86. Available at:

<http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5304a4.htm> Accessed on: March 14, 2008

³ Rubenstein LZ, Josephson KR, and Trueblood PR. Effects of a Group Exercise Program on Strength, Mobility, and Falls among Fall-Prone Elderly Men. *J Gerontol.* 2000;55(A):317-321.

³ Fiaterone MA, O'Neill EF, Ryan ND, et. al. Exercise Training and Nutritional Supplementation for Physical Frailty in Very Elderly People. *N Engl J Med.* 1994;300:769-1775.

³ Wolfson L, Whipple R, Derby C, et. al. Balance and Strength Training in Older Adults: Intervention Gains and Tai Chi Maintenance. *J Am Geriatr Soc.* 1996;44:498-506.

⁴ Increasing Physical Activity: A Report on Recommendations of the Task Force on Community Preventive Services. *Morb Mortal Wkly Rep.* 2001;50:1-18.

⁵ Wolf SL, Barnhart HX, Kutner NG, McNeely E, Coogler C, and Xu T. Reducing Frailty and Falls in Older Persons: An Investigation of Tai Chi and Computerized Balance Training. *J Am Geriatr Soc.* 1996;44(5):489-497.

⁶ Ray W and Griffin MR. Prescribed Medications and the Risk of Falling. *Topics in Geriatric Rehabilitation.* 1990;5:10-12.

⁷ Northridge ME, Nevitt MC, Kelsey JL, and Link B. Home Hazards and Falls in the Elderly - the Role of Health and Functional Status. *Am J Public Health.* 1995;85(4):509-515.

⁸ Tideiksaar R. Preventing Falls: Home Hazard Checklists to Help Older Patients Protect Themselves. *Geriatrics.* 1986;41(5):26-8.

⁹ Niedbala DK, Smith SJ, and Langenburn S. Pediatric Falls from Beds at Home Result in Significant Injury. Conference at Children's Hospital of Michigan, 2007.

2nd Leading Cause: Motor Vehicle Traffic (MVT) Collisions

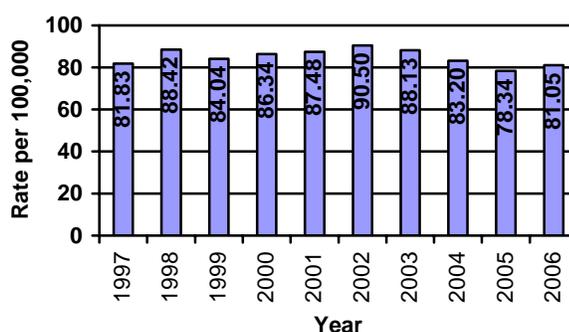
This category includes all hospitalizations caused by motor vehicle collisions while in *traffic*. This means that it includes injuries from collisions that occurred on streets or freeways, but not injuries from collisions in other locations, like parking lots or driveways. This category includes injuries to motor vehicle drivers and passengers, as well as injuries to pedestrians, bicyclists, and motorcyclists.

MVT collisions were the second leading cause of injury hospitalizations in Los Angeles County, with an average of more than 8,300 reported each year. Statewide, there were 197,689 hospitalizations due to MVT collisions reported between 2000 and 2005 (statewide data are not yet available for 2006). During this period, 25.4% of all MVT-related hospitalizations in California were to Los Angeles residents.

Trends

Between 2000 and 2006, there were 58,506 hospitalizations for MVT-related injuries. While the rate of MVT-related hospitalizations did not change much between 1997 and 2006, the rates for 2005 and 2006 were lower than the rates for any other year (Figure 1).

Figure 1: MVT-Related Hospitalization Rate per 100,000 Population by Year, Los Angeles County



Intent

The vast majority of MVT collisions were unintentional. During the seven years included in this report, only 144 (0.2%) MVT hospitalizations were classified as suicide attempts, assaults, or undetermined intent.

Role of Person Injured

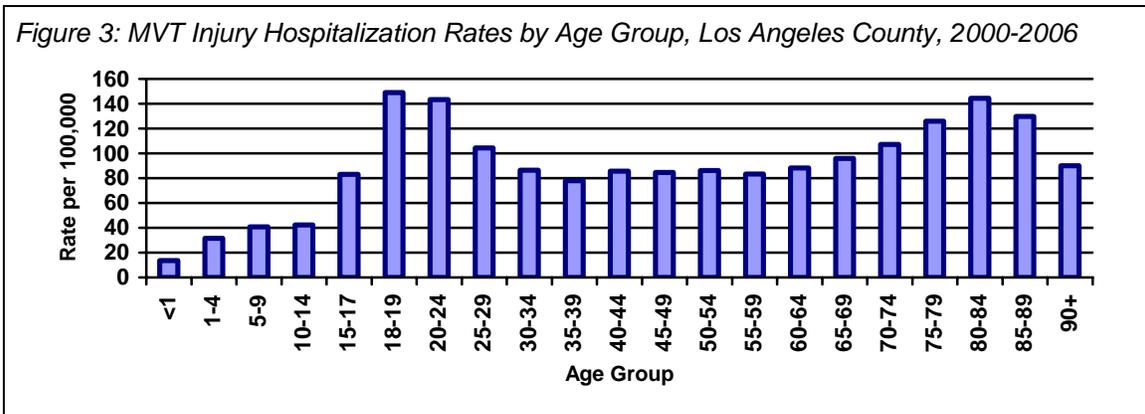
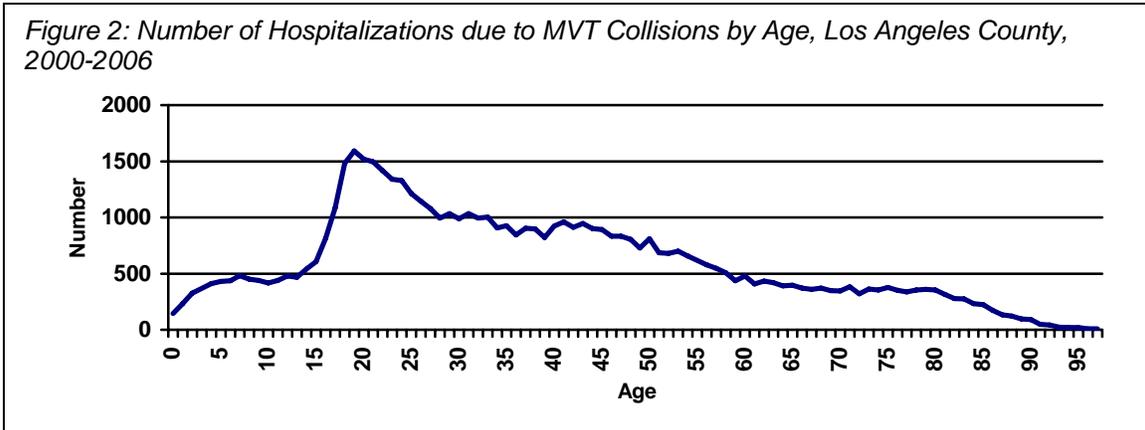
Table 1 shows the role of the hospitalized person in the MVT collision that resulted in injury. More than half of the hospitalizations were to vehicle occupants and most of the rest were to pedestrians and motorcyclists. The small “other” category includes occupants of streetcars, riders of animals, and “other specified persons”.

Table 1: Role of Injured Person in MVT Collision, Los Angeles County Hospitalizations, 2000-2006

Role of Injured Person	Number	Percent
Occupant	35,402	61%
Pedestrian	11,262	19%
Bicyclist	2,494	4%
Motorcyclist	6,080	10%
Other	522	1%
Unspecified	2,602	4%
Total	58,362	100%

Percents do not add to 100% due to rounding.
Only unintentional MVT collisions are included.

Age



The number of hospitalizations due to MVT collisions peaked among 19 year olds, with 1,591 during the 7 years covered by this report (Figure 2). In fact, MVT collisions were responsible for nearly one-quarter (24.1%) of all injury hospitalizations among 18-24 year olds. In contrast, just 2.7% of all injury hospitalizations among 80+ year olds were related to MVT collisions. The rate of MVT injury hospitalizations was highest among 18-19 year olds (Figure 3). After this peak, rates declined among people in their twenties and were relatively stable among people between the ages of 30 and 64 years. Among people 65 and older, the rates increased again, peaking among 80-84 year olds, who had a hospitalization rate nearly equal to 18-19 year olds.

Table 2: Age Specific MVT Hospitalization Rates by Victim's Role in Collision, Los Angeles County, 2000-2006

Age Group	Occ	Ped	Bike	MC
<1 Year	10.74	*	*	*
1-4 Years	12.41	17.96	*	*
5-9 Years	14.24	20.35	3.82	*
10-14 Years	15.05	16.62	6.39	1.78
15-19 Years	77.42	15.45	3.76	6.68
20-24 Years	99.56	13.34	3.10	16.18
25-29 Years	67.17	11.93	2.88	13.69
30-34 Years	52.51	10.78	2.84	13.10
35-44 Years	46.77	13.48	3.02	11.70
45-54 Years	48.40	16.76	3.50	9.96
55-64 Years	51.71	18.15	2.70	5.84
65+ Years	77.88	25.36	1.61	1.93

All rates are per 100,000

* Numbers are too small to calculate rates.

Note: This chart only includes unintentional injuries.

Looking at age specific hospitalization rates by the victim's role in the collision shows that among children aged 1-14 years, pedestrian injury rates are higher than rates of any other type of MV collision (Table 2). For infants and those over 14 years old, the rates of occupant injuries were much higher than the rates for any other MVT collision. Rates for occupant and motorcyclist injuries peak among 20-24 year olds, pedestrian injuries peak among 65+ year olds, and bicyclist injuries peak among 10-14 year olds. The average age of all patients hospitalized with a MVT collision was 38.0 years; this varies slightly based on the victim's role in the collision. Bicyclists had the lowest average age (31.2 years) for injury followed by "other" (35.2 years), motorcyclists (35.6 years), pedestrians (36.5 years), occupants (39.1 years), and "unspecified" (42.4 years). The average age of victims of assault, suicide attempt, or undetermined intent MV collisions was 35.9 years.

Gender

Males accounted for 61% of all MVT collision-related hospitalizations; however, the gender distribution varied considerably by the victim's role in the collision (Table 3). Occupant injuries were more evenly divided between males and females, while nearly all bicyclist and motorcyclist-related hospitalizations were to males. Males also accounted for 60% of assault, suicide attempt, and undetermined intent MVT collisions.

Table 3: MVT Collisions by Victim's Role & Gender, Los Angeles County Hospitalizations, 2000-2006

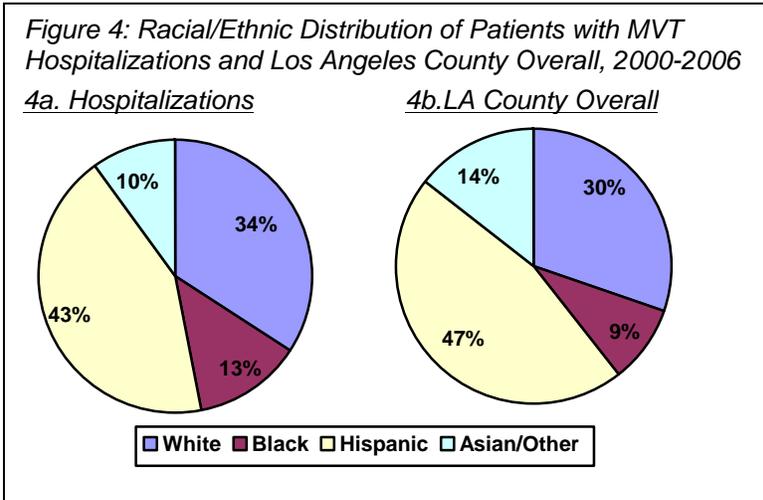
Victim's Role	Males	Females
Occupant	53%	47%
Pedestrian	63%	37%
Bicyclist	88%	12%
Motorcyclist	91%	9%
Other	54%	46%
Unspecified	61%	39%

Only includes unintentional injuries.

Male victims of MVT collisions were slightly younger (average age of 36.4 years) than female victims (40.4 years).

Race/Ethnicity

The patient's racial/ethnic group was unknown for 2.7% of all MVT collision-related hospitalizations; all statistics presented in this section only include those records for which race/ethnicity was reported. The racial/ethnic distribution of the 56,907 MVT-related hospitalizations



was fairly similar to the racial/ethnic distribution of the entire Los Angeles County population (Figure 4 and Appendix VI). Blacks had the highest age-adjusted

hospitalization rate for MVT collisions (111.1 per 100,000) followed by Whites (87.0 per 100,000), Latinos (79.9 per 100,000), and Asians/Others (60.6 per 100,000).

Table 4: Racial/Ethnic Distribution of MVT Injuries by Victim's Role in Collision, Los Angeles County, 2000-2006

	White	Black	Asian/Oth	Latino
Occupant	33%	12%	11%	42%
Pedestrian	23%	15%	9%	50%
Bicyclist	29%	13%	5%	51%
Motorcyclist	53%	11%	6%	27%
Other	30%	16%	6%	45%
Unspecified	34%	14%	11%	38%

Only includes unintentional injuries.

The racial/ethnic distribution varied by the victim's role in the MVT collision (Table 4). Whites accounted for less than one-quarter of pedestrian injuries but more than half of motorcyclist-related injuries. By comparison, Latinos accounted for just over one-quarter of motorcyclist injuries, but half of all pedestrian injuries. Blacks and Asians/Others accounted for a much smaller percentage of injuries overall.

On average, White patients were older than those from any other racial/ethnic group when admitted to a hospital for injuries sustained in a MVT collision. The average age of a White patient was 45.2 years, followed by Asian/Other patients (42.6 years), Blacks (36.1 years), and Latinos (31.7 years).

Geography

While the greatest number of MVT-related hospitalizations was found in the San Fernando SPA, this was also the SPA with the largest population. The age-adjusted hospitalization rates varied widely from SPA to SPA (Table 5). The highest rate was found in the Antelope Valley, even though this SPA had the fewest hospitalizations. The hospitalization rate in the Antelope Valley was nearly twice that of the rate found in the San Gabriel and the West SPAs.

Table 5: Total Number of MVT Hospitalizations and Average Annual Age Adjusted Hospitalization Rate by SPA, Los Angeles County, 2000-2006

SPA	Number	Rate
SPA 1: Antelope Valley	3068	136.7
SPA 2: San Fernando	11,855	82.7
SPA 3: San Gabriel	8,901	70.5
SPA 4: Metro	7,420	89.7
SPA 5: West	3,295	71.7
SPA 6: South	8,357	122.9
SPA 7: East	6,849	74.4
SPA 8: South Bay	8,753	81.3
Unknown SPA	8	---
Los Angeles County Total	58,506	85.0

Note: Rates are per 100,000 population.

When looking at MVT collisions by the victim's role in the collision, there were some significant differences between SPAs. Only 53% of patients hospitalized with MVT-related injuries from the Metro SPA were vehicle occupants, while 72% of patients from the Antelope Valley were occupants. By contrast, just 6% of patients from the Antelope Valley were pedestrians, but 30% of those from the Metro SPA were pedestrians. Bicyclist related injuries accounted for less than 2% of hospitalizations from the Antelope Valley but for 6% from the West SPA.

Motorcyclists accounted for 6% of injuries in the South SPA, but 14% in the Antelope Valley.

Males were hospitalized at a much greater rate than females throughout Los Angeles County. Hospitalization

rates were highest in the Antelope Valley (167.8 per 100,000 males and 105.2 per 100,000 females) and lowest in the San Gabriel SPA (87.3 per 100,000 males and 54.1 per 100,000 females) for both genders. The rate ratio (male hospitalization rate divided by the female hospitalization rate) ranged from 1.53 in the San Fernando SPA to 1.68 in the East SPA.

In the San Fernando and the South SPAs the lowest MVT collision hospitalization rates were found among Latinos, while in all other SPAs, the lowest rates were found among Asians/Others (Table 6). In the San Fernando, the South and the East SPAs, Whites had the highest rate of MVT Collision hospitalizations, while in all other SPAs, the highest rates were found among Blacks. For Whites and Asians/Others, the greatest MVT collision hospitalization rate was found in the South SPA, while for Blacks and Latinos, the highest rates were in the Antelope Valley. For Whites and Latinos, the lowest rate was found in the West SPA, for Blacks the lowest rate was from the San Fernando SPA, and for Asians, the lowest rate was from the San Gabriel SPA.

Table 6: Average Annual Age Adjusted MVT Hospitalization Rate by Race/Ethnicity and SPA, Los Angeles County, 2000-2006

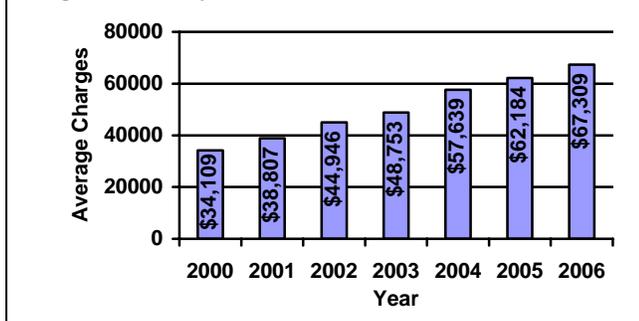
SPA	Rate			
	Black	Latino	As/Oth	White
SPA 1: Antelope Valley	155.7	124.5	114.3	138.5
SPA 2: San Fernando	80.4	77.8	80.3	82.3
SPA 3: San Gabriel	89.4	72.3	45.2	80.1
SPA 4: Metro	106.5	85.6	63.8	99.0
SPA 5: West	106.7	67.5	51.1	71.4
SPA 6: South	143.8	104.9	146.1	271.2
SPA 7: East	86.6	70.0	60.2	92.1
SPA 8: South Bay	85.8	84.0	61.4	79.7
Los Angeles County Total	111.1	79.9	60.6	87.0

Note: Rates are per 100,000 population.

Medical Charges

The average medical charges needed to treat each patient with a MVT collision-related injury were more than \$50,000. The average annual charges nearly doubled during the seven years of this report from \$34,109 per visit during 2000 to \$67,309 per visit during 2006 (Figure 5). Charges were twenty-five percent higher for males (\$54,762 per visit) than females (\$43,723 per visit). Latinos had the lowest

Figure 5: Average Medical Charges for MVT Collision Injury Hospitalizations by Year, Los Angeles County, 2000-2006



medical charges (\$47,096 per visit) followed by Asians/Others (\$49,397), Blacks (\$52,633), and Whites (\$53,738).

These demographic disparities can be largely explained by demographic differences in the victim's role in the collision since medical charges are strongly related to the victim's role. Hospitalizations to other involved people were the least expensive (\$38,286 per visit). Hospitalizations to motorcyclists (\$55,294 per visit) and pedestrians (\$64,098 per visit) were the most costly, while injuries to unspecified persons (\$42,310 per visit), bicyclists (\$44,840 per visit), and occupants (\$46,427) were in between.

Males accounted for significantly more than half of pedestrian and bicyclist hospitalizations, the two most expensive categories. Similarly, compared to their proportion in the overall county population, Whites were overrepresented among motorcyclist injuries and Blacks were overrepresented among pedestrian injuries. However, these differences were small and this is reflected in the smaller gaps in charges between different racial/ethnic groups.

Comparison to Mortality Data

MVT collisions were the second leading cause of injury hospitalizations and of injury fatalities in Los Angeles County. Fatality data are currently only available through 2005, so the mortality and hospitalization data presented in this section and in Table 7 only include 2000-2005 data.

There were almost 10 hospitalizations for each fatality resulting from a MVT collision. Occupant injuries made up a much larger percentage of hospitalized injuries than fatalities, while there was a larger percentage of "unspecified" person injuries among fatalities. While the racial/ethnic distribution of MVT collision-related injuries was similar for deaths and hospitalizations, there was a larger percentage of males among fatalities. Finally, the average age of the injured person was similar for deaths (41.4 years) and hospitalizations (38.0 years).

Table 7: Demographics of Fatal MVT Collisions and Non-Fatal MVT Collision Hospitalizations, Los Angeles County 2000-2005

	Deaths	Hosps
Total Number	5,261	50,246
Victim's Role (%)		
Occupant	49%	61%
Pedestrian	25%	20%
Bicyclist	2%	4%
Motorcyclist	8%	10%
Other	0%	1%
Unspecified	16%	5%
Not Unintentional	1%	<1%
Race/Ethnicity (%)		
Black	12.6%	12.4%
Latino	42.1%	41.8%
White	34.4%	33.5%
Asian/Other	10.7%	9.5%
Unknown	<1%	2.8%
Gender (%)		
Male	69.2%	60.4%
Female	30.8%	39.6%
Average Age (Years)	41.4	38.0

Motor Vehicle Traffic Discussion

Motor vehicle traffic collisions are a continuing cause of injury and hospitalization in Los Angeles County. However, several interventions can reduce injury to occupants, pedestrians and bicyclists from MVT collisions, including the proper use of child car seats, the consistent use of seat belts, decreasing alcohol impaired driving, reducing distracted driving, and instituting graduated licensing for teenage drivers.

Child Passenger Safety

Child passenger safety seats can reduce injury significantly when used properly.¹ In California, children must ride in the rear seats of cars in passenger safety seats until they are six years old or 60 pounds.² The type of appropriate car seat varies with the age of the child (see box).³ Additional recommendations from the federal National Highway Traffic Safety Administration (NHTSA) for child passenger safety go further than California law in stating that older children be restrained in booster seats until they are at least 8 years old or 4'9" tall and that all children under the age of 13 should ride in the back seat.⁴ The Los Angeles County Public Health Department promotes the proper use of child car seats through community-based education programs and free car seat distribution programs for low-income families.

Safety Belts

Seat belt use greatly enhances occupant survival rates in motor vehicle crashes.⁵ With the exception of New Hampshire, all states and the District of Columbia require that vehicle occupants wear seat belts.⁶ In 2005, seat belt use in California was 92.5% for teenagers over age 16 and adults.⁷ The state Department of Transportation has set a goal of 95% usage by 2010.⁷ In California, as well as 25 other states and the District of Columbia, police can stop vehicles for safety belt violations alone.⁸ "Enhanced enforcement", which combines increased citations with public awareness campaigns on the importance of using seat belts, has been shown to increase community seat belt usage rates.⁹

Appropriate Child Passenger Safety Seats by Developmental Stage

- **Infants** must ride in a rear-facing car seat in the back seat of the car until they are at least *1 year old* and weigh at least *20 pounds*.
- **Toddlers** must ride in forward-facing car seats in the back seat until they are *4 years old* and weigh approximately *40 pounds*.
- **Pre-school children** over 40 pounds must ride in a booster seat in the back seat until they are at least *6 years old* or weigh at least *60 pounds*.
- **Older children** who are at least *6 years old* or weigh at least *60 pounds* must wear safety belts.

Alcohol and Driving

In 2005, California had nearly 22,000 fatal and nonfatal injury MVT collisions that involved alcohol.¹⁰ That same year, Los Angeles County had over 5,000 fatal and nonfatal MVT collisions involving alcohol.¹⁰ Drinking and driving is a generations-old problem that requires ongoing vigilance to prevent. Some of the strategies that have been shown effective include establishing 0.08 as the legal limit for blood alcohol

content (BAC), and setting 21 years old as the legal drinking age.¹¹ Both are current California state law. On occasion, high-quality mass media campaigns can also have an impact, such as those that seek to persuade individuals to avoid drinking and driving or to prevent others from doing so.¹¹

Distracted Driving

Distracted driving encompasses a wide range of activities, including talking with a passenger, eating, personal grooming, changing radio stations or CDs, and talking on cell phones. A 2002 survey from NHSTA found that about 3.5% of all drivers nationally reported having been involved in a crash in the past five years due to distraction.¹²

In a partial response to distracted driving, several states, including California, have enacted laws prohibiting the use of “hand-held” cell phone devices while driving. Nationally in 2005, 6% of drivers reported using hand-held cell phones while driving; 10% of drivers aged 16-24 years reported such use.¹³ California’s law prohibits drivers 18 years and older from using “hand-held” cell phone devices, requiring them to use “hands-free” devices only. Drivers under 18 years old are prohibited from using any wireless cell phone device, even if hands-free, except during emergencies.¹⁴ For more information on the cell phone use law please visit the Department of Public Health, Injury & Violence Prevention Program website at <http://www.publichealth.lacounty.gov/ivpp>

Graduated Drivers Licensing Systems

Data in this report show that in Los Angeles County, 15-19 year olds have the second highest MVT collision hospitalization rate of all age groups; only those 65 years and older have higher rates. Teenagers generally start driving at 16 years old and, according to the Insurance Institute for Highway Safety, for crashes of all severities, the crash rate per mile driven for 16-19 year olds is 4 times the rate for older drivers, and the rate for 16 year olds is twice as high as that of 18-19 year olds.¹⁵ The increase in crash rates is generally attributed to younger teenagers’ inexperience as drivers, risky driving behaviors among younger teens, and the presence of other teenaged passengers in cars, among other factors.¹⁶

Graduated licensing systems are provisional licensing programs that seek to reduce the risk of MVT collision and injury among new drivers by placing restrictions on driving privileges for a limited time before granting full drivers’ licenses. The two most common restrictions are limits on nighttime driving and on the age and number of passengers. In 1997, California enacted its current graduated licensing law. To obtain a learner’s permit, an applicant must be at least 15 ½ years old and at least 16-years-old to obtain a license.¹⁷ Those who do not take a drivers education course must wait until age 18 for a license. With the exception of family members, provisional drivers are not allowed to transport passengers under the age of 20 during the first 12 months of driving. The graduated licensing system has reduced motor vehicle crashes among teen drivers in California. One study found that 5½

years after the law's implementation, injury and fatal crashes involving 16 year old drivers were reduced by an estimated 23%.¹⁸

¹ Centers for Disease Control and Prevention. The Guide to Community Preventive Services. Available at: <http://www.thecommunityguide.org/mvoi/mvoi-child-seat-law.pdf>. December 27, 2002. Accessed April 22, 2008.

² California Vehicle Code § 27360 (2008). Available at: <http://www.leginfo.ca.gov/cgi-bin/waisgate?WAISdocID=71448824018+0+0+0&WAISaction=retrieve>. Accessed April 22, 2008.

³ California Department of Public Health. California Child Passenger Safety Law. Available at: <http://www.dhs.ca.gov/EPIC/cps/documents/Laws/California%20Law%20-%20DHS%20California%20Law%20Poster-ENGLISH.pdf>. Accessed April 22, 2008.

⁴ National Highway Transportation Safety Administration. Occupant Protection for Children Safety Information. Available at: http://www.nhtsa.dot.gov/people/injury/childps/safetycheck/OccProtetcFor_Children1.pdf. May 2004. Accessed April 14, 2008.

⁵ National Highway Transportation Safety Administration. 2001 Annual Assessment: Motor Vehicle Traffic Crash Fatality and Injury Estimates for 2001. Available at: <http://www-nrd.nhtsa.dot.gov/pdf/nrd-30/NCSA/Rpts/2002/Assess01.pdf>. November 22, 2002. Accessed May 13, 2008.

⁶ Insurance Institute for Highway Safety. Status Report: How State Laws Measure Up. 2000;35(10):1-8. Available at: <http://www.iihs.org/sr/pdfs/sr3510.pdf>. Accessed April 23, 2008.

⁷ California Department of Transportation, Strategic Highway Safety Plan, February 2008. Available at www.dot.ca.gov/SHSP. Accessed April 23, 2008.

⁸ Insurance Institute for Highway Safety. Child Restraint/Belt Use Laws (see chart under "Seat Belt Laws"). Available at: <http://www.iihs.org/laws/restraintoverview.aspx>. Accessed April 23, 2008.

⁹ Centers for Disease Control and Prevention. The Guide to Community Preventive Services: Effectiveness of Enhanced Enforcement Programs to Increase the Use of Safety Belts. October 2003. Available at: <http://www.thecommunityguide.org/mvoi/mvoi-safety-belt-enforcement.pdf>. Accessed April 22, 2008.

¹⁰ California Highway Patrol, Statewide Integrated Traffic Records System: 2005 Report of Fatal and Injury Motor Vehicle Traffic Collisions. Available at: <http://www.chp.ca.gov/switrs>. Accessed April 24, 2008.

¹¹ Centers for Disease Control and Prevention. The Guide to Community Preventive Services: Motor Vehicle Occupant Injury. Available at: <http://www.thecommunityguide.org/mvoi/default.htm#driving>. Accessed April 22, 2008.

¹² The Gallup Organization. National Survey of Distracted and Drowsy Driving Attitudes and Behavior: 2002, Volume I: Findings. National Institute for Highway Safety, 2003, p.10. Available at: http://www.nhtsa.dot.gov/people/injury/drowsy_driving1/survey-distractive03/index.htm. Accessed April 22, 2008.

¹³ National Highway Transportation Safety Administration. Traffic Safety Facts: Driver Cell Phone Use in 2005 - Overall Results. December 2005. Available at: <http://www-nrd.nhtsa.dot.gov/pdf/nrd-30/NCSA/RNotes/2005/809967.pdf>. Accessed April 22, 2008.

¹⁴ California Vehicle Code § 23123 - § 23125 (2008). Available at: <http://www.leginfo.ca.gov/cgi-bin/waisgate?WAISdocID=7159136412+0+0+0&WAISaction=retrieve>. Accessed April 22, 2008.

¹⁵ Insurance Institute for Highway Safety Highway Loss Data Institute. Fatality Facts 2006: Teenagers. Available at: http://www.iihs.org/research/fatality_facts_2006/teenagers.html. Accessed April 22, 2008.

¹⁶ Centers for Disease Control and Prevention. Teen Drivers: Fact Sheet, March 2008. Available at: www.cdc.gov/ncipc/factsheets/teenmvh.htm Accessed April 22, 2008.

¹⁷ California Vehicle Code § 12814 (2008). Available at: <http://www.leginfo.ca.gov/cgi-bin/waisgate?WAISdocID=71856227180+0+0+0&WAISaction=retrieve>. Accessed April 22, 2008.

¹⁸ Zwicker TJ, Williams AF, Chaudhary NK, and Farmer CM. Evaluation of California's Graduated Licensing System. August 2006. Available at: http://www.iihs.org/research/paper_pdfs/mf_1857.pdf. Accessed May 13, 2008.

3rd Leading Cause: Poisonings

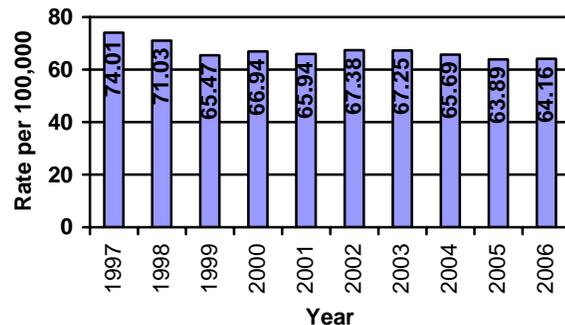
This category contains many different types of poisoning injuries, including those related to medicines (both prescription and over-the-counter), illicit drugs, alcohol, cleaning supplies and other household products, pesticides, and gases (e.g., carbon monoxide). This category also includes some types of food-related poisonings, such as from wild mushrooms. Food poisonings resulting from bacterial contamination (e.g., salmonella or E. coli) are not coded as injuries in medical conditions databases; they are coded as illnesses similar to heart disease or cancer.

Poisonings were the third leading cause of injury hospitalizations in Los Angeles County, with an average of more than 6,300 reported each year. Statewide, there were 154,818 hospitalizations due to poisonings reported between 2000 and 2005 (statewide data are not yet available for 2006). During this period, 24.7% of all poisoning-related hospitalizations in California were to Los Angeles residents.

Trends

There were 44,619 poisoning hospitalizations during the seven years of this study, an average of 6,374 each year. The number of hospitalizations due to poisoning did not change significantly during the past ten years; however, the 2006 hospitalization rate is 13% lower than the 1997 rate (Figure 1).

Figure 1: Poisoning-Related Hospitalization Rate per 100,000 Population by Year, Los Angeles County



Intent

Nearly half (48%) of all poisoning hospitalizations were the result of suicide attempts. Another 40% were the result of unintentional poisonings and for 11% of the hospitalizations the intent could not be determined. Only 46 hospitalizations (0.1%) were the result of assaults or legal intervention.

Poisoning Substances

Table 1 shows the types of substances that were responsible for each poisoning hospitalization. The coding system provides much greater detail for unintentional poisonings than for suicide attempts or poisonings of undetermined intent. Therefore, in Table 1, some categories are combined in the suicide and undetermined columns to make up for both the less specific coding found in these intents, and for the smaller number of poisonings due to some types of substances. Overall, 90.5% of poisonings were caused by drugs (both legal and illicit) or other medicinal substances. Among suicide attempts, 95.1% of all poisonings were caused by some type of drug.

Table 1: Poisoning Hospitalizations by Substance Causing the Poisoning and Intent, Los Angeles County, 2000-2006

Substance	Unintentional	Suicide Attempt	Undetermined Intent
Analgesics, antipyretics & antirheumatics	3,738	6,799	1,211
Barbiturates	194	294	87
Other Sedatives & Hypnotics	502	754	133
Tranquilizers	1,753	7,483	1,338
Other Psychotropic Agents	2,049		
Other drugs acting on central & autonomic nervous system	1,848	5,201	1,780
Antibiotics	82		
Other Anti-infectives	53		
Other drugs	5,121		
Agricultural & horticultural chemical & pharmaceutical preparations other than plant foods & fertilizers	98	100	37
Corrosives & caustics	232	245	28
Alcohol	627	611	377
Cleaning & polishing agents, disinfectants, paints & varnishes	137		
Petroleum products, solvents & their vapors	110		
Poisonous food & plants	291		
Other/unspecified solid & liquid substances	237		
Gas distributed by pipeline	16		
Other utility gas & carbon monoxide	140	106	78
Other gases & vapors	682		

Note: There were 46 poisonings due to assaults or legal intervention which are not further categorized due to the small numbers

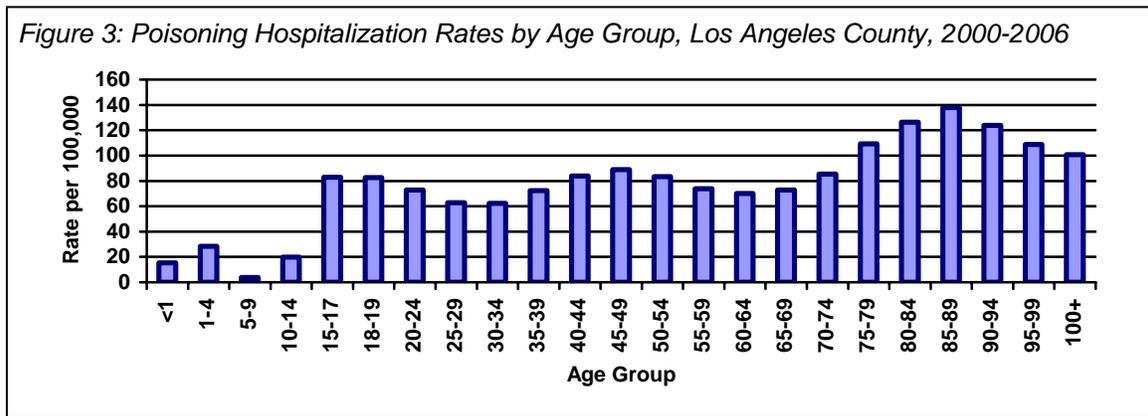
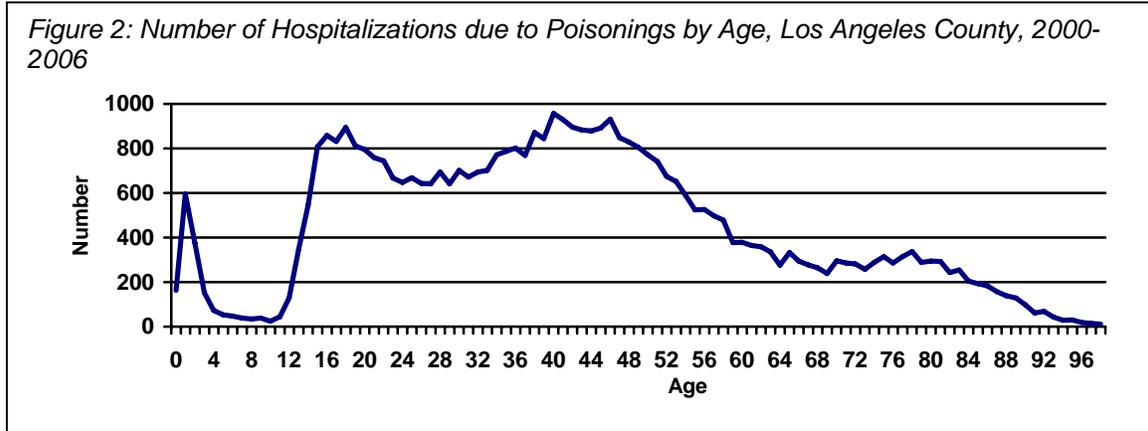
For unintentional poisonings, in many cases, the coding allows for the identification of the specific drug or type of drug involved in the poisoning injury, expanding the information presented in Table 1. During the seven years of data included in this report, there were 88 unintentional poisoning hospitalizations due to psychodysleptic or hallucinogenic drugs, such as cannabis, LSD, and mescaline; 336 hospitalizations due to heroin; and 732 due to psychostimulants, which includes amphetamines, but also caffeine. There were also 274 hospitalizations due to local anesthetics, a category which oddly and unfortunately includes cocaine in addition to related legal medications such as lidocaine. This means that cocaine use cannot be separated out from other local anesthetics as a cause of poisoning hospitalizations. The next version of the coding system for hospitalizations, the ICD 10, will separate cocaine from the other local anesthetic drugs and place it in a category with other illicit drugs, like heroin and LSD.

Among unintentional poisonings with legal drugs, in the analgesic category, there were more than twice as many poisonings due to aromatic analgesics (acetaminophen as in Tylenol; N=886) than due to salicylates (e.g., aspirin; N=336). Three quarters of the hospitalizations due to alcohol poisoning were related to alcoholic beverages, the rest were caused by various other forms of alcohol including denatured alcohol, rubbing alcohol, and ethanol. In the other

gases and vapors category, there was a specific code for second-hand tobacco smoke, which caused 512 hospitalizations during the seven years of this report. There also was a specific code for motor vehicle exhaust for unintentional poisonings, suicide attempts, and undetermined intent poisonings. There were 76 of these poisonings; 57 (75%) of them were caused by suicide attempts.

Older ages with less than 6 hospitalizations are not shown.

Age



There were three distinct peaks in the number of poisoning hospitalizations by age as shown in Figure 2. The first was among infants and toddlers, the second among older teenagers, and the third among people in their 40s. There also was a much smaller peak among people in their late 70s before the numbers gradually trailed off for older individuals.

Hospitalization rates for poisonings are smallest among

Table 2: Poisoning Hospitalization Rates by Intent and Age Group, Los Angeles County, 2000-2006

Age Group	Unint	Sui	Undet
<1 Years	13.52	*	*
1-4 Years	27.10	*	*
5-9 Years	3.38	*	*
10-14 Years	4.53	13.68	1.45
15-19 Years	15.09	61.56	6.04
20-24 Years	14.82	52.18	6.98
25-29 Years	15.47	41.57	6.57
30-34 Years	16.47	38.58	7.17
35-44 Years	23.88	43.67	10.15
45-54 Years	33.19	39.88	12.77
55-64 Years	37.42	23.25	10.60
65+ Years	73.95	15.11	8.71

All rates are per 100,000 population.
* Number too small to calculate rate.

children; rates jump dramatically after the age of 15 and never return to the lower levels (Figure 3). After age 75, hospitalization rates remain above 100 visits per 100,000 population, peaking among 85-89 year olds with 138 visits per 100,000 population.

Overall the average age of a person hospitalized to treat a poisoning was 41.7 years old. However, the intent of the poisoning was strongly related to the age of the victim (Table 2). Among young children, almost all poisonings were unintentional (0-9 years old). For adolescents and young adults (10-24 years olds), suicide attempt hospitalization rates were more than twice as high as unintentional and undetermined hospitalization rates combined. Among somewhat older adults (25-54 years old), rates of hospitalization for suicide attempts were higher than those of unintentional or undetermined intent poisonings, but not as dramatically higher as in the younger population. Finally, among the older population (55+ year olds), unintentional poisoning hospitalization rates were higher than rates of suicide attempts or undetermined intent poisonings. People hospitalized for poisoning-related suicide attempts were, on average, younger (35.7 years) than those hospitalized for poisonings of undetermined intent (43.5 years) or unintentional poisonings (48.4 years).

Among unintentional injuries, victims of poisoning from petroleum products, other solvents and their vapors had the lowest average age (22.6 years). The only other type of unintentional poisoning with an average age of less than 30 years at admission was

Table 3: Gender Distribution of Hospitalizations for Poisoning by Type and Intent, Los Angeles County, 2000-2006

Poisoning Type and Intent	% Male	% Feml
All Unintentional	48%	52%
Analgesics, antipyretics & antirheumatics	43%	57%
Barbiturates	40%	60%
Other Sedatives & Hypnotics	37%	63%
Tranquilizers	39%	61%
Other Psychotropic Agents	60%	40%
Other drugs for central/autonomic nervous system	54%	46%
Antibiotics & other anti-infectives	37%	63%
Other drugs	47%	53%
Agri/horticultural chemical & pharmaceutical preps other than plant foods & fertilizers	64%	36%
Corrosives & caustics	56%	44%
Alcohol	65%	35%
Cleaning & polishing, disinfectants, paints & varnishes	58%	42%
Petroleum products, solvents & their vapors	66%	34%
Poisonous food & plants	55%	45%
Other/unspecified solid & liquid substances	47%	53%
Gases & vapors	38%	62%
All Suicide Attempts	35%	65%
Analgesics, antipyretics & antirheumatics	28%	72%
Barbiturates	32%	68%
Other Sedatives & Hypnotics	34%	66%
Tranquilizers & Other Psychotropic Agents	37%	63%
Other/Unspecified Drugs/Med Substances	39%	61%
Corrosives & Caustics	43%	57%
All other solid & liquid substances	56%	44%
Gases & vapors	74%	26%
All Undetermined Intent	54%	46%
Analgesics, antipyretics & antirheumatics	53%	47%
Tranquilizers & Other Psychotropic Agents	51%	49%
Other Specified Drugs/Med Substances	55%	45%
Other/unspecified solid & liquid substances	62%	38%
Gases & vapors	54%	46%

corrosives and caustics (29.2 years). By contrast, victims of several types of unintentional poisoning had an average age at admission of more than 55 years, including poisonings from other drugs (57.1 years), other sedatives and hypnotics (57.4 years), other gases and vapors (58.1 years), and gas distributed by pipeline (63.6 years).

Gender

Females accounted for 57% of all poisoning-related hospitalizations. The only other leading cause of injury for which there were more females than males hospitalized was falls. Both male (average age = 42.1 years) and female (average age = 41.4 years) poisoning victims were similar in age, but the gender distribution varied by intent. Females accounted for 65% of all poisoning suicide attempts and 52% of unintentional poisonings, but just 46% of all poisonings of undetermined intent (Table 3).

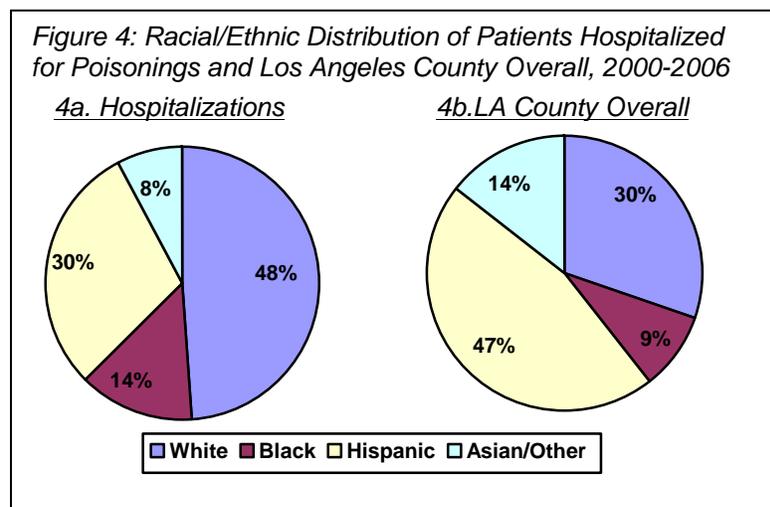
The gender distribution of poisoning injuries varied widely by the type of substance involved (Table 3). Though there were more female than male patients overall, males represented nearly two thirds of unintentional hospitalizations for certain agricultural products, alcohol, and petroleum products. Males also made up 72% of poisoning hospitalizations for the specific codes that include illicit drugs like heroin, cocaine, cannabis, LSD, and amphetamines (These codes also include certain legal medications such as caffeine, lidocaine, and others).

For suicide attempts, females outnumbered males for all categories of drugs and for poisonings from corrosives & caustics. However, more than half of suicide attempt hospitalizations from other solid & liquid substances were male, as were nearly three quarters of those caused by gases & vapors.

Race/Ethnicity

Racial/ethnic group was unknown for 2.1% of all poisoning-related hospitalizations; all statistics presented in this section only include those records for which race/ethnicity was reported. Whites and Blacks were both over-represented among hospitalizations for poisonings relative to their proportions in the

entire county population (Figure 4). In fact, among Whites, poisonings were actually the second leading cause of injury hospitalization after falls (Appendix



VI). Age-adjusted hospitalization rates were highest for Whites (93.8 per 100,000, closely followed by Blacks (92.3 per 100,000). Rates among Latinos (45.2 per 100,000), and Asians/Others (36.5 per 100,000) were much lower. On average, Latino patients hospitalized for poisonings were younger (34.6 years) than poisoning patients of any other race. Asians/Others (41.8 years) were the next youngest, followed by Blacks (43.0 years) and Whites (45.8 years).

There were only minor differences in the racial/ethnic distribution based on the intent of the injury, but the variation was much wider when looking at the racial/ethnic distribution of particular poisoning substances (Table 4). Whites accounted for only 31% of suicide attempts with caustics & corrosives, but for 61% of suicide attempts and unintentional poisonings with other sedatives & hypnotics. Blacks accounted for just 7% of suicide attempts with other sedatives & hypnotics but for 30% of undetermined intent poisonings with other specified drugs/medicinal substances. The percentage of Asian/Others by type of poisoning ranged from 3% of unintentional alcohol poisonings to 16% of suicide attempts with corrosives & caustics. Latinos accounted for 19% of suicide attempts with other sedatives & hypnotics, but for 49% of poisonings of undetermined intent due to other/unspecified solid & liquid substances.

Table 4: Racial/Ethnic Distribution of Hospitalizations for Each Type of Unintentional Poisoning, Los Angeles County, 2000-2006

Poisoning Intent & Type		% White	% Black	% As/Oth	% Latino
Unintentional	Analgesics, antipyretics & antirheumatics	57%	12%	6%	25%
	Other Sedatives & Hypnotics	61%	9%	9%	21%
	Tranquilizers	60%	14%	7%	20%
	Other Psychotropic Agents	47%	18%	4%	31%
	Other drugs for central & autonomic nervous system	43%	22%	5%	30%
	Other drugs	48%	15%	9%	28%
	Alcohol	50%	8%	3%	39%
	Poisonous food & plants	44%	13%	10%	34%
	Other/unspecified solid & liquid substances	39%	13%	13%	35%
	Other gases & vapors	42%	18%	8%	32%
	All Other Unintentional Injuries*	37%	13%	8%	41%
Suicide Attempt	Analgesics, antipyretics & antirheumatics	42%	10%	11%	37%
	Other Sedatives & Hypnotics	61%	7%	13%	19%
	Tranquilizers & Other Psychotropic Agents	58%	10%	8%	25%
	Other Specified Drugs/Medicinal Substances	45%	16%	8%	30%
	Unspecified Drugs/Medicinal Substances	44%	15%	6%	35%
	Corrosives & Caustics	31%	23%	16%	31%
	Other/unspecified solid & liquid substances	46%	11%	8%	34%
	All other suicide attempts*	54%	11%	7%	28%
Undeterm. Intent	Analgesics, antipyretics & antirheumatics	53%	13%	5%	29%
	Tranquilizers & Other Psychotropic Agents	54%	10%	7%	29%
	Other Specified Drugs/Medicinal Substances	35%	30%	6%	29%
	Other/unspecified solid & liquid substances	32%	11%	8%	49%
	All other injuries of undetermined intent*	52%	16%	7%	25%

* Multiple categories have been combined because of small numbers.

Geography

The Antelope Valley had the lowest number of poisoning-related hospitalizations, but by far the highest hospitalization rate of any SPA (Table 5). The lowest rate of any SPA was found in the East SPA, but the rates for all the SPAs other than the Antelope Valley were relatively close together.

Most of the increased rate of hospitalizations in the Antelope Valley was due to suicide attempts; the rate for the Antelope Valley was 55.7 per 100,000, while no other SPA had a rate greater than 35 per 100,000. The Antelope Valley also had the highest rate of

Table 5: Number of Poisoning Hospitalizations and Average Annual Age Adjusted Hospitalization Rate by SPA, Los Angeles County, 2000-2006

SPA	Number	Rate
SPA 1: Antelope Valley	2,215	101.5
SPA 2: San Fernando	9,941	69.4
SPA 3: San Gabriel	7,335	58.9
SPA 4: Metro	5,644	67.6
SPA 5: West	2,886	61.0
SPA 6: South	4,282	69.7
SPA 7: East	5,042	56.5
SPA 8: South Bay	7,274	68.2
Los Angeles County Total	44,619	65.8

Note: Rates are per 100,000 population. The small number of patients with unknown SPA were added to the most populous SPA (SPA 2).

unintentional poisoning hospitalizations (37.7 per 100,000), but this was much closer to unintentional poisoning rates in other SPAs, which ranged from 22.8 per 100,000 (East SPA) to 32.2 per 100,000 (South SPA).

Age-adjusted rates of hospitalization were higher for females than males in each SPA; however, in the Metro SPA the actual number of hospitalizations was slightly higher for males. Hospitalization rates were highest in the Antelope Valley and lowest in East SPA for both genders. The rate ratio (male

Table 6: Average Annual Age Adjusted Poisoning Hospitalization Rate by Race/Ethnicity and SPA, Los Angeles County, 2000-2006

SPA	Rate			
	Black	Latino	As/Oth	White
SPA 1: Antelope Valley	131.49	56.58	34.40	124.98
SPA 2: San Fernando	80.48	42.08	46.35	89.92
SPA 3: San Gabriel	98.57	48.65	26.06	96.04
SPA 4: Metro	129.97	47.11	38.85	107.71
SPA 5: West	82.77	39.37	36.98	67.96
SPA 6: South	95.44	41.58	87.15	236.39
SPA 7: East	73.45	48.62	35.15	92.36
SPA 8: South Bay	76.75	45.95	42.76	96.04
Los Angeles County Total	92.31	45.23	36.53	93.77

Note: Rates are per 100,000 population.

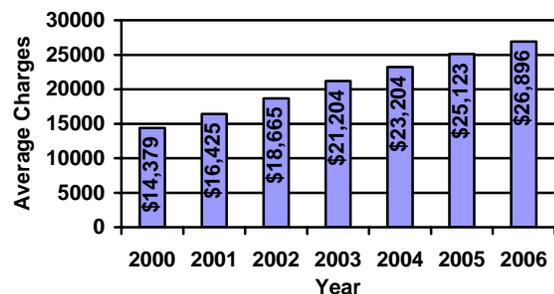
hospitalization rate divided by the female hospitalization rate) ranged from 0.67 in the Antelope Valley to 0.96 in the Metro SPA.

Within each SPA, the lowest poisoning hospitalization rate was always found among Asians/Others or Latinos and the highest rate was always found among Whites or Blacks (Table 6). For Whites and Asians/Others, the greatest poisoning hospitalization rate was found in the South SPA, while for Blacks and Latinos, the highest rate was in the Antelope Valley. For Whites and Latinos, the lowest rate was found in the West SPA, for Blacks the lowest rate was from the East SPA, and for Asians, the lowest rate was from the San Gabriel SPA.

Medical Charges

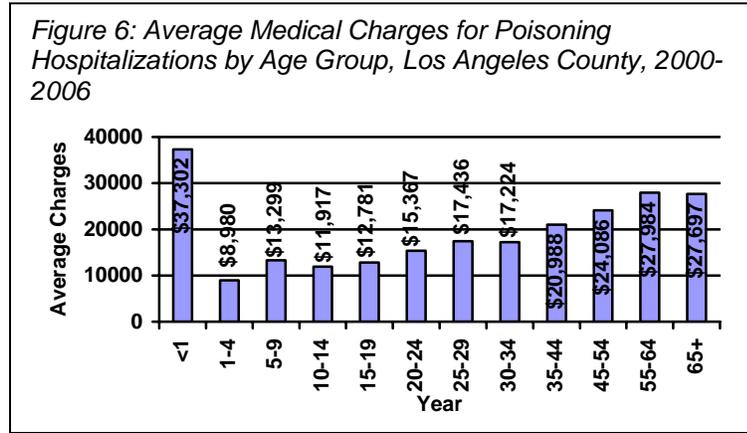
The average medical charges incurred during each poisoning-related hospitalization were \$20,890. During the seven years of this report, the average charges increased each year (Figure 5). Charges were somewhat higher for males (\$22,757 per visit) than females (\$19,512 per visit). Latinos had the lowest medical charges (\$18,009 per visit) followed by Whites (\$21,463), Asian/Others (\$22,857), and Blacks (\$24,069). There was more variation in average charges by age group than by sex or race/ethnicity (Figure 6). The average charges were highest for infants less than 1 year old

Figure 5: Average Medical Charges for Poisoning Hospitalizations by Year, Los Angeles County, 2000-2006



and lowest for children 1-4 years old. The average charges generally tended to increase with age.

There was also significant variation based on the intent and type of poisoning. Average charges were the lowest for suicide attempts (\$16,971), followed by unintentional poisonings (\$22,915) and poisonings of undetermined intent



(\$30,441). For unintentional poisonings, average charges ranged from \$12,746 per hospitalization resulting from poisonous foods & plants to \$34,607 for poisonings from other & unspecified solid & liquid substance and \$48,005 per visit for poisonings from gas distributed by pipelines. For suicide attempts, average charges were lowest for poisonings from unspecified drugs or medicinal substances (\$11,857 per visit) and highest for poisonings from corrosive & caustic substances (\$32,333 per visit). For injuries of undetermined intent, average charges were actually lowest for poisonings from corrosive & caustic substances (\$18,340) and highest for barbiturate poisonings (\$44,533 per visit).

Comparison to Mortality Data

Between 2000 and 2005, there were about 9 hospitalizations for each poisoning fatality (Table 7). A much larger percentage of fatalities were caused by unintentional poisonings, while suicide attempts and poisonings of undetermined intent made up a larger proportion of hospitalizations. The racial/ethnic distribution of poisonings was fairly similar for deaths and hospitalizations, but Whites made up a slightly larger proportion of deaths than hospitalizations and Asian/Others accounted for a greater percentage of hospitalizations. Males accounted for more than two thirds of fatalities but less than one half of the poisoning hospitalizations. The average age of people with fatal and hospitalized injuries was similar. Unfortunately, it is difficult to compare the type

Table 7: Demographics of Fatal Poisonings and Non-Fatal Poisoning Hospitalizations, Los Angeles County 2000-2005

	Deaths	Hosps
Total Number	4,216	38,184
Intent (%)		
Unintentional	79.4%	40.3%
Suicide/Sui Attempt	17.0%	48.5%
Homicide/Assault*	<1%	<1%
Undetermined Intent	3.2%	11.1%
Race/Ethnicity (%)		
Black	16.4%	13.3%
Latino	25.9%	28.9%
White	54.3%	48.1%
Asian/Other	2.9%	7.6%
Unknown	<1%	2.1%
Gender (%)		
Male	68.2%	42.2%
Female	31.8%	57.8%
Average Age (Years)	44.6	41.4

* Also includes legal intervention.

of poisonings between deaths and hospitalizations since fatal and non-fatal injuries were coded under two different systems (ICD 10 for fatalities and ICD 9 for hospitalizations) during this time period.

Poisonings Discussion

Poisonings are a significant cause of injury hospitalizations in Los Angeles County. During the report period, unintentional and deliberate overdoses of both legal and illegal substances resulted in nonfatal injuries. Most of the county's poisoning hospitalizations were the result of the use of prescription or over-the-counter drugs.

The news has given much attention to the misuse and abuse of prescription recently. The death of a well-known young celebrity and the start of a White House-sponsored prescription-drug abuse public awareness campaign brought attention to the need for education about the dangers of medications that have the aura of safety because they are obtained by prescription and not illegally off the street.¹

The Centers for Disease Control and Prevention (CDC) recently reported a nationwide increase in poisoning deaths among certain younger and older adult age groups between 1999 and 2004, reflecting an increase in unintentional prescription drug overdose deaths.² According to the CDC, nationally, prescription drugs overtook heroin and cocaine combined as the leading cause of lethal overdoses.¹ Los Angeles County has had a more mixed overdose death picture over time, with increases in deaths for some adult age groups and decreases for others. In addition, overdoses of illicit drugs generally accounted for a greater percentage of deaths than did legal drugs. The Injury & Violence Prevention Program is developing a poisoning death surveillance system using information from Coroner's records to try to better distinguish between deaths due to legal and illegal drugs. The system should give a more accurate picture of the role of prescription drugs in the poisoning deaths of county residents.

In contrast to deaths, hospitalizations in Los Angeles County appear to result from overdoses of prescription or over-the-counter medications more so than illicit drugs. As this data report shows, between 2000 and 2006 approximately one-quarter of poisoning hospitalizations were attributable to analgesics and antipyretics, such as found in over-the-counter-medications like Tylenol, or Advil, or prescription medications like Oxycontin. Another one-quarter of deaths were attributable to tranquilizers and other psychotropic drugs, such as found in prescription medications like Valium. Prevention efforts focused on the attentive and conscientious use of prescription and over-the-counter medications could reduce the number of hospitalizations in the County due to poisonings from these substances.

¹ Engel M. and Costello D. Overdose Deaths on the Rise, CDC Says. *Los Angeles Times*. January 26, 2008. Available at: <http://articles.latimes.com/2008/01/26/news/me-drugs26>. Accessed May 13, 2008.

² Centers for Disease Control and Prevention. Increases in Age-Group-Specific Injury Mortality –United States, 1999--2004. *Morb Mortal Wkly Rep*. 2007;56(49):1281-1284. Available at: <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5649a1.htm>. Accessed on January 28, 2008.

5th Leading Cause: Struck By or Against

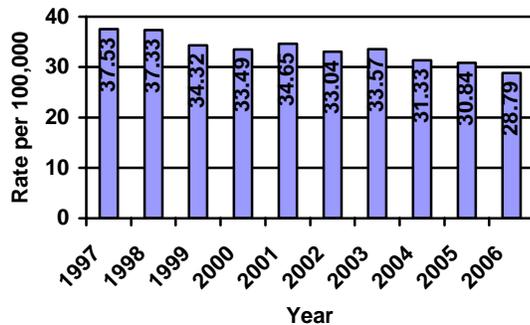
Struck by or Against injuries, from here on referred to as "struck injuries", encompass a wide range of injuries, including hits or tackles in sports and unarmed fights. This category does not include being struck by a motor vehicle, or injuries from striking the ground after falling.

Struck injuries were the fifth leading cause of injury hospitalizations in Los Angeles County, with an average of 3,200 reported each year. Statewide, there were 67,043 hospitalizations due to struck injuries reported between 2000 and 2005 (statewide data are not yet available for 2006). During this period, 29.0% of all struck by or against injury hospitalizations in California were to Los Angeles residents.

Trends

Between 2000 and 2006, there were 22,413 hospitalizations for struck injuries in Los Angeles County. There were more than 3,500 struck injuries per year in 1997 and 1998, but by 2006, there were less than 3,000. This resulted in a 23% decrease in the annual hospitalization rate during this time (Figure 1).

Figure 1: Struck Injury Hospitalization Rate per 100,000 Population by Year, Los Angeles County



Intent

Slightly more than half (53%) of all struck hospitalizations were due to unintentional injuries. The remainder was caused by assaults and legal intervention (47%). There were no struck injury hospitalizations caused by suicide attempts or of undetermined intent.

Cause of Injury

The greatest number of unintentional struck injury hospitalizations were classified nonspecifically as struck by/against other objects or persons, despite changes in the coding system that allowed for more detail about the injury.¹ The number of

Table 1: Struck Injury Hospitalizations by Cause of Injury, Los Angeles County, 2000-2006

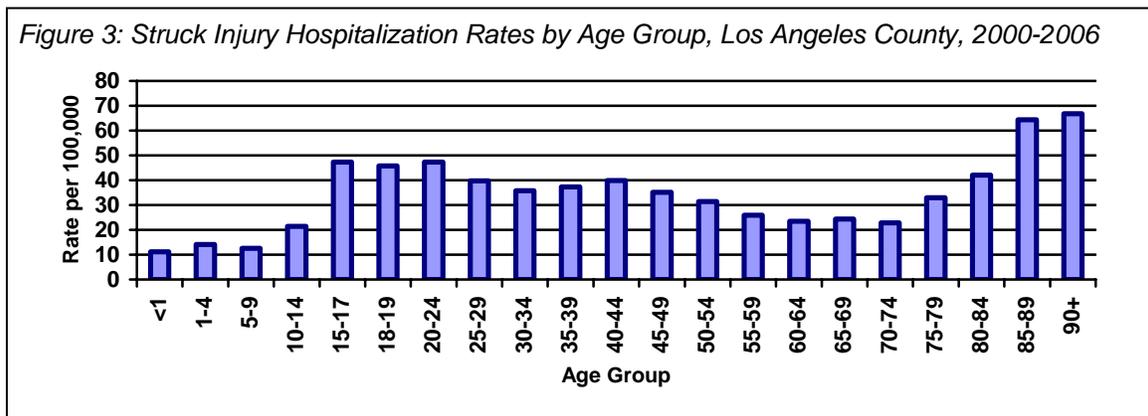
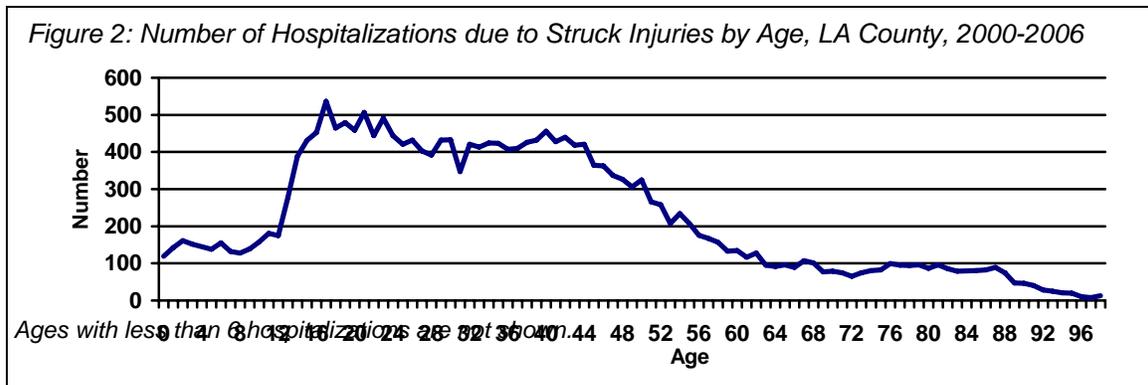
Cause of Injury	#
Struck by falling object	2,195
Struck by/against objects/persons in sports	3,307
Struck in crowd or during collective fear/panic	40
Struck by/against furniture	616
Struck by/against other stationary objects	1,083
Struck by/against other objects/persons	4,665
Struck in running water	22
Assault: unarmed fight or brawl	6,832
Assault: striking by blunt or thrown object	3,355
Legal Intervention by blunt object	54
Other Legal Intervention (blow, manhandling)	244

¹ On October 1, 2001 changes to the codes for struck by or against injuries resulted in the reclassification of struck injuries that had a subsequent fall. They had been classified simply as falls, but were reclassified as struck by or against injuries. Also, new codes were added specifying striking against furniture or against other stationary objects; these injuries were previously coded as struck by/against other objects/persons. While the coding system specifies whether or not a fall followed each struck/by against injury, Table 1 categorizes injuries by the object involved regardless of the whether or not the patient fell after being struck.

sports-related injury hospitalizations was also quite large, accounting for more than one quarter of all unintentional struck injury hospitalizations and 15% of all struck injury hospitalizations. The single largest category of struck injuries was assault in an unarmed fight or brawl, which accounted for 30% of all struck injuries. Just 5,046 (23%) injuries were given a code that designated if a fall occurred subsequent to the struck injury. Of these, only one quarter had a fall after the injury occurred.

Age

The number of struck injuries increased dramatically among teenagers, peaking among 17 year olds. The number of hospitalizations remained high for people in their twenties, thirties and early forties before gradually decreasing among older people (Figure 2). Hospitalization rates were lowest among young children; 0-9 year olds had rates less than 20 visits per 100,000 population (Figure 3). Hospitalization rates increased sharply among older teenagers, the rate for 15-17 year olds was more than double that of 10-14 year olds. However, the greatest rates were found among the elderly population, with more than 60 visits per 100,000 population among people 85 and older.



Overall, the average age of patients hospitalized for a struck injury was 36.3 years. There was not much difference in the average age of patients based on

intent; patients with unintentional injuries (average age = 36.9 years) were just slightly older than those with legal intervention (average age = 35.7 years) or assault (average age = 35.5 years) injuries. However, Table 2 shows that the average hospitalization rate for each age group varied significantly for unintentional injuries and assaults. Assaults were very rare among young children; assault hospitalization rates peaked among people in their twenties. Unintentional injury hospitalization rates were more consistent throughout, but were much higher among 65+ year olds and among 15-19 year olds than other ages. The assault hospitalization rate was higher than the unintentional injury rate for 20-54 year olds. There were also striking differences in age when looking at how the injury was incurred. Patients with sports-related injuries were on average only 23.9 years old while those with injuries from striking against furniture were on average 53.4 years old.

Table 2: Average Annual Struck Injury Hospitalization Rates for by Age Group & Intent, Los Angeles County, 2000-2006

Age Group	Unint.	Assault
<1 Years	10.2	0.9
1-4 Years	13.9	0.4
5-9 Years	12.1	0.6
10-14 Years	17.7	3.4
15-19 Years	24.1	22.1
20-24 Years	17.7	29.5
25-29 Years	16.5	23.0
30-34 Years	15.5	19.4
35-44 Years	15.1	22.7
45-54 Years	14.5	18.3
55-64 Years	14.5	9.8
65+ Years	27.9	5.4

All rates are per 100,000 population.

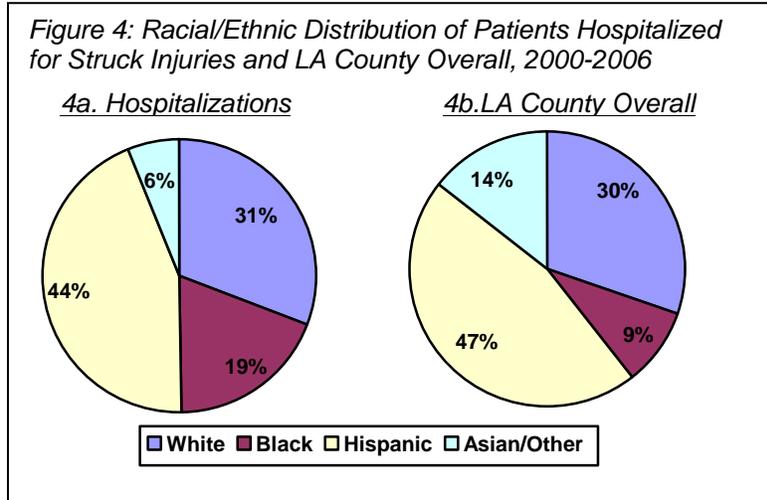
Gender

Overall, males accounted for more than three quarters (79%) of all struck injuries. Males predominated even more strongly among sports-related injuries (89% male), legal intervention injuries (86% male), and assault injuries (85% male). By comparison, injuries caused by striking by or against furniture were evenly divided among males and females. Among the unintentional injuries for which there was information on subsequent falls, males made up a larger percentage of those injuries that were not followed by a fall (81% male) than injuries that were followed by a fall (71% male). Finally, the average age of male patients (34.2 years) hospitalized with a struck injury was less than that of female patients (44.4 years). This was due to the higher number of males found among the types of injuries that occurred to relatively young people (e.g., sports injuries).

Race/Ethnicity

Racial/ethnic group was unknown for 2.3% of all hospitalizations for struck injuries; all statistics presented in this section only include those records for which race/ethnicity was reported. Blacks were significantly overrepresented among hospitalizations for struck injuries relative to their proportion in the entire county population (Figure 4). Age-adjusted hospitalization rates among Blacks (62.3 per 100,000) were more than double that of any other racial/ethnic group. The next highest rate was found among Whites (31.1 per 100,000), followed by Latinos (30.4 per 100,000) and Asians/Others (14.8 per 100,000).

There was considerable variation in racial/ethnic distribution by intent. Blacks accounted for 19% of struck injuries overall, however, only 12% of unintentional struck injury hospitalizations occurred among Black patients, while 27% of patients hospitalized due to assault or legal intervention injuries were Black. By comparison, Whites accounted for 37% of unintentional struck injuries but only 24% of assault and legal intervention injuries. There was less difference based on intent for Latinos (43% of unintentional injuries and 45% of assault/legal intervention injuries) or Asian/Others (7% of unintentional and 5% of assault/legal intervention injuries).



There was also variation in the racial/ethnic distribution by the type of unintentional struck injuries. The proportion of hospitalizations attributed to Whites ranged from 30% of injuries caused by being struck by a falling object to 48% of injuries from being struck against furniture. The proportion of Blacks ranged from 10% of hospitalizations due to being struck by a falling object to 14% of hospitalizations from being struck in sports. Latinos accounted for only 34% of injuries from being struck against furniture, but for 54% of injuries from a falling object. There was much less variation among Asian/Others who accounted for between 7% and 9% of each type of unintentional struck hospitalizations. There was little difference in the racial/ethnic distribution of injuries based on whether or not there was a fall subsequent to the striking injury.

Geography

The greatest number of struck injuries occurred among residents of the South SPA; this SPA also had the highest age adjusted hospitalization rate by a wide margin (Table 3). The smallest number of hospitalizations was found in the Antelope Valley, while the lowest hospitalization rate was found in the San Gabriel SPA. The Metro SPA also had a high hospitalization rate, while the San

Table 3: Number of Struck Hospitalizations and Average Annual Age Adjusted Hospitalization Rate by SPA, Los Angeles County, 2000-2006

SPA	Number	Rate
SPA 1: Antelope Valley	724	31.6
SPA 2: San Fernando	3,840	26.7
SPA 3: San Gabriel	2,987	23.6
SPA 4: Metro	3,439	40.4
SPA 5: West	1,179	25.8
SPA 6: South	4,143	61.9
SPA 7: East	2,569	27.7
SPA 8: South Bay	3,532	32.5
Los Angeles County Total	22,413	32.2

Note: Rates are per 100,000 population.

Fernando and the East SPAs had low rates of struck injury hospitalizations.

Unintentional injuries accounted for more than half of all struck injury hospitalizations in six of the eight SPAs. In the South and the Metro SPAs, 62% and 59%, respectively, of hospitalizations were caused by assaults and legal intervention injuries. These two SPAs, with 22% of the county's population, accounted for 44% of all assault/legal intervention hospitalizations and only one quarter of unintentional struck hospitalizations.

Hospitalization rates were much higher for males than for females in each SPA. Rates for males ranged from 37.0 per 100,000 in the San Gabriel SPA to 102.5 per 100,000 in the South SPA. For females, hospitalization rates ranged from 10.4 per 100,000 in the San Gabriel SPA to 24.0 per 100,000 in the South SPA. The male to female rate ratio (male hospitalization rate divided by female hospitalization rate) ranged from 3.0 in the West SPA to 4.3 in the South SPA. The rate ratio was also high (4.2) in the Metro SPA, the other SPA with a large number of assault hospitalizations.

Hospitalization rates by race/ethnicity and SPA are shown in Table 4. The highest hospitalization rates for Whites (140.6 per 100,000), Latinos (43.6 per 100,000), and Asians/Others (57.6 per

Table 4: Average Annual Age Adjusted Struck Hospitalization Rate by Race/Ethnicity and SPA, Los Angeles County, 2000-2006

SPA	Rate			
	Black	Latino	As/Oth	White
SPA 1: Antelope Valley	46.98	26.34	11.81	31.56
SPA 2: San Fernando	44.64	25.21	15.49	27.16
SPA 3: San Gabriel	41.22	24.55	9.62	30.29
SPA 4: Metro	95.36	39.30	16.85	40.30
SPA 5: West	49.18	28.82	13.54	24.23
SPA 6: South	88.64	43.56	57.61	140.53
SPA 7: East	39.66	26.36	14.76	35.80
SPA 8: South Bay	41.36	33.16	18.65	32.90
Los Angeles County Total	62.31	30.42	14.76	31.08

Note: Rates are per 100,000 population.

100,000) were found in the South SPA, while for Blacks the highest rate was in the Metro SPA (95.4 per 100,000). The lowest hospitalization rates for Asians/Others (9.6 per 100,000) and Latinos (24.6 per 100,000) were found in the San Gabriel SPA, for Blacks the lowest rate was found in the East SPA (39.7 per 100,000), and for Whites the lowest rate was found in the West SPA (24.2 per 100,000). Blacks had the highest rate of any racial/ethnic group in every SPA except the South SPA, where the rate among Blacks was lower than that of Whites. Asians/Others had the lowest rate of every racial/ethnic group in each SPA except the South SPA, where Asians/Others had a higher rate than Latinos.

Medical Charges

The average medical charges incurred for each struck hospitalization increased dramatically during the seven years covered by this report (Figure 5). The average charge for each hospitalization during this time period was \$27,471.

Charges were somewhat higher for males (\$28,147 per visit) than females (\$24,934 per visit). There was little variation in average charge per visit among the different racial/ethnic groups. Asians/Others had the lowest medical charges (\$25,559 per visit) followed by Latinos (\$27,156), Blacks (\$27,569), and Whites (\$28,367). There was more variation in average charges by age group than by sex or race/ethnicity. The average charge per visit was more than \$30,000 for babies less than one year old and people 45+ years old. Average charges per visit were \$16,764 for 1-14 year olds and \$26,334 for 15-44 year olds.

There was more variation in charges based on the intent of the injury. Average charges were lowest for legal intervention injuries (\$21,778), followed by unintentional injuries (\$26,355) and assaults (\$28,944). For unintentional struck injuries, the lowest average charge per visit was found for sports-related injuries and the highest was for being struck by or against furniture (Table 5). This is likely because people affected by sports injuries are much younger than those affected by injuries caused by striking against furniture (23.9 years versus 53.4 years). Older patients may be more fragile and require longer hospitalizations and increasing costs. There was also a large difference in average charges among assault injuries; injuries incurred in an unarmed fight were much less costly to treat than those injuries caused by being hit with a blunt or thrown object.

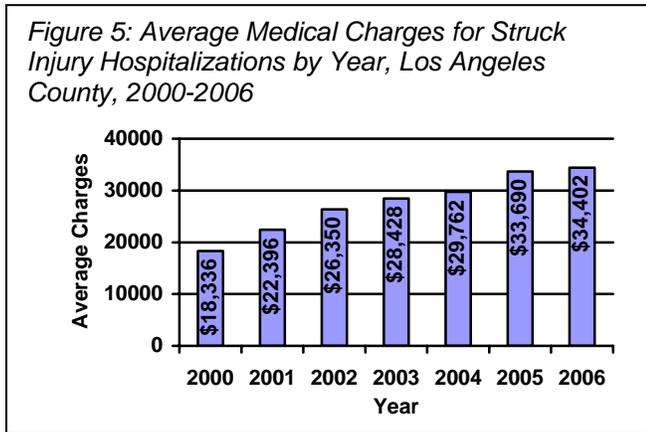


Table 5: Average Charges per Visit for Struck Injury Hospitalizations by Cause of Injury, Los Angeles County, 2000-2006

Cause of Injury	Avg Charges
Struck by falling object	\$30,821
Struck by/against objects/persons in sports	\$21,441
Struck in crowd or during collective fear/panic	\$30,270
Struck by/against furniture	\$34,366
Struck by/against other stationary objects	\$27,270
Struck by/against other objects/persons	\$26,400
Struck in running water	\$33,082
Assault: unarmed fight or brawl	\$25,851
Assault: striking by blunt or thrown object	\$35,244
Legal Intervention by blunt object	\$19,202
Legal Intervention by other means (blow, manhandling)	\$22,348

Comparison to Mortality Data

There were very few fatalities from struck injuries, only 104 were reported between 2000 and 2005, the most recent six years of available mortality data. During this time there were more than 19,000 struck injury hospitalizations, or 187 hospitalizations for each fatality. Given the very small number of deaths, it is hard to make subgroup comparisons between fatalities and hospitalizations, but there were no striking differences in racial/ethnic group or gender. Unintentional injuries made up a much larger percentage of fatalities than hospitalizations, and the average age of fatalities was somewhat higher than the average age of hospitalized patients, but again, this was based on a small number of deaths.

Table 6: Demographics of Fatal Struck Injuries and Non-Fatal Struck Injury Hospitalizations, Los Angeles County 2000-2005

	Deaths	Hosps
Total Number	104	19,475
Intent (%)		
Unintentional	71.2%	53.2%
Homicide/Assault	28.9%	45.6%
Legal Intervention	0%	1.3%
Race/Ethnicity (%)		
Black	12.5%	18.6%
Latino	44.2%	43.1%
White	34.6%	30.1%
Asian/Other	8.7%	6.0%
Unknown	0%	2.2%
Gender (%)		
Male	73.1%	79.0%
Female	26.9%	21.0%
Average Age (Years)	43.1	36.1

Struck By or Against Discussion

Los Angeles County residents incurred struck injuries by a variety of mechanisms. Because of the multiple and varied causes of struck injuries, the most common and preventable causes have been singled out for discussion.

Sports-Related Injuries

In Los Angeles County, sports-related injuries accounted for more than a quarter of all unintentional struck injury hospitalizations and 15% of all struck injury hospitalizations. Many of these injuries affected younger people, including children and adolescents who are more likely to participate in organized sports.

Struck injuries incurred through sports participation can take many forms. Common causes of injury include ball or bat impact, collisions with poles or goal posts, tackles or collisions between players, the misuse or malfunction of protective gear and equipment, poor field and surface conditions, and playing sports in unsafe locations.¹

Many prevention efforts have successfully reduced sports injuries, including the implementation of safety rules, encouraging or enforcing the use of protective gear, and changes in sports equipment and environments. Enforcing helmet use and introducing safer equipment such as “breakaway bases” for baseball games have decreased the incidence and severity of sports-related injuries.¹ The continued development and enforcement of protective gear use and safety rules, and the redesign or elimination of some sports equipment may reduce injuries even further.¹ In urban areas such as Los Angeles County, recreational facilities may be scarce in some neighborhoods, or may not be properly maintained. Safe and accessible recreational areas are essential for County residents to enjoy the benefits of sports participation.

Occupational Injuries

Nationally, there were 250,380 work-related struck injuries reported in 2006, accounting for over 20% of all occupational injuries.² Industries with the highest occurrences of struck injuries include transportation, utilities, construction, and

American Academy of Pediatrics Sports Injury Prevention Tips

- **Wear the right gear.** Players should wear appropriate protective equipment such as pads, helmets, mouthpieces, face guards, protective cups, and/or eyewear.
- **Use the proper technique.** This should be reinforced during the playing season.
- **Take breaks.** Rest periods during practice and games can reduce injuries and prevent heat illness.
- **Play safe.** Strict rules against headfirst sliding (baseball and softball), spearing (football), and body checking (ice hockey) should be enforced.
- **Stop the activity** if there is pain.

*Source: American Academy of Pediatrics.
Sports Injury Prevention Tips,
<http://www.aap.org>*

manufacturing.³ Workers under age 25 had some of the highest overall injury/illness rates, while injuries sustained by workers over age 55 tended to be more severe.³

Occupational injury rates have remained fairly stable in recent years,³ however opportunities still exist for preventing and reducing the incidence of the most common injuries. While prevention strategies should be targeted specifically to the occupations and workers at highest risk, workers in many industries could benefit from some general interventions such as, removing pathway obstacles, improving lighting, replacing faulty or worn equipment, and updating the overall design of workplace environments. Better safety training may help inexperienced younger workers, and could counteract the impulse to take risks on the job.⁴ Stress-inducing factors such as impending layoffs, long work shifts, and the pressure to meet production demands have also been associated with higher levels of occupational injury and decreased motivation to follow safety procedures,⁴ which suggests a need for workplace policies that address job-related stress and reward workers for maintaining safe work practices.

¹ Cheng TL, Fields CB, Brenner RA, et. al. Sports injuries: An Important Cause of Morbidity in Urban American Youth. *Pediatrics*. 2000;105(3):e32. Available at: <http://www.pediatrics.org/cgi/content/full/105/3/e32>. Accessed April 8, 2008.

² U.S. Department of Labor, Bureau of Labor Statistics. Nonfatal Occupational Injuries and Illnesses Requiring Days Away from Work, 2006. News Release. November 8, 2007. Available at: <http://www.bls.gov/news.release/osh2.nr0.htm>. Accessed May 13, 2008.

³ Nonfatal Occupational Injuries and Illnesses – United States, 2004. *J Am Med Assoc*. 2007;298(8):856-858. Available at: <http://jama.ama-assn.org/cgi/content/full/298/8/856> Accessed March 17, 2008.

⁴ American Psychological Association. Workplace Stress and Fear of Lay-Offs Can Lead to Increased Rates of Worker Illness and Injury. *Science Daily*. April 23, 2001. Available at: <http://www.sciencedaily.com/releases/2001/04/010415224503.htm>. Accessed March 17, 2008.

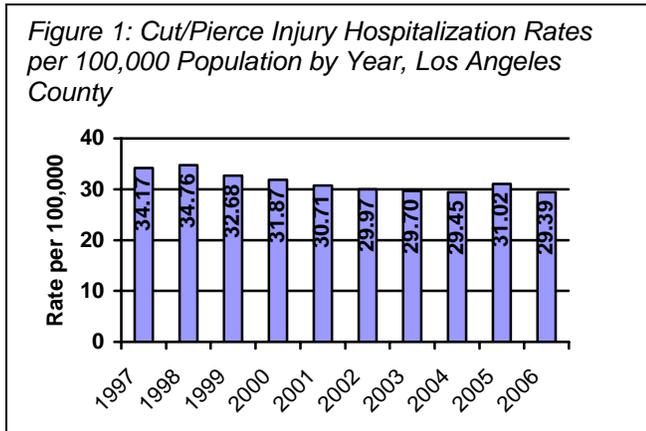
7th Leading Cause: Cutting and Piercing Injuries

Cutting and piercing injuries (from here on referred to as “cut/pierce” injuries) include those inflicted by sharp instruments such as knives and razors. This category also includes injuries from lawn mowers, power tools (e.g., drills and saws), appliances (e.g., blenders and sewing machines), and other tools or implements such as axes, forks, and scissors. It also includes cuts from splinters and broken glass, as well as paper cuts.

Cut/pierce injuries were the seventh leading cause of injury hospitalization in Los Angeles County, with an average of more than 3,000 reported each year. Statewide, there were 43,827 hospitalizations due to cut/pierce injuries reported between 2000 and 2005 (statewide data are not yet available for 2006). During this period, 32.7% of all cut/pierce hospitalizations in California were to Los Angeles residents.

Trends

Between 2000 and 2006, there were 21,474 hospitalizations for cut/pierce injuries in Los Angeles County. The annual number of cut/pierce hospitalizations was slightly higher in the late 1990s, but have not changed much since 2000; however, rates of hospitalization have been decreasing fairly steadily since 1998 (Figure 1).



Intent

Almost half (47%) of all cut/pierce injuries were unintentional. Assaults and legal intervention accounted for 30% and suicide attempts for 23% of cut/pierce injury hospitalizations. Legal intervention injuries accounted for less than 6 hospitalizations during this time period; these were combined with assault injuries since the number was so small. Less than one percent of all hospitalizations were attributed to injuries of undetermined intent.

Table 1: Cut/Pierce Injury Hospitalizations by Cause of Injury, Los Angeles County, 2000-2006

Cause of Injury	Number
Powered lawn mower	73
Other powered hand tools	1,667
Powered household appliances or implements	80
Knives, swords, daggers	830
Other hand tools and implements	801
Hypodermic needle	1,461
Other specified instruments or objects	4,653
Unspecified instruments or objects	445
Suicide Attempt	4,953
Assault & Legal Intervention	6,389
Undetermined Intent	122

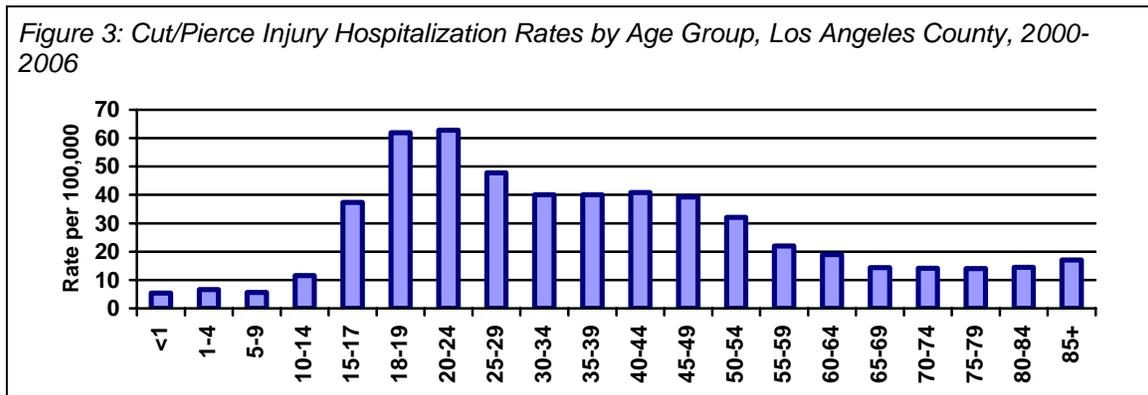
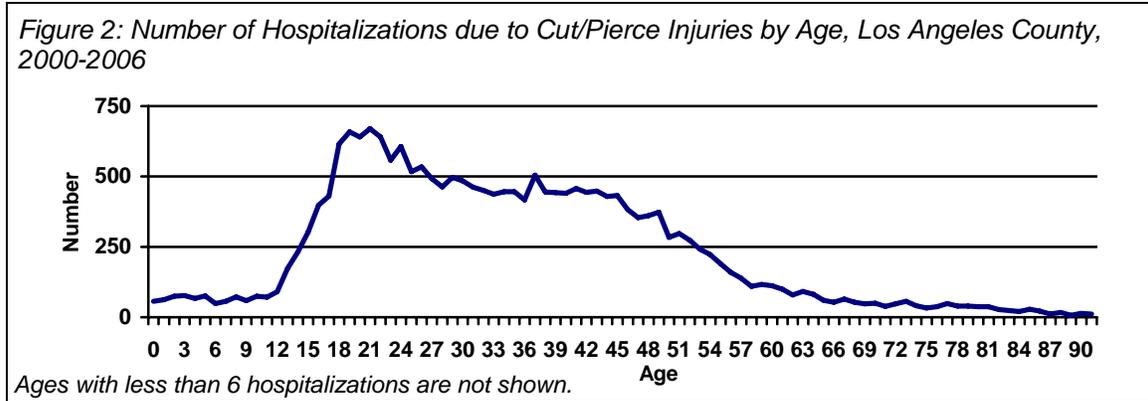
Cause of Injury

Over 60% of unintentional cut/pierce injuries were classified as caused by other or unspecified instruments or objects (Table 1). Powered hand tools were responsible for 17% of unintentional injury hospitalizations and injuries from hypodermic needles (including contaminated needles) caused 15% of unintentional injury hospitalizations. The system of coding injury hospitalizations does not describe which specific implement was the cause of the injury for suicide attempts, assaults, legal intervention, or injuries of undetermined intent.

Age

Cut/pierce injury hospitalizations peaked among older teenagers and people in their early twenties, before dropping steadily among older people (Figure 2). Overall, hospitalization rates were lowest for 0-9 year old children, who had fewer than 10 visits per 100,000 population and highest for 18-24 year olds, who had more than 60 visits per 100,000 population (Figure 3). After this peak in the early twenties, hospitalization rates generally decreased with age; among people 60 and older, rates were less than 20 visits per 100,000 population.

The intent of the cut/pierce injury showed similar age patterns (Table 2). Hospitalization rates peaked among 20-24 year olds for suicide attempts (15.4 per 100,000) and assaults (27.2 per 100,000). For unintentional injuries, the highest rate was found among 45-54 year olds (21.8 per 100,000), but 20-24 year olds had the second highest rate of unintentional injuries. Children under the age of 10 had the lowest hospitalization rates for each intent.



The average age of a person hospitalized for a cut/pierce injury was 34.5 years. People hospitalized for injuries of undetermined intent were youngest (29.9 years on average), followed by hospitalizations for assaults & legal intervention (30.7 years), suicide attempts (33.4 years), and unintentional injuries (37.6 years). There was considerable variation in the average age of patients hospitalized for different types of unintentional injuries. Patients injured with power lawn mowers were the youngest (30.7 years on average) and patients with hypodermic needle injuries were oldest (44.7 years).

Table 2: Average Annual Cut/Pierce Injury Hospitalization Rates for by Age Group & Intent, Los Angeles County, 2000-2006

Age Group	Unint.	Sui Attempt	Assault
<1 Years	5.2	*	*
1-4 Years	6.4	*	*
5-9 Years	5.4	*	*
10-14 Years	5.8	4.2	1.1
15-19 Years	12.2	13.7	20.9
20-24 Years	20.9	15.4	27.2
25-29 Years	17.3	11.9	19.1
30-34 Years	16.8	9.4	13.8
35-44 Years	19.0	9.5	11.7
45-54 Years	21.8	7.2	6.8
55-64 Years	13.9	3.5	2.9
65+ Years	10.5	2.8	1.0

** Numbers too small to calculate rate.
All rates are per 100,000 population.*

Gender

Overall, males accounted for about three quarters (74%) of all cut/pierce injuries. The age-adjusted hospitalization rate for males (44.9 visits per 100,000 population) was nearly 3 times that of females (15.9 per 100,000). The gender distribution of cut/pierce injuries varied substantially by the intent of the injury. Males accounted for 90% of assault & legal intervention injuries and 76% of unintentional injuries, but only for 52% of injuries of undetermined intent and 49% of suicide attempts. Among unintentional injuries, nearly all (98%) people injured with power lawn mowers or other powered hand tools were male. By comparison, less than 70% of patients hospitalized for unintentional injuries from knives, swords, or daggers and for injuries from hypodermic needles were male. Despite the differences in type and intent of injuries experienced by males and females, there was little difference in the average age of hospitalized patients (males = 34.9 years and females = 34.4 years on average).

Race/Ethnicity

Racial/ethnic group was unknown for 2.3% of all hospitalizations for cut/pierce injuries; all statistics presented in this section only include those records for which race/ethnicity was reported. Blacks were significantly overrepresented among hospitalizations for cut/pierce injuries relative to their proportion in the entire county population and Asians/Others were underrepresented (Figure 4). Age-adjusted hospitalization rates were highest among Blacks (47.6 per 100,000), followed by Latinos (32.8 per 100,000) and Whites (27.6 per 100,000). The hospitalization rate among Asians/Others (12.7 per 100,000) was less than half that of any other racial/ethnic group.

There was considerable variation in racial/ethnic distribution by intent (Table 3). Latinos accounted for over half of all cut/pierce injury hospitalizations, but just one third (34%) of hospitalizations for suicide attempts. On the other hand, Whites accounted for 28% of all cut/pierce injury hospitalizations, but for nearly one half (48%) of all suicide attempts and just 14% of all assault & legal intervention hospitalizations. Looking at this slightly differently, over 40% of all injuries among each racial/ethnic group were unintentional. However, among Whites, most of the remaining injuries were suicide attempts, while among Blacks and Latinos, most of the intentional injuries were assaults. Among Asians/others, the intentional injuries were split nearly evenly between assaults and suicide attempts.

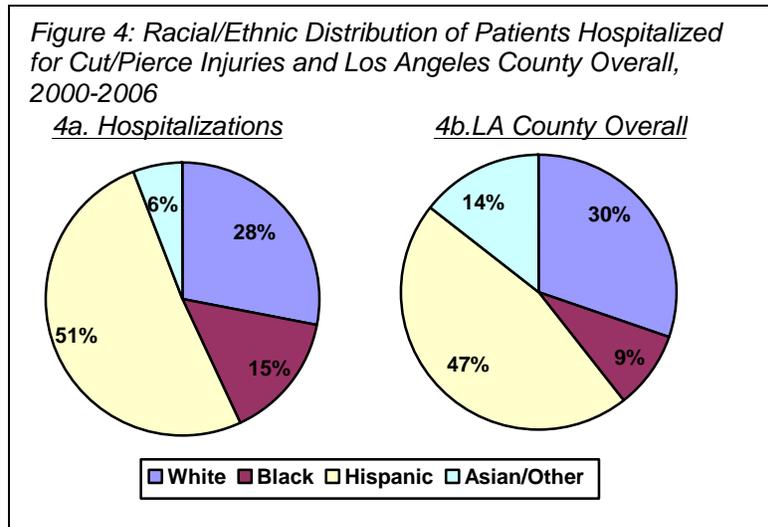


Table 3: Racial Ethnic Distribution of Cut/Pierce Injury Hospitalizations by Intent, Los Angeles County, 2000-2006

Intent	% White	% Black	% As/Oth	% Latino
Unintentional	26%	13%	5%	55%
Suicide Attempt	48%	10%	7%	34%
Assault	14%	20%	6%	59%
Undetermined	34%	13%	7%	44%

Legal intervention injuries are included with assaults.

The racial/ethnic distribution also varied widely for the different categories of unintentional injuries. Whites accounted for 22% of injuries from other powered hand tools, but for 41% of injuries from unspecified cut/pierce instruments. Blacks accounted for 3% of injuries from other powered hand tools, but for 26% of injuries from hypodermic needles. Latinos accounted for 40% of injuries from unspecified cut/pierce instruments and for 69% of injuries from other powered hand tools. Finally, Asians/Others accounted for 2% of injuries from hypodermic needles and 8% of injuries from knives, swords, and daggers.

Geography

The total number of cut/pierce injury hospitalizations was lowest for residents of the Antelope Valley and highest for the South SPA residents. The hospitalization rate for cut/pierce injuries varied from 18.6 per 100,000 in the West SPA to 54.3 per 100,000 in the Metro SPA (Table 4).

In each SPA, the rate of unintentional injury hospitalization was higher than that of hospitalizations for suicide attempts or assaults. Hospitalization rates for suicide attempts were higher than rates for assaults in the Antelope Valley, San Fernando, and West SPAs. Rates for unintentional injury hospitalizations ranged from 9.0 per 100,000 in the West to 27.9 per 100,000 in the South SPA. Hospitalization rates for suicide attempts ranged from 5.6 per 100,000 in the West to 11.2 per 100,000 in the Antelope Valley. Rates for assault hospitalizations ranged from 3.7 per 100,000 in the West to 18.5 per 100,000 in the South SPA.

Hospitalization rates for

cut/pierce injuries were much higher for males than for females in each SPA. Rates for males ranged from 25.6 per 100,000 in the West SPA to 86.6 per 100,000 in the South SPA. For females, hospitalization rates ranged from 11.8 per 100,000 in the West SPA to 24.3 per 100,000 in the South SPA. The male to female rate ratio ranged from 2.2 in the West SPA to 3.6 in the South SPA. The rate ratio was also high (3.1) in the Metro SPA, the other SPA with a large number of assault hospitalizations.

Hospitalization rates by SPA and race/ethnicity are shown in Table 5. The highest hospitalization rates for Whites (115.6 per 100,000), Latinos (46.9 per 100,000), and Asians/Others (39.1 per 100,000) were found in the South SPA, while for Blacks the highest rate was in the Metro SPA (94.1 per 100,000). The lowest hospitalization rates for Whites (16.7 per 100,000), Asians/Others (9.9 per 100,000) and Latinos (24.9 per 100,000) were found in the West SPA, while for Blacks the lowest rate was found in the South Bay SPA (29.0 per 100,000). Blacks had the highest rate of any racial/ethnic group in every SPA except the South (highest rate was among Whites) and the South Bay (highest rate was

Table 4: Number of Cut/Pierce Hospitalizations and Average Annual Age Adjusted Hospitalization Rate by SPA, Los Angeles County, 2000-2006

SPA	Number	Rate
SPA 1: Antelope Valley	817	35.8
SPA 2: San Fernando	3,552	24.2
SPA 3: San Gabriel	3,129	24.4
SPA 4: Metro	3,715	42.6
SPA 5: West	868	18.6
SPA 6: South	3,673	54.3
SPA 7: East	2,720	28.8
SPA 8: South Bay	3,000	27.3
Los Angeles County Total	21,474	30.3

Note: Rates are per 100,000 population. The small number of patients with unknown SPA were added to the most populous SPA (SPA 2).

Table 5: Average Annual Age Adjusted Cut/Pierce Hospitalization Rate by Race/Ethnicity and SPA, Los Angeles County, 2000-2006

SPA	Rate			
	Black	Latino	As/Oth	White
SPA 1: Antelope Valley	45.54	33.26	14.42	35.08
SPA 2: San Fernando	30.76	26.99	13.78	22.78
SPA 3: San Gabriel	39.29	28.01	10.39	27.26
SPA 4: Metro	94.08	43.33	16.58	42.19
SPA 5: West	30.60	24.94	9.87	16.69
SPA 6: South	61.99	46.94	39.09	115.55
SPA 7: East	37.20	28.94	12.75	35.31
SPA 8: South Bay	28.99	31.82	11.28	27.79
Los Angeles County Total	47.59	32.82	12.69	27.60

Note: Rates are per 100,000 population.

among Latinos) SPAs. Asians/Others had the lowest rate of every racial/ethnic group.

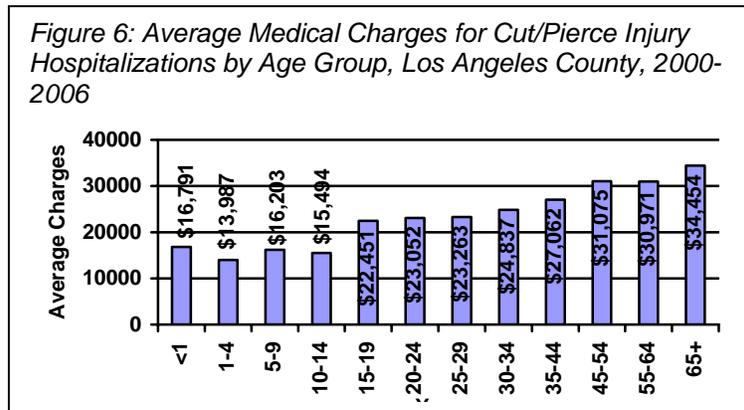
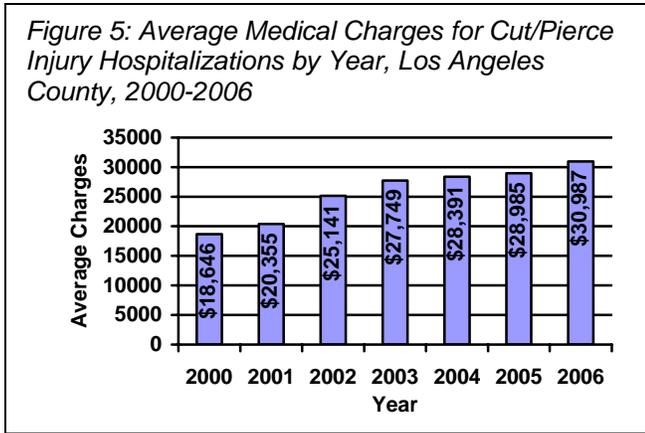
Medical Charges

The average medical charges incurred for each struck hospitalization increased during each of the seven years covered by this report (Figure 5). The average charge for each hospitalization during this time period was \$25,747.

Charges were higher for males (\$27,108 per visit) than females (\$21,824 per visit). There was little variation in average charge per visit among the different racial/ethnic groups. Whites had the lowest medical charges (\$24,275 per visit) followed by Latinos (\$25,123), Asians/Others (\$28,298), and Blacks (\$29,232). There was more variation in average charges by age group than by sex or race/ethnicity.

The average charge per visit generally increased with age (Figure 6). The average charge for 65+ year old patients was more than double that of patients under the age of 15.

When looking at the average charges for injuries of different intents, assaults and legal intervention injuries were the most expensive to treat, averaging \$31,613 per visit. Suicide attempts (\$20,154 per visit), injuries of undetermined intent (\$21,196 per visit) and unintentional injuries (\$24,825) were less costly. There was a wide range in the average charge among unintentional injuries depending on how the injury was incurred. The average charge per visit was less than \$20,000 to treat injuries from power lawn mowers, powered household appliances and implements, and knives, swords, and daggers. In contrast, injuries from hypodermic needles were much more expensive to treat (\$36,599 per visit).



Comparison to Mortality Data

Between 2000 and 2005, the most recent 6 years of available mortality data, there were approximately 30 hospitalizations for every fatal cut/pierce injury (Table 6). The demographics of fatal and hospitalized cut/pierce injuries were fairly similar, but the intent of injuries varied significantly. The vast majority of all fatal cut/pierce injuries were homicides, while unintentional injuries made up only a small proportion of fatalities. On the other hand, unintentional injuries accounted for nearly half of all hospitalized cut/pierce injuries and assaults made up less than one third of non-fatal hospitalizations.

Table 6: Demographics of Fatal Cut/Pierce Injuries and Non-Fatal Cut/Pierce Injury Hospitalizations, Los Angeles County 2000-2005

	Deaths	Hosps
Total Number	610	18,417
Intent (%)		
Unintentional	<1%	47.7%
Suicide/Sui Attempt	18.5%	22.1%
Homicide/Assault*	79.8%	29.6%
Undetermined	<1%	<1%
Race/Ethnicity (%)		
Black	21.6%	14.9%
Latino	42.5%	49.9%
White	25.4%	27.4%
Asian/Other	10.3%	5.5%
Unknown	<1%	2.3%
Gender (%)		
Male	76.4%	74.1%
Female	23.6%	25.9%
Average Age (Years)	40.1	34.5

** Includes Legal Intervention*

Cutting and Piercing Discussion

In Los Angeles County, cut/pierce injuries are common occurrences that often involve everyday items such as power tools or household appliances in a variety of settings (home, work, or recreation). Because of the multiple and varied causes of these injuries, only a few have been singled out for discussion.

Power Tools and Appliances

Injuries from lawn mowers, other power tools, and powered household appliances or implements were the fourth most common cause of cut/pierce injury hospitalizations with 1,820 from 2000-2006. Remaining attentive to the dangers of tools or appliances despite familiarity with them can help to prevent these types of injuries. Employing simple safety measures such as always reading instructions, ensuring proper supervision, and using safety devices can reduce the risk of injury from most power tools and appliances (see box).

Power Tool and Appliance Injury Prevention Tips

Individuals

- Always supervise and keep children away from power equipment being used
- Read all instructions prior to operating any equipment or appliances
- Do not remove or disengage safety devices, shields or guards from any power equipment
- Always cut away from your body
- Do not carry sharp or pointed tools in pockets, use a toolbox/belt
- Keep hands and fingers away from saw blades

Community Leaders and Policymakers

- Disseminate information regarding product recalls due to safety hazards
- Educate the public regarding potential hazards associated with power tools and equipment
- Educate workers regarding safe workplace practices
- Promote and enforce safer workplace regulations and safety standards.

Source: Missouri Department of Health and Senior Services. Injuries in Missouri: A Call to Action. December 2002, http://www.dhss.mo.gov/Injuries_in_Missouri/FocusInjuries.html

Needle Sticks

Hypodermic needle sticks were a significant source of injury in the County with 1,461 hospitalizations reported from 2000-2006. These injuries occur most often in hospitals and other healthcare facilities. Guidelines and requirements for preventing needle sticks in these settings are easily available from the Occupational Safety and Health Administration (OSHA)¹ and other regulatory agencies and professional organizations.

However, needle stick injuries also occurred in more common settings at home and in the community. The Centers for Disease Control and Prevention estimates that as many as 3 billion syringes are used outside of healthcare facilities each year,² usually in connection with medicinal injections for conditions such as diabetes. Needle stick injuries can occur at any time during these self-care activities.

Many times needles are discarded into the public waste system after use, presenting a risk of injury to sanitation workers. In 2006, the Environmental Protection Agency (EPA) issued guidelines for safe needle disposal that advised individuals to no longer put used syringes in household waste.³ Instead, they were encouraged to use community drop-off programs, household hazardous waste facilities, sharps mail back programs, or at-home needle destruction devices. In 2007, California enacted legislation allowing counties to establish community-based safe needle disposal sites.⁴ Los Angeles County then organized several safe disposal sites. On September 1, 2008 it will become illegal in California to dispose of home-generated medical waste in household trash or recycling bins.⁵ Consumers will be required to use a safe disposal method for disposing medical waste. For a list of local safe-disposal sites, please visit the Los Angeles County Department of Public Health website at <http://www.publichealth.lacounty.gov/php/DPDP/resources.htm>.

¹ U.S. Department of Labor, Occupational Health and Safety Administration. Safety and Health Topics: Bloodborne Pathogens and Needlestick Prevention. <http://www.osha.gov/SLTC/bloodbornepathogens/index.html> Accessed May 9, 2008.

² Centers for Disease Control and Prevention. Safe Community Needle Disposal, California Public Health Laws and Regulations: Impact on the Safe Disposal of Used Syringes by Individuals in the Community. Available at: <http://www.cdc.gov/needledisposal/ca/index.htm> Accessed May 9, 2008.

³ U.S. Environmental Protection Agency. Protect Yourself, Protect Others: Safe Options for Home Needle Disposal. Available at: <http://www.epa.gov/epaoswer/other/medical/med-home.pdf> Accessed May 16, 2008.

⁴ California Health and Safety Code § 117904 (2008). Available at: <http://www.leginfo.ca.gov> Accessed May 13, 2008.

⁵ California Health and Safety Code § 117671 and 118286. Available at <http://leginfo.ca.gov> Accessed July 23, 2008.

9th Leading Cause: Firearm Injuries

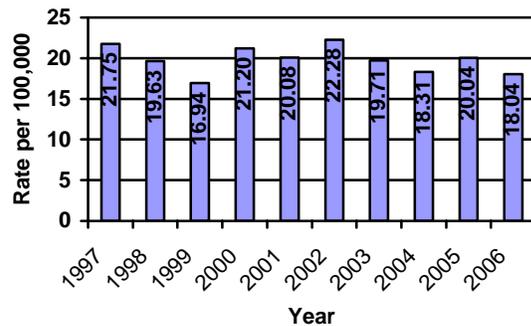
Firearm injuries include all injuries from handguns, shotguns, rifles, and military weapons, such as machine guns. Injuries from air guns (e.g., BB guns, pellet guns, air pistols, and air rifles) are not included in the firearm injury category. Prior to October 1, 2002 injuries from paintball guns were grouped into the unspecified firearm category. Since then, they have been categorized as “other classified” injuries (see Appendix I).

Between 2000 and 2006, firearm injuries were the ninth leading cause of injury hospitalizations in Los Angeles County, with an average of more than 2,000 reported each year. Statewide, there were 24,833 hospitalizations due to firearm injuries reported between 2000 and 2005 (statewide are not yet available for 2006). During this period, 51.1% of all firearm injury hospitalizations in California were to Los Angeles County residents.

Trends

Overall there were 14,619 firearm-related hospitalizations in Los Angeles County between 2000 and 2006. The annual firearm injury hospitalization rate peaked in 2002 and was lowest in 1999 (Figure 1).

Figure 1: Firearm Injury Hospitalization Rate per 100,000 Population by Year, Los Angeles County



Intent

The majority (86%) of firearm injury hospitalizations were due to assaults. Most of the rest of the hospitalizations (9%) were due to unintentional injuries. Suicide attempts and legal intervention (each accounting for 1% of firearm injuries) and injuries of undetermined intent (3%) were less commonly reported.

Cause of Injury

The type of gun involved in the injury was not reported for the vast majority of firearm injury hospitalizations; across all intents, 62% of firearm injuries were classified as other or unspecified firearm (Table 1). Among injuries for which the type of gun was reported, 79% of hospitalizations were caused by handguns and 20% were caused by shotguns. Very few injuries were caused by rifles or military weapons.

Table 1: Firearm Injury Hospitalizations by Cause of Injury, Los Angeles County, 2000-2006

Cause of Injury	Number
Handgun	4427
Shotgun	1101
Rifle	33
Military Weapon	29
Other/Unspecified	9029

Age

There was a dramatic peak in the number of firearm injury hospitalizations among older teenagers and people in their early twenties (Figure 2). In fact, firearms were the 3rd leading cause of injury hospitalization among 15-19 year olds and the 2nd leading cause among 20-24 year olds (See Appendix VI). More than 50% of all patients hospitalized

Figure 2: Number of Hospitalizations due to Firearm Injuries by Age, Los Angeles County, 2000-2006

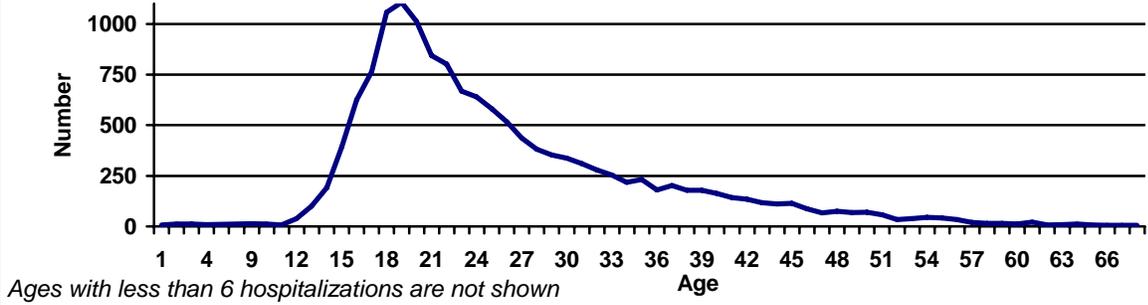
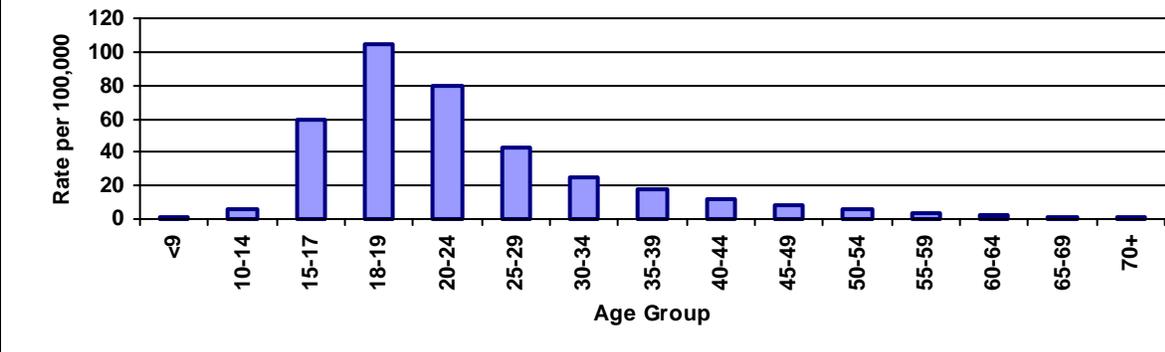


Figure 3: Firearm Injury Hospitalization Rates by Age Group, Los Angeles County, 2000-2006



with firearm injuries were between the ages of 15 and 24. Rates of hospitalization were highest among 18-19 year olds (Figure 3). The hospitalization rates were clearly driven by assaults; rates for assault hospitalizations were generally an order of magnitude greater than rates for unintentional firearm hospitalizations (Table 2).

The average age of a person hospitalized for a firearm injury was 26.0 years. There was significant variation in the average age of people hospitalized for injuries of different intent. On average, people hospitalized for firearm assaults were 25.5 years old. People with unintentional (27.3 years) and undetermined intent (27.5 years) were similar in age, while people with legal intervention (34.1 years) and suicide attempt (39.8 years) injuries were somewhat older. When looking at the average age of patients based on the type of weapon involved in the injury, people injured with rifles (33.3 years) and military weapons (29.4 years) tended to be the oldest. However, these two categories of patients were very small. People injured with handguns (26.1 years), shotguns (25.2 years) and other/unspecified weapons (25.9 years) were similar in age.

Table 2: Average Annual Firearm Injury Hospitalization Rates by Age Group & Intent, Los Angeles County, 2000-2006

Age Group	Unint.	Assault
<1 Years	*	*
1-4 Years	*	*
5-9 Years	*	*
10-14 Years	*	5.35
15-19 Years	6.54	68.52
20-24 Years	6.95	71.48
25-29 Years	3.89	38.09
30-34 Years	2.24	20.99
35-44 Years	1.51	12.30
45-54 Years	1.11	5.59
55-64 Years	*	2.24
65+ Years	*	*

All rates are per 100,000 population.
* Numbers too small to calculate rates.

Gender

Overall, males accounted for 92% of all firearm injuries. The age adjusted hospitalization rate for males (36.2 visits per 100,000 population) was more than 10 times that of females (3.3 per 100,000). There was minor variation in the gender distribution of firearm injuries by the intent of the injury. Males accounted for 92% of assault injuries, 91% of undetermined intent injuries, and 90% of unintentional and legal intervention injuries, but just 83% of suicide attempts. There was even less variation in gender when looking at the type of gun involved in the injury; males accounted for 92% of hospitalizations for handguns, shotguns, and all other firearm injury hospitalizations. Female (28.0 years) patients were, on average, slightly older than male (25.8) patients. This is likely because females made up a larger proportion of suicide attempts, and victims of suicide attempts had a higher average age at the time of admission.

Race/Ethnicity

Racial/ethnic group was unknown for 2.9% of all firearm injury hospitalizations; all statistics presented in this section only include those records for which race/ethnicity was reported. Latinos and Blacks were significantly overrepresented among hospitalizations for firearm injuries relative to their proportion in the entire county population, while Whites and Asians/Others were underrepresented (Figure 4). Age-adjusted hospitalization rates were lowest by far among Asians/Others (4.4 per 100,000) and Whites (5.3 per 100,000). The rate among Latinos (20.2 per 100,000) was 3.8 times that of Whites and 4.6 times that of Asians/Others. The hospitalization rate among Blacks (74.6 per 100,000) was 3.7 times that of Latinos, 14.1 times that of Whites and 16.8 times that of Asians/Others.

Figure 4: Racial/Ethnic Distribution of Patients Hospitalized for Firearm Injuries and LA County Overall, 2000-2006

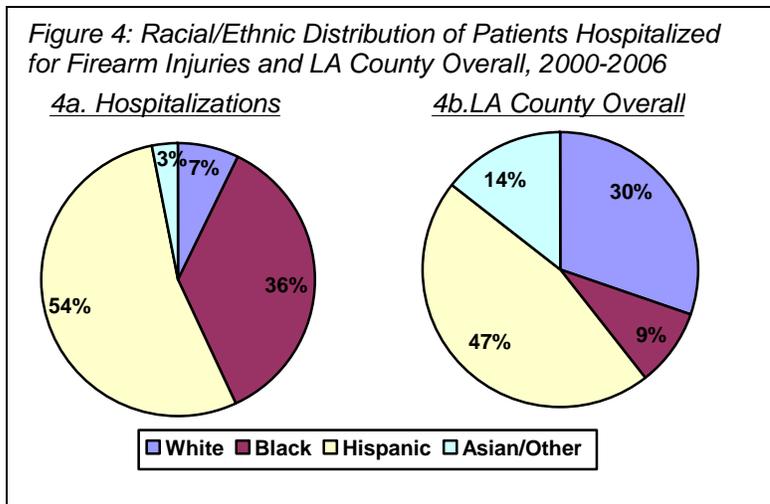


Table 3: Racial Ethnic Distribution of Firearm Injury Hospitalizations by Intent, Los Angeles County, 2006-2006

Intent	% White & As/Oth	% Black	% Latino
Unintentional	20%	30%	50%
Suicide Attempt	41%	13%	47%
Assault	9%	37%	55%
Legal Intervention	27%	28%	46%
Undetermined	14%	42%	44%

There was considerable variation in racial/ethnic distribution by intent. In Table 3, Asians/Others are combined with Whites because there were very few Asians/Others in some of the intent categories. Whites and Asians/Others accounted for only 9% of all assault firearm injuries, but for 41% of the injuries from suicide attempts. Blacks, on the other hand, accounted for only 13% of firearm related suicide attempts, but for 37% of

all firearm assault injury hospitalizations. The proportion of Latinos was more consistent, ranging from 44% of undetermined intent firearm injuries to 55% of firearm assaults. There was little variation in race/ethnicity by the type of gun involved in the injury.

Geography

The total number of firearm injury hospitalizations was lowest for residents of the West and highest for the South SPA residents. The hospitalization rate for firearm injuries varied from 7.6 per 100,000 in the West SPA to 70.7 in the South SPA (Table 4). In fact, the firearm injury hospitalization rate in the South SPA was more than 3 times that of the Metro, the SPA with the next highest rate.

The South SPA had the highest age-adjusted rates of firearm injury hospitalizations caused by unintentional injury (4.68 per 100,000), assaults (63.4 per 100,000), legal intervention (0.5 per 100,000), and of undetermined intent (1.8 per 100,000). The highest rate of firearm-related suicide attempts (0.6 per 100,000) was found in the Antelope Valley. The San Gabriel SPA had the lowest rates of unintentional (0.9 per 100,000), suicide attempt (0.2 per 100,000), and undetermined intent (0.2 per 100,000) injuries, while the West SPA had the lowest rates of assault (6.0 per 100,000) and legal intervention (0.1 per 100,000) injuries.

Males substantially outnumbered females among firearm injury patients from each SPA. Countywide, the hospitalization rate among males was 10.8 times that of females. The Antelope Valley had the smallest variation by gender, the rate for males was just 8.3 times higher than that for females. The largest difference was found in the West SPA, where the rate for males was 15.1 times that of females. The West SPA also had the lowest hospitalization rates of any SPA for both males (14.4 per 100,000) and females

Table 4: Number of Firearm Hospitalizations and Average Annual Age Adjusted Hospitalization Rate by SPA, Los Angeles County, 2000-2006

SPA	Number	Rate
SPA 1: Antelope Valley	369	15.4
SPA 2: San Fernando	1,414	9.8
SPA 3: San Gabriel	1,095	8.2
SPA 4: Metro	1,956	22.6
SPA 5: West	324	7.6
SPA 6: South	5,589	70.7
SPA 7: East	1,574	15.4
SPA 8: South Bay	2,298	20.8
Los Angeles County Total	14,619	20.1

Note: Rates are per 100,000 population. The small number of patients with unknown SPA were added to the most populous SPA (SPA 2).

Table 5: Average Annual Age Adjusted Firearm Hospitalization Rate by Race/Ethnicity and SPA, Los Angeles County, 2000-2006

SPA	Rate			
	Black	Latino	As/Oth	White
SPA 1: Antelope Valley	47.17	14.68	7.04	6.84
SPA 2: San Fernando	20.97	14.84	3.31	4.03
SPA 3: San Gabriel	29.97	10.37	2.44	3.84
SPA 4: Metro	55.18	25.87	4.62	9.67
SPA 5: West	36.66	14.49	2.97	2.52
SPA 6: South	141.81	39.46	27.84	44.25
SPA 7: East	39.87	17.03	4.12	7.77
SPA 8: South Bay	50.90	21.36	7.73	5.28
Los Angeles County Total	74.58	20.23	4.43	5.31

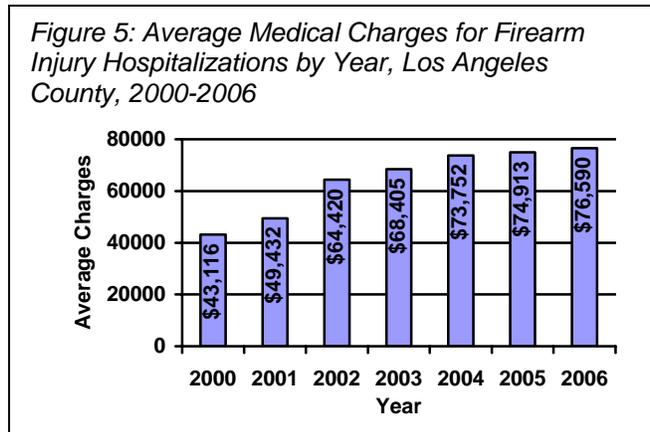
Note: Rates are per 100,000 population.

(1.0 per 100,000). The highest hospitalization rates were found in the South SPA for both males (128.7 per 100,000) and females (13.1 per 100,000).

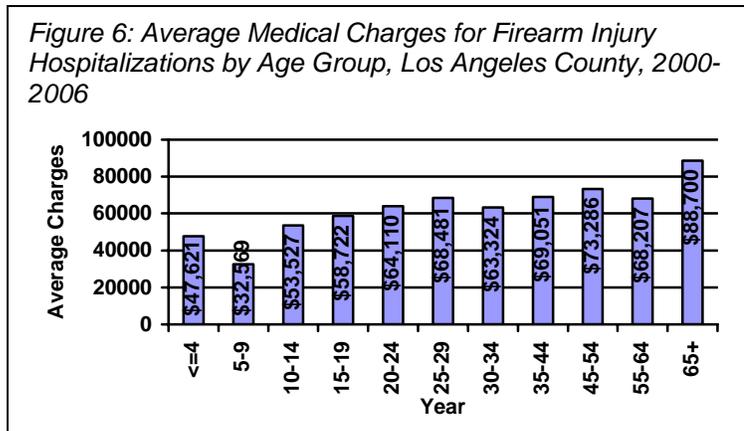
Hospitalization rates by race/ethnicity and SPA are shown in Table 5. Hospitalization rates among Whites ranged from 2.5 per 100,000 in the West SPA to 44.3 per 100,000 in the South SPA. For Blacks, rates ranged from 21.0 per 100,000 in the San Fernando SPA to 141.8 per 100,000 in the South SPA. Among Latinos, rates ranged from 10.4 per 100,000 in the San Gabriel SPA to 39.5 per 100,000 in the South SPA. For Asians/Others, rates ranged from 2.4 per 100,000 in the San Gabriel SPA to 27.8 in the South SPA. Blacks had the highest hospitalization rate in each SPA. Latinos had the second highest rate in every SPA except the South SPA, where Whites had the second highest rate. Asians/Others had the lowest hospitalization rate in five of the eight SPAs: the San Fernando, San Gabriel, Metro, South, and East SPAs. Whites had the lowest rate in the remaining three SPAs: the Antelope Valley, West, and South Bay.

Medical Charges

The average medical charges incurred for each firearm injury hospitalization increased dramatically during the seven years covered by this report (Figure 5). The biggest increase came during 2002, when the average charge jumped 30% from the previous year. The average charge for each hospitalization during this time period was \$64,040. Only injuries from fire/burns or suffocation cost more per visit to treat than firearm injuries.



Charges were higher for males (\$64,326 per visit) than females (\$59,923 per visit). Medical charges were lower for Latinos (\$61,777) and Blacks (64,342) than for Asians/Others (\$70,810) and Whites (\$71,571). There was more variation in average charges by age group than by sex or race/ethnicity. The average charge per visit



generally increased with age (Figure 6). The average charge for 65+ year old patients was more than double that of patients under the age of 10.

There were striking differences in average medical charges for injuries of different intents. Unintentional injuries (\$44,884 per visit) and injuries of undetermined intent (\$43,210 per visit) were relatively cheap to treat when compared to assault injuries

(\$65,883 per visit), legal intervention injuries (\$88,106 per visit), and especially injuries caused by suicide attempts (\$108,096 per visit). When stratified by type of gun involved in the injury, hospitalizations due to rifle wounds were the least expensive to treat (\$43,235 per visit) and injuries from military weapons (\$84,550) were the most expensive. Average charges were similar for handguns (\$62,719), shotguns (\$64,078) and other/unspecified weapons (\$64,693).

Comparison to Mortality Data

Between 2000 and 2005, which are the most recent 6 years of available mortality data, there were 76% more hospitalizations than fatalities from firearm injuries. There were some striking differences in the demographics of fatal and non-fatal hospitalized firearm injuries. Almost all fatalities were either suicides or homicides, while almost all hospitalizations were caused by assaults or unintentional injuries. Over one quarter of the fatalities were caused by suicides, while just 1% of the hospitalizations were suicide attempts, indicating that firearm-related suicide attempts are likely to be successful. There were also striking differences in the racial/ethnic distribution of fatal and hospitalized firearm injuries. Whites accounted for just 7% of injury hospitalizations, but nearly one quarter of fatalities. This is due to the larger percentage of suicides among fatalities; Whites made up a greater proportion of firearm suicides than they did of firearm injuries of other intents. Victims of fatal firearm injuries were, on average, older than victims of hospitalized injuries. This is linked to the increased proportion of suicides among fatalities; victims of suicides tend to be older than victims of other intents of injuries.

Table 6: Demographics of Fatal Firearm Injuries and Non-Fatal Firearm Injury Hospitalizations, Los Angeles County 2000-2005

	Deaths	Hosps
Total Number	7,201	12,701
Intent (%)		
Unintentional	1.1%	9.5%
Suicide/Sui Attempt	25.6%	1.2%
Homicide/Assault	71.6%	85.5%
Legal Intervention	1.1%	1.1%
Undetermined	<1%	2.8%
Race/Ethnicity (%)		
Black	28.9%	34.2%
Latino	44.0%	52.6%
White	22.8%	7.3%
Asian/Other	4.1%	2.8%
Unknown	<1%	3.1%
Gender (%)		
Male	90.6%	92.0%
Female	9.4%	8.0%
Average Age (Years)	34.2	26.1

Firearm Injuries Discussion

Firearm injuries are a major cause of hospitalization in Los Angeles County. The majority of the injuries resulted from assaults, however, suicide attempts and unintentional injuries also constituted a portion of the injuries. Because firearm injuries typically involved adolescents and young adults, strategies for decreasing the rates of injuries should target these populations. These strategies can include policy changes regarding handgun access, gun design changes and safe storage, and suicide prevention. However, recognizing where youths obtain firearms is a first step in reducing the rates of firearm injuries among adolescents.

Youth Access to Firearms

In Los Angeles County, 79% of firearm hospitalizations for which the type of gun was known were caused by handguns, and firearms were the leading cause of injury hospitalization among 15-19 year old males (Appendix VI). California prohibits minors (persons under 18 years old) from possessing handguns and prohibits selling handguns to anyone under 21 years old.¹ However, minors can easily obtain handguns through illegal means. Typically, adolescents obtain handguns from family or friends either directly, or through so-called straw purchases, where a person of legal age purchases a gun for someone who cannot legally buy a gun. Minors can also obtain firearms through household theft or on the street from private sellers or illegal dealers.²

The 2002 Behavioral Risk Factor Surveillance System (BRFSS) found that 33% of adults in the U.S. had firearms in their homes. Of adults who had children under 18 years of age, 5.5% reported having loaded firearms in their homes and 2.5% reported having loaded and unlocked firearms in their homes.³ A recent California survey found that 19.6% of adolescents reported living in a home with a firearm and 3.0% reported having their own guns (usually rifles or shotguns).⁴ Clearly youth have ready access to firearms, even those that they are not legally allowed to buy or possess. Increased restrictions on youth firearm access can decrease the rate of firearm injuries and deaths among youth in Los Angeles County.

Firearms Policies

Regulating legal gun markets can help to better control illegal gun markets. Tightening federal and state laws regarding gun sales and requiring all gun owners to obtain licenses for firearm possession with annual renewal and to register their firearms annually could reduce the number of guns available to youth.⁵ Other firearms policies such as identification and background checks for all gun purchasers, mandating dealers to keep records of all transactions so law enforcement officers can trace guns used in crimes, and requiring gun sales to take place through licensed dealers, all help to keep track of guns in communities and help identify responsible parties when guns slip into the illegal market.⁶

California's gun laws are some of the strongest in the U.S. and include:

- Background checks on all potential gun buyers.⁷
- Safety tests which handguns must pass before they can be sold in the State.⁸
- Keeping record of handgun purchasers.⁹

- Restricting sales to one gun per person per month.¹⁰
- A 10-day waiting period before receiving guns.¹¹
- Requiring all sales, including private sales, be completed through licensed firearms dealers.¹²

In addition, California has banned assault weapons and 50 caliber rifles¹³ as well as the sale of large capacity ammunition magazines.¹⁴ More information on current and pending firearm laws in California can be found on the Department of Justice website at <http://ag.ca.gov/firearms>.

Gun Design and Storage

In addition to regulating firearms sales, incorporating safety devices on firearms and advocating safe storage may reduce firearm injuries. Personalized or childproof guns that can be operated only by the intended user are still in the development stage. In the future, such firearms may only function through the use of special technology like fingerprint recognition.¹⁵ Currently, there are no California laws requiring personalized handguns.

Safe storage such as gun locks, lock boxes, or gun safes may also reduce unintentional shootings, gun suicides, thefts, and homicides.¹⁶ One study found a 73% reduction in the risk of youth suicide and unintentional death when guns were locked away.¹⁷ Presently, California firearms law requires that a trigger lock or other safety device approved by the Department of Justice be included with each gun sold or produced in California.¹⁸ However, the future of this law is uncertain after the recent U.S. Supreme Court decision stating that trigger lock mandates violate the Second Amendment and are therefore unconstitutional.¹⁹

Safe Storage for Firearms at Home

- Keep the gun unloaded.
- Use a trigger lock or other safety device to prevent access from unauthorized users.
- Store the gun and ammunition separately.
- Do not keep guns where depressed individuals and children can have access to them.
- Ask neighbors, relatives, and those who have contact with your family members if they have guns in their homes and how the guns are stored to prevent unauthorized access.

Source: www.doctorsagainstandguninjury.org

Suicide Prevention

In 2005, about half (51.5%) of all suicide deaths in the U.S. were firearm-related. Of those deaths, males aged 75-84 had the highest rate of suicide.²⁰ Safety measures such as trigger locks, lock boxes, and personalized firearm designs may help prevent suicides, however, these safety measures will not prevent suicides among the owners of firearms.²¹ In addition, safe storage may help prevent suicide among those with low to medium intention but has been shown not to be effective for those with high suicidal intent.²² Therefore, it is still important also to look for warning signs of suicide such as

changes in mood, diet, or sleeping patterns, and suicidal ideation, to help reduce the rate of firearm suicides.

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- ¹ Legal Community Against Violence. Regulating Guns in America. Available at: http://www.lcav.org/library/reports_analyses/regulating_guns.asp. Accessed June 26, 2008.
- ² Wintemute GJ. Where the Guns Come from: The Gun Industry and Gun Commerce. *Future Child*. 2002;12(2):55-71.
- ³ Household Firearm Statistics. *Pediatrics for Parent*. 2006;22(8):5. Available at: <http://pediatrics.aappublications.org/cgi/reprint/116/3/e370>. Accessed June 26, 2008.
- ⁴ Sorenson SB, Vittes KA. Adolescents and Firearms: A California Statewide Survey. *Am J Public Health*. 2004;94(5):852-858. Available at: <http://www.ajph.org/cgi/reprint/94/5/852.pdf>. Accessed June 26, 2008.
- ⁵ Reich K, Culross PL, Behrman RE. Children, Youth, and Gun Violence: Analysis and Recommendations. *Future Child*. 2002;12(2):5-23.
- ⁶ Wintemute GJ. Where the Guns Come from: The Gun Industry and Gun Commerce. *Future Child*. 2002;12(2):55-71.
- ⁷ Cal Penal Code § 12072(d). Available at: <http://ag.ca.gov/firearms/forms/pdf/Cfl2007.pdf>. Accessed July 1, 2008.
- ⁸ Cal Penal Code § 12125. Available at: <http://ag.ca.gov/firearms/forms/pdf/Cfl2007.pdf>. Accessed July 14, 2008.
- ⁹ Cal Penal Code § 11106(c)(1). Available at: <http://ag.ca.gov/firearms/forms/pdf/Cfl2007.pdf>. Accessed July 14, 2008.
- ¹⁰ Cal Penal Code § 12072(a)(9)(A), § 12072(c)(6). Available at: <http://ag.ca.gov/firearms/forms/pdf/Cfl2007.pdf>. Accessed July 14, 2008.
- ¹¹ Cal Penal Code § 12071(b)(3)(A), § 12072(c)(1). Available at: <http://ag.ca.gov/firearms/forms/pdf/Cfl2007.pdf>. Accessed July 14, 2008.
- ¹² Cal Penal Code § 12071, § 12072, § 12082. Available at: <http://ag.ca.gov/firearms/forms/pdf/Cfl2007.pdf>. Accessed July 14, 2008.
- ¹³ Cal Penal Code § 12280(a)(1). Available at: <http://ag.ca.gov/firearms/forms/pdf/Cfl2007.pdf>. Accessed July 14, 2008.
- ¹⁴ Cal Penal Code § 12020(a)(2), § 12020 (b). Available at: <http://ag.ca.gov/firearms/forms/pdf/Cfl2007.pdf>. Accessed July 14, 2008.
- ¹⁵ Rivara FP, Kellermann AL. Reducing the Misuse of Firearms. In Doll LS, Bonzo SE, Mercy JA, Sleet DA, Haas EN eds. *Handbook of Injury and Violence Prevention*. New York: Springer. 2007:311-331.
- ¹⁶ Rivara FP, Kellermann AL. Reducing the Misuse of Firearms. In Doll LS, Bonzo SE, Mercy JA, Sleet DA, Haas EN eds. *Handbook of Injury and Violence Prevention*. New York: Springer. 2007:311-331.
- ¹⁷ Grossman DC, Mueller BA, Riedy C, et. al. Gun Storage Practices and Risk of Youth Suicide and Unintentional Firearm Injuries. *J Am Med Assoc*. 2005;293:707-714.
- ¹⁸ Cal Penal Code § 12088.1. Available at: <http://ag.ca.gov/firearms/forms/pdf/Cfl2007.pdf>. Accessed July 14, 2008.

¹⁹ Heller v District of Columbia. No. 07-290. (U.S. Supreme Court, 2008).

²⁰ Centers for Disease Control and Prevention. Surveillance for Violent Deaths - National Violent Death Reporting System, 16 States, 2005. *Morb Mortal Wkly Rep.* 2008;57(SS03):1-45. Available at: <http://www.cdc.gov/mmwr/preview/mmwrhtml/ss5703a1.htm>. Accessed June 30, 2008.

²¹ Romero MP, Wintemute GJ. The Epidemiology of Firearm Suicide in the United States. *J Urban Health.* 2002;79(1):39-48.

²² Rivara FP, Kellermann AL. Reducing the Misuse of Firearms. In Doll LS, Bonzo SE, Mercy JA, Sleet DA, Haas EN eds. *Handbook of Injury and Violence Prevention.* New York: Springer. 2007:311-331.

10th Leading Cause: Natural & Environmental Injuries

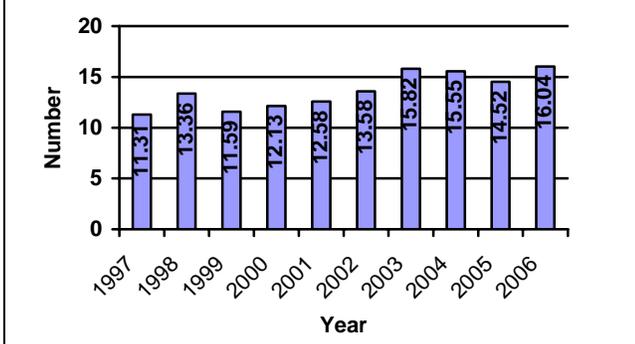
Natural and environmental injuries (from here on referred to as “natural” injuries) include injuries from excessive heat and cold; from high or low air pressure or changes in air pressure; from travel and motion; from hunger, thirst, exposure, or neglect; from bites or stings from animals or plants (but not from ingesting poisonous plants); from storms (lightning or flooding); and from earthquakes.

Between 2000 and 2006, natural injuries were the tenth leading cause of injury hospitalizations in Los Angeles County, with an average of more than 1,300 reported each year. Statewide, there were 32,010 hospitalizations due to natural injuries reported between 2000 and 2005 (statewide data are yet available for 2006). During this period, 25.0% of all natural injury hospitalizations in California were to Los Angeles residents.

Trends

Between 2000 and 2006 there were 9,583 natural injury hospitalizations in Los Angeles County. By 2006, the annual hospitalization rate was 42% greater than during 1997 (Figure 1).

Figure 1: Natural Injury Hospitalization Rate per 100,000 Population by Year, Los Angeles County



Intent

The vast majority (99.6%) of natural injury hospitalizations were due to unintentional injuries. Only 36 hospitalizations were caused by suicide attempts or injuries of undetermined intent.

Cause of Injury

Most (80%) of the natural injuries were caused by contact with some type of animal (Table 1). All the various forms of insects, both poisonous and not, were the most common type of animal involved in the injuries; over half of all animal-related hospitalizations and 42% of all natural hospitalizations were due to a bite or sting of an arthropod. The “other injury caused by animal” category includes several types of injuries (e.g., pecked at by birds, hurt by porcupine quills, or butted by/fallen on/stepped on/run over by an animal), but it excludes all injuries that occurred while riding on animals (which are categorized as a form of transportation under the motor vehicle traffic category).

Other than injury by animals, the most common types of natural injuries were exposure to heat (6.3%) and cold (7.8%). Most of the heat-related injuries were due to weather conditions, but the cause of the injury was not specified for most cold-related injuries. The hospitalizations in the earth surface movements and

eruption category were most likely caused by mudslides, or landslides; none were caused by earthquakes.

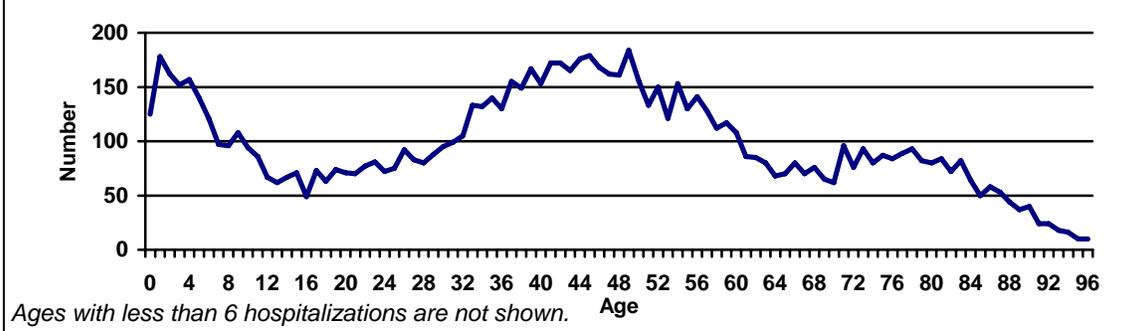
Table 1: Cause of Unintentional Natural Injury Hospitalizations, Los Angeles County, 2000-2006

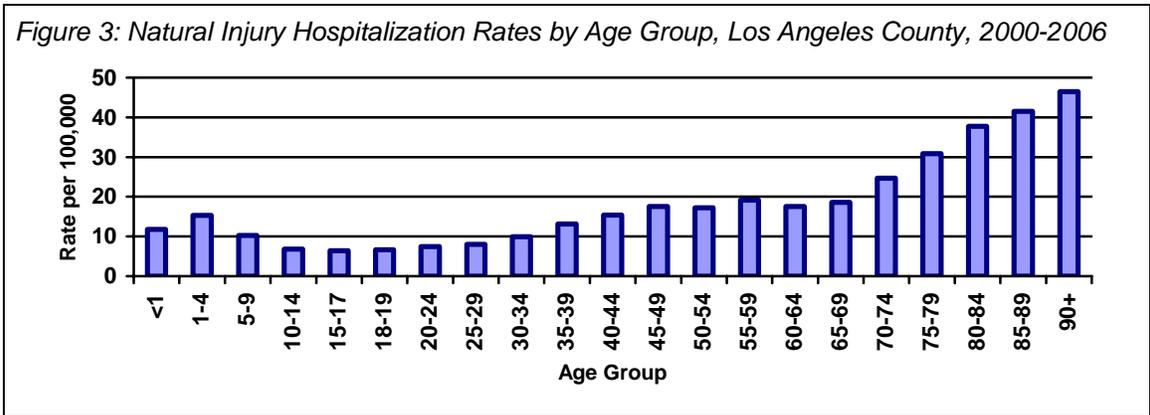
Cause of Injury	Number	Cause of Injury	Number
Excessive Heat	611	Venomous animals & plants	1,821
From weather conditions	494	Snakes & lizards	271
Of manmade origin	12	Spider	1,041
Of unspecified origin	105	Scorpion	7
Excessive Cold	744	Hornet, bee, wasp, yellow jacket	351
From weather conditions	197	Other venomous arthropods	87
Of manmade origin	10	Marine animals/plants	20
From other specified origin	133	Poison/toxic reaction by other plants	13
Of unspecified origin	404	Other & unspecified	31
Air pressure	90	Other injury caused by animals	5,898
Residence/long visit at high altitude	35	Dog bite	1,739
Due to diving	9	Rat bite	28
Other specified (includes airplane)	26	Bite of nonvenomous snake/lizard	9
Unspecified cause	20	Bite of other animal except arthropod	1,166
Travel & Motion	11	Bite of nonvenomous arthropod	2,510
Hunger/Thirst/Exposure/Neglect	346	Bite of unspecified animal	42
Abandon/Neglect Helpless Persons	194	Other/unspecified injury from animal	404
Lack of food/Lack of water	68	Lightning & Storms, Flooding	6
Exposure to weather (ex: hailstones)	76	Earth Movements & Eruptions	10
Privation, unqualified	8	Other/Unspecified Natural Causes	10

Age

There were three separate peaks in natural injury hospitalizations by age; the first among very young children, the second among people in their late 40s and the third among people in their 70s (Figure 2). Rates, however, were highest by far among the elderly population (Figure 3). There were also noticeable, but much smaller peaks in rates among 1-4 year old children and adults in their 40s. For all age groups, the most common type of natural injury was “other injury caused by animals”. These other animal injuries accounted for 61% of all natural injuries. Among the very young and very old, other animal injuries accounted for only about half of all hospitalizations (52% among <1 year olds and 48% among 65+ year olds), but among 1-9 year old children, over three quarters of all hospitalizations were due to other animal injuries. Among infants, hunger/thirst/exposure/neglect was the second leading cause of hospitalization,

Figure 2: Number of Hospitalizations due to Natural Injuries by Age, Los Angeles County, 2000-2006





accounting for 28% of injuries among children less than one year old. Exposure to heat and cold peaked among the elderly, nearly half (49%) of all hospitalizations due to these causes were to patients 65+ years old. Since other animal injuries accounted for such a large proportion of natural injuries, it is not surprising that rates for other animal injuries were higher than rates for other types of natural injuries for every age group (Table 2). Rates for other animal injuries peaked among the very young (1-4 year olds) and older adults (45+ year olds).

Table 2: Average Annual Natural Injury Hospitalization Rates by Age Group & Intent, Los Angeles County, 2000-2006

Age Group	Venom. Animals	Other Animals	All Other Natural
<1 Years	*	*	*
1-4 Years	2.53	11.95	*
5-9 Years	2.29	7.75	*
10-14 Years	1.60	4.72	*
15-19 Years	1.70	4.15	*
20-24 Years	1.85	4.70	*
25-29 Years	1.86	5.47	*
30-34 Years	2.80	6.01	*
35-44 Years	3.60	9.03	1.60
45-54 Years	3.43	11.10	2.84
55-64 Years	2.91	10.89	4.66
65+ Years	2.53	13.68	12.40

All rates are per 100,000 population.

Hospitalization rates for venomous animal injuries were highest among adults 35-54 years old, while non-animal-related natural injuries were uncommon among children and young adults and peaked among 65+ year olds.

Table 3: Average Age of Patients with Natural Injuries, by Type, Los Angeles County, 2000-2006

Cause of Injury	Avg. Age
Excessive Heat	60.5
Excessive Cold	61.9
Air pressure	52.1
Travel & Motion	40.3
Hunger/Thirst/Exposure/Neglect	52.1
Venomous animals & plants	36.9
Other injury caused by animals	39.5
Storms & lightning	30.8
Earth movements/eruptions	36.7
Other/Unspecified causes	55.7
Suicide Attempt & Undetermined Intent	53.1

Overall the average age of patients hospitalized with natural injuries was 42.7 years old. The age of patients varied considerably with the type of injury (Table 3). Victims of excessive heat and cold were, on average, considerably older than patients with other types of injuries. Patients with injuries caused by storms (including flooding and lightning) were the youngest. Within the venomous

animals & plants category, the average age of the small number of patients who were stung by scorpions was 22.3 years, while patients who were stung by marine animals or plants were considerably older, with an average age of 39.3 years. Breaking down the other animal injury category, the average age of patients ranged from 32.6 years for patients injured by bites from nonvenomous arthropods to 55.5 years for patients injured by bites of other animals except arthropods.

Gender

Overall, males accounted for 54% of all natural injuries, and the age adjusted hospitalization rate was slightly higher for males (15.9 per 100,000) than females (12.6 per 100,000). However, there was considerable variation in the gender distribution for different types of injury (Table 4). Males accounted for almost two thirds of injuries from excessive heat and venomous animals and plants, but for half or less of hospitalizations due to other animal injuries and hunger/thirst/exposure/neglect. Within some of these general categories, there was additional variation. In the venomous animals and plants category, 80% of injuries caused by snakes or lizards were among males, while just 46% of injuries from other arthropods were among males. In the other animal injury category, only 31% of hospitalizations for bites from other animals except arthropods were male, while 57% of injuries from nonvenomous arthropods were to males. Finally, female patients (45.9 years on average) were somewhat older than male patients (40.0 years).

Table 4: Gender Distribution of Natural Injuries, by Type, Los Angeles County, 2000-2006

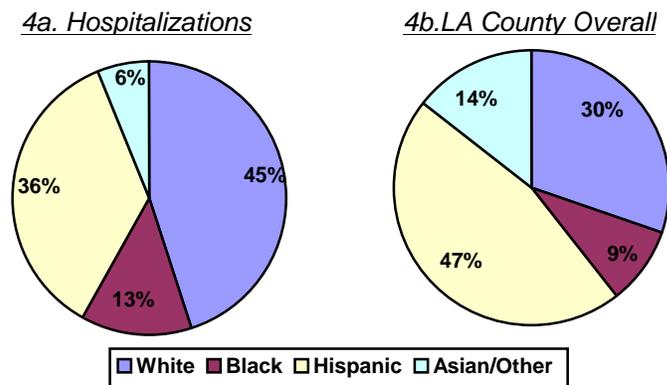
Cause of Injury	% Male
Excessive Heat	66%
Excessive Cold	54%
Air pressure	61%
Hunger/Thirst/Exposure/Neglect	44%
Venomous animals & plants	65%
Other injury caused by animals	50%
All other unintentional causes	57%
Suicide Attempt & Undetermined Intent	78%

Race/Ethnicity

Racial/ethnic group was unknown for 2.1% of all natural injury hospitalizations; all statistics presented in this section only include those records for which race/ethnicity was reported. Whites and Blacks were significantly overrepresented among hospitalizations for

natural injuries relative to their proportion in the entire county population, while Latinos and Asians/Others were underrepresented (Figure 4). The age adjusted

Figure 4: Racial/Ethnic Distribution of Patients Hospitalized for Firearm Injuries and LA County Overall, 2000-2006



hospitalization rate among Asians/Others (6.3 per 100,000) was almost half that of Latinos (11.8 per 100,000). Hospitalization rates were much higher among Whites (17.8 per 100,000) and Blacks (19.1 per 100,000). Latinos (32.8 years on average) had the lowest average age of any racial/ethnic group, followed by Blacks (42.4 years), Asians/Others (43.3 years), and Whites (50.6 years).

There was considerable variation in racial/ethnic distribution by type of injury (Table 5). Whites accounted for only 40% of injuries from venomous plants and animals, but more than half of all hospitalizations from excessive heat. Blacks accounted for just 11% of other animal injury hospitalizations, but for more than 20% of

Table 5: Racial Ethnic Distribution of Natural Injury Hospitalizations by Type, Los Angeles County, 2000-2006

Intent	% White	% Black	% As/Oth	% Latino
Excessive Heat	54%	12%	9%	25%
Excessive Cold	43%	22%	8%	27%
Hunger/Thirst/Exposure/Neglect	41%	23%	6%	30%
Venomous animals & plants	40%	13%	6%	41%
Other injury caused by animals	46%	11%	6%	37%

All other types of injuries are excluded from the table because of the small number of hospitalizations.

hospitalizations from excessive cold and hunger/thirst/exposure/neglect. Only 25% of hospitalizations from excessive heat were to Latinos, but Latinos accounted for 41% of injuries from venomous animals and plants. Asians/Others accounted for between 6% and 9% of injuries in each category. Injury from venomous animals & plants was the only broad category in which another racial/ethnic group outnumbered Whites. Whites generally outnumbered all the other racial/ethnic groups for each specific type of natural injury; however, some of the larger specific categories in which Latinos outnumbered Whites were abandonment or neglect of infants or helpless people, venomous spiders, hornets/wasps/bees/ yellow jackets, and the bite of nonvenomous arthropods.

Geography

The total number of natural injury hospitalizations was lowest for residents of the Antelope Valley and highest for the San Fernando SPA residents. The natural injury hospitalization rate varied from 11.7 per 100,000 in the West SPA to 20.4 per 100,000 in the South SPA (Table 6). However, five of the eight SPAs had very similar rates of natural injury hospitalizations, ranging from 13.0 to 13.9 per 100,000.

Table 6: Number of Natural Injury Hospitalizations and Average Annual Age Adjusted Hospitalization Rate by SPA, Los Angeles County, 2000-2006

SPA	Number	Rate
SPA 1: Antelope Valley	403	19.6
SPA 2: San Fernando	1,925	13.7
SPA 3: San Gabriel	1,610	13.0
SPA 4: Metro	1,141	13.9
SPA 5: West	549	11.7
SPA 6: South	1,321	20.4
SPA 7: East	1,208	13.6
SPA 8: South Bay	1,426	13.4
Los Angeles County Total	9,583	14.3

Note: Rates are per 100,000 population. The small number of patients with unknown SPA were added to the most populous SPA (SPA 2).

Different types of natural injuries were more prevalent in different SPAs. The other animal injury category accounted for 57% of injuries in the Antelope Valley, but for 67% in the San Fernando SPA. Injuries from venomous animals and plants ranged from 13% of all hospitalizations from the West SPA to 22% from the San Fernando and San Gabriel SPAs. Injuries from excessive cold ranged from 6% of injuries in San Fernando to 11% in the Metro, while injuries from excessive heat ranged from 3% of all hospitalizations from the South SPA to 9% of hospitalizations from the San Fernando and San Gabriel SPAs.

Males outnumbered females among natural injury hospitalizations from each SPA except in the West. Countywide, the hospitalization rate among males was 1.3 times that of females. The Antelope Valley had the largest variation by gender; the natural injury hospitalization rate for males in the Antelope Valley was 1.5 times higher than that for females. The smallest difference was found in the West SPA, where the rate for males was slightly less than that of females. The West SPA also had the lowest hospitalization rates of any SPA for males (11.6 per 100,000), while the lowest rate among females was found in the San Gabriel SPA (11.1 per 100,000). The South SPA had the highest rates for both males (24.0 per 100,000) and females (17.4 per 100,000).

Hospitalization rates by race/ethnicity and SPA are shown in Table 7.

Hospitalization rates among Whites ranged from 12.3 per 100,000 in the West SPA to 55.4 per 100,000 in the South SPA. For Blacks, rates

ranged from 12.0 per 100,000 in the South Bay SPA to 26.9 per 100,000 in the Metro SPA. Among Latinos, rates ranged from 8.9 per 100,000 in the West SPA to 16.1 per 100,000 in the South SPA. For Asians/Others, rates ranged from 4.9 per 100,000 in the San Gabriel and Metro SPAs to 21.1 per 100,000 in the South SPA. Blacks had the highest hospitalization rate in the Metro and West SPAs, while Whites had the highest rate in each of the other SPAs. Latinos had the lowest rate in the South SPA, while Asians/Others had the lowest rate in each of the other SPAs.

Table 7: Average Annual Age Adjusted Natural Injury Hospitalization Rate by Race/Ethnicity and SPA, Los Angeles County, 2000-2006

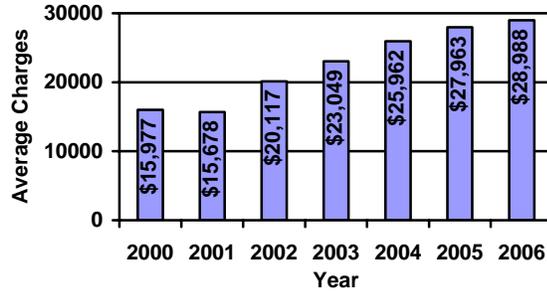
SPA	Rate			
	Black	Latino	As/Oth	White
SPA 1: Antelope Valley	19.51	14.20	9.04	23.65
SPA 2: San Fernando	12.99	10.39	7.25	16.75
SPA 3: San Gabriel	18.65	12.24	4.93	19.08
SPA 4: Metro	26.91	11.97	4.89	19.85
SPA 5: West	14.36	8.90	8.22	12.34
SPA 6: South	25.80	16.07	21.06	55.35
SPA 7: East	17.44	11.97	6.57	19.93
SPA 8: South Bay	12.04	11.44	8.15	17.22
Los Angeles County Total	19.08	11.83	6.32	17.82

Note: Rates are per 100,000 population.

Medical Charges

The average medical charges incurred for each natural injury hospitalization increased during the seven years covered by this report (Figure 5). However, this is the only leading cause of injury that ever showed a decrease in medical charges from one year to the next (from 2000 to 2001). The average charge for each hospitalization during this time period was \$23,138.

Figure 5: Average Medical Charges for Natural Injury Hospitalizations by Year, Los Angeles County, 2000-2006



Charges were higher for males (\$25,067 per visit) than females (\$20,841 per visit). Medical charges were much lower for Latinos (\$21,576), Asians/Others (\$22,203), and Whites (\$22,350) than for Blacks (\$29,022). When looking at average charges by age group, the youngest and oldest patients were the most costly to treat. Charges were lowest for 5-9 year old children, and then charges generally increased with increasing age. Overall, the average charges to treat 1-14 year old children were less than half the average charges incurred to treat <1 year olds and 65+ year olds.

Table 8: Average Charges for Natural Injury Hospitalizations, by Type, Los Angeles County, 2000-2006

Cause of Injury	Avg Charge
Excessive Heat	\$28,228
Excessive Cold	\$55,112
Air pressure	\$23,920
Hunger/Thirst/Exposure/Neglect	\$39,572
Venomous animals & plants	\$20,974
Other injury caused by animals	\$18,008
All other unintentional causes	\$42,065
Suicide Attempt & Undetermined Intent	\$46,365

There were striking differences in average medical charges for injuries of different types (Table 8). The least costly injuries to treat were other injuries caused by animals and injuries from venomous animals and plants. Injuries from exposure to excessive cold were the most expensive to treat. There was also considerable variation in charges within the general categories shown in Table 8. For instance, in the venomous animals and plants category, bites from

Table 9: Demographics of Fatal Natural Injuries and Non-Fatal Natural Injury Hospitalizations, Los Angeles County 2000-2005

	Deaths	Hosps
Total Number	86	8,001
Intent (%)		
Unintentional	100%	99.7%
All Other Intents	0%	<1%
Race/Ethnicity (%)		
Black	12.8%	12.6%
Latino	31.4%	34.9%
White	53.5%	44.6%
Asian/Other	1.2%	5.7%
Unknown	1.2%	2.1%
Gender (%)		
Male	67.4%	54.6%
Female	32.6%	45.4%
Average Age (Years)	52.4	42.3

poisonous spiders cost an average of \$20,264 to treat while the average cost to treat bites from venomous snakes and lizards was \$40,741.

Comparison to Mortality Data

Between 2000 and 2005, which are the most recent 6 years of available mortality data, there were just 86 fatalities from natural injuries. During this time, there were nearly 100 hospitalizations for each natural injury death (Table 9). All deaths and almost all of the hospitalizations were due to unintentional injuries. It is difficult to make subgroup comparisons since there were so few fatalities, but it appears that Whites and males accounted for a greater percentage of deaths than of hospitalizations. The average age among fatalities was also greater than the average age of hospitalized patients.

Natural & Environmental Injuries Discussion

Los Angeles County has a broad range of natural environments that can expose residents to an array of injuries. Because of the multiple and varied causes of these injuries, only a few have been singled out for discussion.

Non-venomous animal injuries

Arthropod bites

In Los Angeles County, over half of all animal-related hospitalizations and 42% of all natural hospitalizations were due to a bite or sting of an arthropod.

Arthropods are comprised of several common types of animals including insects, spiders, centipedes, and crustaceans (e.g., crabs and shrimp). Most non-venomous arthropods are harmful to humans because they spread disease. For example, in the U. S., mosquitoes spread the West Nile virus, fleas have been known to carry the plague bacteria, and ticks spread the Lyme disease bacteria. Arthropods can also injure without causing disease; for example, some people may experience severe allergic reactions to non-venomous insect bites, and infections may develop if bites are repeatedly irritated by scratching.¹ In Los Angeles County during the seven years of this report, nearly one person a day was hospitalized for the treatment of non-venomous arthropod bites.

To reduce the risk of mosquito bites, the American Mosquito Control Association recommends applying the three D's of protection: drain, dress, and defend.² Mosquitoes need water to breed therefore, drain all containers of standing water. Even a small amount of water is enough for mosquitoes to lay eggs. When outdoors, dress appropriately; light-colored, loose-fitting clothing is best, and long sleeved shirts and pants provide more protection. Further defend yourself and your family against mosquito bites by using mosquito repellents registered by the Environmental Protection Agency. Visit the Environmental Health Program page at the Los Angeles County Department of Public Health website for more information about mosquitoes and other arthropod pests.³

Dog Bites

Dog bites were one of the most common causes of natural injury hospitalization in Los Angeles County. The American Veterinary Medical Association (AVMA) estimates that in 2007, there were more than 71 million dogs living in the U.S. and that more than 37% of households owned at least one dog.⁴ Using these statistics and 2000 U.S. census data for Los Angeles,⁵ we can estimate that there are about 2 million dogs living in Los Angeles County. This means that there is about one dog for every five people living in the County and human-dog interactions resulting in injury are inevitable.

The Centers for Disease Control and Prevention (CDC) estimates that more than 4.7 million people are bitten by dogs in the U.S. each year. About 800,000 of these people need some medical help to treat their injuries, and more than 360,000 require a visit to an emergency department.⁶ Another study found that

around 1.8% of emergency department visits resulted in an inpatient hospitalization.⁷ Applying this statistic to the hospitalization data from this report, we can estimate that between 2000 and 2006 there were more than 96,000 emergency department visits for dog bite injuries in Los Angeles County.

Dog bites are much more common among children and boys than among adults or girls. Children are not only more likely to be bitten than adults; they are also more likely to be severely injured, with bites to the head and neck much more commonly found among children.⁸ Among adults, 7.9% of dog bite injuries were work-related, including injuries to mail carriers, people doing in-home repair work, and workers at animal clinics or shelters.⁸

Several factors may affect the risk of dog bite. As previously mentioned, children and boys are at greater risk of being bitten. Male dogs, dogs that are not neutered, dogs living in a house with one or more children, and dogs that are kept chained while in the yard are more likely to bite.⁹ It is most common for the victim to know the dog, and most injuries occur in a home (the victim's home or another home).¹⁰ Among children, the majority of dog bites are caused by the family's dog or a neighbor's dog.¹¹

The CDC and AVMA provide guidelines on reducing the risk of dog bites and on teaching children how to avoid being bitten by dogs (see box). The AVMA's community guide for dog bite prevention discusses how to form a community coalition to reduce dog bites.¹² Other resources for bite risk reduction include the American Kennel Club, which has a Canine Good Citizen program.¹³ Many home insurance policies will provide dog bite coverage for dogs that have been through this program.¹⁴

Dog Bite Prevention for Children

Teach Children:

- Not to approach an unfamiliar dog.
- Not to run from a dog and scream.
- To remain still when approached by an unfamiliar dog.
- If knocked over by a dog, roll into a ball and lie still
- Not to play with a dog unless an adult is present.
- Report stray dogs to an adult
- Avoid direct eye contact with a dog.
- Not to disturb a dog who is sleeping, eating, or caring for puppies
- Not to pet a dog without letting it see or sniff you first.
- If bitten, to tell an adult right away.

Source: Centers for Disease Control and Prevention, National Dog Bite Prevention Week⁶

Venomous Animal Injuries

Spider Bites

The majority of the 30,000 spider species in the world are unable to cause substantial harm since their small size and other factors make it impossible for them to bite humans.¹⁵ In the U.S., only a few species of spiders are known to cause serious bite injuries in humans. These include the black widow, brown recluse, hobo, and yellow sac spiders.¹⁶ Black widow spiders are the only

dangerous spider commonly found in Los Angeles County,¹⁷ but they are not aggressive and will run away if threatened rather than bite.¹⁶

From 2000-2006, there were nearly 150 hospitalizations for spider bites in Los Angeles County each year. However, it is unlikely that all, or even any, of these hospitalizations were due to spiders bites. Spider bites are often misdiagnosed and confused with other medical conditions, such as antibiotic resistant staphylococcal infections.¹⁸ At one Los Angeles County hospital an estimated 80% of visits for spider bites were misidentified as such.¹⁹ Other times, bite-like symptoms may be the result of allergic reactions to spiders that are otherwise harmless to humans.

Spider bites in the United States are rarely fatal; between 2000 and 2005, there were 52 deaths from venomous spiders, an average of less than 9 per year.²⁰ Black widow spider bites contain a neurotoxin that leads to systemic problems. Prior to the development of an anti-venom, around 5% of bites resulted in death.¹⁶

Bee, Wasp, Hornet & Yellow Jacket Bites

Bee, wasp, hornet, & yellow jacket stings are the leading cause of emergency department visits for non-canine bite and sting injuries in the U.S., with around 200,000 visits each year.²¹ Most deaths from bee and wasp stings occur from allergic reactions to the venom, although people who are not allergic may die if they are stung many times at once.¹⁶ Tips for avoiding bee stings include running away and finding shelter away from the bees (see box).²²

What to do if you are attacked by bees

- Run away quickly.
- Pull your shirt over your head to protect your face.
- Find shelter, such as a vehicle or building.
- Do not jump into water – the bees will wait for you to come up for air.
- Once you have reached shelter, remove all stingers.
- Do not pull out the stinger, scrape it out sideways using your fingernail, a credit card, etc.
- Seek medical attention for multiple stings, if you are feeling ill, or if you are allergic to bee stings.

Injuries from Excessive Heat

The climate of Los Angeles County makes heat stress a serious problem. During the summer, temperatures routinely approach 90° F or higher in some parts of the county.²³ Despite frequent high temperatures in the area, one study found that the rate of heat-related deaths in Los Angeles County was 44% lower than the rate for the rest of the U.S.²⁴ Air conditioning, at home or elsewhere, reduces heat-related illness and mortality.²⁵ Los Angeles County may have a higher prevalence of air conditioned settings than other areas in the country.

Heat exhaustion and heat stroke are the two most serious types of heat-related conditions.²⁶ Young children and the elderly are the groups most affected by

heat-related illness. Outdoor athletes are susceptible to heat-related illness unless they acclimate themselves to the heat and stay sufficiently hydrated. Children who are left unattended in cars also can suffer from heat-related illness. Nationally from 2000-2001, over one third of all fatalities to children left alone in motor vehicles were due to high temperatures inside the cars.²⁷ Even on mild days, the temperature in a car can quickly soar to over 100° F. To reduce the risk to children of vehicle-associated hyperthermia, California enacted Kaitlyn’s Law in 2001. The law prohibits leaving a child 6 years old or younger in a car without supervision by a person who is at least 12 years old if conditions exist that present a risk to the child’s health and safety, or if the vehicle’s engine is running or the keys are in the ignition.²⁸

Symptoms of heat exhaustion and heat stroke are shown in the box.²⁹ Drinking cool, non-alcoholic beverages; resting; taking a cool bath or shower; finding air conditioning;

Warning Signs of Heat Exhaustion and Heat Stroke	
Heat Exhaustion	Heat Stroke
<ul style="list-style-type: none"> • Heavy sweating • Paleness • Muscle cramps • Tiredness • Weakness • Dizziness • Headache • Nausea or Vomiting • Fainting 	<ul style="list-style-type: none"> • High body temperature (above 103° F) • Red, hot and dry skin (no sweating) • Rapid, strong pulse • Throbbing headache • Dizziness • Nausea • Confusion • Unconsciousness

and wearing light clothing can all help alleviate the symptoms of heat exhaustion. For heat stroke, it is important to cool the person rapidly in a shady area and to get medical assistance. People can be cooled in a tub of cool water or a cool shower, by spraying with a hose, by sponging with cool water, or in low humidity, by wrapping in a wet sheet and fanning.

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