Motor Vehicle Collisions

What is a Motor Vehicle Collision?

A motor vehicle collision is an unintended event involving a motor vehicle in transport, whether moving or ready to move, that cause death, injury, or property damage on a public road.[1] Among unintentional injuries, motor vehicle collisions were one of the top three causes of death among people aged 5-44 years old in 2020.[2] There were close to 41,000 deaths from vehicle collisions in 2020, which amounted to $430 billion from medical cost and cost estimates for lives lost.[3] Globally, around 1.35 million people (approximately 3,740 people every day) are fatally wounded, and 20-50 million people are injured in motor vehicle collisions every year.[4] In 2019, there were 3,737 people killed and 269,031 people injured from motor vehicle collisions in California.[5]

Risk Factors for Motor Vehicle Collisions

Demographic Risk Factors

- *Age*
  - In 2021, 20-34-year-olds in the United States had the highest rates of being involved in a motor vehicle collision, followed by 35-69-year-olds. Children younger than 13 years old were least likely to be involved in a motor vehicle collision resulting in death compared to other age groups.[6]
  - Death rates due to motor vehicle collisions increase as the child seat age requirement decreases.[7]
    - Counties with a higher age requirement for occupying child/boosters have fewer youth death rates compared to counties with a lower age requirement.[7]
  - Newly licensed teens are most vulnerable to motor vehicle collisions due to driver inexperience and the transition to independent driving.[8-10]
  - For every 1,000 motor vehicle collisions, older adults ages 70 and older have higher death rates compared to middle-aged adults ages 34-54.[11]

- *Race/Ethnicity*
  - In the United States, Non-Hispanic American Indian/Alaska Native (AIAN) and Non-Hispanic Black Americans had higher death rates due to motor vehicle collisions (24.0 per 100,000 population and 18.1 per 100,000 population, respectively), compared to Non-Hispanic White (12.2 per 100,000) Americans in 2020.[7]

- *Sex*
  - In the United States, males had higher death rates due to motor vehicle collisions than females (18.1 per 100,000 population and 6.7 per 100,000 population, respectively) at all ages in 2020.[6]

Social and Behavioral Risk Factors

- *Location*
  - In the United States, motor vehicle collisions to pedestrians are more likely to happen in areas further from an intersection.[12]
    - There are more objects that help reduce speed and make drivers more aware of their surroundings in an intersection, such as stop signs, stop lights, and crosswalks.
  - Children living in rural areas are more likely to be killed in the event of a motor vehicle collision.[7]
    - Seat belts and child car seats are used more in urban areas.
  - Most pedestrian deaths due to motor vehicle collisions happen in urban areas.[12]
    - Population is denser in urban areas, increasing the likelihood that a collision would happen, compared to rural areas where there is less traffic and people are more spread out.

- *Alcohol Use*
  - A driver with a blood alcohol concentration (BAC) of more than 0.08 grams per deciliter (g/dL) is considered alcohol-impaired in the United States.[13]
  - In 2020, 3 out of 10 motor vehicle collision fatalities in the United States involved an alcohol-impaired driver.[13]

- *Drug Abuse*
  - Both illicit and prescription drugs can impair an individual.[14]
  - Drug usage may double the driver's risk of being involved in a motor vehicle collision in the United States.
  - The risk of being in a motor vehicle collision is more pronounced when using drugs and alcohol in combination.[14]

- *Seat Belt Use*
  - Seat belts reduce collision-related injuries and deaths by half.[16]
  - Seat belts were designed to:
    - Keep you upright and close to your seat.
    - Slow your body from hitting another object in the case of a motor vehicle collision.

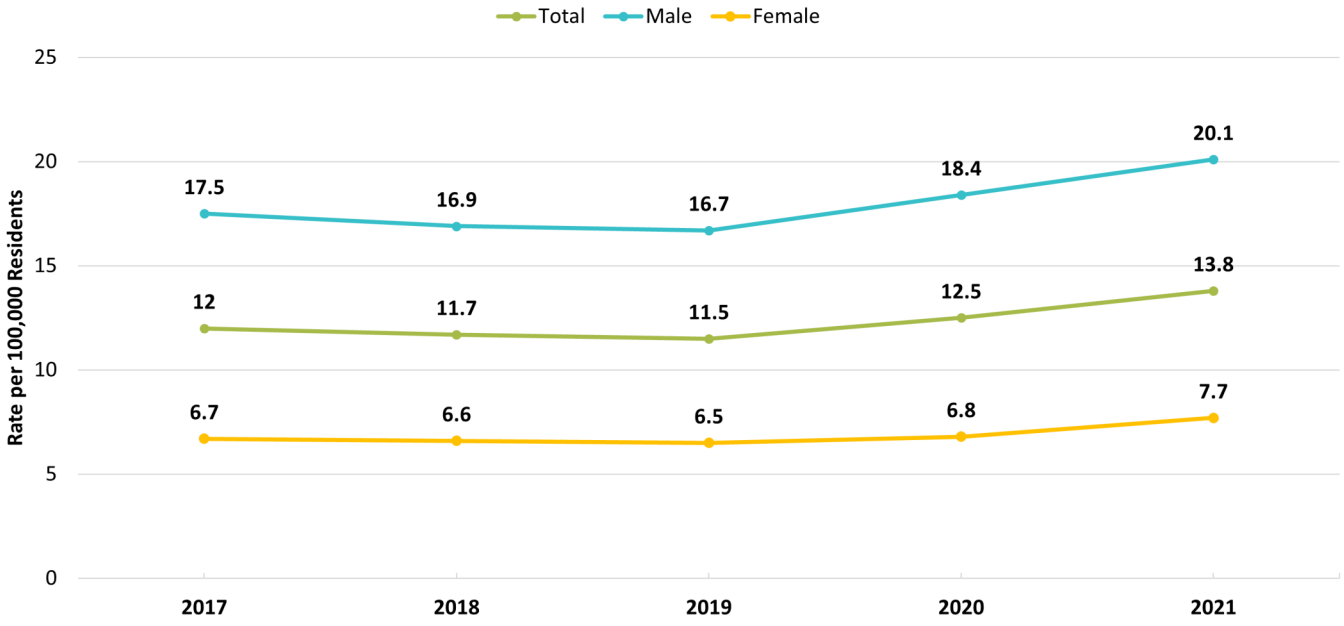
- *Nighttime Driving*
  - In 2019, most pedestrian deaths due to motor vehicle collisions happened at night in the United States.[12,17]
    - 46% of collision deaths happened between 6pm and 3am.[6,]

- *Speeding*
  - Speeding is driving a motor vehicle at a speed that is too fast for conditions, racing or exceeding the speed limit.[6]
  - Higher vehicle speeds increase likelihood of a pedestrian being struck by a motor vehicle.[18,19]
  - Over the past decade, speeding had been a factor in 1 of 4 motor collision deaths in the United States.[6]

National Statistics and Disparities

- In 2021, more than 40,000 people died due to motor vehicle collisions in the United States.[6]

Motor Vehicle Injuries*: Age-Adjusted Death Rates, United States, 2017-2021**



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**Age-adjusted rates per 100,000 2000 US standard population.
Source: Centers for Disease Control and Prevention, National Center for Health Statistics. National Vital Statistics System, Mortality 2000-2020 and Mortality 2018-2021 on CDC WONDER Online Database, released in 2021.The COVID-19 pandemic was associated with increases in all-cause mortality. COVID-19 deaths have affected the patterns of mortality.

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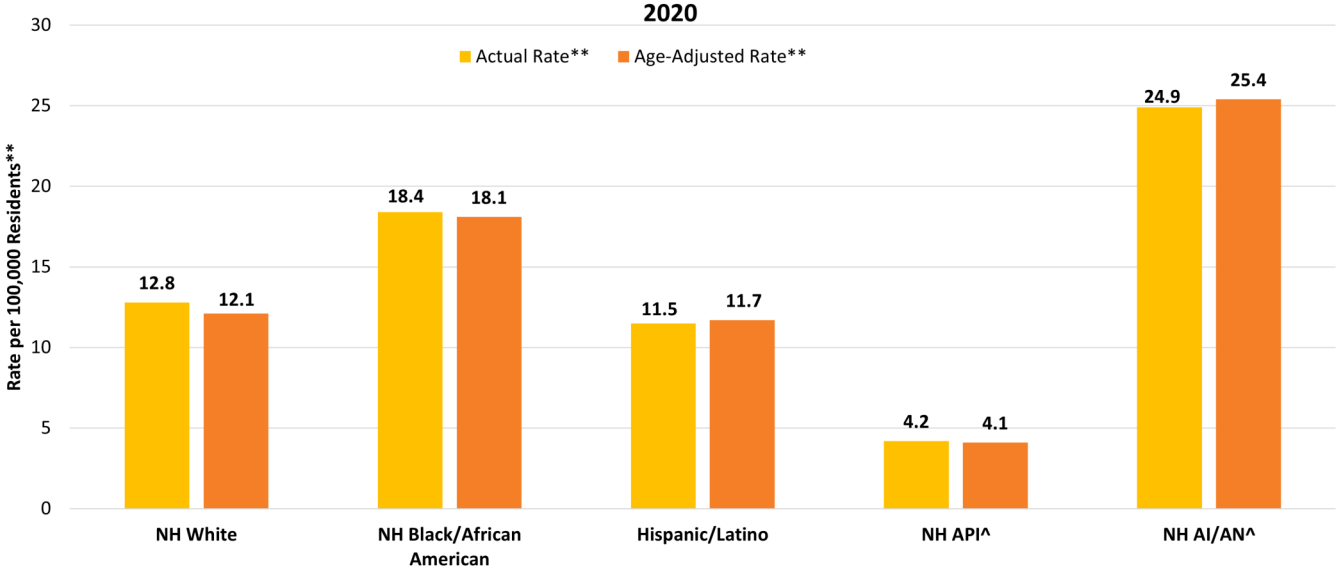
- Between 2017-2021, males in the United States had a higher age-adjusted death rate due to motor vehicle injuries compared to females.[20]
- In the United States, between 2017-2021, males, on average, had a 2.6 times higher death rate due to motor vehicle injuries compared to females.[20]
- From 2017-2019, the overall age-adjusted death rate due to motor vehicle injuries in the United States decreased, however, it increased from 2019-2021.[20]

Motor Vehicle Collisions



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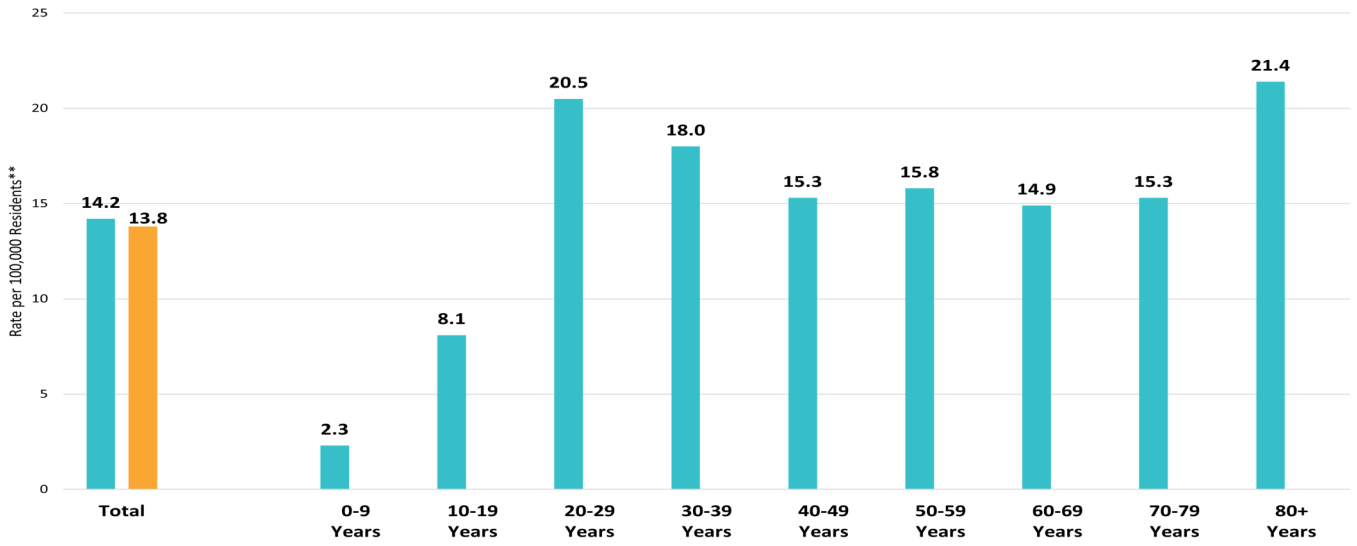
- In 2020, Non-Hispanic American Indian/Alaskan Natives had the highest actual and age-adjusted rates of death due to motor vehicle injuries compared to all other races/ethnicities in the United States.[20]
- In 2020, Non-Hispanic Asian/Pacific Islanders had the lowest actual (4.2 per 100,000 residents) and age-adjusted (4.1 per 100,000 residents) rates of death due to motor vehicle injuries compared to all other races/ethnicities in the United States.[20]

Motor Vehicle Collisions



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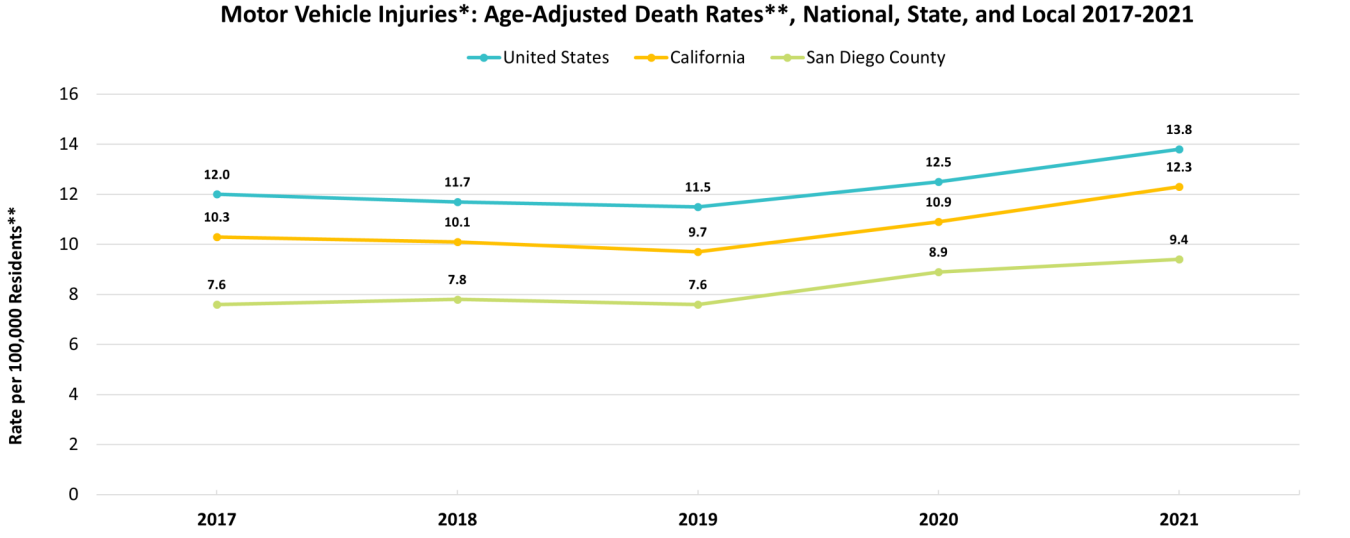
- Individuals 80 years and older (21.4 per 100,000 residents) had the highest actual death rate due to motor vehicle collisions, followed closely by 20-29-year-olds (20.5 per 100,000 residents).[20]
- Among every age group 20 years and older, the death rate due to motor vehicle injuries was higher than the total actual and age-adjusted death rate in the United States.[20]

Cost

- The U.S. Department of Transportation estimated that the annual economic cost of motor vehicle collisions in the United States was $340 billion in 2019.[21]
- Out of the $340 billion:[21]
  - $106 billion was due to lost market and household productivity.
  - $115 billion was because of property damage.
  - Medical expenses amounted to $31 billion.
  - Congestion caused by crashes accounted for $36 billion.
  - All other crash-related costs totaled $51.4 billion.

National, State, and Local Statistics



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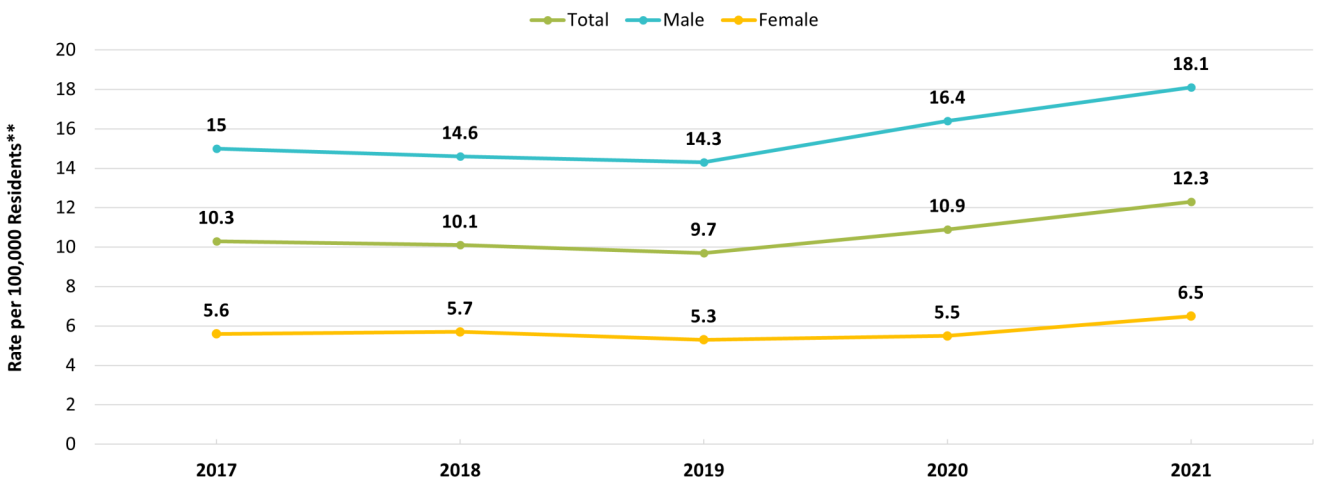
- Compared to California and the United States, San Diego County had a lower age-adjusted death rate due to motor vehicle collisions from 2017-2021.[20,22]
- Although San Diego County's age-adjusted death rate due to motor vehicle collisions was lower than California's and the United States, it is important to practice prevention efforts because death rates continued to increase in San Diego County from 2019-2021.[20,22]

State Statistics and Disparities



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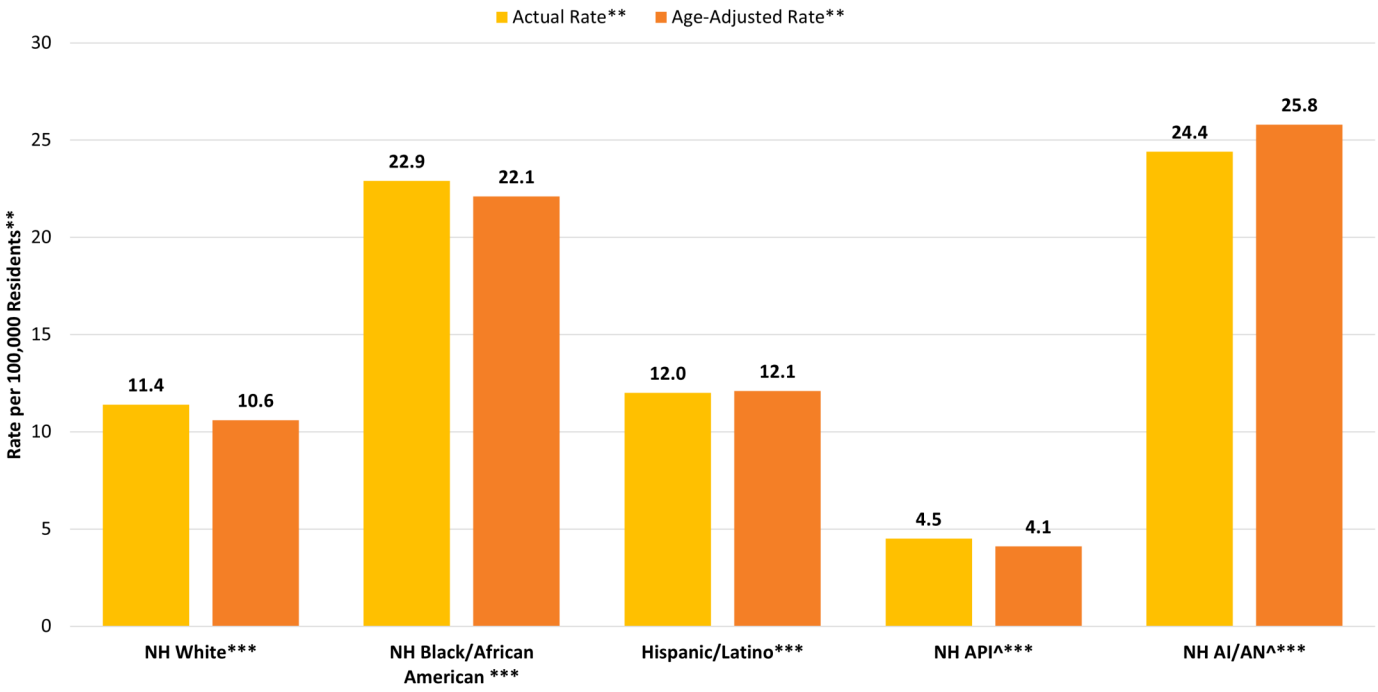
- Between 2017-2021, males in California had higher age-adjusted death rates due to motor vehicle injuries compared to females.[20]
- In California, between 2017-2021, males, on average, had 2.7 times higher motor vehicle injury death rates compared to females.[20]

Motor Vehicle Collisions



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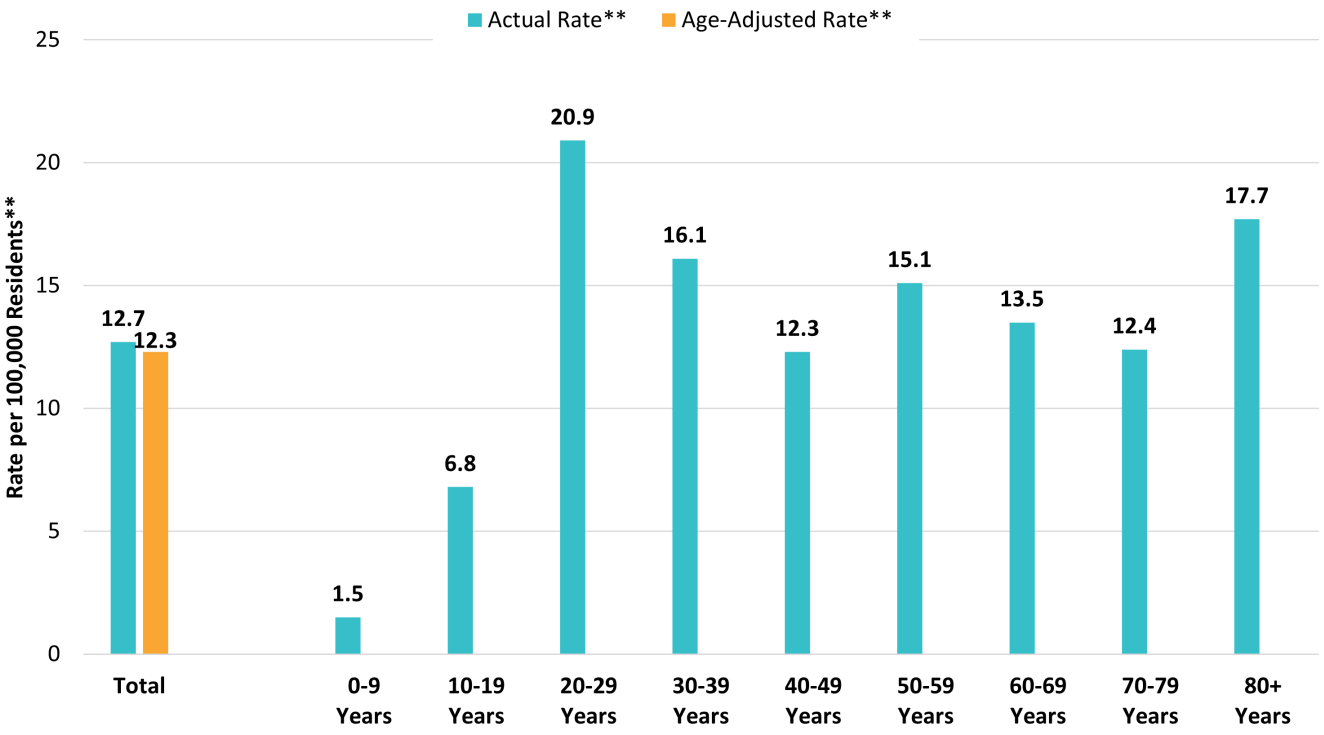
- In 2020, Non-Hispanic American Indian/Alaskan Natives had the highest actual and age-adjusted death rate due to motor vehicle injuries compared to all other races/ethnicities in California.[20]
- In 2020, Non-Hispanic Asian/Pacific Islanders had the lowest actual and age-adjusted death rates due to motor vehicle injuries compared to all other races/ethnicities in California.[20]

Motor Vehicle Injuries*: Actual and Age-Adjusted Death Rates** by Age, California, 2021



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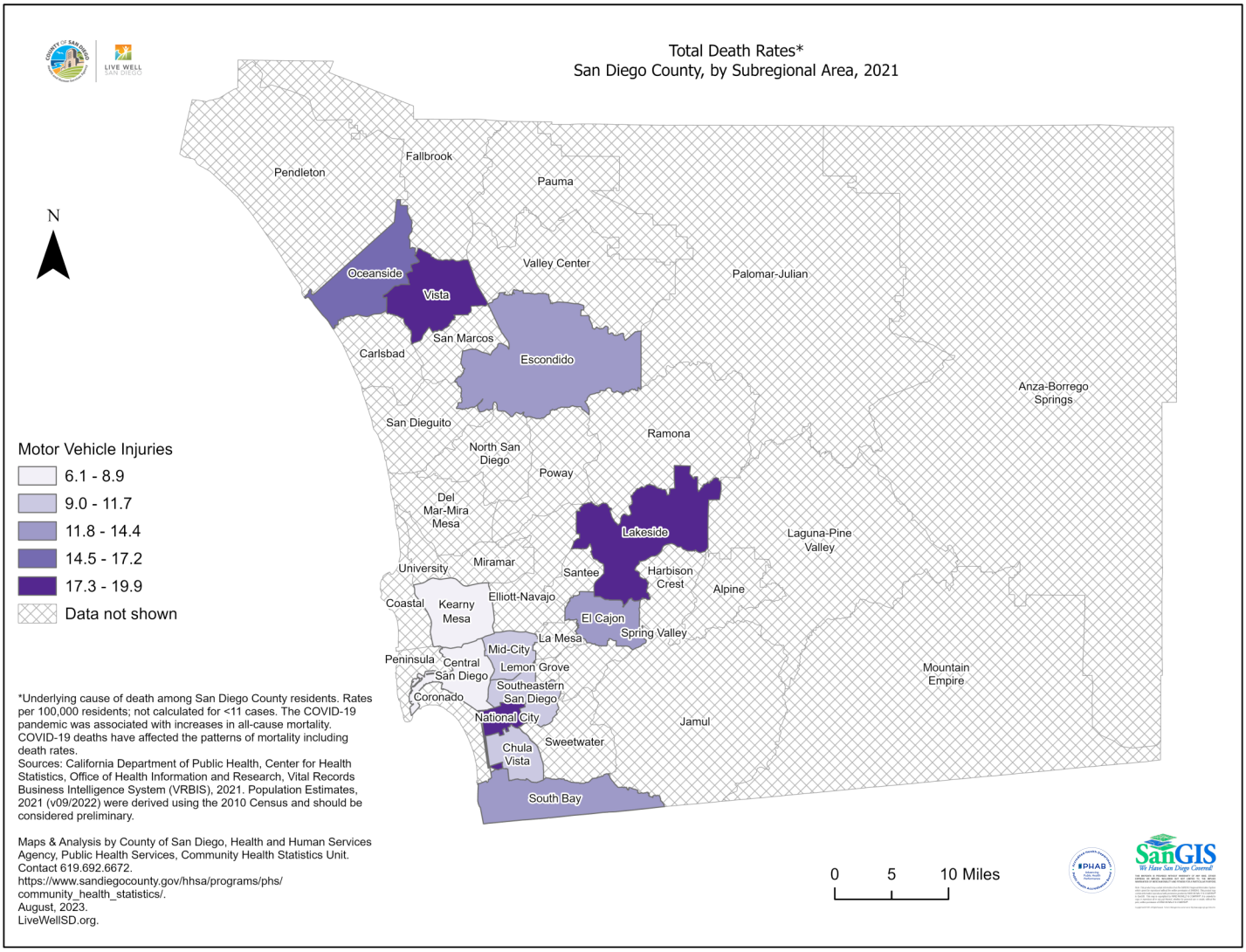
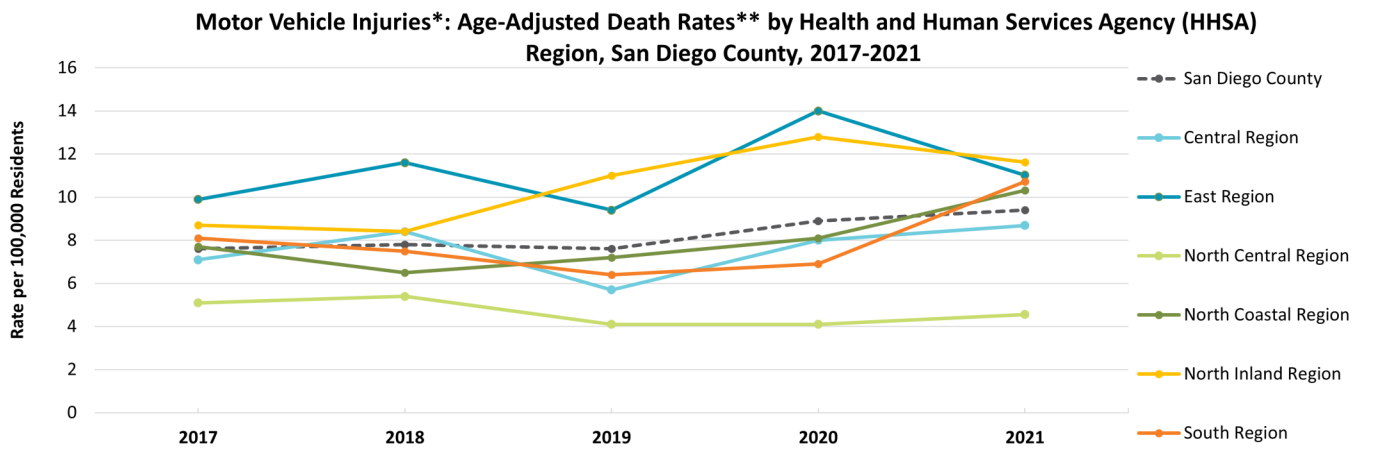
- In 2021, 20-29-year-olds had the highest death rate due to motor vehicle injuries (20.9 per 100,000 residents), followed by those 80 years and older (17.7 per 100,000 residents).[20]

Motor Vehicle Collisions



- In 2021, residents of subregional areas National City, Lakeside, and Vista had the highest motor vehicle injury death rates in San Diego County.[22]
- Compared to other subregional areas, in 2021, residents of Kearny Mesa and Central San Diego had the lowest motor vehicle injury death rates in San Diego County.[22]

Local Statistics and Disparities



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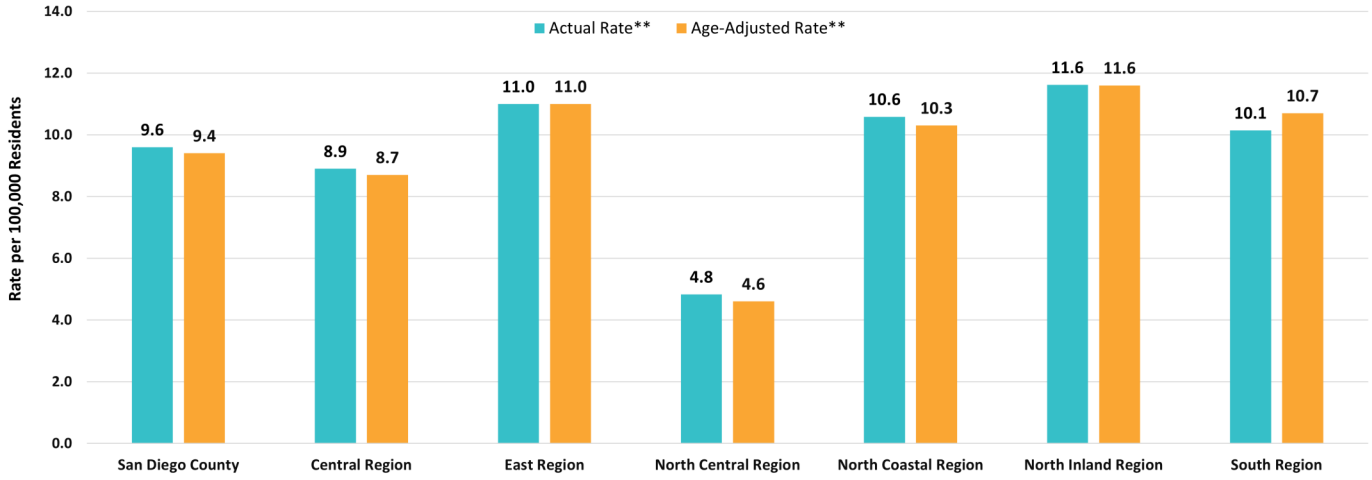
- The age-adjusted death rate from motor vehicle injuries in North Central Region was lower than San Diego County and all other Health and Human Services Agency (HHSA) regions, every year between 2017-2021.[22]
- The age-adjusted death rate from motor vehicle injuries in East Region and North Inland Region was higher than San Diego County and all other HHSA regions, every year between 2017-2021.[22]

Motor Vehicle Injuries*: Actual and Age-Adjusted Death Rates by Health and Human Services Agency (HHSA) Region, San Diego County, 2021**



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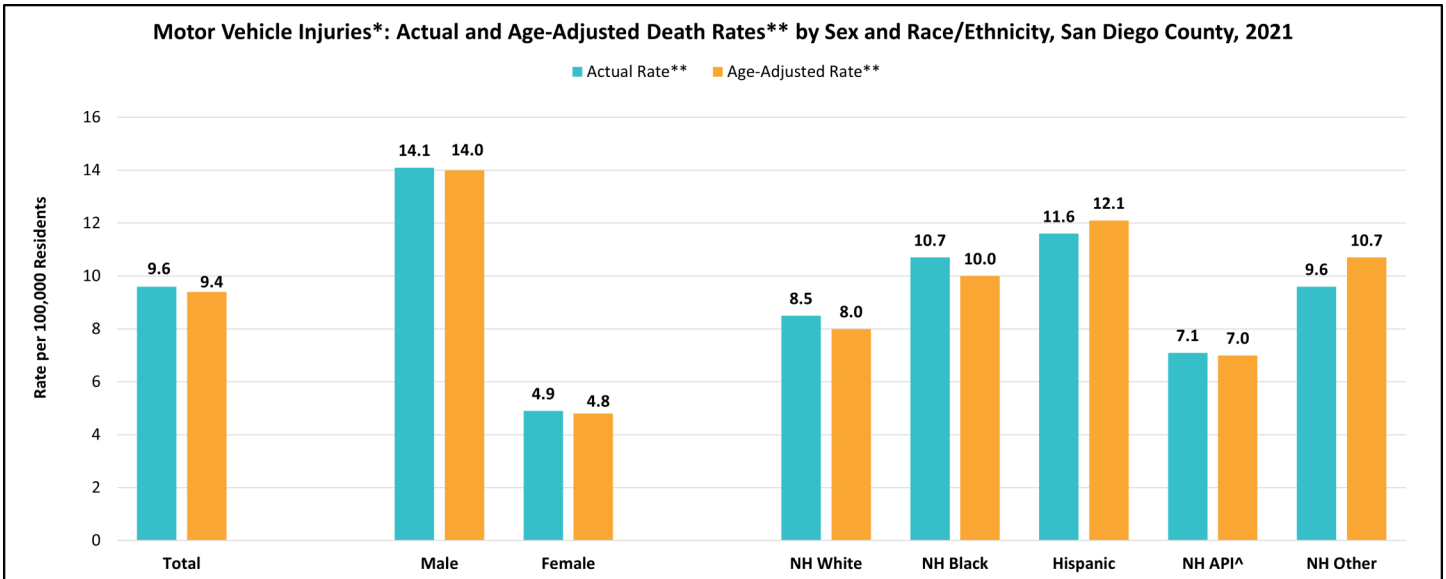
- In San Diego County, North Inland Region had the highest actual and age-adjusted death rates (11.6 per 100,000 residents respectively) due to motor vehicle injuries, followed by East Region (11.0 per 100,000 residents respectively) in 2021.[22]
- In San Diego County, North Central Region had the lowest actual (4.8 per 100,000 residents) and age-adjusted (4.6 per 100,000) death rates due to motor vehicle injuries, followed by Central Region (8.9 per 100,000 residents actual and 8.7 per 100,000 residents age-adjusted) in 2021.[22]

Motor Vehicle Collisions



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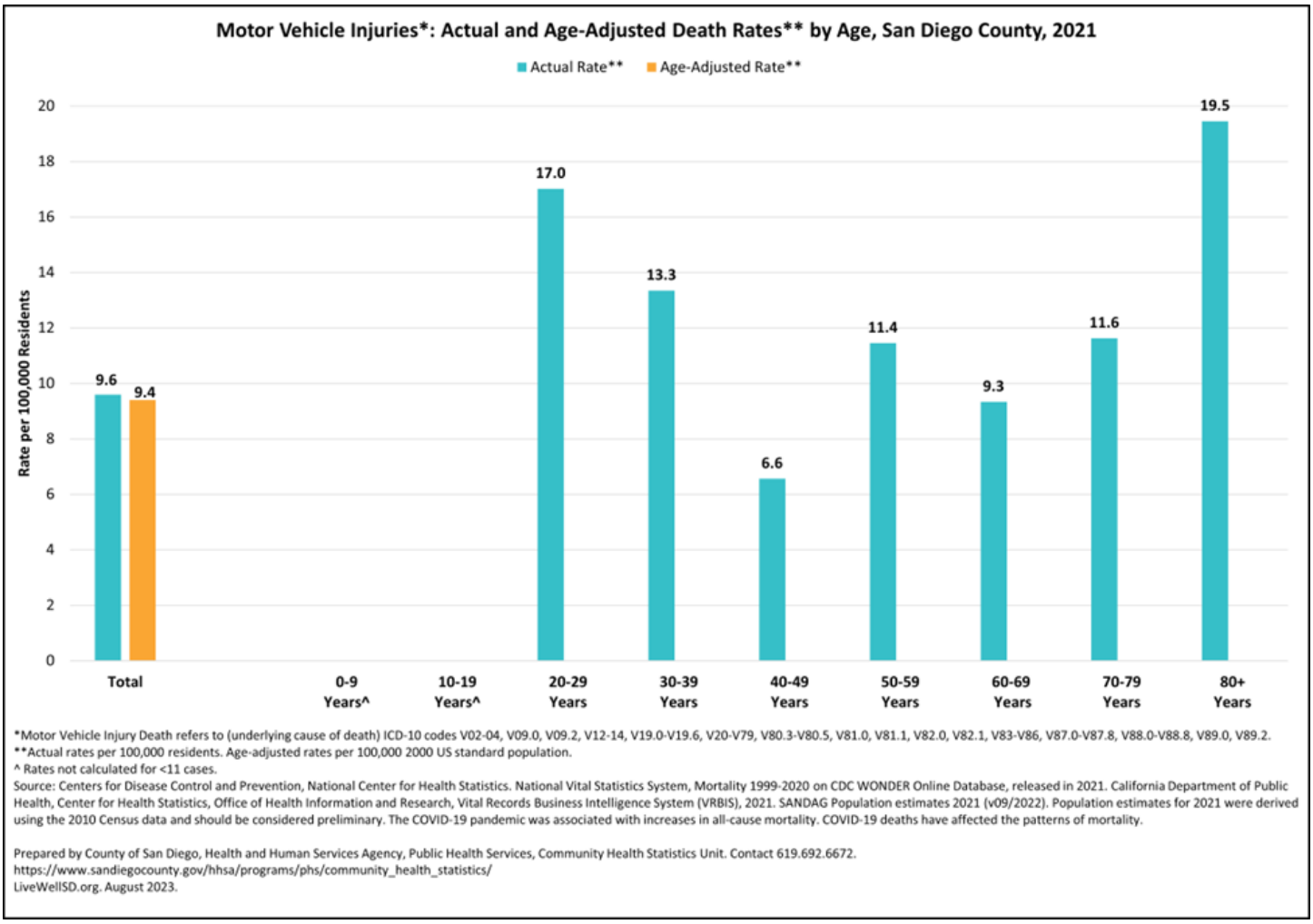
- In 2021, Non-Hispanic Asian/Pacific Islanders had the lowest actual and age-adjusted rates of death due to motor vehicle injuries in San Diego County compared to other race/ethnicities.[22]
- Compared to other race/ethnicities, Hispanic residents of San Diego County had the highest actual (11.6 per 100,000 residents) and age-adjusted (12.1 per 100,000 residents) rates of death due to motor vehicle injuries in 2021.[22]
- In 2021, males in San Diego County had higher actual (14.1 per 100,000 residents) and age-adjusted (14.0 per 100,000 residents) rates of death due to motor vehicle injuries compared to females.[22]

Motor Vehicle Collisions



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- In San Diego County, 40-49-year-olds (6.6 per 100,000 residents) and 60-69-year-olds (9.3 per 100,000 residents) had lower death rates due to motor vehicle crashes in 2021 compared to residents overall in San Diego County (9.6 per 100,000 residents actual and 9.4 per 100,000 adjusted).[22]
- In 2021, individuals 80 years and older (19.5 per 100,000 residents) had the highest actual death rate in San Diego County, followed by 20-29-year-olds (17.0 per 100,000 residents).[22]

Motor Vehicle Collisions: Prevention for Individuals

Deaths due to motor vehicle collisions are unfortunate and costly, but can be prevented. Risk of injury due to a motor vehicle collision can be reduced with modifiable risk factors.

Seat Belts and Car Seats

- When inside of a vehicle, use your seat belt. Using seat belts help reduce collision-related injuries and deaths.[16]
- Children ages 8 and younger should occupy a safety/booster seat. [23,24]

Impaired Driving

- Avoid consuming any alcohol, other illicit drugs, and any prescription/over-the-counter medications known to impair driving. [25]
- If impaired or under the influence, plan ahead and get a ride home and/or agree on a designated driver.

Distracted Driving

- Avoid multitasking while driving.
- If possible, assign navigation or other tasks to the passenger to reduce distractions.

Bicyclists/Motorcyclists

- Wear a helmet
    - Wearing a helmet can reduce the risk of head and brain injuries and is at least 37% effective in preventing deaths among motorcycle riders.[26,27]
    - Helmets may reduce the risk of head injury by 69%.[28]

Prevention Tools for Public Health Professionals: Motor Vehicle Collisions Critical Pathway

There are many opportunities for public health professionals in the community to help reduce the risk of motor vehicle collision injuries and to improve the health outcomes of individuals who already have been involved in one. To assist in community health efforts, a *Motor Vehicle Collisions Critical Pathway* was developed.

The *Motor Vehicle Collisions Critical Pathway* is a tool to be used in health promotion efforts. Its purpose is to identify populations at greater risk of being involved in a motor vehicle collision, and to identify prevention and early intervention opportunities. The *Motor Vehicle Collisions Critical Pathway* displays a diagram of the major risk factors and intermediate outcomes or related diseases that have an impact on, or result from, motor vehicle collisions. Risk factors are marked as non-modifiable (black striped bars) such as race/ethnicity or sex and modifiable (solid colored bars) such as seat belt use and drug abuse.

Beneath the risk factors diagram is a data grid describing the San Diego resident population in relation to selected elements of the pathway. The data grid is designed to assist in quick identification of opportunities for interventions that might have a high impact on being involved in a motor vehicle collision. The data represent all San Diegans, not only those involved in a particular type of collision. The left axis (bar) indicates the percent of the population with a known risk factor or intermediate outcome. The right axis (diamond) indicates the rate of a particular medical encounter within the population that is specified. The data are described fully in the complete version of the *Critical Pathway*s.

In addition, the Community Health Statistics Unit website (www.SDHealthStatistics.com) provides detailed demographic, health and facility data including maps of geographically formatted health data. Also available are links to other County data sources, state and national sites of interest. For further assistance with data or interpretation, please contact the Community Health Statistics Unit.

Motor Vehicle Collision Critical Pathway

Critical Pathway

Motor Vehicle Collisions

COUNTY OF SAN DIEGO HEALTH AND HUMAN SERVICES AGENCY

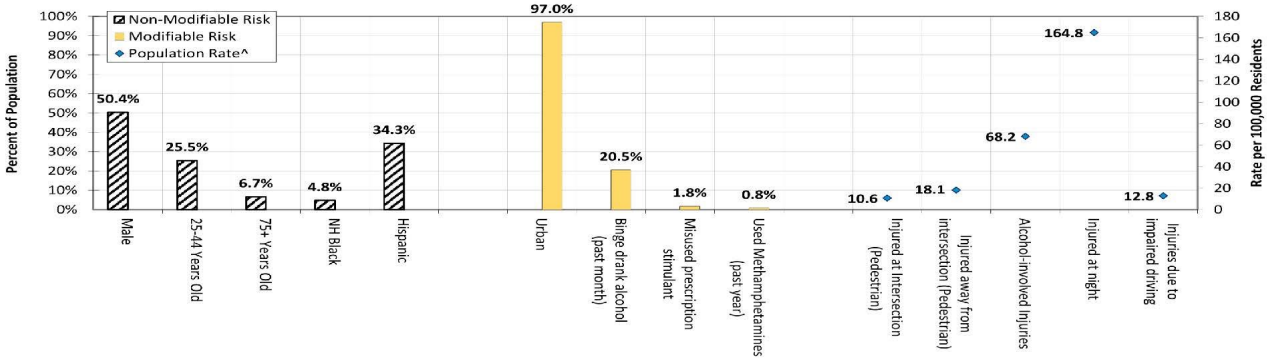
LIVE WELL SAN DIEGO

OPPORTUNITIES FOR PREVENTION

	PRIMARY	SECONDARY	TERTIARY	
Birth	**Demographic Risk Factors*** Age, Race/Ethnicity, Sex, Location	**Behavioral & Social Risk Factors*** Alcohol use, Illicit/Prescription drug abuse, Seat belt use, Nighttime driving, Speeding	**Intermediate Outcomes** Distracted driving, Drowsy driving, Impaired driving, Reckless driving	Motor Vehicle Collisions

*SOCIAL DETERMINANTS OF HEALTH

Characteristics of Residents, San Diego County, 2021
Selected Elements from Motor Vehicle Collisions Pathway[19,20]



^The most up-to-date non-provisional data from TIMS is 2020. Rates were calculated using 2020 TIMS data. The data reported are for injury collisions occurring on public roads in San Diego County. Rates include anyone traveling on San Diego County roads. Rates are not calculated for fewer than 5 events. The location of collisions is based on reports filed by law enforcement report and may not contain specific geographic coordinates. Locational data may be different when data are finalized by TIMS. Rates displayed are "crude" rates not adjusted for age and calculated per 100,000 resident population.

County of San Diego ■ Health and Human Services Agency ■ Public Health Services ■ Community Health Statistics Unit ■ www.SDHeathStatistics.com ■ (619)692-6667 10/2023

Data Sources

[1] California Highway Patrol. Glossary. CA.GOV. https://www.chp.ca.gov/InformationManagementDivisionSite/Documents/14-Glossary 2017 (Crash) (Revised on 10092019).pdf

[2] Centers for Disease Control and Prevention (CDC). WISQARS — Web-based Injury Statistics Query and Reporting System. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Injury Prevention and Control; 2022.

[3] Center for Disease Control and Prevention (CDC). Transportation Safety. Atlanta, GA: U.S. National Center for Injury Prevention and Control. https://www.cdc.gov/transportationsafety/index.html

[4] Centers for Disease Control and Prevention (CDC). Transportation Safety. Atlanta, GA: U.S. National Center for Emerging and Zoonotic Infectious Diseases (NCEZID). https://wwwnc.cdc.gov/travel/yellowbook/2024/air-land-sea/road-and-traffic-safety

[5] California Highway Patrol. SWITRS Report. https://www.chp.ca.gov/programs-services/services-information/switrs-internet-statewide-integrated-traffic-records-system/switrs-2019-report. Accessed 14 June 2023

[6] Institute Insurance for Highway Safety (IIHS). Fatality Facts 2021 Yearly Snapshot. https://www.iihs.org/topics/fatality-statistics/detail/yearly-snapshot

[7] Shaw KM, West B, Kendi S, Zonfrillo MR, Sauber-Schatz E. Urban and rural child deaths from motor vehicle crashes: United States, 2015-2019. *J Pediatr*. 2022;S0022-3476(22)00620-5. doi:10.1016/j.jpeds.2022.07.001

[8] Mayhew DR, Simpson HM, Pak A. Changes in collision rates among novice drivers during the first months of driving. *Accid Anal Prev*. 2003;35(5):683–691. doi:10.1016/s0001-4575(02)00047-7

[9] McCartt AT, Shabanova VI, Leaf WA. Driving experience, crashes and traffic citations of teenage beginning drivers. *Accid Anal Prev*. 2003;35(3):311–320. doi:10.1016/s0001-4575(02)00006-4

[10] Gershon P, Ehsani JP, Zhu C, Sita KR, Klauer S, Dingus T, Simons-Morton B. Crash Risk and Risky Driving Behavior Among Adolescents During Learner and Independent Driving Periods. *J Adolesc Health*. 2018;63(5):568–574. doi:10.1016/j.jadohealth.2018.04.012

[11] Cox AE and Cicchino JB. Continued trends in older driver crash involvement rates in the United States: Data through 2017–2018. *Journal of Safety Research* 2021; 77: 288-295. https://doi.org/10.1016/j.jsr.2021.03.013

[12] National Highway Traffic Safety Administration. Traffic Safety Facts 2019 Data: Pedestrians. U.S. Department of Transportation, Washington, DC; 2021. Available at https://crashstats.nhtsa.dot.gov/Api/Public/Publication/813079. Accessed 14 June 2023.

[13]National Highway Traffic Safety Administration (NHTSA). Traffic Safety Facts 2020 Data: Alcohol-Impaired Driving (Report No DOT HS 813 294). Washington, DC: U.S. Department of Transportation, National Highway Traffic Safety Administration, National Center for Statistics and Analysis; April 2022.

[14] Li, Guohua, Joanne E. Brady, and Qixuan Chen. "Drug use and fatal motor vehicle crashes: a case-control study." *Accident Analysis & Prevention* 60 (2013): 205-210.

[15] U.S. Department of Transportation National Highway Traffic Safety Administration (NHTSA). National Center for Statistics and Analysis. 2018 Data: Occupant Protection in Passenger Vehicles (dot.gov) . June 2020. Accessed June 20, 2023.

[16] Kahane CJ. National Highway Traffic Safety Administration (NHTSA). Lives Saved by Vehicle Safety Technologies and Associated Federal Motor Vehicle Safety Standards, 1960 to 2012 – Passenger Cars and LTVs – With Reviews of 26 FMVSS and the Effectiveness Of Their Associated Safety Technologies in Reducing Fatalities, Injuries, and Crashes (Report No. DOT HS 812 069). Washington, DC: U.S. Department of Transportation, National Highway Traffic Safety Administration (NHTSA); January 2015.

[17] Torbjörn Åkerstedt, PhD and others, Night Driving, Season, and the Risk of Highway Accidents, *Sleep*, Volume 24, Issue 4, June 2001, Pages 401–406, https://doi.org/10.1093/sleep/24.4.401

[18] Rosen, E. & Sander, U. (2009) Pedestrian Fatality Risk as a Function of Car Impact Speed. Accident Analysis & Prevention, 41(3), 536-542

[19] Tefft, B. (2013) Impact Speed and a Pedestrian's Risk of Severe Injury or Death. Accident Analysis & Prevention, 50, 871-878

[20] Centers for Disease Control and Prevention, National Center for Health Statistics. National Vital Statistics System, Mortality 1999-2020 and Mortality 2018-2021, released in 2021. Retrieved from https://wonder.cdc.gov/. Accessed July 25, 2023.

[21] National Highway Traffic Safety Administration. (2019). The Economic and Societal Impact of Motor Vehicle Crashes, 2019 (Revised). Retrieved from https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/813403 Accessed July 19, 2023.

[22] California Department of Public Health, Center for Health Statistics, Office of Health Information and Research, Vital Records Business Intelligence System (VRBIS), 2021.

[23] Arbogast, K. B., Jermakian, J. S., Kallan, M. J., & Durbin, D. R. (2009). Effectiveness of belt positioning booster seats: An updated assessment. Pediatrics, 124(5), 1281–1286. doi:10.1542/peds.2009-0908

[24] Pai, J. E. (2020). National Highway Traffic Safety Administration (NHTSA). Evaluation of Child Restraint System Effectiveness (Report No. DOT HS 813 047). Washington, DC: U.S. Department of Transportation, National Highway Traffic Safety Administration (NHTSA).

[25] National Highway Traffic Safety Administration. (n.d.). Dangers of Driving After Taking Prescription Drugs or Over-The-Counter Medicines. Retrieved from https://www.nhtsa.gov/drug-impaired-driving/dangers-driving-after-taking-prescription-drugs-or-over-counter-medicines. Accessed July 2023.

[26] Liu, B., Ivers, R., Norton, R., Blows, S., & Lo, S. K. (2004). Helmets for preventing injury in motorcycle riders. The Cochrane database of systematic reviews, (2), CD004333. https://doi.org/10.1002/14651858.CD004333.pub2

[27] National Highway Traffic Safety Administration. Motorcycles (Traffic Safety Facts. Report No. DOT HS 813 112). U.S. Department of Transportation, Washington, DC; 2021. Available at https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/813112. Accessed 19 June 2023.

[28] Thompson DC, Rivara FP, Thompson R. Helmets for preventing head and facial injuries in bicyclists. Cochrane Database Syst Rev. 2000;1999(2):CD001855. doi: 10.1002/14651858.CD001855. PMID: 10796827; PMCID: PMC7025438.