

COUNTY OF SAN DIEGO EMERGENCY MEDICAL SERVICES



SAN DIEGO COUNTY TRAUMA SYSTEM REPORT

2016

County of San Diego
Board of Supervisors

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COUNTY OF SAN DIEGO EMERGENCY MEDICAL SERVICES

2016 TRAUMA SYSTEM REPORT

San Diego County Facts

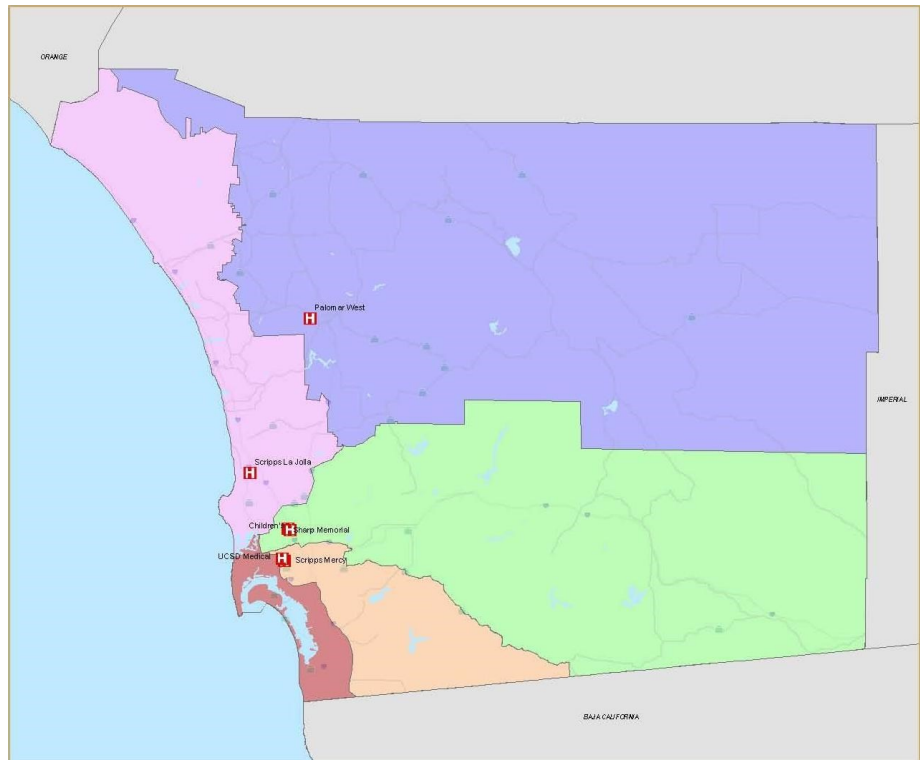
Population - 3,288,612
Square Miles - Over 4,200

Adult Trauma Centers

- Scripps Mercy Hospital
- Palomar Medical Center
- Scripps Memorial Hospital
- Sharp Memorial Hospital
- UCSD Medical Center

Pediatric Trauma Center

- Rady Children's Hospital



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San Diego County Trauma System Report, 2016

Introduction and *Live Well San Diego*

Introduction

In October 1983, with support and direction from the San Diego County Board of Supervisors, the Department of Health Services created an Ad Hoc Trauma Advisory Task Force to assist in the review and evaluation of the Hospital Council – Medical Society Trauma Plan. The advisory group of outside trauma experts conducted public hearings and informal sessions with hospital and prehospital trauma providers, and synthesized the experiences of other trauma systems into a single set of recommendations for the Department and the Board of Supervisors to consider. The recommendations urged the County to adopt trauma standards that closely approximated the American College of Surgeons' guidelines. The community consensus that emerged from their effort resulted in the formal adoption of their recommendations by the County Board of Supervisors in November 1983.

Once the trauma standards were adopted, the Department implemented a competitive selection process, seeking to designate five adult trauma centers and one pediatric trauma center. Designation criteria were incorporated in a Request for Proposal and the Ad Hoc Trauma Advisory Task Force became the Proposal Review Committee to evaluate and recommend hospitals for designation. Six facilities were awarded provisional designation status based on the quality of trauma services provided.

On August 1, 1984, after 16 months of direct preparation, major trauma victims in San Diego County began bypassing community hospitals in favor of designated trauma centers.

The purpose of this annual report is to describe the San Diego County Trauma System with regards to various aspects of data, including patient volume, patient demographics, mechanisms of injury, and patient outcomes.

Live Well San Diego and Trauma

Live Well San Diego is a regional vision adopted by the San Diego County Board of Supervisors in 2010 that aligns the efforts of County government, community partners and individuals to help all San Diego County residents be healthy, safe, and thriving. The vision includes three components. *Building Better Health*, adopted on July 13, 2010, focuses on improving the health of residents and supporting healthy choices; *Living Safely*, adopted on October 9, 2012, focuses on protecting residents from crime and abuse, making neighborhoods safe, and supporting resilient communities; and, *Thriving*, adopted on October 21, 2014, focuses on cultivating opportunities for all people to grow, connect and enjoy the highest quality of life.

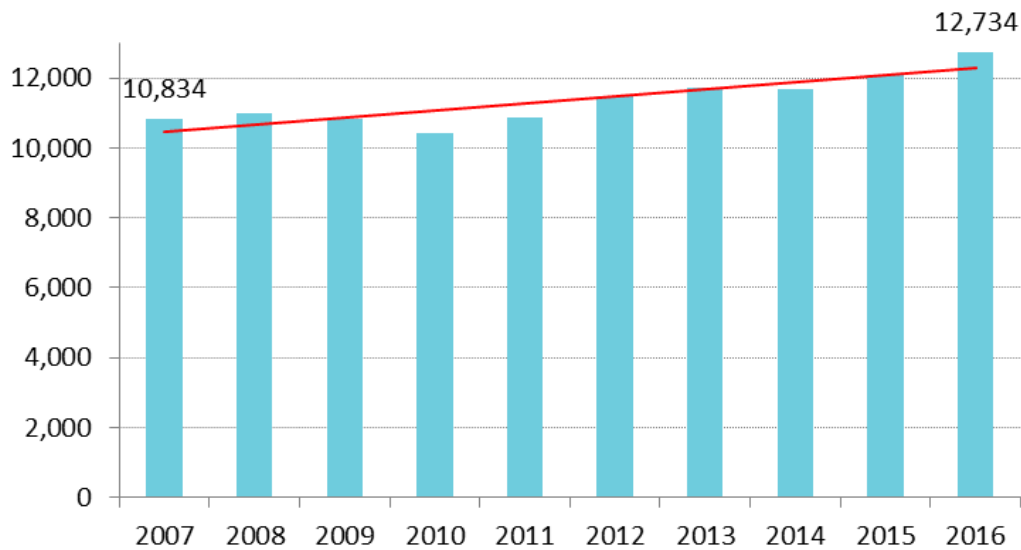
Healthcare and services organizations are working together to improve access and quality of care for local residents. Healthcare providers are implementing innovative strategies to reduce hospital readmissions for our most vulnerable populations and integrating behavioral health services into primary care to improve patient outcomes and reduce the stigma of mental illness. They are also adopting workplace wellness practices to achieve a healthy bottom line for our region. Services organizations are working with the County to implement nutrition education programs for low income families and to help families navigate through complex systems to gain access to needed services.

This San Diego County Trauma System Report contributes to the Live Well San Diego vision by reporting the incidence of traumatic injuries with the goal of injury and violence prevention in support of a healthy, safe and thriving region.

San Diego County Trauma System Report, 2016

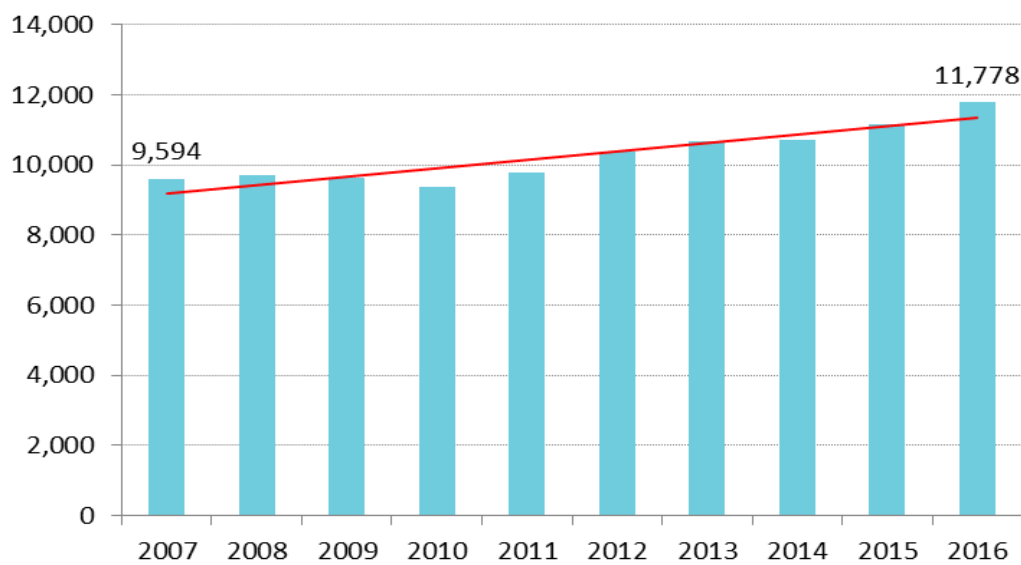
Trauma System Overview Patient Volume

A Decade of Trauma



Over the last decade the San Diego County Trauma System has witnessed a 17.5% increase in total trauma volume and an 22.8% increase in trauma volume at the adult trauma centers. Over that same time period, the County of San Diego has experienced a 9.7% increase in population.

Trauma Volume, Adult Trauma Centers



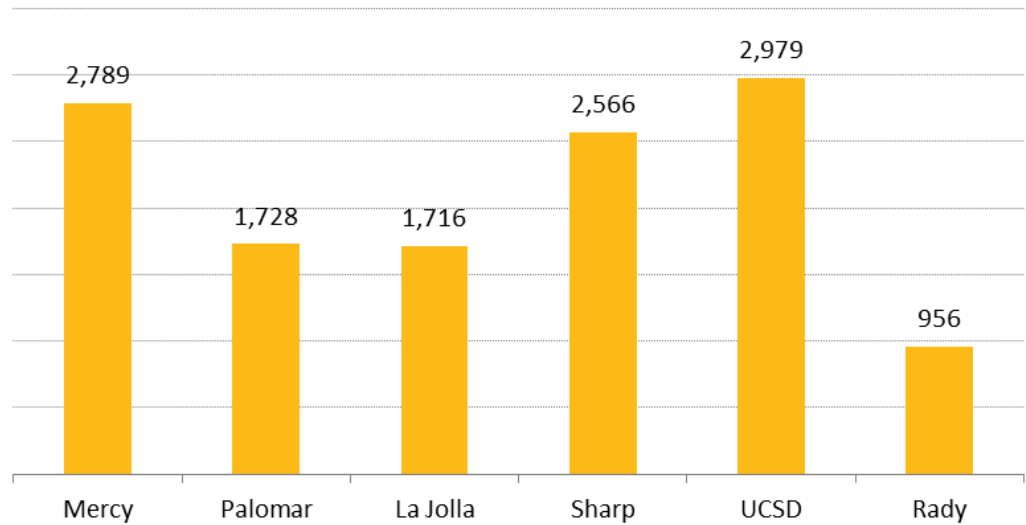
Source of all data: County of San Diego, Health and Human Services Agency, Emergency Medical Services, Trauma Registry, 2016.

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Trauma System Overview Patient Volume

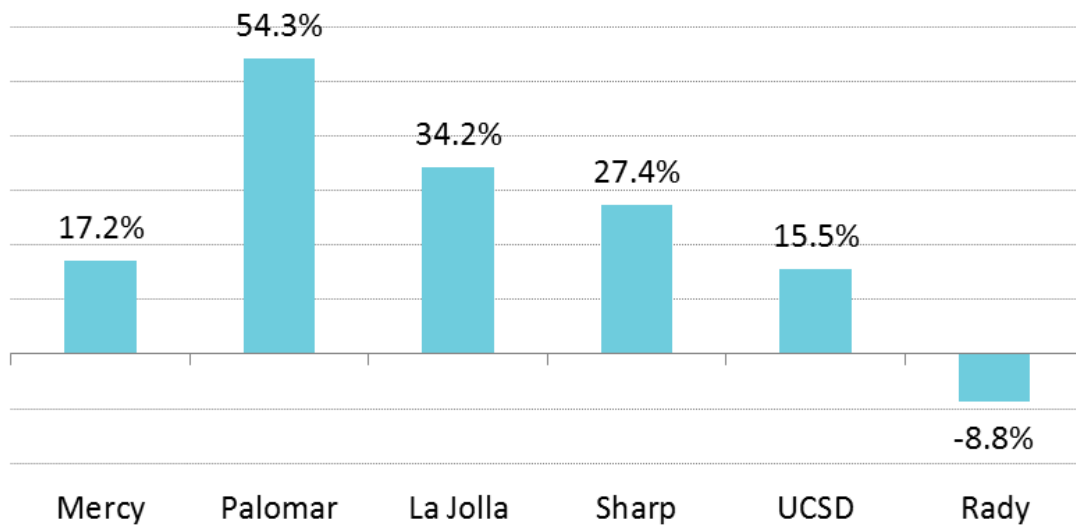
In 2016, there were 12,734 total patients treated in the San Diego County Trauma System, with most centers experiencing annual volume growth compared to 2015.

Total Trauma Volume by Trauma Center, 2016



All adult trauma centers experienced a six-year increase in total volume, with Palomar having the largest increase. However, Rady Children's experienced an 8.8% decrease in trauma volume over the last six years.

Six Year Change in Trauma Volume, 2010-2016



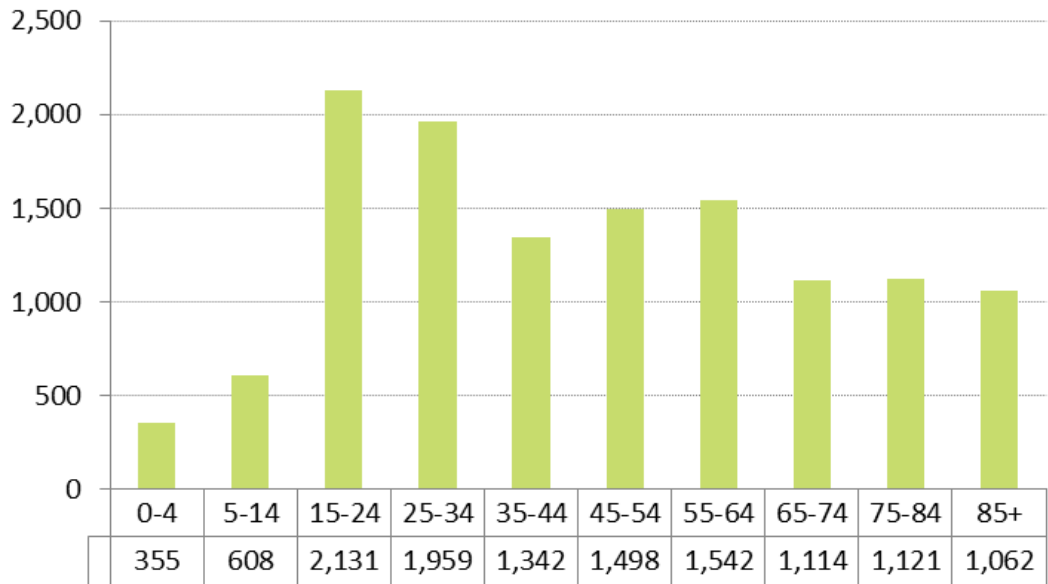
Source of all data: County of San Diego, Health and Human Services Agency, Emergency Medical Services, Trauma Registry, 2016.

San Diego County Trauma System Report, 2016

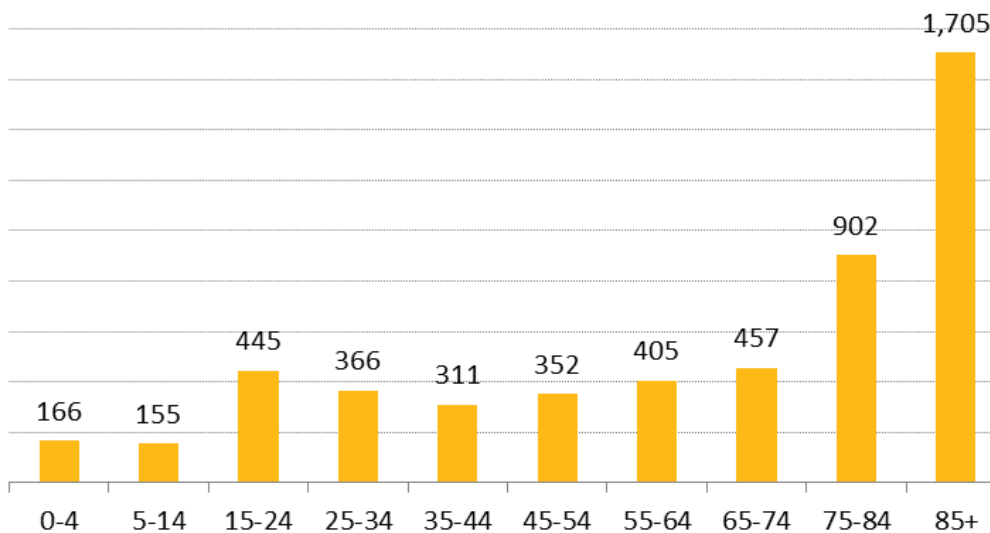
Trauma System Overview Patient Volume—Age Groups

Trauma Patients by Age Group, 2016

In 2016, 55.4% of trauma patients were aged 15 to 54 years.



Trauma Patient Rate* by Age Group



Although the majority of injuries occur in younger age groups, those 85 years and older are at a much higher risk of traumatic injury compared to other age groups.

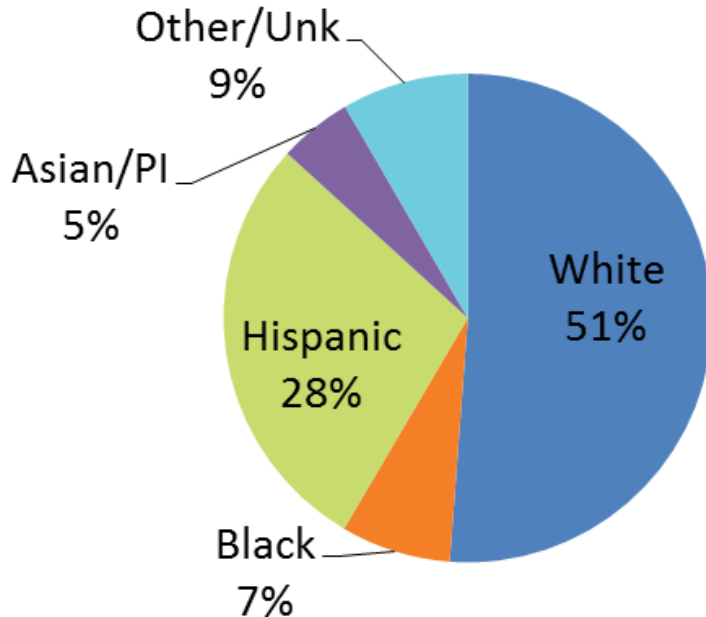
*Rate per 100,000 people.

Source of all data: County of San Diego, Health and Human Services Agency, Emergency Medical Services, Trauma Registry, 2016.

San Diego County Trauma System Report, 2016

Trauma System Overview Patient Volume—Race/Ethnicity

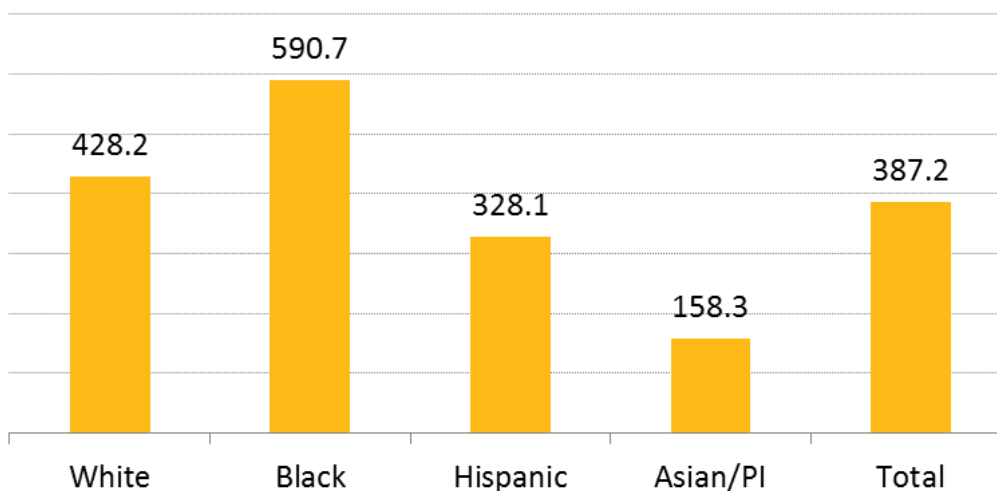
Trauma Patients by Race/Ethnicity Percent



In 2016, 51% of trauma patients were white, with Hispanics (28%) making up the next largest race/ethnicity.

In 2016, Asians/Pacific Islanders had the lowest rate of traumatic injury at about 158 injuries per 100,000 people.

Trauma Patients by Race/Ethnicity Rate*



Blacks are at higher risk of traumatic injury compared to other race/ethnicities, with about 591 injuries occurring for every 100,000 people.

*Rate per 100,000 people.

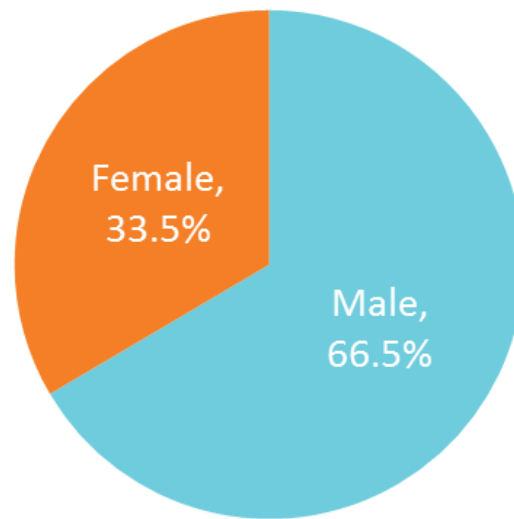
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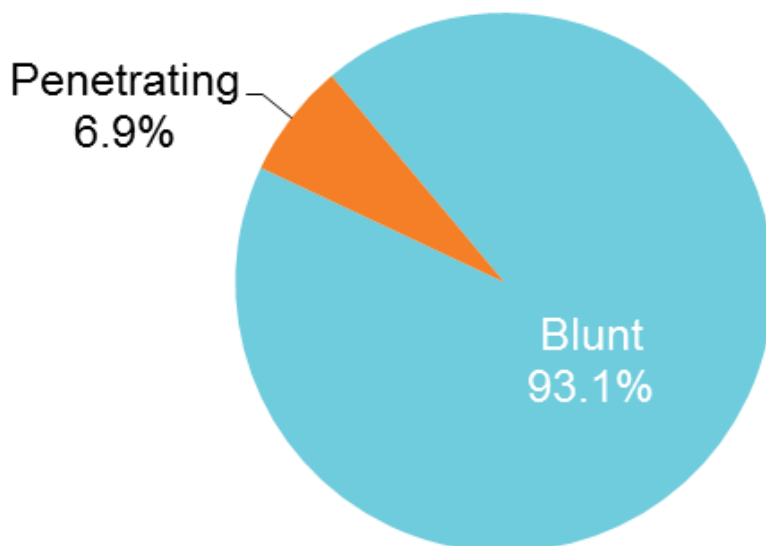
Trauma System Overview Patient Volume—Gender and Injury Type

Percent of Trauma Patients by Gender, 2016

In 2016, male trauma patients outnumbered females by about two to one. This has been a consistent trend for many years.



Percent of Trauma Patients by Injury Type



Similar to previous years, patients with blunt injuries outnumbered those with penetrating injuries by more than ten to one.

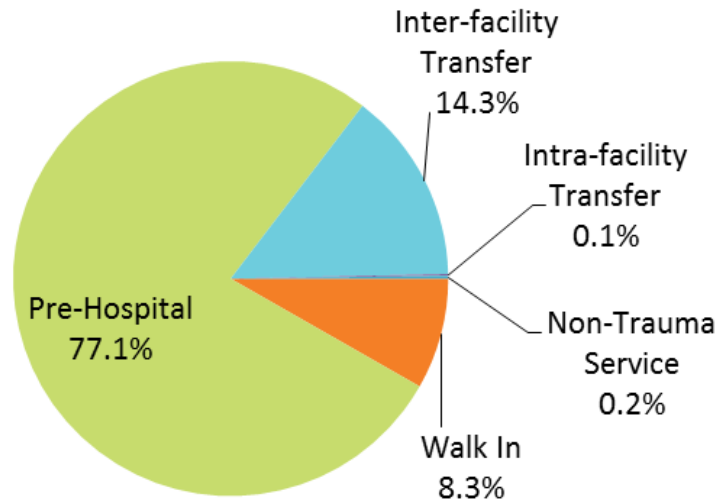
Source of all data: County of San Diego, Health and Human Services Agency, Emergency Medical Services, Trauma Registry, 2016.

San Diego County Trauma System Report, 2016

Trauma System Overview Patient Volume—System Access and Discharge Month

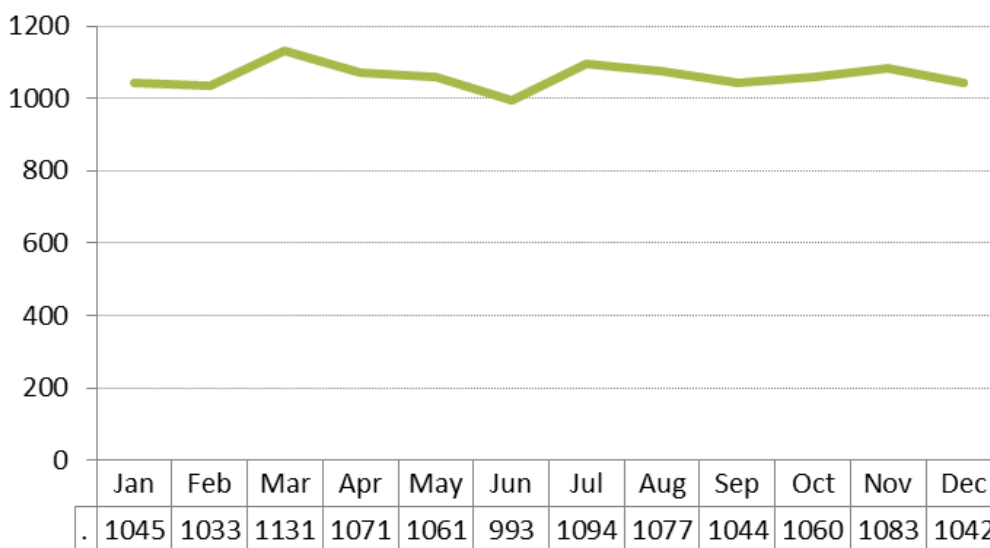
Trauma Patients by Method of System Access

In 2016, there were 9,820 patients delivered directly to trauma centers by pre-hospital, 1,819 inter-facility transfers, and 1,051 walk-ins. This distribution of trauma patients is similar to 2015.



In 2016, the San Diego County Trauma System did not experience the usual surge in patient volume during the summer months, as seen in many previous years.

Trauma Patients by Discharge Month, 2016



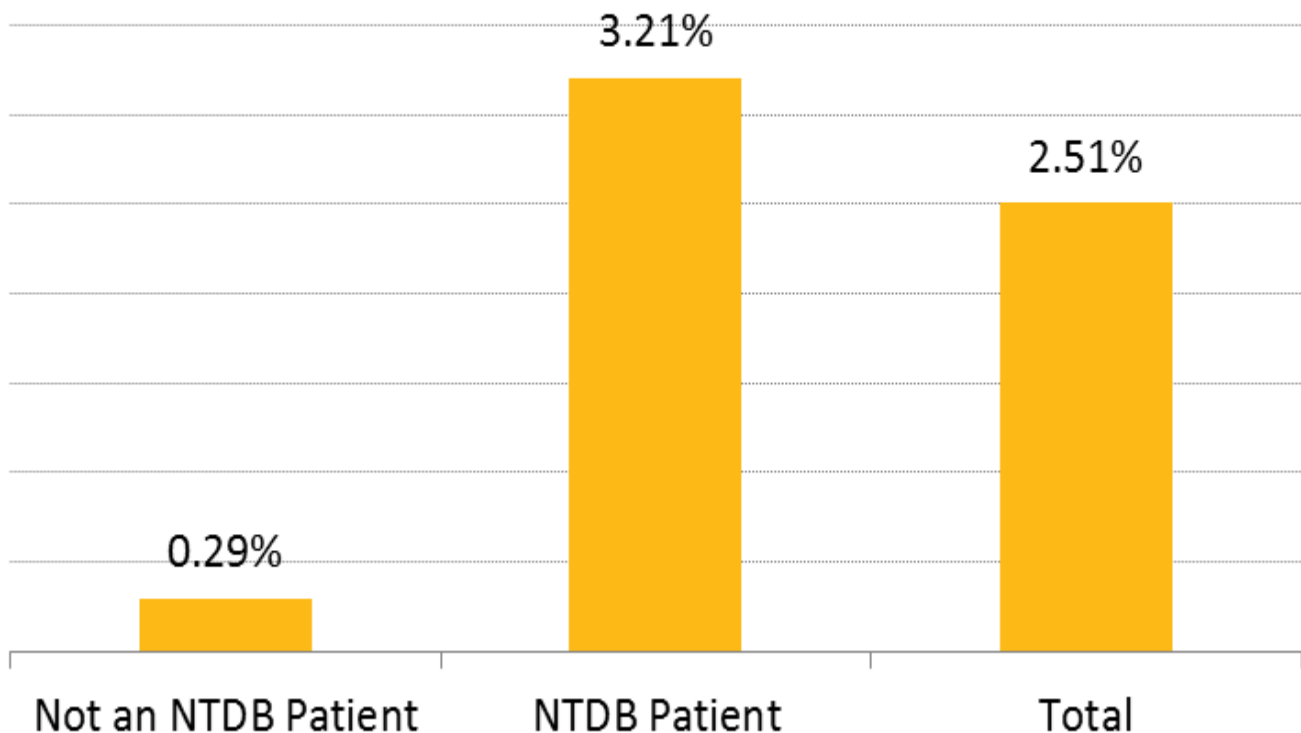
Source of all data: County of San Diego, Health and Human Services Agency, Emergency Medical Services, Trauma Registry, 2016.

San Diego County Trauma System Report, 2016

Trauma System Overview Mortality Rates

In 2016, the overall mortality rate of the San Diego County Trauma System was 2.5%. For those patients who qualified for the National Trauma Data Bank, the mortality rate was 3.2%.

2016 Trauma Patient Mortality Rates



NTDB: National Trauma Data Bank. Some patients treated at San Diego County Trauma Centers do not meet criteria for NTDB inclusion.

Note: Mortality rates are calculated using traumatic deaths that were treated at trauma centers. For a more complete report on traumatic deaths in San Diego County, including those dead on scene, please refer to the San Diego County Medical Examiner Annual Report available at: www.sandiegocounty.gov/me/.

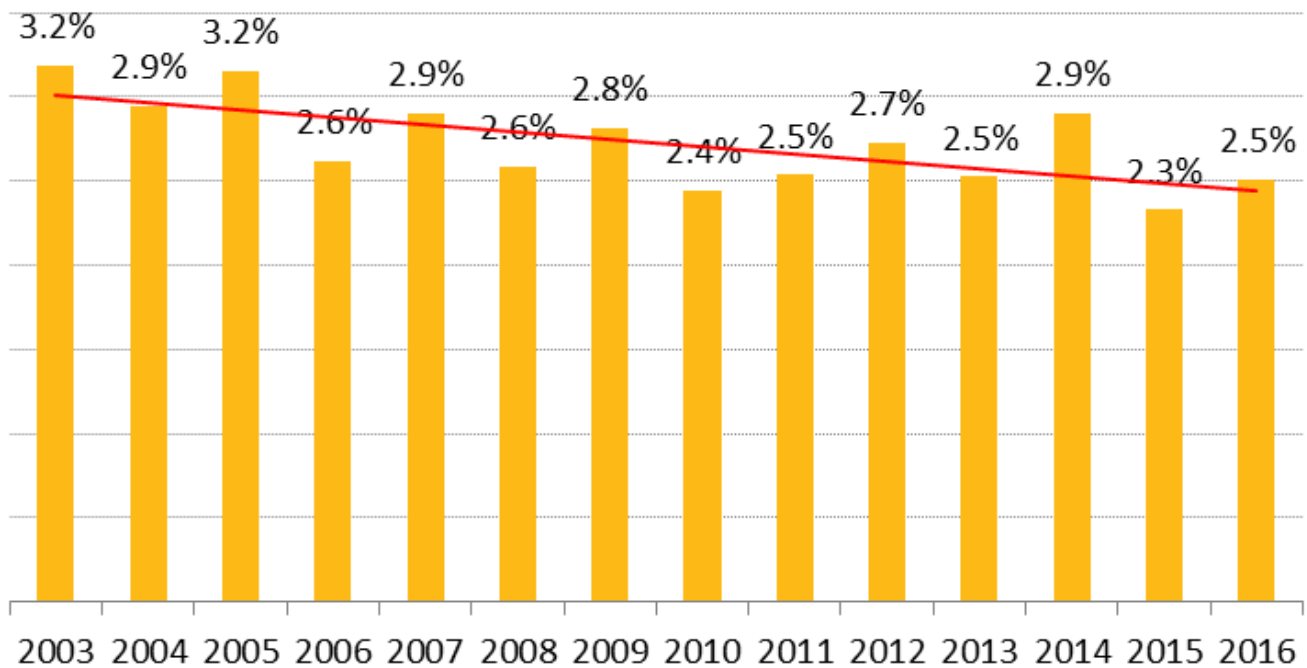
Source of all data: County of San Diego, Health and Human Services Agency, Emergency Medical Services, Trauma Registry, 2016.

San Diego County Trauma System Report, 2016

Trauma System Overview Mortality Rate Trends

Mortality rate trends have steadily decreased as the San Diego County Trauma System has matured. The 2016 mortality rate of 2.5% continues this overall descending trend.

Mortality Rates, 2003 - 2016

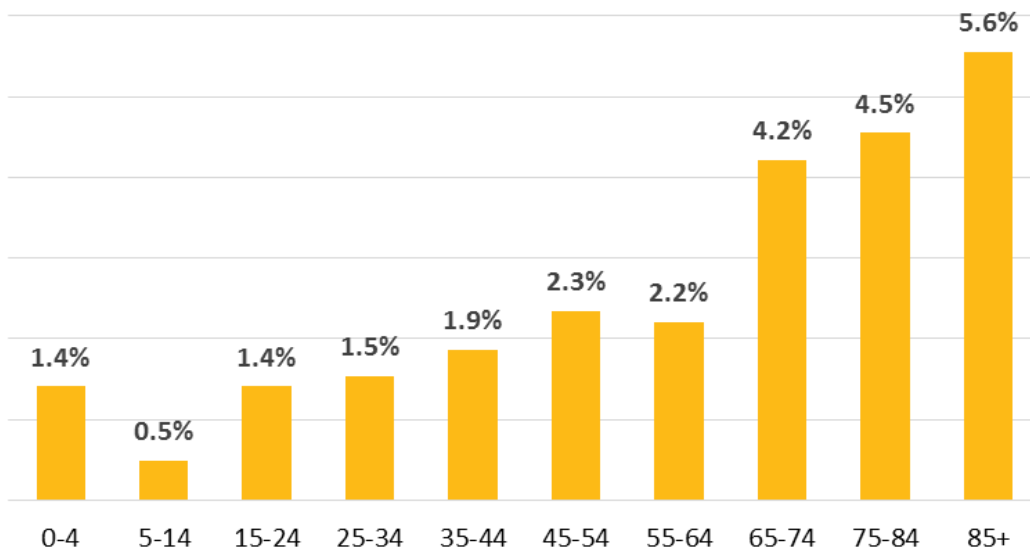


Source of all data: County of San Diego, Health and Human Services Agency, Emergency Medical Services, Trauma Registry, 2016.

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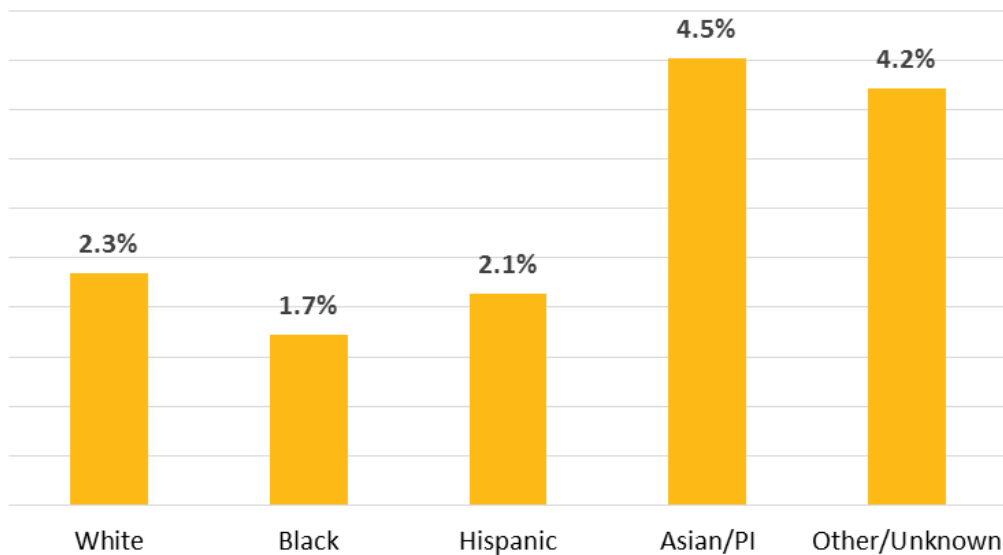
Mortality Rates and Demographics

Mortality Rate by Age Group, 2016



Age is an important factor associated with survival in almost all causes of death. This is demonstrated fully in trauma as we see increased mortality rates as patient age increases.

Mortality Rate by Race/Ethnicity



While Asian/Pacific Islanders had the lowest incidence of traumatic injury in 2016, they actually had the highest mortality rate. Conversely, blacks had the highest incidence of traumatic injury with the lowest mortality rate.

Source of all data: County of San Diego, Health and Human Services Agency, Emergency Medical Services, Trauma Registry, 2016.

San Diego County Trauma System Report, 2016

Mechanism of Injury—Age Groups

Top Five Trauma Mechanisms by Age Group					
Age	1	2	3	4	5
0 - 4	Falls	MV Traffic	Pedestrian	Assault	Oth Trans
	207	44	35	25	10
5 - 14	Falls	Pedestrian	MV Traffic	Pedalcycle	Motorcycle
	163	126	120	47	37
15 - 24	MV Traffic	Assault	Motorcycle	Falls	Pedestrian
	697	348	295	227	169
25 - 34	MV Traffic	Assault	Motorcycle	Falls	Pedestrian
	516	410	336	249	119
35 - 44	MV Traffic	Assault	Falls	Motorcycle	Pedalcycle
	318	264	243	163	77
45 - 54	Falls	MV Traffic	Assault	Motorcycle	Pedalcycle
	409	283	196	163	123
55 - 64	Falls	MV Traffic	Assault	Pedalcycle	Motorcycle
	625	251	139	126	123
65 - 74	Falls	MV Traffic	Pedalcycle	Pedestrian	Motorcycle
	666	175	57	50	41
75 - 84	Falls	MV Traffic	Pedestrian	Oth Trans	Assault
	893	121	31	13	12
85+	Falls	MV Traffic	Pedestrian	Assault	Oth Trans
	913	67	24	4	2
Total	Falls	MV Traffic	Assault	Motorcycle	Pedestrian
	4595	2593	1447	1166	806

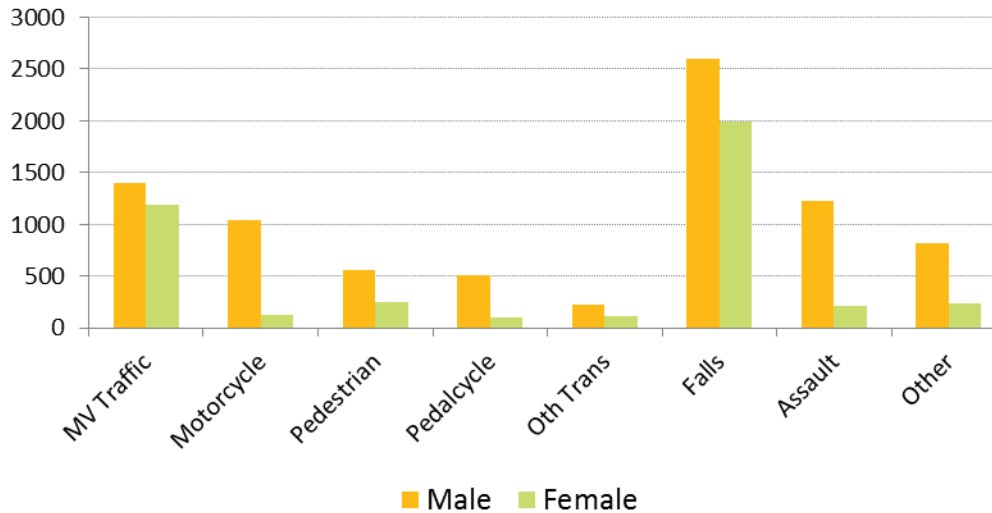
In 2016, falls accounted for 36% of all causes of injury in the San Diego County Trauma System. Additionally, falls are the number one cause of injury in each age group, other than those aged 15 to 44 years.

Source of all data: County of San Diego, Health and Human Services Agency, Emergency Medical Services, Trauma Registry, 2016.

San Diego County Trauma System Report, 2016

Mechanism of Injury—Gender and Race/Ethnicity

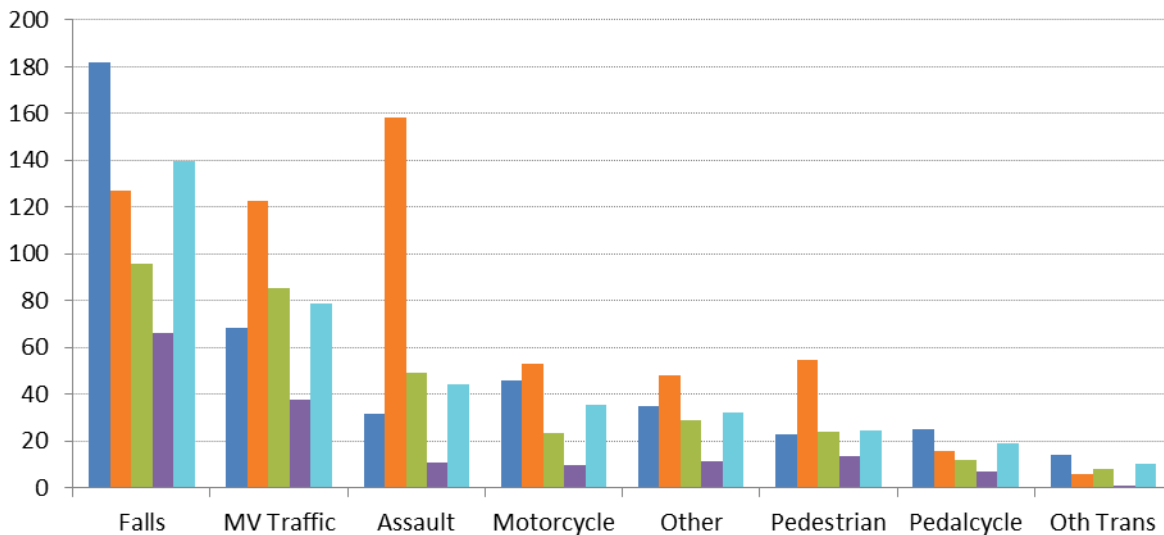
Mechanism of Injury by Gender, 2016



Other than motor vehicle traffic injuries, males substantially exceeded females in all other causes of injury. The largest differences occurred in motorcycle, pedalcycle, and assault injuries.

While whites had the highest risk of fall-related injuries and pedalcycle injuries, blacks had the highest rate for motor vehicle injuries, assault injuries, motorcycle injuries, pedestrian injuries, and other uncategorized injuries. Asians and Pacific Islanders had a very low rate of fall-related injuries and other mechanisms in general.

Mechanism of Injury Rate* by Race/Ethnicity, 2016



*Rate per 100,000 people. Legend: White (blue), Black (orange), Hispanic (green), Asian/PI (purple), Total (light blue)

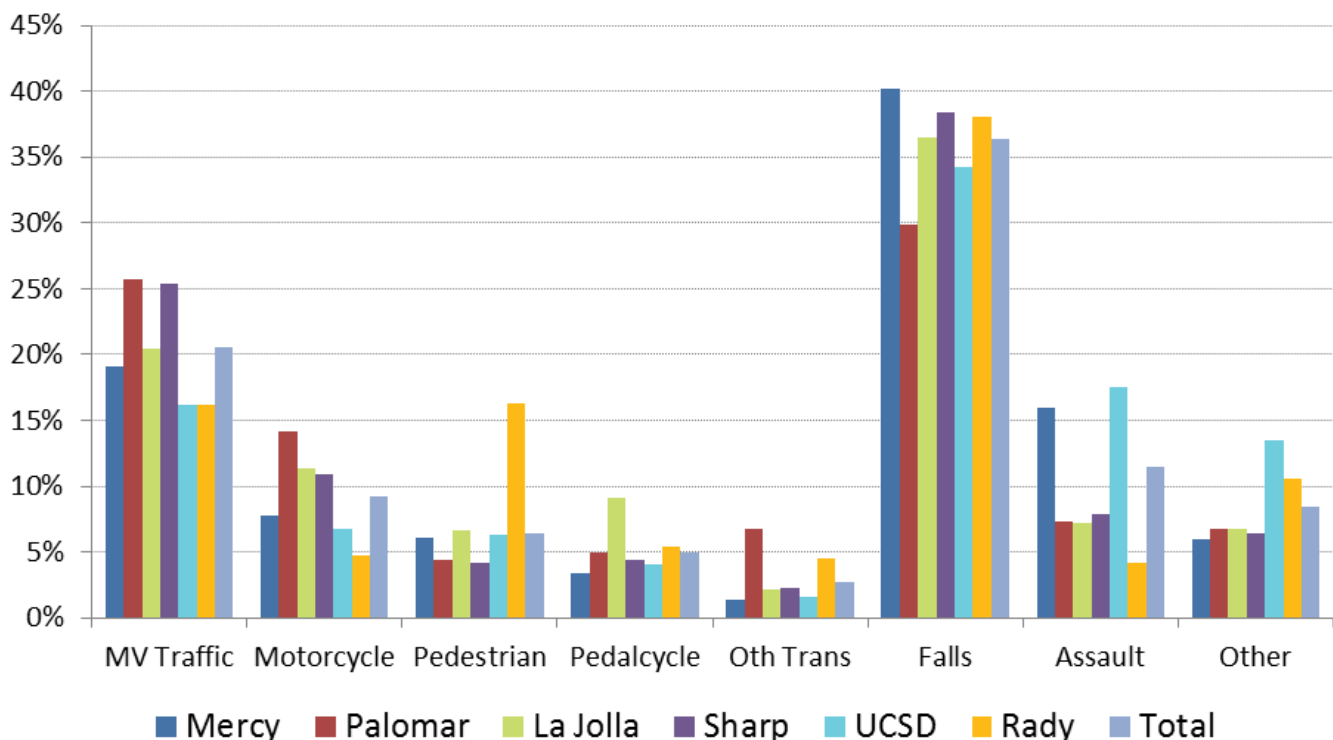
Source of all data: County of San Diego, Health and Human Services Agency, Emergency Medical Services, Trauma Registry, 2016.

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Mechanism of Injury—Trauma Centers

In 2016, 26% of Palomar Medical Center’s traumatic injuries were from motor vehicle injuries and 14% were from motorcycle injuries, which were higher than other trauma centers. At 16%, Rady Children’s experienced a higher percent of pedestrian injuries than other centers, and Scripps La Jolla had the highest percent of pedalcycle injuries. UCSD and Scripps Mercy had the highest percent of assault injuries. For each trauma center, fall-related injuries represented the highest percent of patients

Percent of Injuries by Trauma Center and Mechanism, 2016

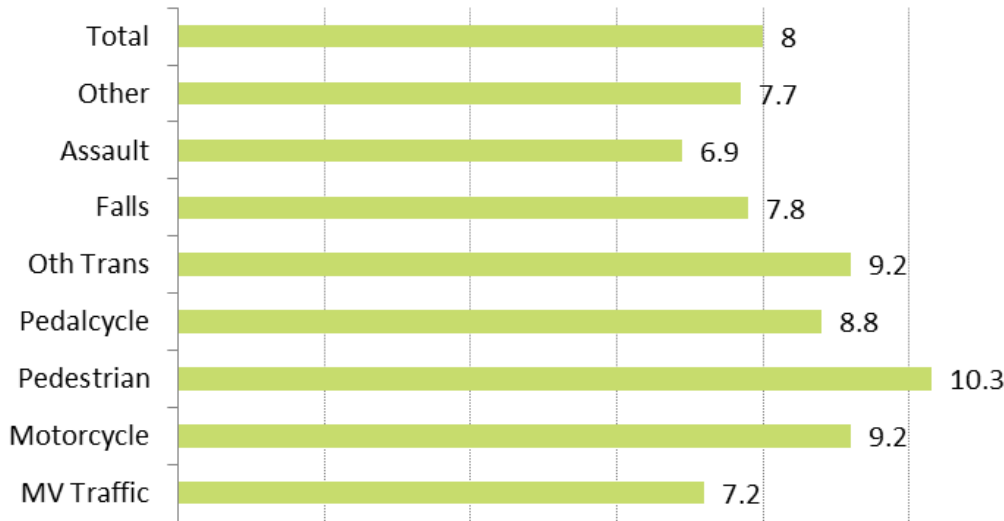


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Mechanism of Injury—Injury Severity and Length of Stay

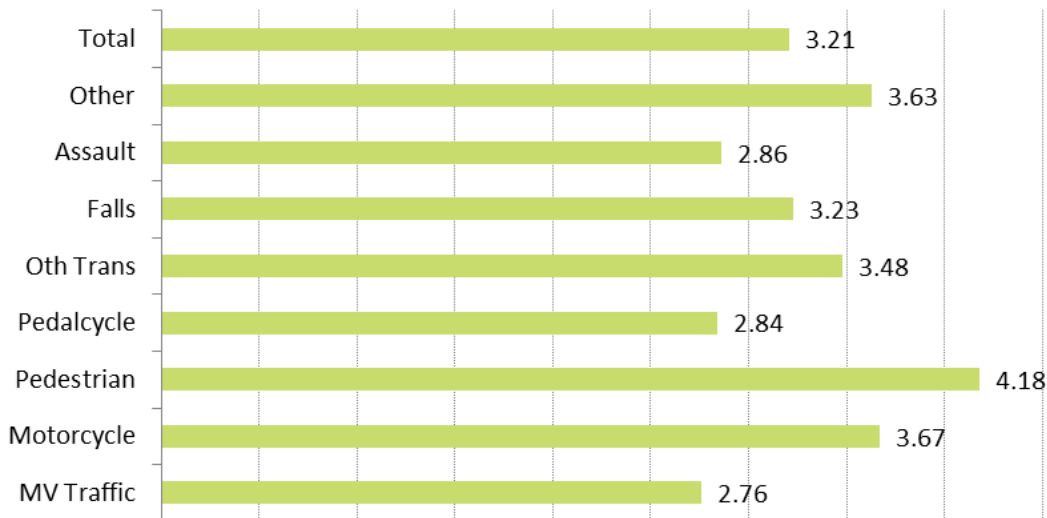
Mechanism of Injury by Mean ISS*



Pedestrian injuries were the most severe, while motor vehicle traffic and assault injuries were among the least severe mechanisms of injury. The total average injury severity score was 8.0.

*ISS: Injury Severity Score.

Mechanism of Injury by Mean Length of Stay in Days



Being the most severe, pedestrian injuries also led to the longest lengths of stay. The shortest lengths of stay were from motor vehicle traffic, pedalcycle and assault injuries. The overall mean length of stay was 3.21 days.

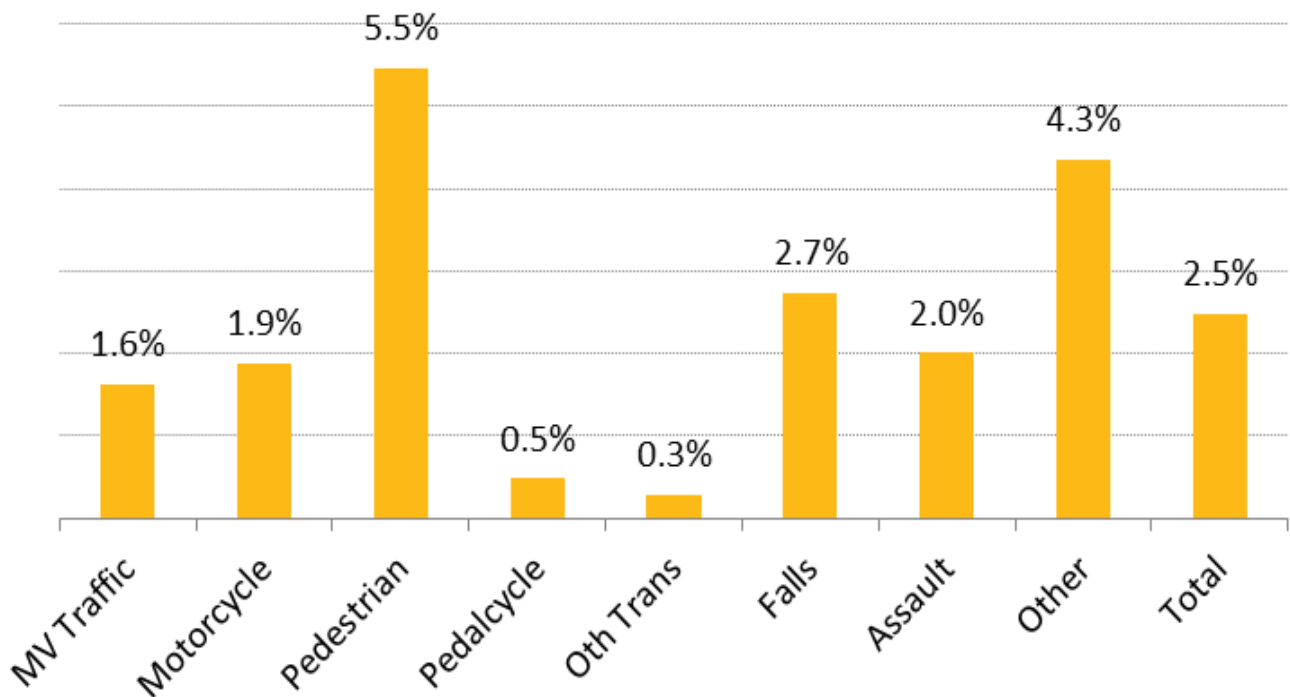
Source of all data: County of San Diego, Health and Human Services Agency, Emergency Medical Services, Trauma Registry, 2016.

San Diego County Trauma System Report, 2016

Mechanism of Injury—Mortality Rates

In 2016, mortality rates differed greatly by mechanism of injury. About 5.5% of pedestrian injury patients who made it to a trauma center did not survive their injuries. Conversely, only one in 200 pedalcycle injury patients died. About one in 37 fall-related injury patients died. This is an important number to track as fall-related injuries continue to increase in San Diego County. The fall-related mortality rate was 3.1% in 2014 and 2.6% in 2015.

Mortality Rate by Mechanism of Injury, 2016



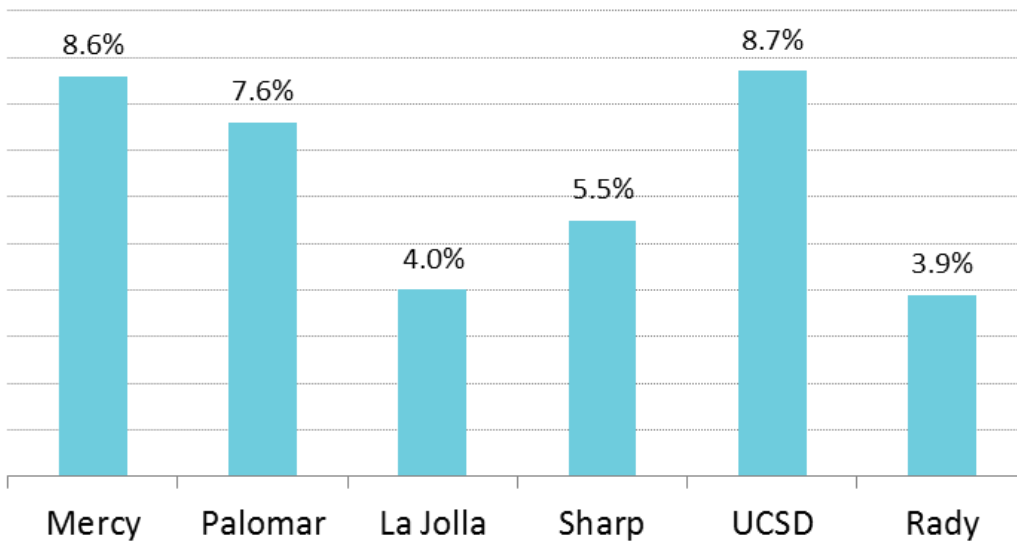
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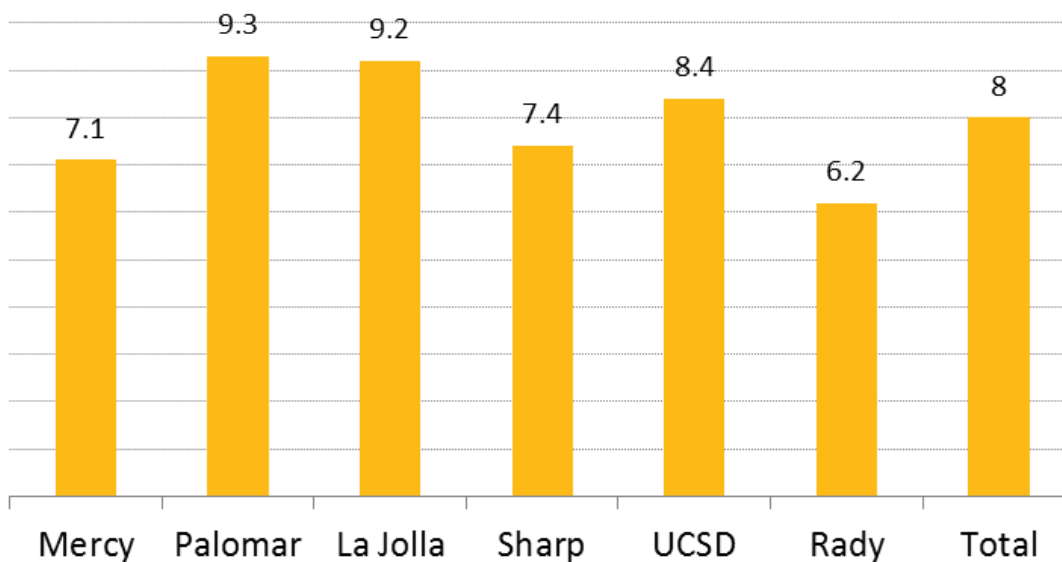
Injury Type and ISS by Trauma Center

Percent Penetrating by Trauma Center, 2016



Mercy, Palomar, and UCSD had the highest percent of penetrating injuries. Of the adult centers, Scripps La Jolla and Sharp had the lowest percent of penetrating injuries, while Rady Children's had the lowest overall.

Mean ISS* by Trauma Center, 2016



Among the adult trauma centers, Palomar and Scripps La Jolla had the highest mean ISS with Scripps Mercy and Sharp having the lowest. Rady Children's had the lowest overall mean ISS.

*ISS: Injury Severity Score.

Source of all data: County of San Diego, Health and Human Services Agency, Emergency Medical Services, Trauma Registry, 2016.

Directory

County of San Diego, Emergency Medical Services
6255 Mission Gorge Road, San Diego, CA. 92120 - (619) 285-6429

RADY CHILDREN'S HOSPITAL SAN DIEGO
3020 Childrens Way, San Diego, CA 92123 - (858) 576-1700

SCRIPPS MERCY HOSPITAL
4077 Fifth Avenue, San Diego, CA 92103 - (619) 294-8111

PALOMAR MEDICAL CENTER
2185 Citracado Parkway, CA 92029 - (442) 281-5000

SCRIPPS MEMORIAL HOSPITAL, LA JOLLA
9888 Genesee Avenue, La Jolla, CA 92037 - (858) 457-4123

SHARP MEMORIAL HOSPITAL
7901 Frost Street, San Diego, CA 92123 - (858) 541-3400

UNIVERSITY OF CALIFORNIA, SAN DIEGO MEDICAL CENTER
200 West Arbor Drive, San Diego, CA 92103 - (619) 543-6222