Office of Health Equity
Healthy Communities Data and Indicators Project

Short Title: Road Traffic Injuries.
Full Title: Annual number of fatal and severe road traffic injuries per population and per miles traveled by transport mode.

1. **Healthy Community Framework:**
   Meets basic needs of all.

2. **What is our aspirational goal?**
   Safe, sustainable, accessible and affordable transportation options.

3. **Why is this important to health?**

   a. **Description of significance and health connection.**

   Transportation accidents are the second leading cause of death in California for people under the age of 45 and account for an average of 4,018 deaths per year (2006-2010). Risks of injury in traffic collisions are greatest for motorcyclists, pedestrians, and bicyclists and lowest for bus and rail passengers. Minority communities bear a disproportionate share of pedestrian-car fatalities; Native American male pedestrians experience 4 times the death rate as Whites or Asian pedestrians, and African-Americans and Latinos experience twice the rate as Whites or Asians.

   b. **References**

1. Chang D. *National pedestrian crash report (http://www-nrd.nhtsa.dot.gov/Pubs/810968.PDF)*. Washington, DC: National Center for Statistics and Analysis, National Highway Traffic Safety Administration, U.S. Department of Transportation; 2008. Report No.: DOT HS 810 968. Accessed October 27th, 2013.
2. Beck LF, Dellinger AM, O'Neil ME. Motor vehicle crash injury rates by mode of travel, United States: Using exposure-based methods to quantify differences. *Am J Epidemiol* 2007; 166(2):212-218.
3. Leaf WA, Preusser DF. *Literature review on vehicle travel speeds and pedestrian injuries (http://www.nhtsa.gov/people/injury/research/pub/hs809012.html)*. National Highway Traffic Safety Administration, U.S. Department of Transportation; 1999. Report No.: DOT HS 809 021. Accessed October 27th, 2013.
4. California Department of Public Health. *Vital Statistics Query System*

(http://www.apps.cdph.ca.gov/vsq/), 2006-2010. Accessed October 27th, 2013.
5. Naumann RB, Beck LF. Motor vehicle traffic-related pedestrian deaths – United States, 2001-2010. *MMWR* 2013; 62(15): 277- 282.

4. What is the indicator?

a. Detailed Definition:

Annual number of fatal and severe road traffic injuries 1) per population and 2) per miles traveled by transport mode.

b. Stratification.

Victim mode of transport (Bicyclist, Bus, Car/Pickup, Motorcycle, Pedestrian, Truck, Vehicles), severity of injury (fatal, severe).

c. Data Description.

1. Data sources:
   Numerator: Statewide Integrated Traffic Records System (SWITRS), California Highway Patrol (CHP), 2002-2010 data from the Transportation Injury Mapping System (TIMS) (http://www.tims.berkeley.edu).
   Denominator 1: Historical Population and Housing Estimates for Cities, Counties, and the State, 2000-2010, Demographic Research Unit, Department of Finance (DOF) (http://www.dof.ca.gov/research/demographic/reports/estimates/e-8/2000-10/view.php).
   U.S. Census Bureau, 2006-2010 American Community Survey (American Fact Finder http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml).
   Denominator 2: California Public Road data (CPR); Division of Research, Innovation and System Information; Office of Highway System Information & Performance; Highway Performance Monitoring System; California Department of Transportation http://www.dot.ca.gov/hq/tsip/hpms/datalibrary.php).
   U.S. Department of Transportation, Federal Highway Administration, 2009 National Household Travel Survey (NHTS) (http://nhts.ornl.gov). All data accessed 7/2013.

2. Years available: 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2002 through 2004, 2005 through 2007, 2008 through 2010, 2006 through 2010.

3. Geographies available: census tracts, cities/towns, counties, regions, consolidated metropolitan statistical areas (CMSA), and state.

Numerator: collision data for severe and fatal injuries occurring between 2002 and 2010 were downloaded from TIMS and geocoded to the 2010 U.S. census tracts and places. Specific coordinates within counties were not reported for 7.7% of injuries, which could not be geocoded to a specific city or census tract. CHP defines severe

injuries as those other than fatal injuries that include the following: broken or fractured bones; dislocated or distorted limbs; severe lacerations; skull, spinal, chest or abdominal injuries that go beyond other visible injuries; unconsciousness at or when taken from collision scene; and severe burns. Fatal injuries are deaths from collisions occurring within 30 days after the collision date. Victim mode of transport was classified into 6 groups: car/pickup, truck, bus, motorcycle, pedestrian, and bicyclist.

Denominator 1: annual total population for 480 incorporated cities, counties, and California from 2002 to 2010 was acquired from DOF. Three-year population averages were calculated for 2002 through 2004, 2005 through 2007, and 2008 through 2009. Total population counts for census tracts and 1043 census designated places for the period 2006 through 2010 were obtained from the American Community Survey.

Denominator 2: Daily vehicle miles traveled for cities, counties, and California from 2002 to 2010 was abstracted from CPR and multiplied by 365 to estimate annual vehicle miles traveled. Annual miles traveled by bicyclists and pedestrians for CMSAs (county clusters for major metropolitan areas) and California was estimated between 2002 and 2010 from the NHTS by applying the annual rate of change between 2001 and 2009. Three and five- year averages were calculated.

Indicator: the rate of collisions was calculated as injuries (severe or fatal) per 100,000 people (denominator 1) and injuries (severe or fatal) per 10^9 miles traveled (denominator 2), for each of the 6 victim modes of transport. The standard error was calculated as: rate/√injuries. Relative standard errors, 95% confidence intervals, and decile ranking of places were also calculated. Regions were based on counties of metropolitan transportation organizations (MPO) regions as reported in the *2010 California Regional Progress Report (http://www.dot.ca.gov/hq/tpp/offices/orip/Collaborative%20Planning/Files/CARegionalProgress_2-1-2011.pdf)*.

5. Strengths and limitations

SWITRS provides information on injury occurrence for census tracts and cities, geographies not currently available from death certificates or data on hospitalizations or emergency room visits. SWITRS undercounts “non-traffic” injuries that occur off of public roads. The occurrence of the injury may not match the geography where the victim resides, although this discrepancy decreases at larger geographic units (counties, states). Compared to death certificates and hospitalizations, SWITRS is known to undercount both fatal and severe injuries. This may be especially true for victims that are low income, do not have health insurance, or are undocumented. Furthermore, collision data do not address disability and mental health impacts or economic losses.

6. Projects using this indicator

1. San Francisco Department of Public Health's The San Francisco Indicator Project. https://www.sfindicatorproject.org/
2. Community Indicators Victoria. Community Indicators Victoria: Data Framework. Community Indicators Victoria; 2011. Community Indicators (http://www.communityindicators.net.au/ data_framework).