

Northwestern Health Unit
Road Safety Trends Report
2019



**Northwestern
Health Unit**

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Introduction

Injury is one of the leading causes of mortality and morbidity across the world. In Canada, unintentional injury is the third highest contributor to the burden of illness in the country (Roberts, S., Vingilis, E., Wilk, P., Seeley, 2008). Injury resulting from motor vehicle collisions is one of the most prominent forms of unintentional injury.

Incidence of motor vehicle collisions is linked to demographic variables. For example, incidence of collisions often varies between different age groups, and therefore age can be viewed as a predictor of collision injury incidence. A Canadian study showed an inverse correlation between age and probability of injury from collision, with younger drivers having higher risk compared with older drivers (Vingilis & Wilk, 2007). Road traffic injuries are the leading cause of death among children and youth under 20 years old (Fridman, Fraser-Thomas, Pike, & MacPherson, 2018).

Alcohol has a large and well-documented impact on the incidence of injury and death from motor vehicle collisions, with impaired driving being one of the main causes of collisions. Despite decreases in impaired driving when looking at long-term trends, a fifth of Canadians in 2007 aged 15-24 reported driving under the influence of alcohol and a third reported having been a passenger where the driver was under the influence (Popova, S., Patra, J., Sarnocinska-Hart, A., Gnam, W., Mann, R., Rehm, 2011).

With these broad national trends in mind, the aim of this report is to provide a local picture of the incidence, characteristics, and distribution of collisions in the northwestern Ontario area. The report presents an analysis of historical motor vehicle collision data obtained from the Ontario Ministry of Transportation (MTO), which includes information on collisions in the area that resulted in injuries and deaths. These data include information on the demographics of drivers involved in the crashes, the road or highway on which they occurred, the month, the time of day, and the condition of the driver.

The report also outlines an analysis of mortality and emergency room (ER) visit trends for residents of the Northwestern Health Unit (NWHU) catchment area. The analysis looks at recent trends, demographics, and how residents compare to the rest of the province in terms of mortality and morbidity from transportation accidents.

Data sources and analysis methods

Collision statistics were obtained from the Ontario Ministry of Transportation (MTO) between June and September of 2018. Data on reported motor vehicle collisions (MVCs) resulting in death or injury in Canada are collected and stored in the National Collision Database.

The NWHU contacted the MTO in June 2018 and requested collision data for the area from 2008 to 2015 (the most recent year available at the time of the request). Data were not available at the Public Health Unit (PHU) geographic level, so data at the Census Division (CD) level was requested for the Kenora and Rainy River Districts which cover a similar combined geography to the NWHU catchment area. The MTO sent the requested data to the NWHU in the form of aggregated tables in Microsoft Excel®.

All subsequent collation, manipulation and analyses of these data were done using Microsoft Excel®.

Ambulatory data for emergency room (ER) visits from land transport accidents were obtained from the National Ambulatory Care Reporting System (NACRS) via IntelliHEALTH Ontario. IntelliHEALTH Ontario is a provincial portal that contains clinical and administrative data collected from various sectors of the Ontario healthcare system.

Mortality data for land transport accidents were obtained from Vital Statistics-Death Database via IntelliHEALTH Ontario as well.

ER visit data and mortality data for the NWHU catchment area and Ontario for the years 2008 to 2017 were extracted on June 21, 2019 (mortality data only went up to 2015). The following ICD-10 codes were included in the data extraction and subsequent analyses:

- V01-V09 Pedestrian injured in transport accident
- V10-V19 Pedal cyclist injured in transport accident
- V20-V29 Motorcycle rider injured in transport accident
- V30-V39 Occupant of three-wheeled motor vehicle injured in transport accident
- V40-V49 Car occupant injured in transport accident
- V50-V59 Occupant of pick-up truck or van injured in transport accident
- V60-V69 Occupant of heavy transport vehicle injured in transport accident
- V70-V79 Bus occupant injured in transport accident
- V80-V89 Other land transport accidents

Collation and analysis of ER visits and mortality data were carried out using Microsoft Excel® and STATA® SE 15. Crude, age-standardized, and age- and sex-specific rates were calculated for the NWHU catchment area and Ontario, as well as sub-geographies within the NWHU catchment area where possible. Age-standardized rates were calculated in Stata® SE 15 using the 2011 Canadian Census population, obtained from Statistics Canada.

Sub-geographies used in the analyses correspond to the local health hubs (LHHs) in the region as defined by the North West Local Health Integration Network (NW LHIN). Information on the LHHs and their boundaries can be found here:

<http://www.northwestlhin.on.ca/goalsandachievements/Health%20Services%20Blueprint/BlueprintTools/LocalHealthHubProfiles.aspx>

Data limitations

One of the limitations of the data received from the MTO is that it did not include the exact locations of the collisions that occurred in the region. Originally we had requested GPS coordinates for each collision, but were told that was not possible. The MTO was able to provide only the name of the highway or road where the collisions occurred, which was a limiting factor in analyzing the geographic distribution of the collisions.

Another limitation of these data is that no comparison was able to be drawn from it; as the data indicates only that the collisions took place in the Kenora and Rainy River Districts, we did not know where the drivers and passengers involved in the collisions were from, so there was no denominator. Subsequently, collision/mortality rates could not be calculated from these data and therefore they could not be compared to other geographic regions.

For the data on residents of the NWHU catchment area that were extracted, one of the limitations is that out of province data are not captured in the database. Deaths to NWHU residents as well as ER visits that occurred outside of Ontario are not included in the data set. Subsequently, numbers and rates will likely be underreported to a certain extent.

Fatal and Non-Fatal Collisions in Kenora and Rainy River Districts

The dataset received from the MTO was not available at the public health unit geography, so NWHU-specific analysis of trends was not possible for these data. Instead, data for Kenora and Rainy River Districts were used as an alternate geographic level that represents a similar area and population to the NWHU.

Between 2008 and 2015 there were 83 fatalities recorded in the Kenora and Rainy River Districts caused by motor vehicle collisions (average of about 10 per year). There were 66 collisions in total that resulted in these 83 fatalities. Of these 83 fatalities, 57 (68.7%) were males and 26 (31.3%) were females. Fatalities were most common in the 21-44 age group (43.4% of fatalities) and the 45-64 age group (28.9% of fatalities).

Figure 1: Fatal motor vehicle collisions in the Kenora and Rainy River Districts, by age group and sex, 2008-2015

| Age group | # Fatalities | | |
|--------------|--------------|-----------|-----------|
| | Males | Females | Total |
| 0-20 | 8 | 4 | 12 |
| 21-44 | 24 | 12 | 36 |
| 45-64 | 18 | 6 | 24 |
| 65+ | 7 | 4 | 11 |
| Total | 57 | 26 | 83 |

Source: Ontario Ministry of Transportation. Date received: September 25, 2018.

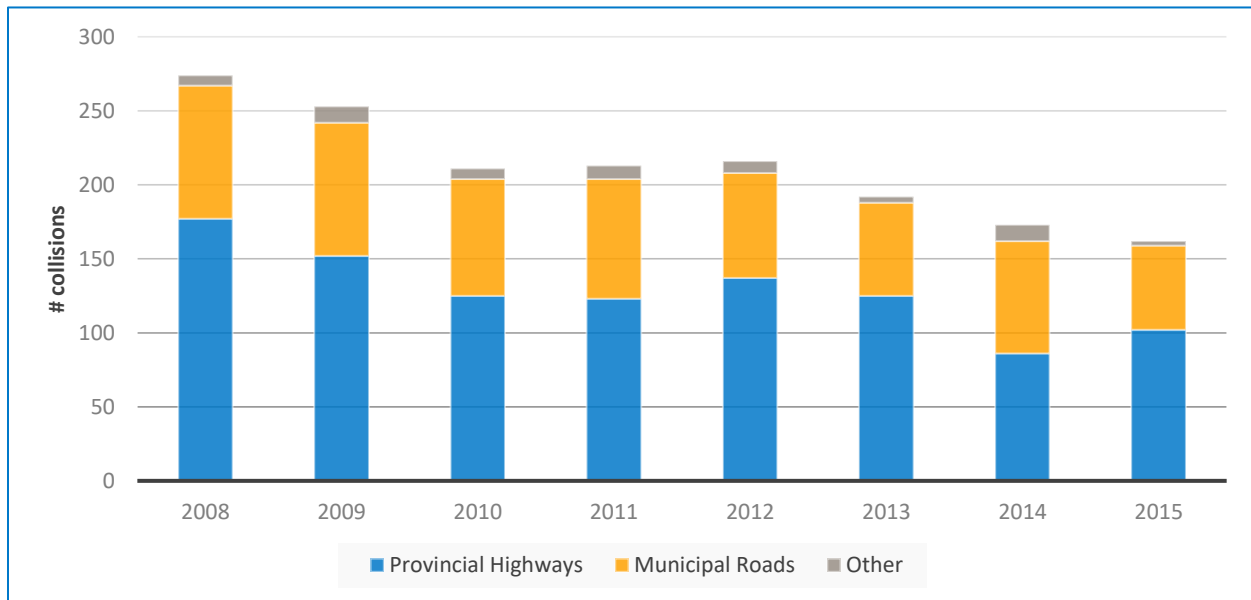
During the same time period there were a total of 1,694 non-fatal collisions that resulted in injury in the Kenora and Rainy River Districts, which is an average of 211 per year. These collisions resulted in a total of 2,507 injured people. There has been a generally decreasing trend in the number of collisions over this time, going from a high of 274 in 2008 to a low of 162 in 2015, a decrease of 40.9% (Figure 3).

Figure 2: Non-fatal motor vehicle collisions in the Kenora and Rainy River Districts, by age group and sex, 2008-2015

| Age group | # Injuries | | | |
|--------------|--------------|--------------|-----------|--------------|
| | Males | Females | Unknown | Total |
| 0-20 | 221 | 269 | 0 | 490 |
| 21-44 | 561 | 464 | 0 | 1,025 |
| 45-64 | 381 | 283 | 0 | 664 |
| 65+ | 115 | 118 | 0 | 233 |
| Unknown | 20 | 16 | 59 | 95 |
| Total | 1,298 | 1,150 | 59 | 2,507 |

Source: Ontario Ministry of Transportation. Date received: September 25, 2018.

Figure 3: Non-fatal motor vehicle collisions in the Kenora and Rainy River Districts by year and road type, 2008-2015

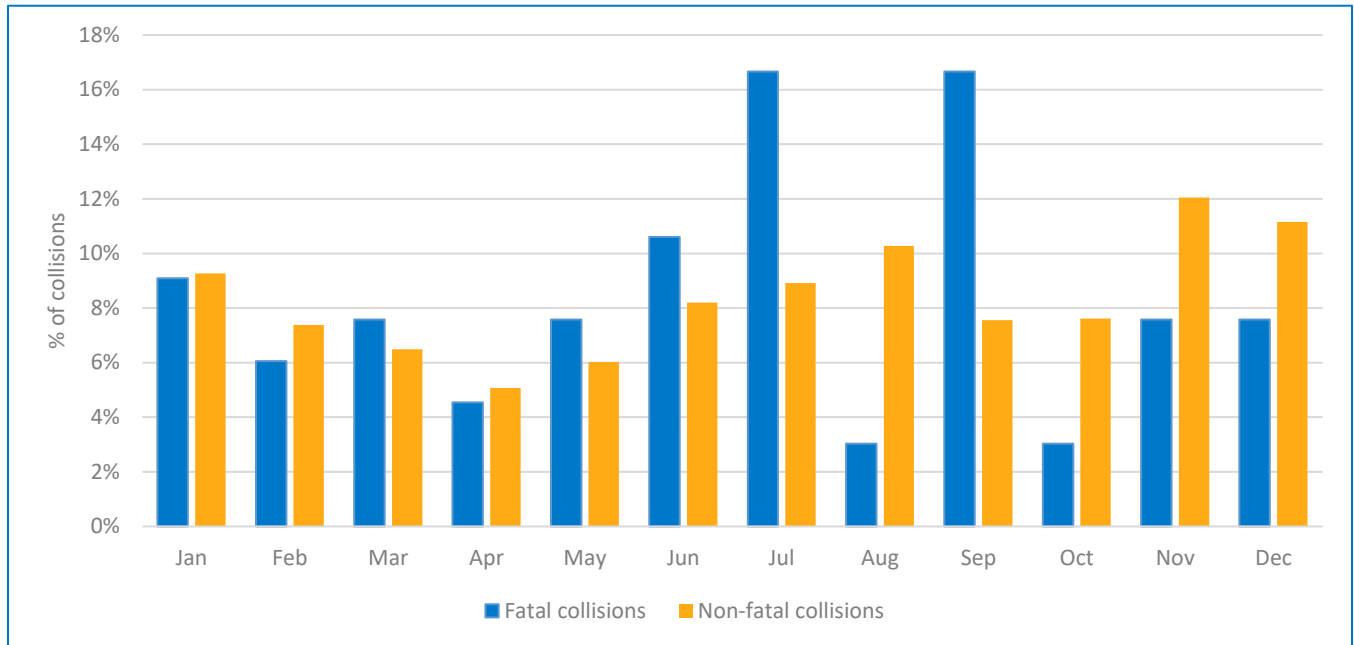


Source: Ontario Ministry of Transportation. Date received: September 25, 2018.

July and September were the most common months for fatal collisions to occur, with 11 collisions (16.7%) each between 2008 and 2015, figures likely impacted by increased traffic in the area during tourist season. June was the next most common month with 7 fatal collisions (10.6%). The most common times of day for fatal collisions were between 6:00 a.m. 8:59 a.m. (21.5% of collisions) and between 3:00 p.m. and 5:59 p.m. (18.2%).

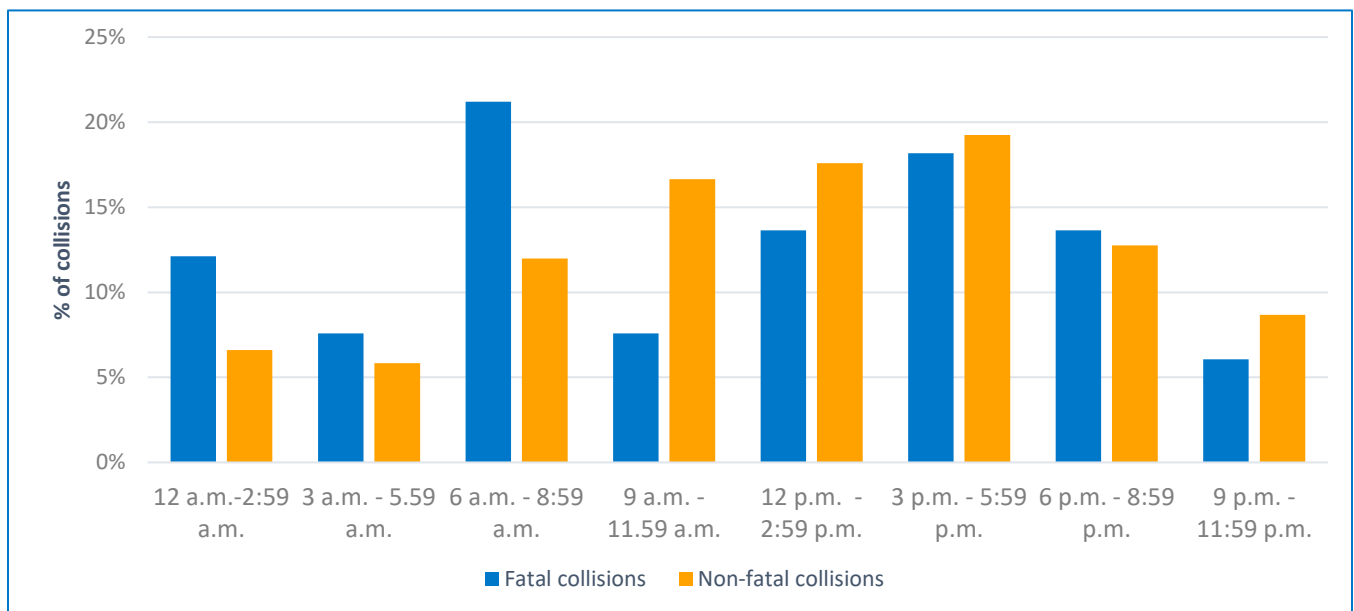
A slightly different pattern was observed for non-fatal collisions over the same time period when looking at the numbers on a monthly basis. The months with the most collisions in this case were November (12.0% of collisions) and December (11.2% of collisions). The most common time of day for non-fatal collisions to occur was between 3:00 p.m. and 5:59 p.m. (19.2% of collisions).

Figure 4: Collisions in the Kenora and Rainy River Districts by month, 2008-2015



Source: Ontario Ministry of Transportation. Date received: September 25, 2018.

Figure 5: Collisions in the Kenora and Rainy River Districts by time of day, 2008-2015

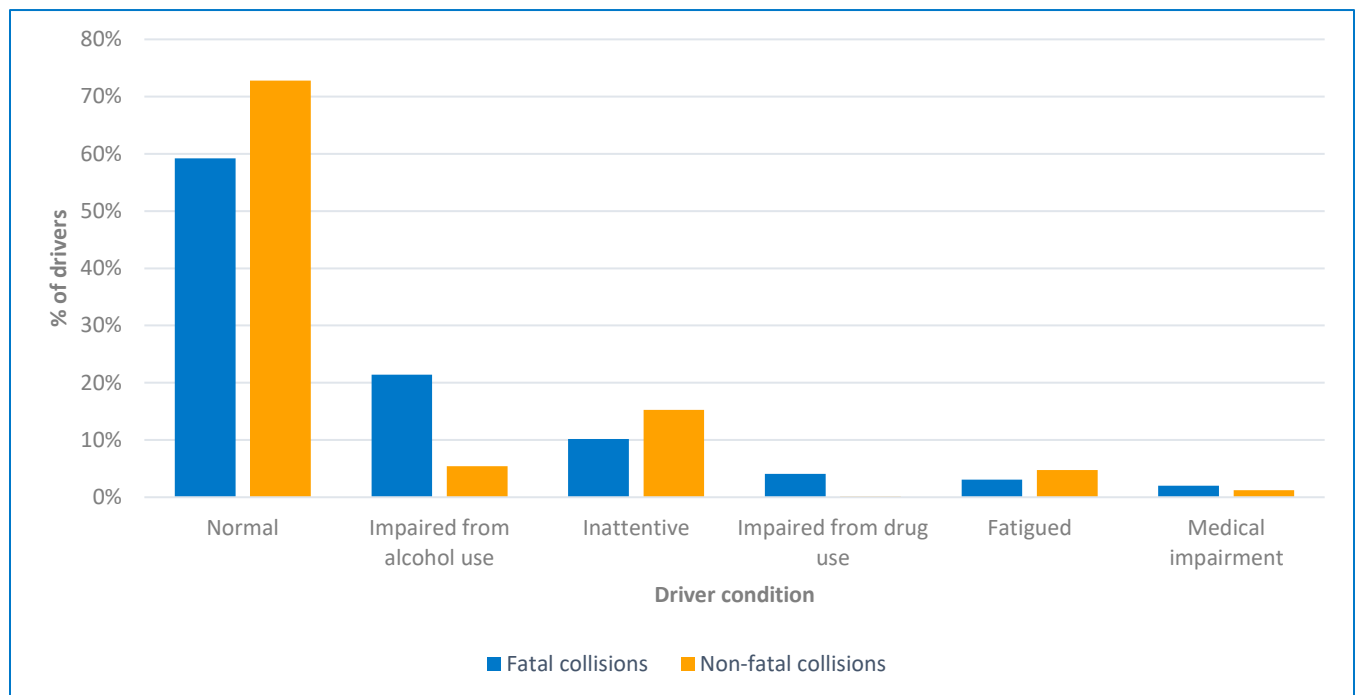


Source: Ontario Ministry of Transportation. Date received: September 25, 2018.

A total of 103 drivers were involved in the 66 fatal collisions between 2008 and 2015; 74 of the drivers (71.8%) were involved in multi-car collisions while 29 (28.2%) were in single-car collisions. Of these drivers, only 59.2% were in a “normal” condition. Over a fifth of the drivers (21.4%) had impaired cognition due to alcohol use, a further 10.2% were inattentive, 4.1% were impaired from drug use, 3.1% were fatigued and 2.0% had a medical impairment.

For non-fatal collisions, 72.8% of drivers were in a “normal” condition at the time of the collision. Alcohol use was less of a factor in non-fatal collisions; 5.4% of drivers were impaired by alcohol, significantly lower than the 21.4% of drivers in fatal collisions (Figure 6).

Figure 6: Drivers involved in fatal collisions in the Kenora and Rainy River Districts, by driver condition, 2008-2015



Source: Ontario Ministry of Transportation. Date received: September 25, 2018.

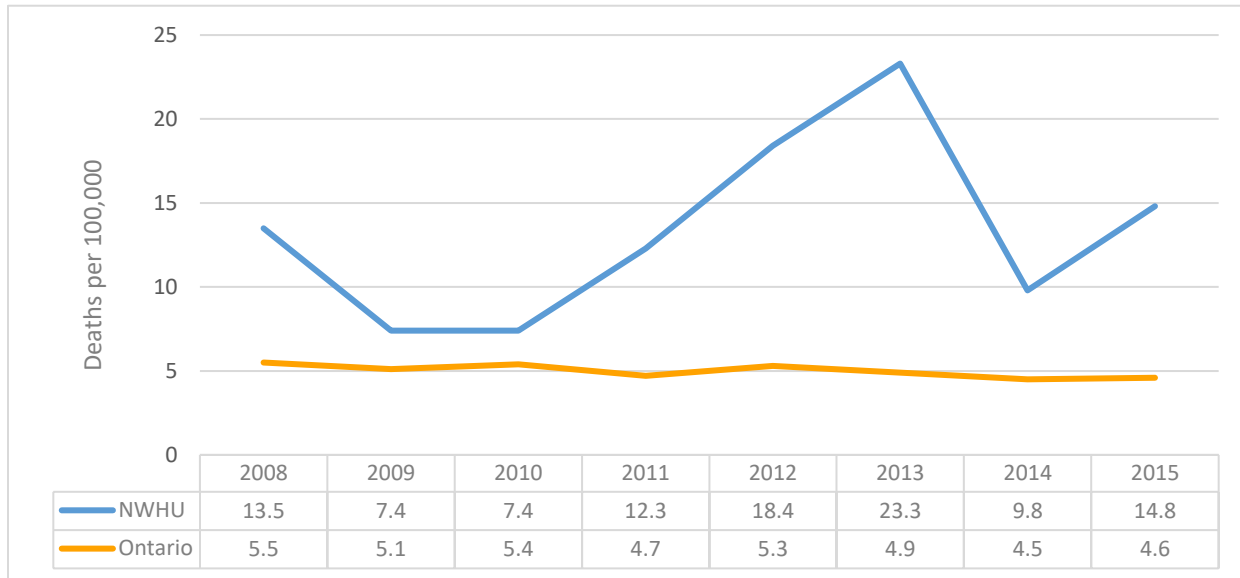
Note: “impaired from alcohol use” includes three categories: had been drinking, ability impaired by alcohol, and ability impaired by alcohol (over 0.08). “Inattentive” refers to driving without due care (e.g. eating food, changing radio station, talking on phone, etc.)

Mortality from Land Transport Collisions in Residents of the NWHU Catchment Area

Between 2008 and 2015 there was a total of 87 deaths caused by land transport accidents to residents of the NWHU catchment area. This is an incidence rate of 13.4 per 100,000 people per year. During the same time period the incidence rate for all residents of Ontario was 5.0 per 100,000 per year; incidence in the NWHU over this time was 168% higher than the overall provincial rate.

Annual incidence in the NWHU catchment area fluctuated during this period time, ranging from a low of 7.4 deaths per 100,000 in both 2009 and 2010 to a peak of 23.3 per 100,000 in 2013. By comparison, rates in Ontario as a whole during this period showed a more consistent pattern, with the overall trend of a slight decrease (Figure 7).

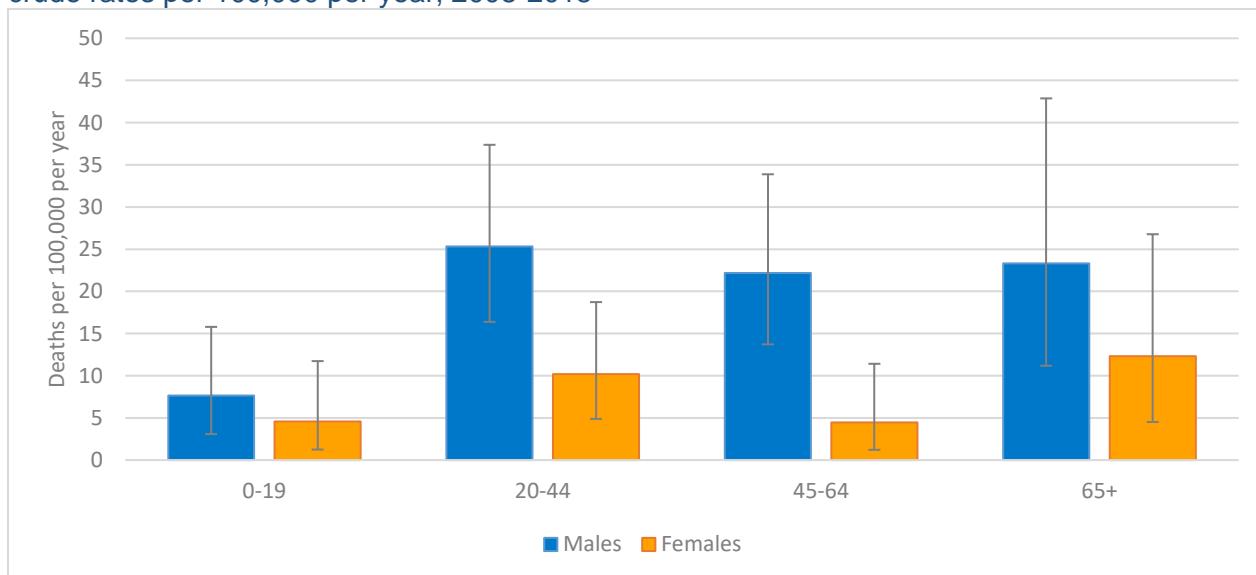
Figure 7: Mortality from land transport accidents, age-standardized rates per 100,000, 2008-2015



Source: Ontario Agency for Health Protection and Promotion (Public Health Ontario). Snapshots. Injury Mortality Snapshot. Toronto, ON: Queen's Printer For Ontario; 2019. Accessed August 1, 2019. Available from: <https://www.publichealthontario.ca/en/data-and-analysis/injuries-data/injury-mortality>

Mortality from land transport collisions is higher amongst males in the NWHU catchment area. Between 2008 and 2015 the rate of mortality in males was 19.2 deaths per 100,000 people per year. This is over twice as high as the rate in females during the same time of 7.4 per 100,000 per year. Figure 8 shows mortality rates of residents of the NWHU by age group and sex.

Figure 8: Mortality from land transport accidents in the NWHU catchment area by age group and sex, crude rates per 100,000 per year, 2008-2015

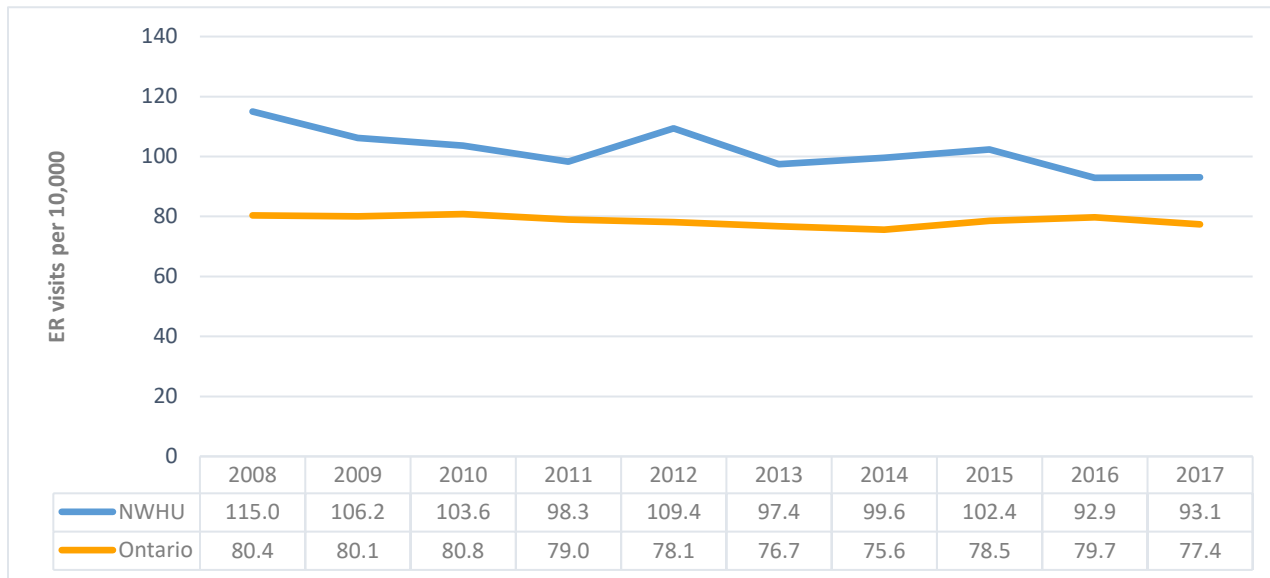


Source: Ontario Mortality Data [2008-2015]. IntelliHEALTH Ontario. Ministry of Health and Long-Term Care. Date Extracted: June 21, 2019

Emergency Room (ER) Visits due to Land Transport Collisions in Residents of the NWHU Catchment Area

In 2017 there were 738 visits to the ER due to land transport collisions for residents of the NWHU catchment area. This is an incidence rate of 90.3 ER visits per 10,000 people. For comparison, this is 18% higher than the provincial rate of 76.5 per 10,000. Despite being higher than the provincial rate, rates in the NWHU have shown a generally decreasing trend between 2008 and 2017. During that time, the rate of ER visits decreased by 23% (Figure 9).

Figure 9: ER visits from land transport accidents, age-standardized rates per 10,000, 2008-2017

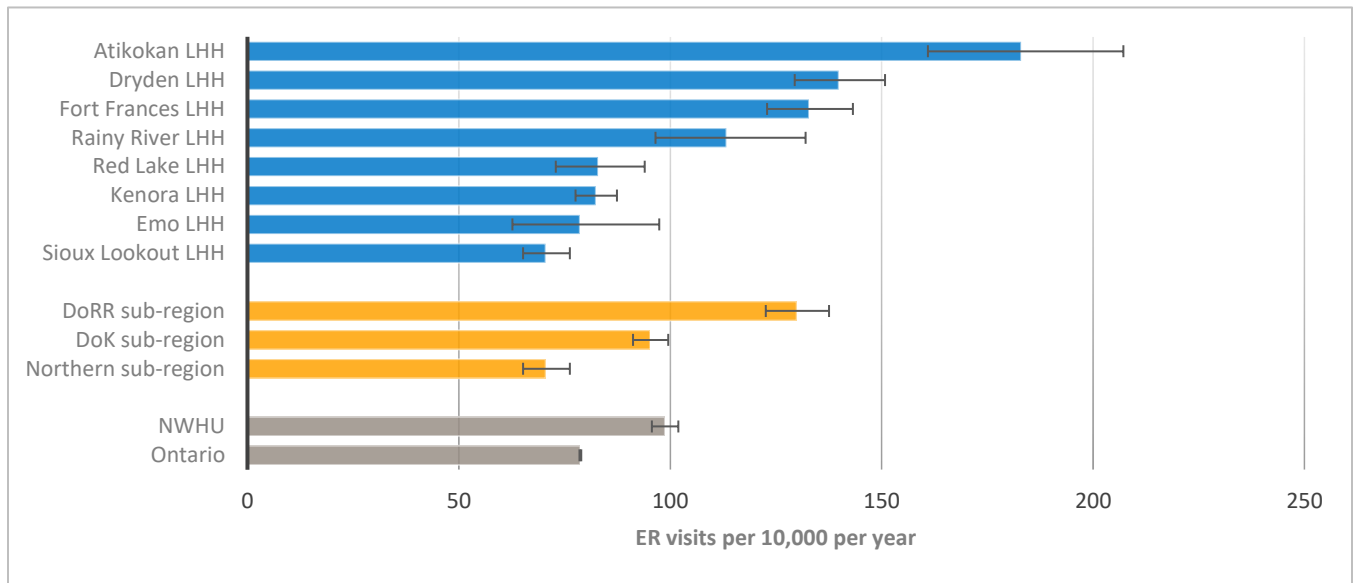


Source: Ontario Agency for Health Protection and Promotion (Public Health Ontario). Snapshots. Emergency Department Visits for Injuries Snapshot. Toronto, ON: Queen's Printer For Ontario; 2019. Accessed August 1, 2019. Available from: <https://www.publichealthontario.ca/en/data-and-analysis/injuries-data/injury-er-visits>

When analyzing recent ER visit rates by local health hub (LHH), the Atikokan area has the highest rates resulting from transport injuries. Between 2013 and 2017 the rate of ER visits in the Atikokan LHH was 183.0 visits per 10,000 people per year, which is statistically higher than all of the other health hubs in the region. The health hubs with the next highest rates are Dryden, Fort Frances and Rainy River.

The District of Rainy River sub-region had relatively high rates of ER visits during this time; 129.9 visits per 10,000 per year, which is 36% higher than the District of Kenora sub-region and 84% higher than the Northern sub-region (Figure 10).

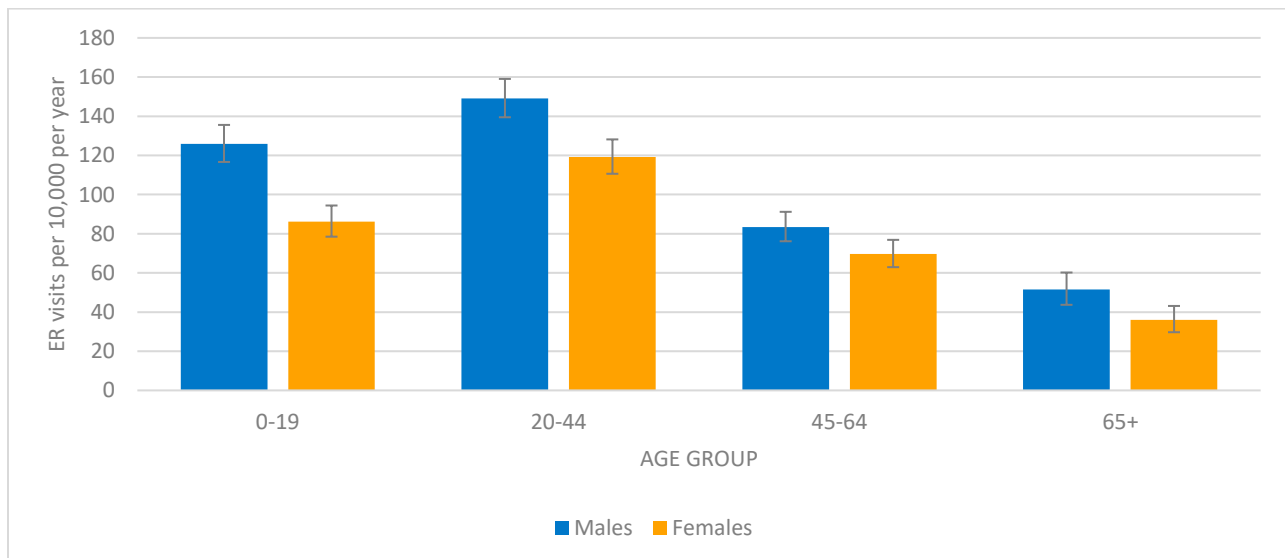
Figure 10: ER visits from land transport accidents by local health hub and sub-region, age-standardized rates per 10,000 per year, 2013-2017



Source: Ambulatory Visits [2013-2017]. IntelliHEALTH Ontario. Ministry of Health and Long-Term Care. Date Extracted: June 21, 2019

Males in the NWHU catchment area have higher rates of ER visits due to land transport accidents. Between 2013 and 2017 there were 1,694 ER visits from males in the region, which is an incidence rate of 109.6 visits per 10,000 per year. This is 31% higher than the rate in females of 83.4 per 10,000 per year. Males have higher rates than females across all age groups. The age group with the highest rate overall is 20-44, with a rate of 134.1 per 100,000 per year (Figure 11).

Figure 11: ER visits from land transport accidents in the NWHU catchment area by age group and sex, crude rates per 10,000 per year, 2013-2017



Source: Ambulatory Visits [2013-2017]. IntelliHEALTH Ontario. Ministry of Health and Long-Term Care. Date Extracted: June 21, 2019

Discussion

Mortality from collisions in northwestern Ontario disproportionately occurs in males, with 69% of fatalities in the area between 2008 and 2015 being males. Similarly, the mortality rate from land transport accidents for males who reside within the NWHU catchment is over twice as high as for females in the region. The rate of visits to the ER from land traffic accidents is also 31% higher for males in the region compared to females. Mortality and morbidity from collisions in the region is most prominent in younger adults (20-44 years old). This younger adult population, and particularly younger males, is a priority demographic to target when it comes to mitigating the burden of traffic collisions.

ED data provided us an opportunity to determine the areas within the region with the highest incidence of injury from transport collisions. Analysis of these data indicated significant discrepancies throughout the region, with rates ranging from 70 to 182 ER visits per 10,000 people per year for residents of different regions within the NWHU area. This analysis helps us to determine which geographic regions are priorities for prevention programming.

Stressing the importance of driving while alert and in good condition is a key message to get across to our population. In all of the fatal collisions in northwestern Ontario described in the results section, 41% of drivers involved were not in a “normal” condition. These drivers were either impaired by alcohol or other drugs, inattentive, or fatigued, all factors which likely played a major role in the collision. A particularly sobering statistic is that 26% of these fatal collisions were impaired by alcohol. Preventing the incidence of impaired and distracted driving would help reduce the overall burden of mortality from collisions.

On a positive note, a trend we are seeing is that the number of non-fatal collisions in the region has been decreasing. Between 2008 and 2015 there was a consistently downward trend in the number of collisions in the area, with an overall decrease in this time period of 41%. Similarly, rates of ER visits from NWHU residents due to land transport accidents decreased 19% between 2008 and 2017. While these trends are promising, other statistics in the report indicate that our relatively high rates of morbidity and mortality compared to provincial trends are still a concern.

Conclusion

This report provides us with a picture of the morbidity and mortality caused by traffic accidents and collisions in northwestern Ontario. Analysis of these data can allow us to identify target populations within our catchment area to focus our promotional efforts on, as well as to develop relevant key messages around the importance of road safety. The NWHU will continue to monitor these trends as part of our ongoing surveillance and population health assessment activities.

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