

# Firearm-Related Injury and Death in Orange County

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Quality Management - Research and Planning

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August 2010

## Fire-Arm Related Injury and Death in Orange County

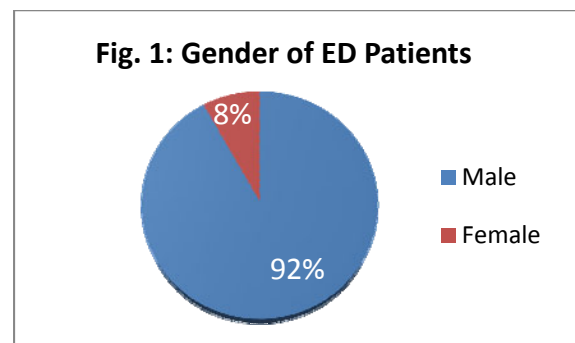
There were 1,680 firearm-related incidents in Orange County between 2006 and 2008 that resulted in the death of 436 persons. The majority (52%, n=878) of the 1,680 firearm-related incidents were treated solely in the emergency department (ED) while 29% (n=484) of the victims required hospitalization. For 19% of incidents (n=318) the victim was declared deceased at the scene and not transported to the ED. The first section of this report presents ED data<sup>1</sup> and the second section reports on patients admitted to the same hospital<sup>2</sup>, because no ED data are reported for these patients. Data concerning the mechanism of injury, patient demographics and dispositions are provided for ED visits and hospitalizations. The final section details firearm-related deaths as reported in the Orange County master death records.<sup>3</sup>

### Emergency Department Visits

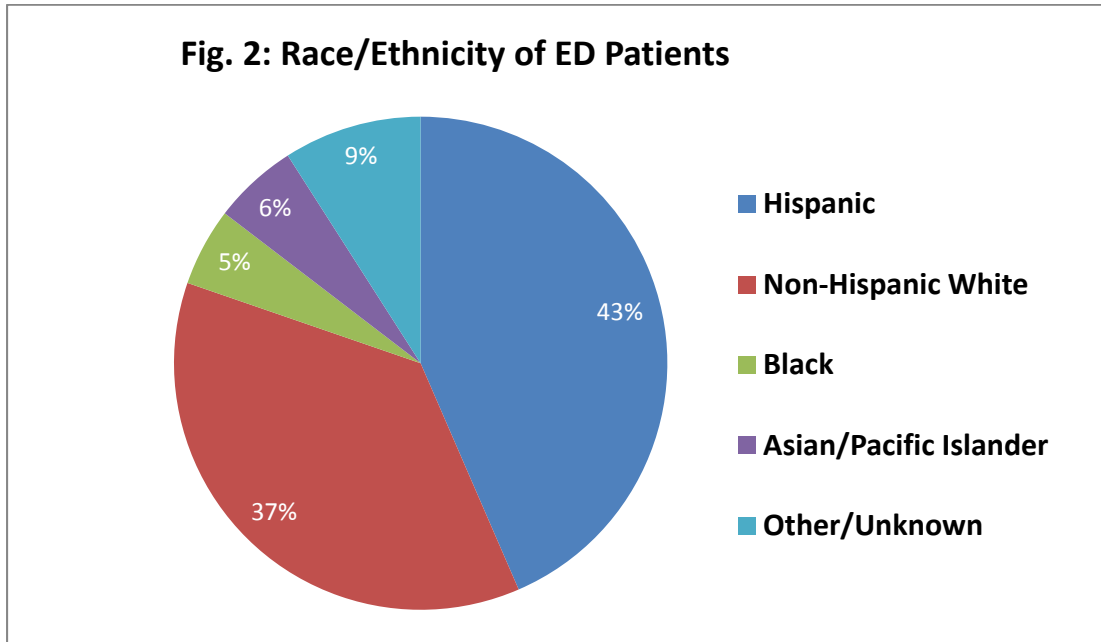
As shown in **Table 1**, half of all firearm-related ED visits (n=467) were due to accidental injuries caused by the projectile or missile of a firearm. Most notably, nearly half (n=228, 48%) of such injuries were due to air guns. Intentional injuries or assaults by firearms accounted for the second highest number of cases (n=238, 25%) during this time period. Self-inflicted or attempted suicides accounted for about 3% (n=27) of such ED visits, while 17% (n=159) were due to legal interventions involving law enforcement.

<b>Table 1: Emergency Department Visits</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>Total</b>
Accident Caused by Firearm or Air Gun Missile (E922)	172	155	140	467
Suicide and Self-Inflicted Injury (E955)	6	11	10	27
Homicide or Injury Purposely Inflicted by Other Persons (E965)	89	86	63	238
Legal Intervention (E970)	42	48	69	159
Injury Undetermined Whether Accidentally or Purposely Inflicted (E985)	20	17	10	47
<b>Total</b>	<b>329</b>	<b>317</b>	<b>292</b>	<b>938</b>

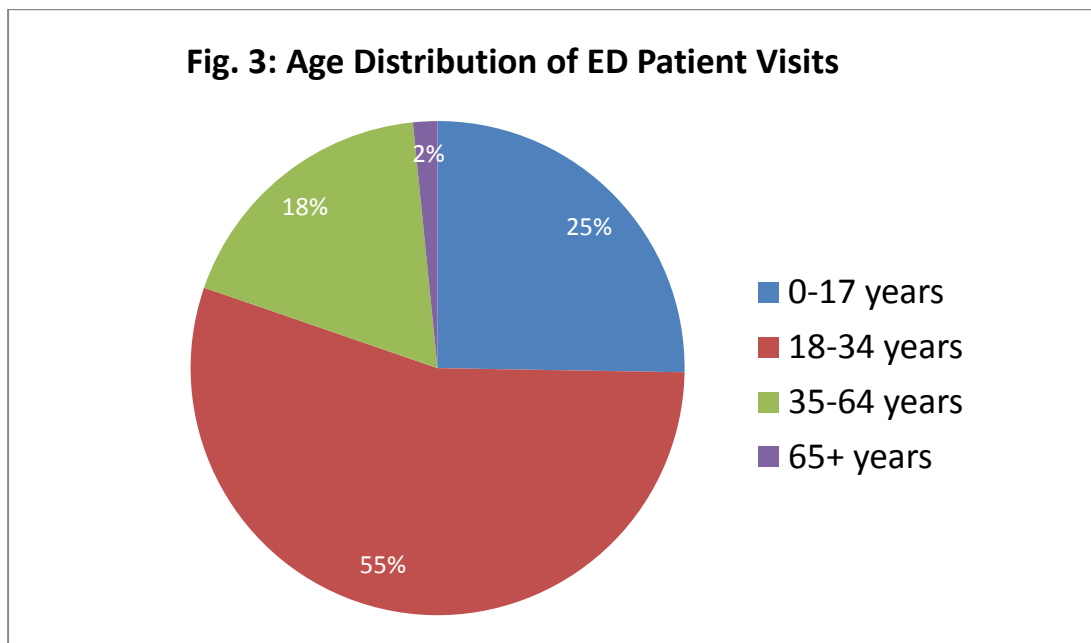
Males presenting at EDs for firearm-related injuries were disproportionately represented (92%) compared to females (8%; **Fig. 1**).



Hispanics composed 43% (n=408) of all firearm-related ED visits followed by Non-Hispanic whites at 37% (n=345). Asian/Pacific Islanders accounted for 6% (n=52) of cases and blacks 5% (n=48; **Fig. 2**).

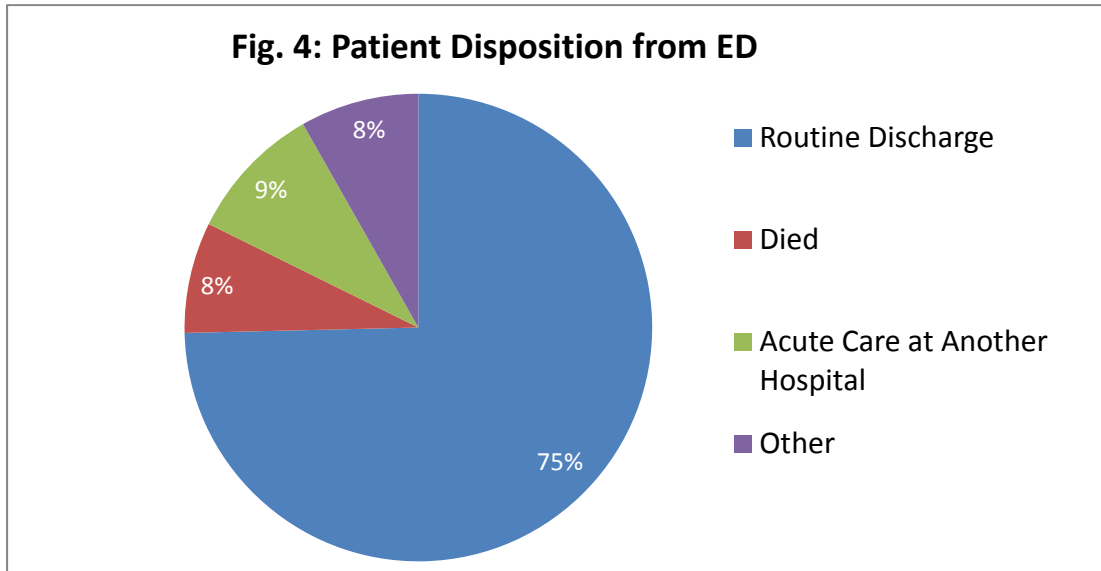


Over three quarters of the victims of firearm-related injuries were under 35 years of age (**Fig. 3**). Specifically, over half (55%, n=516) of all people injured by firearms were adults 18-35 years of age and a quarter (25%, n=237) were children 17 years and younger.



## Emergency Department Dispositions

The dispositions of patients treated in the ED are presented below in **Figure 4**. Three-quarters (75%, n=700) of victims were discharged home. Eight percent of victims (n=72) died in the emergency department as a result of injuries from firearms and 9% of patients (n=89) were transferred to another hospital for care.



## Hospitalizations

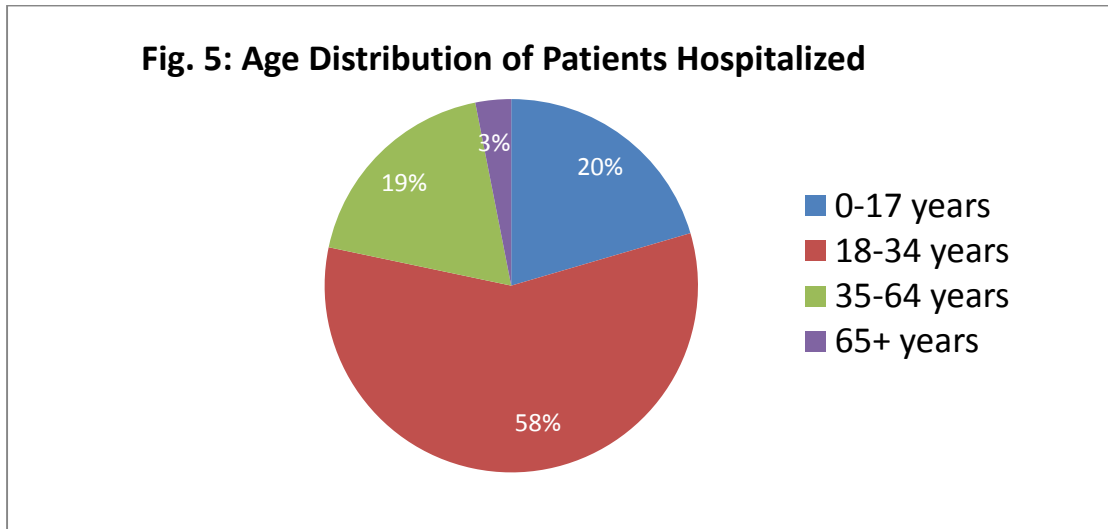
Between 2006 and 2008, a total of 484 victims were hospitalized due to firearm-related injuries. Of these hospitalizations, **Table 2** shows that the majority (70%, n=334) were due to assaults or injury purposely inflicted by other individuals.

<b>Table 2: Hospitalizations</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>Total</b>
Accident Caused by Firearm or Air Gun Missile (E922)	29	25	32	86
Suicide and Self-Inflicted Injury (E955)	11	12	13	36
Assault and Injury Purposely Inflicted by Other Persons (E965)	124	103	107	334
Legal Intervention (E970)	3	8	6	17
Injury Undetermined Whether Accidentally or Purposely Inflicted (E985)	3	6	2	11
<b>Total</b>	<b>170</b>	<b>154</b>	<b>160</b>	<b>484</b>

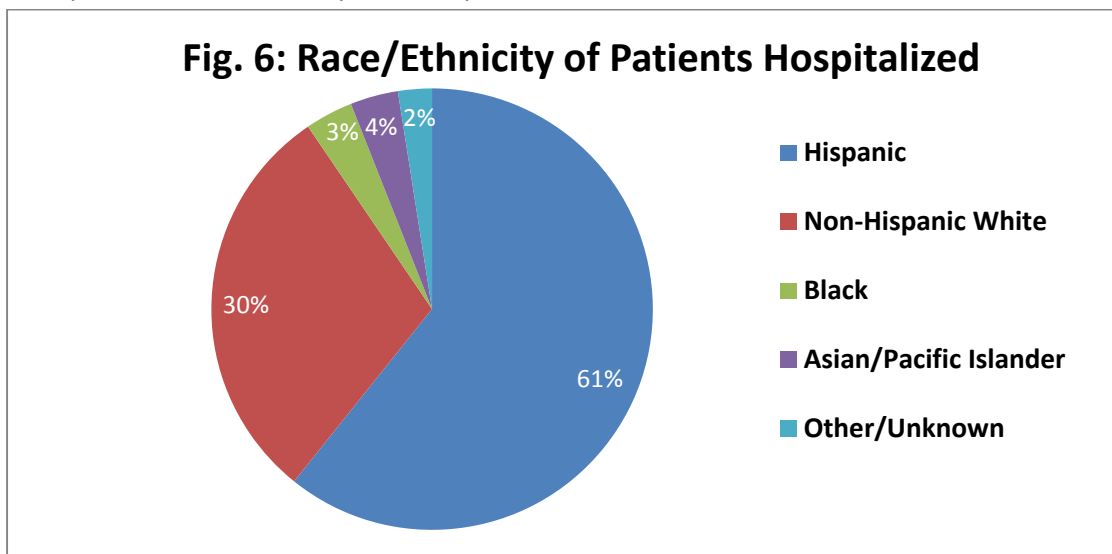
The second highest reason for firearm hospitalizations was due to accidental injuries inflicted by firearms or air guns (n=86, 18%). Intentional, self-inflicted firearm injuries accounted for

about 7% of such hospitalizations (n=36), legal interventions, 3.5% (n=17), and 2% (n=11) cases where the intent could not be determined.

**Figure 5** shows the age distribution of patients hospitalized due to firearm-related injuries. Similar to ED visits, the majority of individuals hospitalized were between 18 and 34 years of age (58%, n=280). This is followed by children 17 years and under (20%, n=99), and adults 35-64 years (19%, n=90). Seniors accounted for only about 2% of cases (n=15) during this time period.

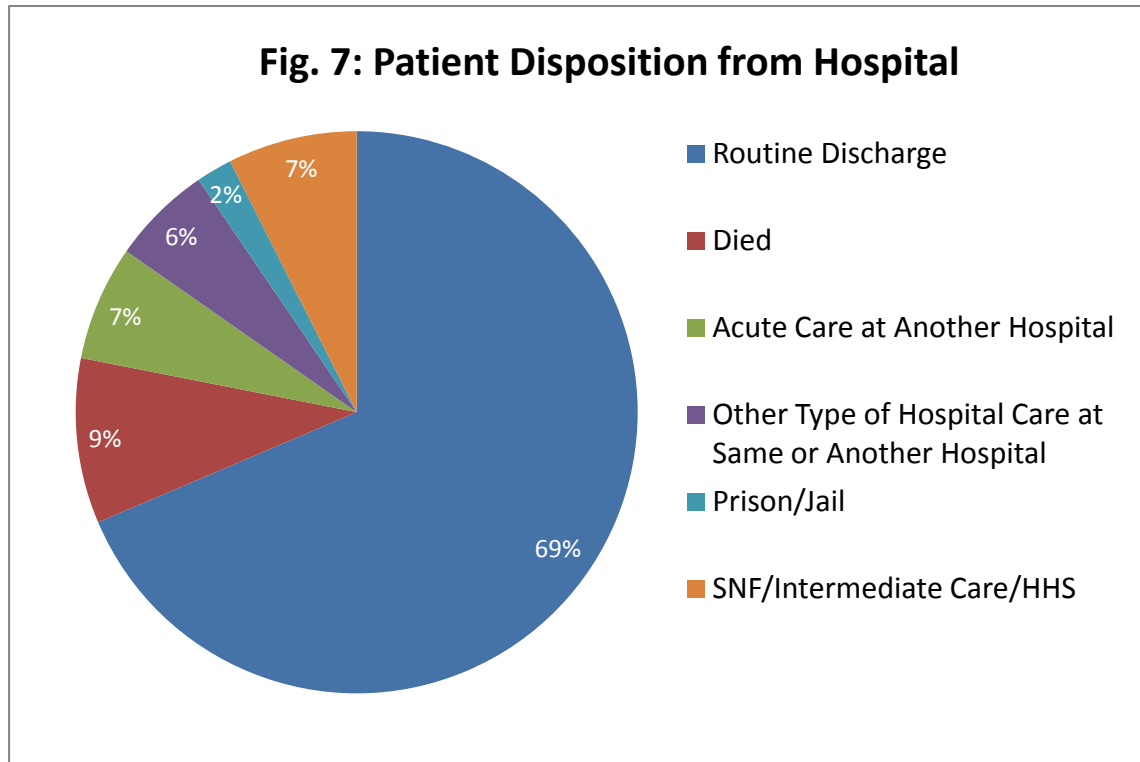


The majority (61%, n=294) of hospitalized patients were Hispanic while 30% were non-Hispanic white (n=144; **Figure 6**). The remainder of cases were Asian/Pacific Islander (4%, n=17), black (3%, n=16) or other/unknown (2%, n=12) descent.



## Hospital Dispositions

As shown in **Figure 7**, the majority of hospitalized patients survived and were discharged home (69%, n=332). Nine percent of patients died (9%, n=46) as a result of their injuries. About 20% required subsequent care at another facility such as a Skilled Nursing Facility (SNF, 7%, n=36), other inpatient care (other type of care at same or another hospital, 7%, n=32). A small percentage were sent to jail (2%, n=10).



## Hospitalization Charges

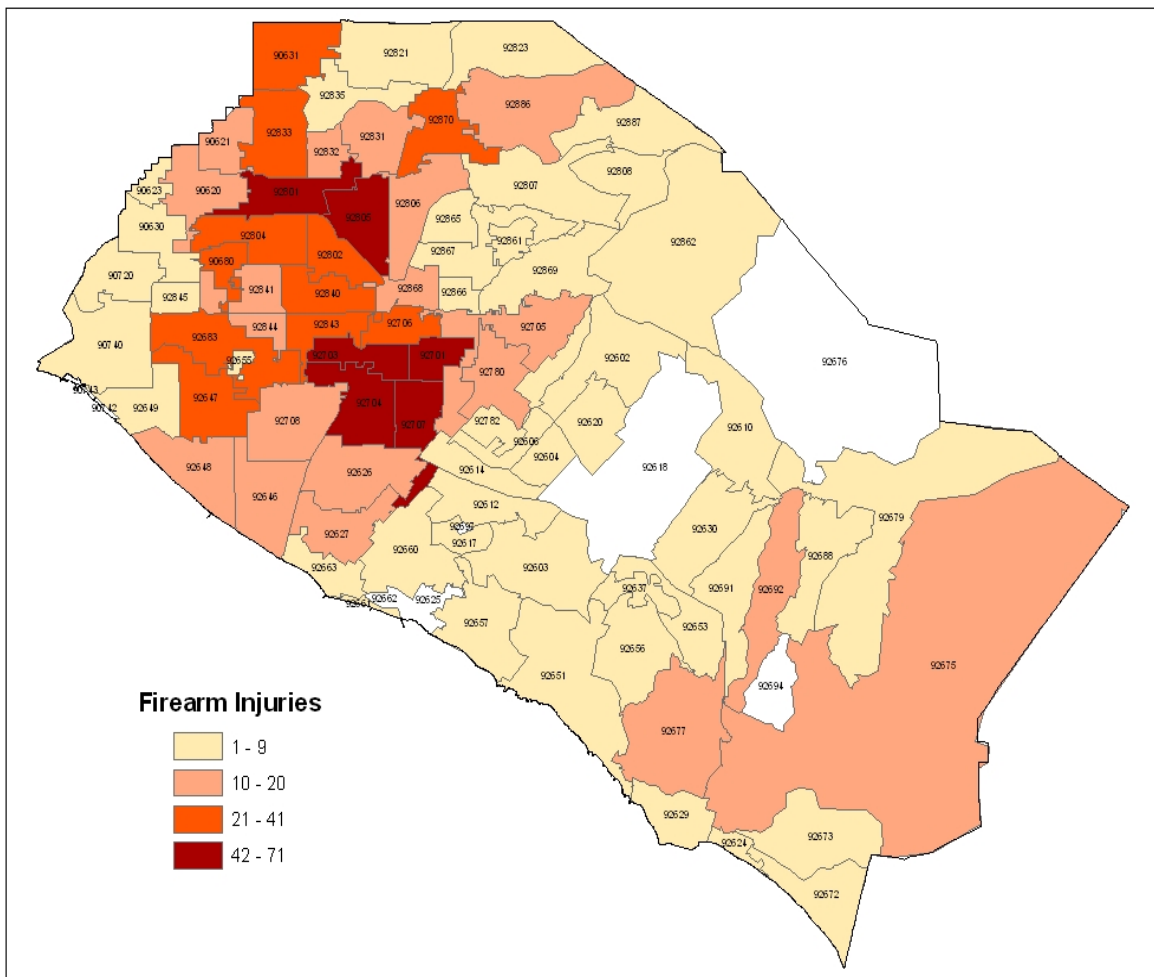
The hospitalization charges associated with these 484 firearm-related cases averaged \$133,598 per admission. During the three-year time period of 2006 to 2008 the sum total charges amounted to about \$65 million dollars or an average of about \$21.5 million per year. **Table 3** below shows that about 50% (n=241) of firearm-related hospitalizations were paid through public insurance programs like Medi-Cal or county indigent programs. Nineteen percent of

<b>TABLE 3: Source of Payment</b>	<b>Frequency</b>
Public Insurance	241
Private Insurance	91
Self-Pay (Uninsured)	87
Other Payer	65
<b>Total</b>	<b>484</b>

of cases were paid through private insurance (n=91), 18% of patients were uninsured (n=87), and 13% had some other form of payment (n=65).

### Geographic Distribution of Firearm-Related Injuries

The geographic distribution of firearm-related injuries based on combined ED visits and hospitalizations were mapped based on the victim's ZIP code of residence. One quarter (26%) of all incidents between 2006 and 2008 occurred in four ZIP codes in Santa Ana (92701, 92703, 92704, & 92707; red shading) and two ZIP codes in Anaheim (92801 & 92805; red shading). Neighboring ZIP codes in central and northern Orange County denoted by the orange shading had the second highest range of incidents.



## Deaths

Firearm-related deaths are reported in the Orange County master death file and include cases (n=318) not reported in the ED or hospitalization data when the individual is pronounced in the field and not transported for care. A total of 436 persons died as a result of firearms between 2006 and 2008 for a yearly average of about 145.

The mechanism or cause of death for firearm-related incidents is presented in **Table 4**. The majority of deaths were due to intentional self-harm or suicide (61%, n=264). The second most common occurrences were intentional assaults or homicides which accounted for a third of firearm-related deaths (33%, n=144). Less common were firearm deaths related to legal interventions by law enforcement (6%, n=25), accidental discharges (n=1) and situations where the intent could not be determined (<1%, n=3).

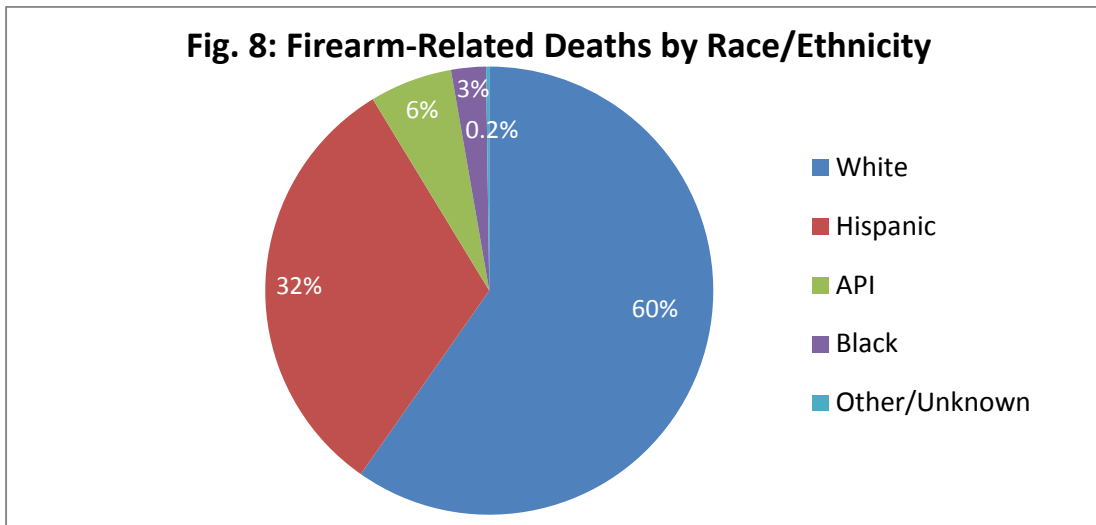
<b>Table 4: Cause of Death (ICD-10 Group)</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>Total</b>
Suicide by Firearm (X72-X74)	77	95	92	264
Assault/Homicide by Firearm (X93-X94)	55	45	44	144
Legal Intervention Involving Firearm Discharge (Y35.0)	8	10	7	25
Firearm Death - Undetermined Intent (Y22-Y24)	0	1	2	3
Accidental Discharge of Firearm (W32-W34)	0	1	0	1
<b>Total</b>	<b>140</b>	<b>151</b>	<b>145</b>	<b>436</b>

The mechanism of firearm-related death is presented by age group in **Table 5**. The majority (53%, n=138) of suicides by firearm were committed by middle aged persons (35-64 years) followed by seniors, 65 years and older (26%, n=68; see also ref. 4). Sixty percent of homicide victims were young adults 18 to 34 years (60%, n=86). Deaths due to legal intervention that involved firearms were equally divided between adults 18 to 34 and 35 to 64 year olds (48%, n=12).

**Table 5: Mechanism of Firearm-Related Death by Age Group**

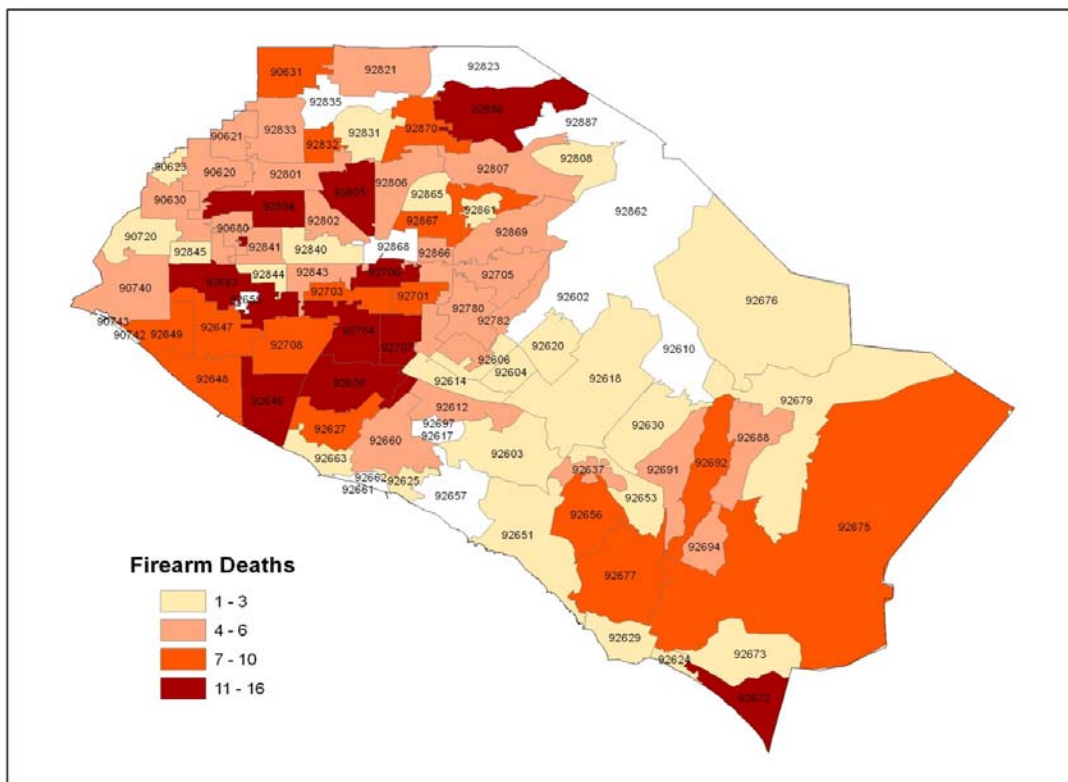
<b>Age Group</b>	<b>Accidental</b>	<b>Suicide</b>	<b>Homicides</b>	<b>Undetermined Intent</b>	<b>Legal Intervention</b>	<b>Totals</b>
0-17	0	1	21	0	0	22
18-34	0	56	86	1	12	155
35-64	1	138	31	2	12	184
65+	0	68	6	0	1	75
<b>Totals</b>	<b>1</b>	<b>263</b>	<b>144</b>	<b>3</b>	<b>25</b>	<b>436</b>

Non-Hispanic whites accounted for the majority (60%) of firearm-related deaths followed by Hispanics (32%), Asian/Pacific Islanders (6%) and blacks (3%; **Figure 8**).



**Geographic Distribution of Firearm-Related Deaths**

The geographic distribution of firearm-related deaths based on the 2006-2008 Orange County master death files were mapped based on the decedent’s ZIP code of residence. The highest number of cases occurred throughout the county including ZIP codes in Yorba Linda



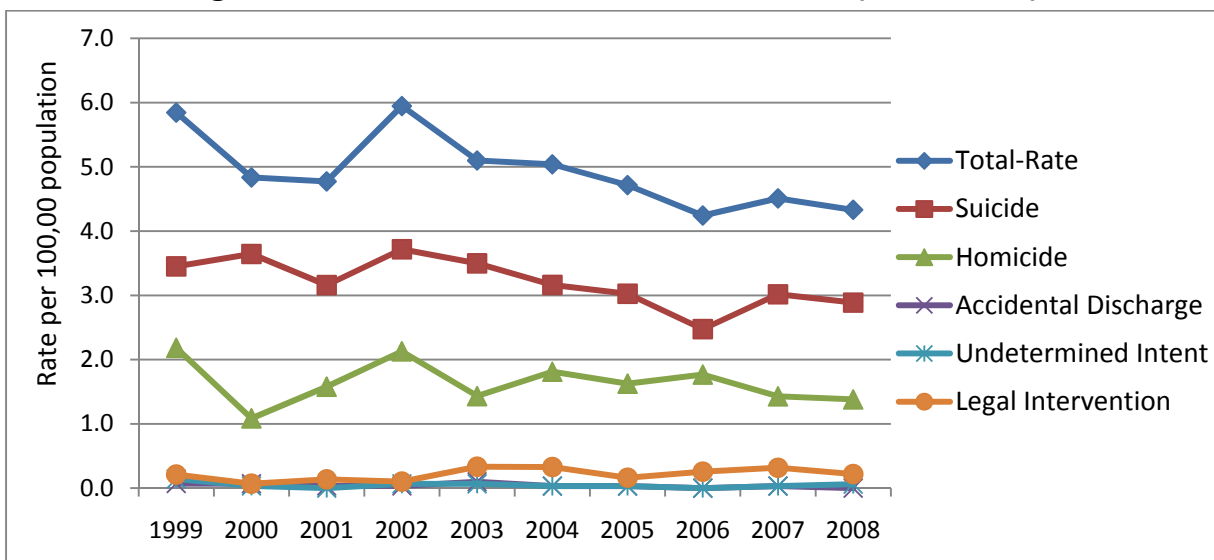
(92886) and Anaheim (92804 & 92805) in the north, Santa Ana (92704, 92706 & 92707) and Westminster (92683) in central county, Huntington Beach (92646) and Costa Mesa (92626) in west county, and San Clemente (92672) in south county.

Orange County’s firearm-related mortality rate, crude rate and age-adjusted rate (to control for the age of the county’s population) is markedly lower compared to neighboring counties and the state of California (**Table 6**).<sup>5</sup> Specifically, the county’s firearm-related death rate is 4.7 (per 100,000 population) and almost two-times lower than California’s rate. The state and all counties listed here are well above the Healthy People 2010 goal of 3.6.

<b>Table 6: Firearm-Related Mortality Comparison</b>	<b>Avg. Number of deaths/year (2006-2008)</b>	<b>Crude Death Rate</b>	<b>Age-Adjusted Death Rate</b>
Orange County	145.3	4.7	4.7
San Diego County	202.7	6.5	6.5
Riverside County	179.3	8.7	8.5
Los Angeles	1013.3	9.8	9.8
California	3,243.3	8.6	8.5
<i>Healthy People 2010</i>	-	-	3.6

The annual trends in firearm-related deaths for Orange County are presented in **Figure 9** for the period of 1999 through 2008. The overall rate of firearm-related deaths has decreased to 4.3 in 2008 from a peak of 5.9 in 2002 – a 27% decrease. Similarly, the rate of suicide by firearm has decreased by 22% during this same period. Importantly, the largest decline, 37%, was observed for homicides committed using firearms from a peak of 2.2 in 1999 to a low of 1.4 in 2008.

**Figure 9: OC Firearm-Related Death Trends (1999-2010)**



## **Conclusions**

About 560 people are injured by firearms in Orange County each year. On average about 160 are injured severely enough to require hospitalization and about 145 people per year are killed as a result of firearm injury. While the personal and economic losses associated with these incidents are difficult to measure, the cost associated with hospitalization averaged \$21.5 million per year, half of which were paid by public forms of insurance. Less severe injuries were typically the result of accidental discharges of firearms, while more serious, non-lethal injuries were the result of firearm assaults. Lethal firearm incidents were most often associated with suicide (61%) and homicides (33%). While the rate of firearm-related deaths has decreased over the past 10 years, the rate (4.7 per 100,000 in 2008) remains above the Healthy People 2010 goal of 3.6 deaths per 100,000 people. Efforts to identify those most at risk of intentional self-harm or suicide, and limiting their access to firearms, would help reduce this preventable loss of life. Firearm safety training could also reduce injuries and deaths obtained by accidental discharges.

## Data Sources

1. Office of Statewide Planning and Development. *2006 to 2008 Non-Public Emergency Department Data for Orange County, CA.*
2. Office of Statewide Planning and Development. *2006 to 2008 Non-Public Patient Discharge Data for Orange County, CA.*
3. Orange County Health Care Agency, Public Health Services. *2006 to 2008 Orange County Master Death Files.* Santa Ana, CA.
4. Self-Inflicted Injury and Suicide in Orange County – Based on 2005-2007 Emergency Department, Hospitalization and Death Records. OC Health Care Agency, QM Research and Planning, Santa Ana, CA, 2009. <http://ochealthinfo.com/docs/behavioral/SIIS.pdf>
5. California Department of Health Services and California Conference of Local Health Officers. *County Health Status Profiles 2010.* Sacramento, CA: California Department of Health Services, 2010.