Minnesota Department of Health

SURVEILLANCE, EPIDEMOLOGY AND ANALYSIS UNIT

Pedestrian Fatalities and Injuries in Minnesota

2016 DATA BRIEF

In this Data Brief

Pedestrian injuries and fatalities in Minnesota:

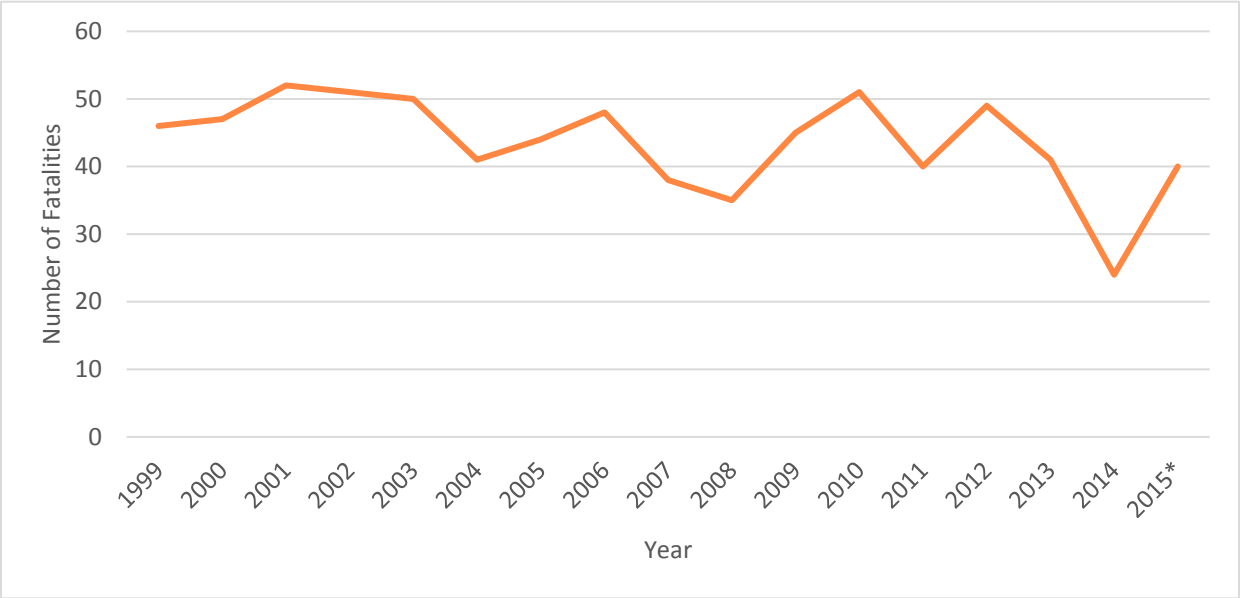
- Trends in fatal and nonfatal traffic-related pedestrian injuries
- Effects of pedestrian intoxication on injury severity
- Differences in fatal and nonfatal injury rates depending on gender and the degree to which an area is urban.
- Relationship between age and crash location
- Discussion
- Data sources and methodology

In 2015, Minnesota experienced an alarming 150% increase in traffic-related pedestrian fatalities – from 16 to 40 deaths – raising concern among public health professionals and Minnesota residents. Researchers hypothesize that a combination of lower gas prices,[1] distracted walking and driving,[1] intoxicated walking,[2] and an increase in the awareness of the health, environmental, and economic benefits of walking[3] may help explain recent increases in pedestrian deaths throughout the U.S.

That's why the Minnesota Department of Transportation and Minnesota Department of Health have collaborated over the past three years to create Minnesota Walks – http://www.dot.state.mn.us/peds/plan/, a framework for making walking and rolling safe, convenient and desirable in Minnesota. Everyone deserves a safe place to walk and roll.

This Data Brief examines trends and patterns in traffic-related pedestrian fatalities and injuries in Minnesota, highlighting potential risk factors for fatal and injurious crashes. The data show that gender, the degree to which an area is urban, alcohol intoxication, and age are all associated with pedestrian crash risk. Of particular interest is the finding that pedestrian age and crash location are strongly related. Taken together, these findings can inform a multi-pronged preventive approach that addresses pedestrian fatalities and injuries, targeting the most at-risk populations of pedestrians in Minnesota.

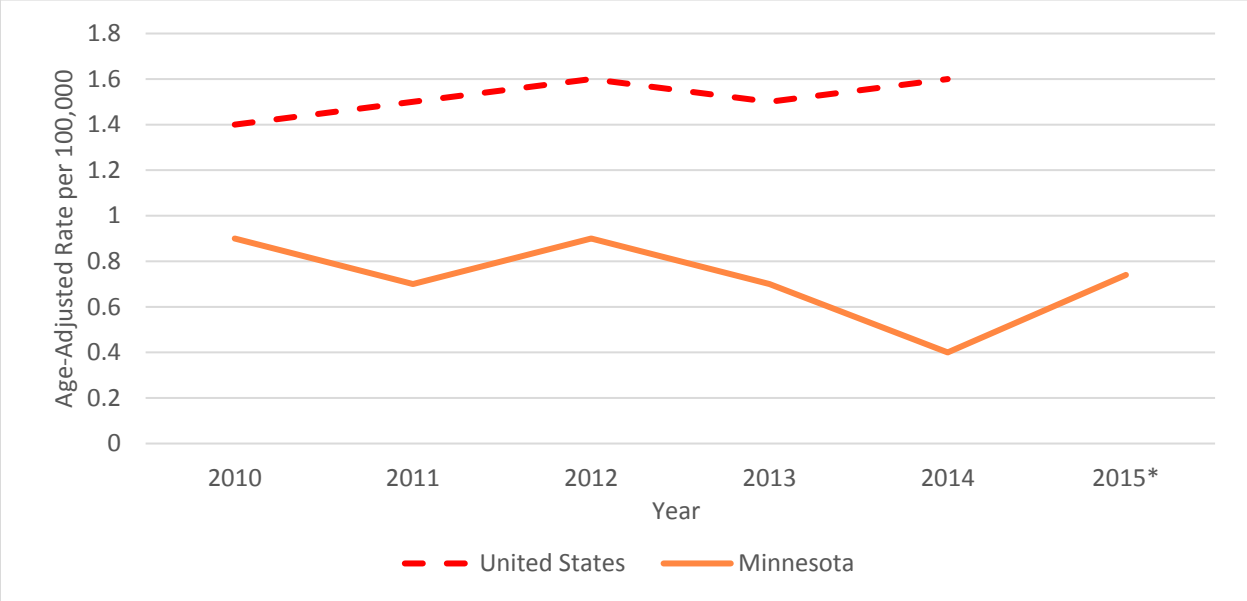
Chart 1: The Annual Pedestrian Crash Fatalities in Minnesota Have Ranged from 4 to 51



Data Source: CDC WONDER

**2015 data obtained from Minnesota Crash Facts-Department of Public Safety*

Chart 2: Minnesota's Pedestrian Crash Fatality Rate is less than that of the U.S.

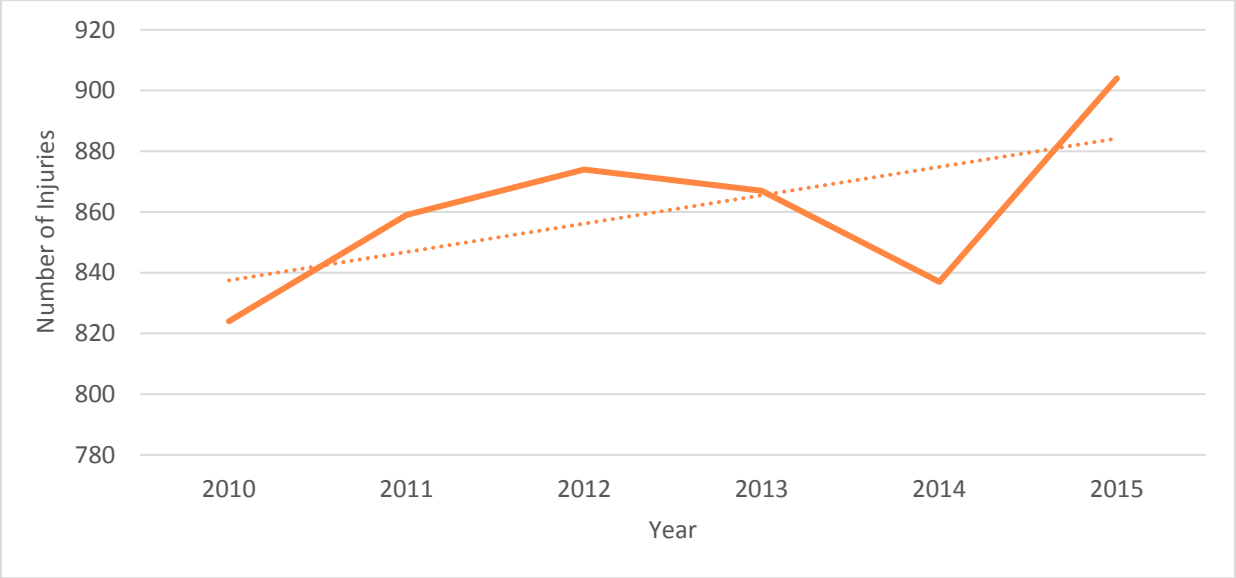


Data Source: CDC WONDER

**2015 age-adjusted rate calculated from crash fatality data obtained from Minnesota Crash Facts-Department of Public Safety using the 2014 population of Minnesota as a proxy for the 2015 population*

Charts 1 and 2: Pedestrian crash fatalities in Minnesota spiked in 2015, but a comparison of pedestrian crash fatality rates shows that, since 2010, Minnesota's annual pedestrian crash fatality rates have been lower than those of the U.S.

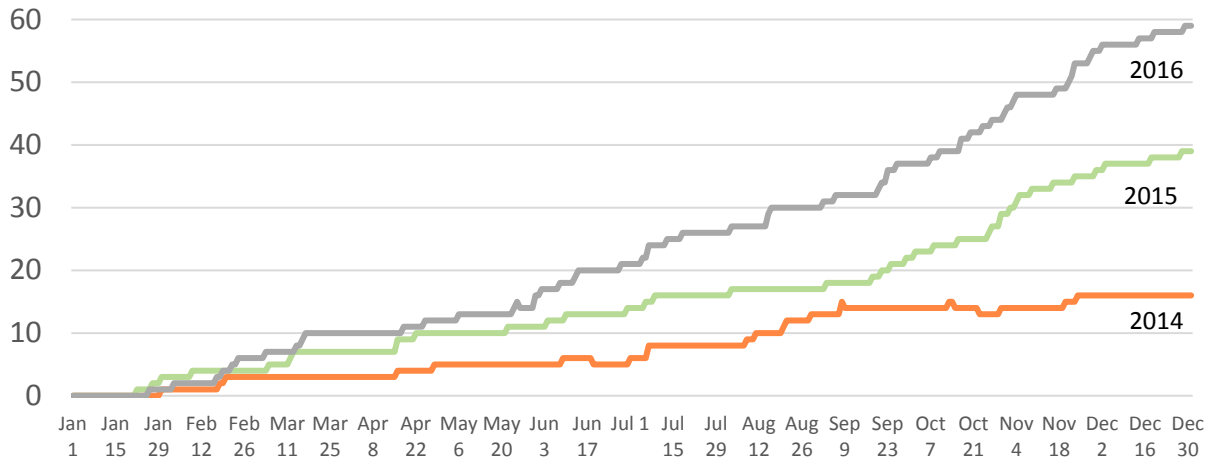
Chart 3: The Number of Nonfatal Traffic-Related Pedestrian Injuries Began to Increase in 2010



Data Source: Minnesota Crash Facts-Department of Public Safety

Chart 3: The number of nonfatal traffic-related pedestrian injuries has been trending upward since 2010, a concerning trend given that fatal pedestrian injuries have been trending downward over the last 10 years. (The average annual age-adjusted nonfatal injury rate in Minnesota is 18.7 per 100,000 persons).[4]

Chart 4: Pedestrian Traffic Fatality Counts Increased Yearly from 2014 to 2016

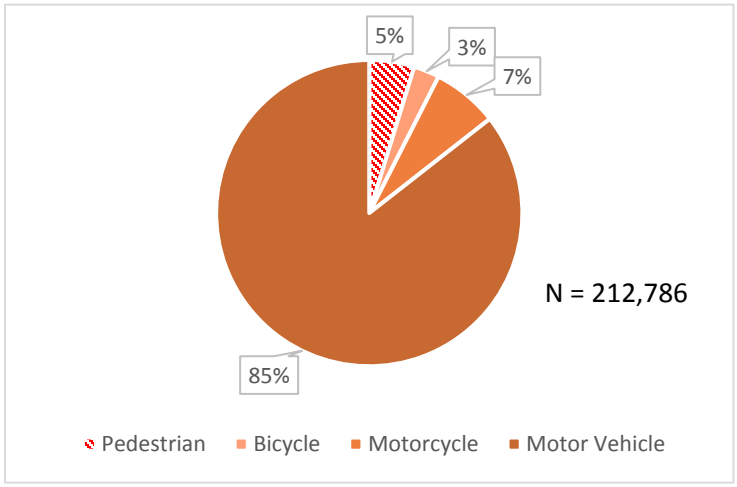


Data Source: Department of Public Safety fatal crash count notification. All cumulative counts are preliminary. Dates are dates of report (not necessarily dates of death).

Chart 4: The annual number of fatal traffic-related pedestrian injuries has been increasing since 2014. While 2016 data at the time of this report is preliminary and incomplete, it nonetheless indicates that pedestrian traffic deaths have risen significantly since 2015, while the number of deaths in 2015 was a significant increase over 2014.

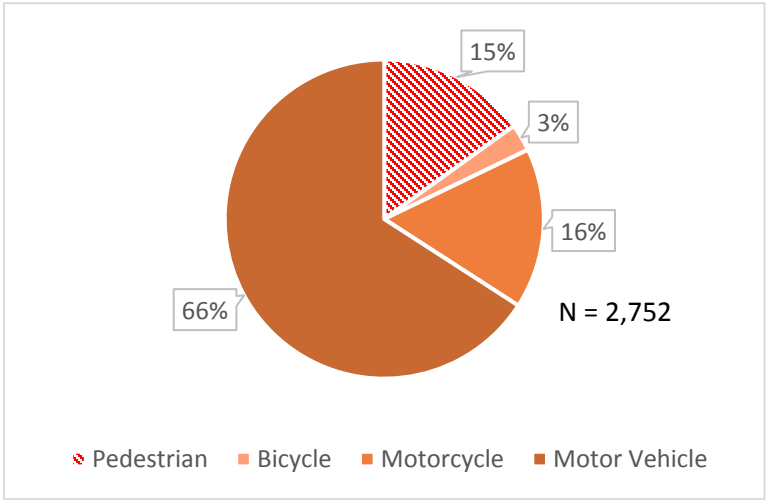
Charts 5 and 6: Pedestrians Are Overrepresented in Traffic-Related Deaths

Nonfatal Injuries



Data Source: MIDAS

Deaths

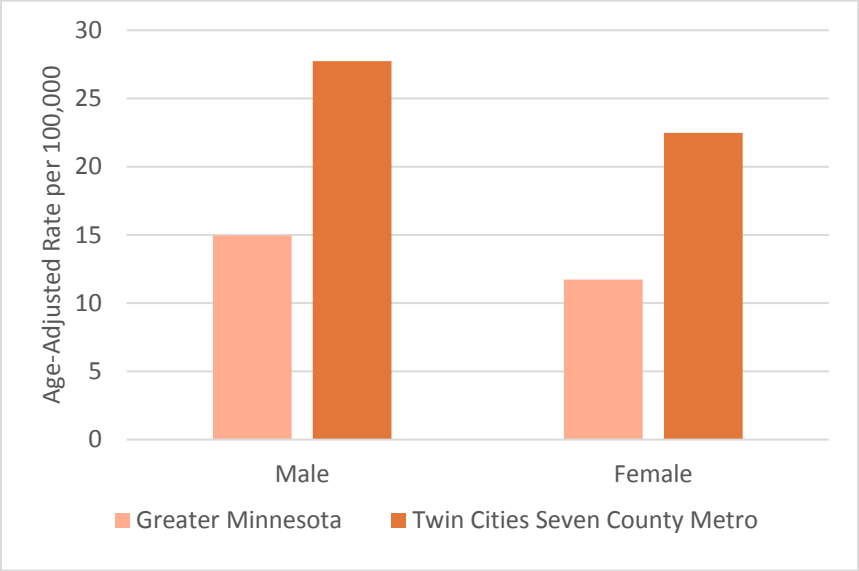


Data Source: MIDAS

Charts 5 and 6: Pedestrians compose only 5% of total traffic injuries each year, yet they account for 15% of total traffic deaths. Without the protection of a motor vehicle, pedestrians are particularly susceptible to sustaining a fatal injury. This overrepresentation of pedestrians in motor vehicle traffic deaths reinforces the importance of working towards reducing traffic-related pedestrian crashes.

Risk Factors

Chart 7: Pedestrian Traffic Injury and Fatality Rates Are Higher in the Twin Cities Seven County Metro Area



Data Source: MIDAS

Chart 7: Individuals living in the Twin Cities Seven County Metro area have a higher age-adjusted rate for fatal and nonfatal pedestrian injuries (25.1 per 100,000) than do individuals living in Greater Minnesota (13.4). Within both settings, males have a higher pedestrian fatality and injury rate than females. The rate for Greater Minnesota males is 28% higher than it is for females and the rate for Seven County Metro males is 23% higher than it is for females. These data are consistent with findings that rates of fatal and injurious pedestrian crashes are higher in both urban areas and among males. It is important to note that, although pedestrian crash rates are higher in U.S. Census-defined urban areas (5,000 people and over), pedestrian crashes are more fatal in rural areas (under 5,000 people). Our analysis of the MIDAS-CODES data has shown that the odds of fatality in a rural crash are 3.6 times that of an urban crash.

Table 1: Pedestrian Traffic-related Hospital-treated Injury by County, 2010-2014

County	Pedestrian Injuries	Crude Injury Rate per 100,000
AITKIN	13	16.29*
ANOKA	222	13.20
BECKER	36	21.84
BELTRAMI	52	22.99
BENTON	29	14.88
BIG STONE	3	11.58*

County	Pedestrian Injuries	Crude Injury Rate per 100,000
BLUE EARTH	51	15.76
BROWN	20	15.68*
CARLTON	18	10.16*
CARVER	20	4.25*
CASS	20	14.04*
CHIPPEWA	6	9.81
CHISAGO	25	9.29
CLAY	23	7.63
CLEARWATER	5	11.45*
COOK	5	19.25*
COTTONWOOD	3	5.14*
CROW WING	42	13.35
DAKOTA	209	10.31
DODGE	9	8.89*
DOUGLAS	19	10.44*
FARIBAULT	5	6.98*
FILLMORE	11	10.56*
FREEBORN	17	10.96*
GOODHUE	44	18.99
GRANT	5	16.73*
HENNEPIN	1844	31.15
HOUSTON	3	3.18*
HUBBARD	5	4.87*
ISANTI	21	11.00
ITASCA	34	15.01
JACKSON	4	7.80*
KANABEC	7	8.70*
KANDIYOHI	28	13.23
KITTSON	1	4.44*
KOOCHICHING	10	15.22*
LAC QUI PARLE	0	0.00*

County	Pedestrian Injuries	Crude Injury Rate per 100,000
LAKE	7	12.97*
LAKE OF THE WOODS	0	0.00*
LE SUEUR	15	10.82*
LINCOLN	0	0.00*
LYON	13	10.11*
MAHNOMEN	9	4.98*
MARSHALL	4	14.58*
MARTIN	19	40.22*
MCLEOD	21	20.47*
MEEKER	5	4.32*
MILLE LACS	28	21.63
MORRISON	21	12.71
MOWER	31	15.77
MURRAY	3	6.98*
NICOLLET	21	12.76
NOBLES	10	9.26*
NORMAN	1	2.97*
OLMSTED	106	14.38
OTTER TAIL	29	10.10
PENNINGTON	11	15.67*
PINE	17	11.59*
PIPESTONE	6	12.76
POLK	20	12.65*
POPE	3	5.48*
RAMSEY	794	30.46
RED LAKE	1	4.91*
REDWOOD	8	10.11*
RENVILLE	1	1.31*
RICE	46	14.19
ROCK	1	2.09*
ROSEAU	6	7.72*

County	Pedestrian Injuries	Crude Injury Rate per 100,000
SCOTT	61	6.08
SHERBURNE	65	9.62
SIBLEY	3	0.67*
ST. LOUIS	209	20.85
STEARNS	74	9.75
STEELE	12	6.58*
STEVENS	2	4.10*
SWIFT	6	12.50*
TODD	3	2.44*
TRAVERSE	0	0.00
WABASHA	6	5.59*
WADENA	2	2.91*
WASECA	13	13.59*
WASHINGTON	180	14.75
WATONWAN	7	12.55*
WILKIN	3	9.14*
WINONA	44	17.16
WRIGHT	59	9.26
YELLOW MEDICINE	2	3.91*

Data Sources: MIDAS and CDC WONDER

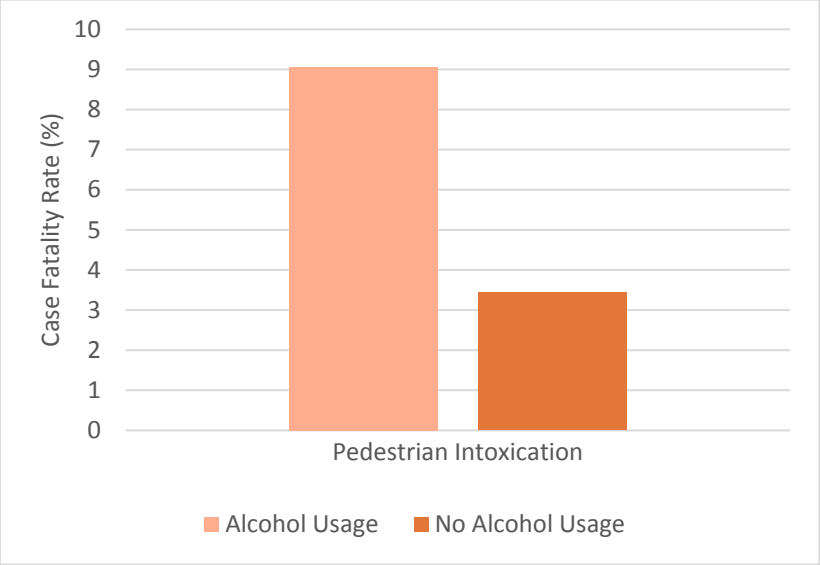
**Asterisk denotes an unstable rate (n<20)*

Table 2: Statewide Pedestrian Fatalities and Injuries, 2010-2014

	Pedestrian Fatalities	Pedestrian Injuries	Crude Fatality Rate	Crude Injury Rate
Minnesota	205	4947	0.8	18.39

Data Sources: MIDAS and CDC WONDER

Chart 8: Pedestrian Crash Fatality Rates Increase with Pedestrian Alcohol Intoxication, 2006-2012

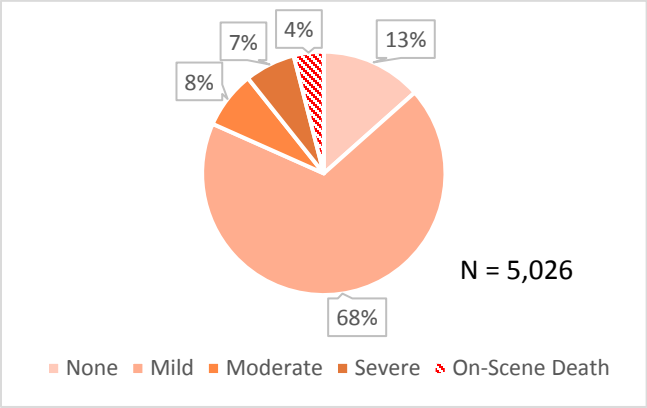


Data Source: MIDAS-CODES

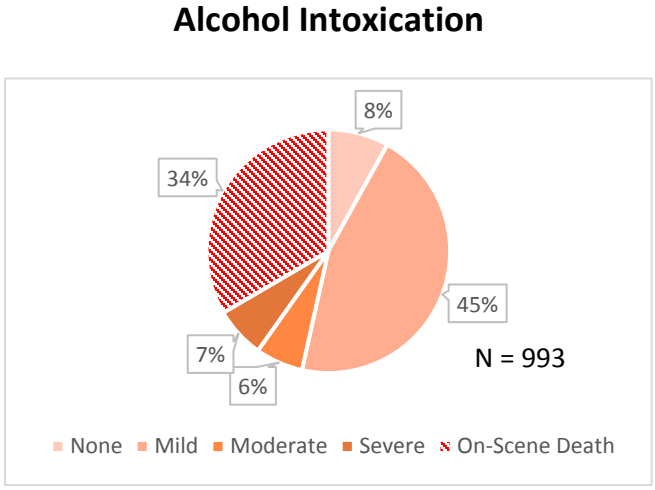
Chart 8: Pedestrian crashes where the pedestrian is intoxicated have a fatality rate more than two and a half times higher than that of crashes where the pedestrian is not intoxicated. Only 3.4% of crashes involving a non-intoxicated pedestrian are fatal, while 9.1% of crashes involving an intoxicated pedestrian are fatal. Intoxicated pedestrians may tend to cross streets in a riskier manner, increasing their likelihood of sustaining a fatal injury.

Chart 9: Injury Severity Increases with Pedestrian Alcohol Intoxication

No Alcohol Intoxication



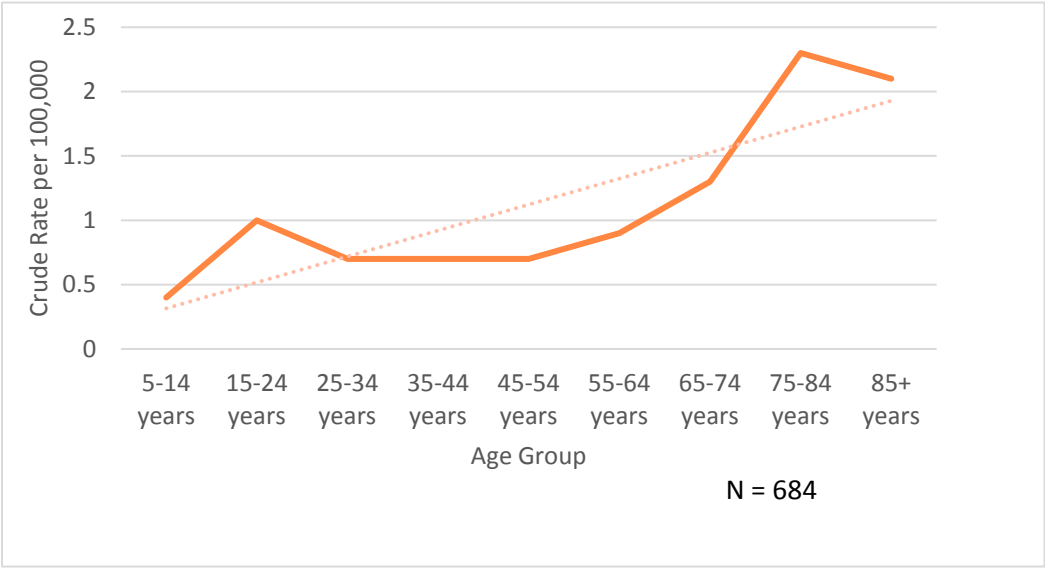
Data Source: MIDAS



Data Source: MIDAS-CODES

Chart 9: Intoxicated pedestrians sustain more severe injuries in a traffic-related crash than do non-intoxicated pedestrians. The increase in the percentage of on-scene deaths and the decrease in the percentage of mild injuries among intoxicated pedestrians is particularly striking. Compared to the 4% of non-intoxicated pedestrians sustaining fatal injuries, 34% of intoxicated pedestrians sustain fatal injuries. (Injuries are classified using the Injury Severity Score (ISS), a scale that assesses trauma severity. The absence of injury corresponds to an ISS of zero, a mild injury to an ISS between 1 and 8, a moderate injury to an ISS between 9 and 15, and a severe injury to an ISS of 16 or above. An ISS is not calculated for on-scene deaths).

Chart 10: The Pedestrian Crash Fatality Rate Increases with Age, 1999-2014

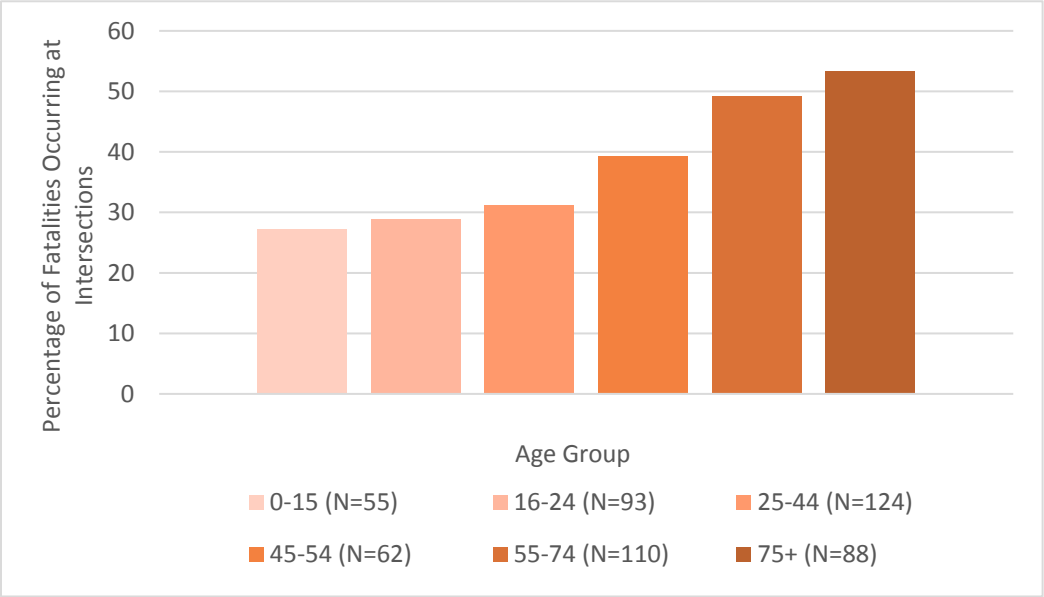


Data Source: CDC WONDER

Chart 10: The rate of traffic-related pedestrian fatalities trends upward with age, with the highest rate of fatalities occurring among 75-84 year-olds. Though a relatively small number of 75-84 year-old pedestrians are involved in crashes each year, the fatality rate is high because of

the small 75-84 year-old population size and the high chance of death that trauma imparts on older individuals. Individuals aged 16-24 compose the greatest percentage of the total number of traffic deaths, but because they belong to a more populous age group and are less likely to die if they are involved in a crash, their age-specific fatality rate is relatively low.

Chart 11: The Percentage of Pedestrian Fatalities Occurring at Traffic Intersections Increases with Age



Data Source: FARS

Chart 11: As pedestrians age, their chances of sustaining a fatal injury in an intersection as opposed to a non-intersection increase. Analysis of Fatality Analysis Reporting System data[5] shows that half (50.0%) of non-intersection-related crashes involved a pedestrian on the roadway, in a location where there was no crosswalk available. A subset of non-intersection related crashes involved a pedestrian on the roadway, but not at a crosswalk despite there one being available (27.4%). Yet a smaller subset occurred when the pedestrian was walking on a road shoulder or outside a trafficway (18.3%).

Most concerning are the fatalities among those aged 75 and over. Our analysis of CODES data shows that, though only 30.4% of all pedestrian traffic-related fatalities occurred at intersection locations, 57.5% of fatalities among those aged 75 and over occurred at intersections. The majority (95.7%) of intersection-related crashes among pedestrians of this age group involved no improper action on the part of the pedestrian and more than one-third (34.1%) of intersection-related crashes occurred when the pedestrian was properly walking in a marked crosswalk. These data suggest that slow walking speed and difficulties with seeing and hearing could be contributing factors in intersection-related fatalities involving pedestrians aged 75 and older.

Though the fact that one's chances of being hit in an intersection increases with age may be unsettling, it is important to consider that intersection-related crashes are less fatal (OR=0.76,

CI: 0.58-0.99) than non-intersection related crashes. Together, these findings suggest the need for a two-pronged approach to address pedestrian injuries and fatalities. Younger pedestrians must be better educated about the dangers of crossing a non-junction road and drivers of all ages must be better educated about how their driving behaviors at intersections threaten pedestrian safety, particularly that of senior pedestrians.

Discussion:

Minnesota's pedestrian crash fatality rate is consistently lower than that of the U.S. In any given year, Minnesota has one of the lowest, if not the lowest, pedestrian crash fatality rate of any state.[6] Nonetheless, any pedestrian fatality is one too many; traffic fatalities remain at high levels in Minnesota and across the country. The rising number of fatal and nonfatal traffic-related pedestrian injuries over the past several years warrants re-evaluation of the efficacy of current preventative measures. In light of the findings outlined in this Data Brief, educating the public about the dangers of walking while intoxicated, of crossing at non-intersection locations, and of motorists failing to yield to pedestrians at crosswalks is imperative.

Methodology

Data presented in this brief were queried from the following sources: CDC WONDER, a collection of public-use online databases, MIDAS Injury, a dataset of hospital treated injuries in Minnesota, MIDAS CODES, a dataset linking Minnesota crash data to hospital discharge data, and FARS, a nationwide census providing public yearly data on fatal motor vehicle crash injuries. The following ICD codes were used to identify traffic-related pedestrian fatalities: V01.1 (pedestrian injured in collision with pedal cycle, traffic accident), V02.1 (pedestrian injured in collision with two-or three-wheeled motor vehicle, traffic accident), V03.1 (pedestrian injured in collision with car, pick-up truck or van, traffic accident), V04.1 (pedestrian injured in collision with heavy transport vehicle or bus, traffic accident), V05.1 (pedestrian injured in collision with railway train or railway vehicle, traffic accident), V06.1 (pedestrian injured in collision with other nonmotor vehicle, traffic accident), V09.2 (pedestrian injured in traffic accident involving other and unspecified motor vehicles), and V09.3 (pedestrian injured in unspecified traffic accident).

Data Sources

1999-2014: Centers for Disease Control and Prevention, National Center for Health Statistics.

Underlying Cause of Death 1999-2014 on CDC WONDER Online Database.

2010-2014: Centers for Disease Control and Prevention, National Center for Health Statistics.

Nonfatal Injury 2001-2014 on CDC WISQARS Online Database.

2000-2014: National Highway Traffic Safety Administration. Fatality Analysis Reporting System.

2001-2014: Minnesota Department of Health. Minnesota Injury Data Access System.

2006-2012: Minnesota Department of Health. Minnesota Injury Data Access System-CODES.

2004-2015. Minnesota Department of Public Safety. Office of Transport Safety. Crash Facts.

References

1. Horn, Marissa. Walking While Texting Can be Deadly, Study Shows. USA Today. 8 March 2016. Web. 18 June 2016.
2. Drinking and Walking Can be a Deadly Combination for Pedestrians. Daily News. The Associated Press. 6 Aug 2013. Web. 20 June 2016.
3. Pedestrian Fatalities Projected to Spike 10% in 2015. Governors Highway Safety Association. 8 March 2016. Web. 20 June 2016.
4. Minnesota Injury Data Access System 2001-2014. Minnesota Department of Health.
5. National Highway Traffic Safety Administration. Fatality Analysis Reporting System. 2001-2009.
6. Centers for Disease Control and Prevention, National Center for Health Statistics. Underlying Cause of Death 1999-2014 on CDC WONDER Online Database.

Suggested Citation

Percival R, Roesler J, Gaichas A, Seymour L, Kinde M. Pedestrian Injuries and Fatalities in Minnesota – 2016 Data Brief. Saint Paul, MN: Minnesota Department of Health, December 2016.

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12/19/2016

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