

Fatal Injury and Violent Death of Minnesota Adolescents 2011-2017

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BACKGROUND/SIGNIFICANCE

- Nationally, accidental deaths are the number one killer of teenagers, accounting for 41% of all adolescent deaths age 10-24.¹
- Motor vehicle accidents (MVA) account for nearly 60% of accidental deaths, or 24% of all adolescent deaths.¹
- In Minnesota, MVA deaths have decreased drastically, leading to an overall reduction in the mortality rate of MN teenagers 15-19.²
- While rates of MVA deaths for teenagers in MN have decreased significantly, overall death rates for MN youth age 10-24 have increased.
- This stable overall death rate suggests that some other cause(s) of death must be increasing to negate the reduction in MVA deaths.

RESEARCH QUESTIONS

- What is driving the stable mortality rates of MN youth (10-24) if MVA deaths have dramatically decreased?
- What are the factors associated with these deaths?
- What populations are most at risk?
- How does risk vary within populations for males and females?

METHODS

Data source and sample

- Mortality data for youth (10-24 years) who died 2011-2017 in Minnesota (n=2,799)

Measures

Exposures

- Alcohol use listed as a contributing cause
- Any drug use listed as a contributing cause

Outcomes

- Manner of Death:** Natural, accident, homicide, suicide, & undetermined as documented by medical examiner or medical certifier of death

- Leading Cause of Death:** Underlying cause of death as documented by ICD10 codes

Covariates

- Sex, race, urban/rural residence

Analysis

- Summary statistics, cross-tabulations with chi-square tests
- Logistic regression to estimate odds of non-natural (suicide, accidental poisoning, MVA) death vs. natural with alcohol or drug use documented at death
- Stata SE, version 15

RESULTS

Trends and Distributions of Manner and Cause of Death (Figures 1 & 2; Table 1)

- Natural deaths trend slightly upward over time; upward trends for death by suicide and accidental poisoning are more pronounced.
- Death by suicide & natural causes each account for about 26% of all adolescent deaths; total accidents account for 38% of youth deaths overall.
 - MVA are half of accidental deaths while accidental poisonings are 36%
- Deaths are distributed differently by both race/ethnicity and sex.
 - Death by suicide is more common for white males (31.8%), Asian/Pacific Islander males (35.8%), and American Indian/Alaskan Native females (37.3%) than for other groups.
 - American Indian/Alaskan Native females have higher percentages of accidental poisonings (25.5%).
 - Black males have the highest percentage of deaths by homicide (38.7%).

Leading causes rank and percent of deaths (Table 2)

- Leading cause of death for youth with no documented alcohol or drug use was suicide (28.6% of all deaths); MVA for those with documented alcohol (40.2% of all deaths), and accidental poisoning (71.5% of all deaths) for those with documented drug use.

Manner of death (Table 3)

- Alcohol use increased the odds of dying by suicide (15.1), MVA (27.0), accidental poisoning (34.1), and any accident (22.1) compared to dying of natural causes
- Drug use increased the odds of dying by accidental poisoning (66.2) and any accident (9.3), but did not significantly change the odds of dying by suicide or MVA.

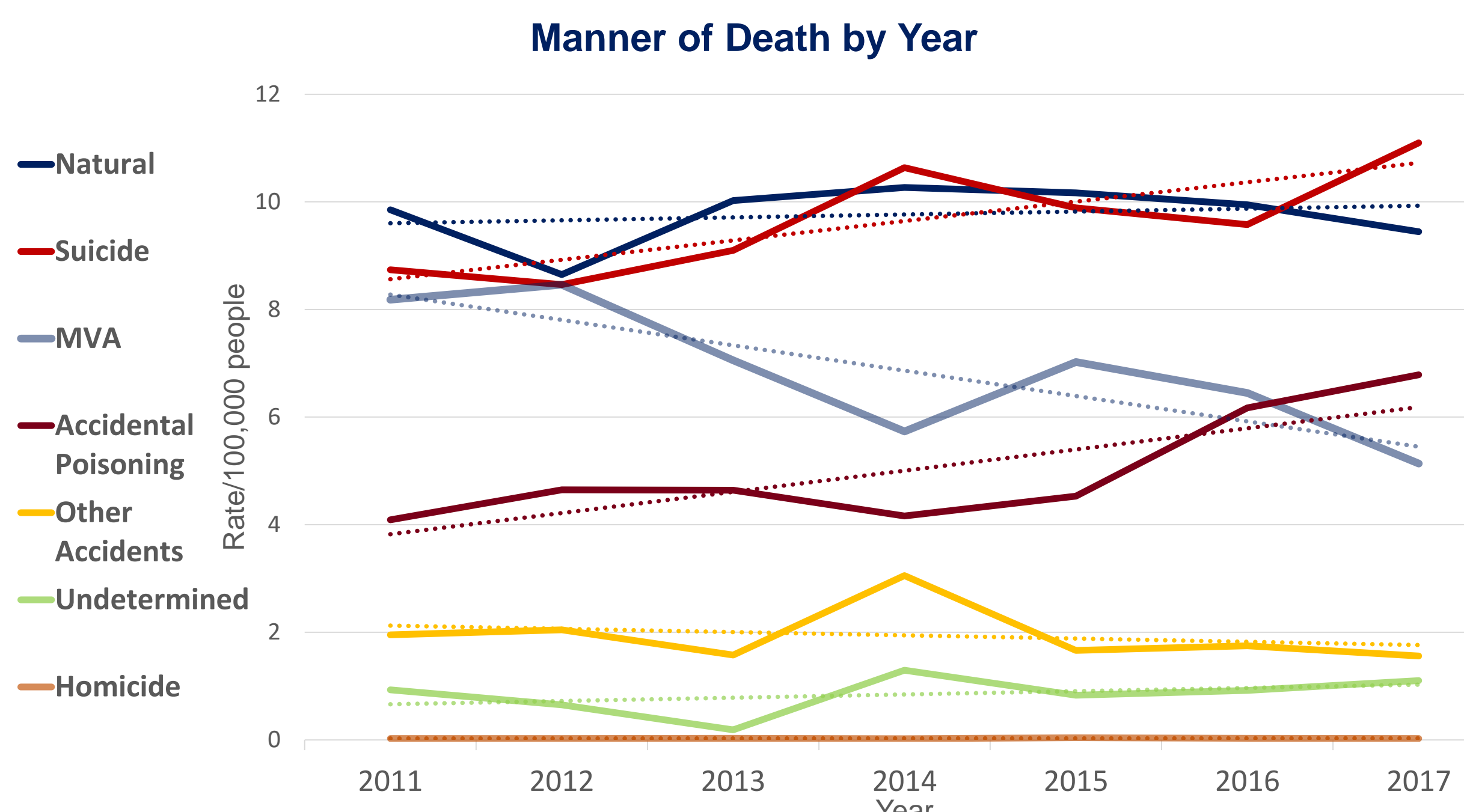


Figure 1. Manner of Death over Time, Counts & Linear Trends, Youth (10-24), MN 2011-2017.

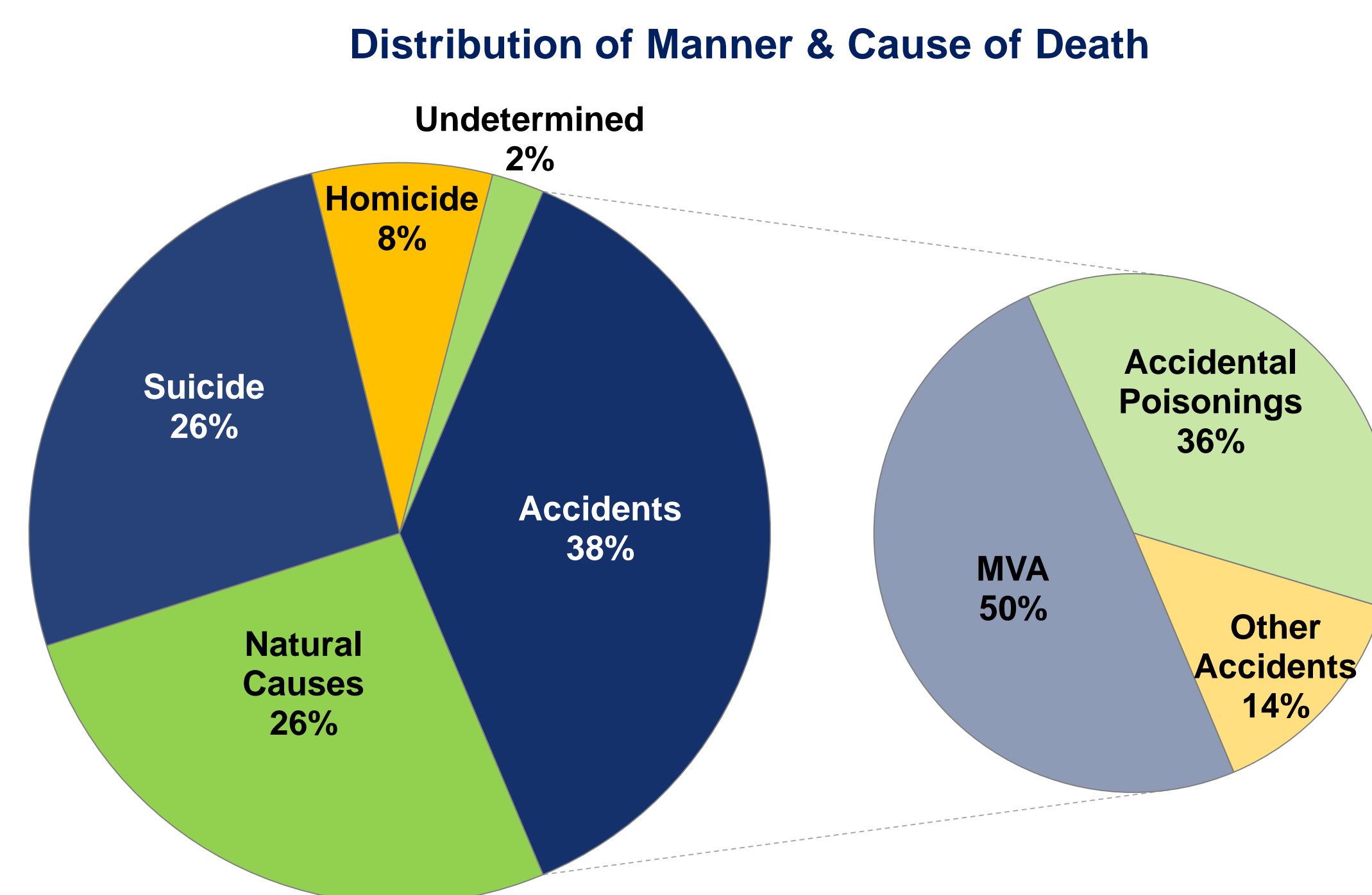


Figure 1. Distributions of Manner & Causes of All Death, Youth (10-24), MN 2011-2017.

Table 1. Percent Distributions of Manner and Cause of Death by race/ethnicity, Youth (10-24), MN 2011-2017.

Manner/Cause	White		Black		AIAN		API		Hispanic	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Natural	21.5%	35.3%	23.1%	48.2%	13.6%	-	37.0%	50.0%	30.1%	41.2%
Suicide	31.8%	19.8%	15.1%	-	28.4%	37.3%	35.8%	-	18.6%	-
Homicide	2.7%	3.5%	38.7%	12.9%	14.8%	-	-	-	12.4%	-
Accidents										
MVA	19.5%	25.3%	5.9%	16.5%	20.5%	-	-	-	17.7%	21.6%
Accidental Poisoning	17.0%	9.6%	5.9%	-	14.8%	25.5%	-	-	11.5%	-
Total All Accidents	42.0%	39.2%	20.2%	29.4%	40.9%	37.3%	16.1%	18.8%	36.3%	33.3%

Table 2. Leading Causes of Death—Rank and Percent—by Documented Drug or Alcohol Use, Youth (10-24), MN 2011-2017.

	No Drugs/Alcohol		Alcohol Only		Drug Use Only	
	Rank	% of Deaths	Rank	% of Deaths	Rank	% of Deaths
Suicide	1	28.6%	2	33.7%	2	8.7%
MVA	2	19.5%	1	40.2%	4	3.8%
Other Residual	3	11.0%	7	1.0%	3	5.2%
Homicide	4	9.8%	5	1.0%	--*	--*
Cancer	5	8.9%	--*	--*	--*	--*
Other Accidents	6	6.1%	6	1.0%	6	2.4%
Accidental Poisoning	7	1.9%	3	19.1%	1	71.5%

* Other Residual Deaths and Cancer were not in the top 7 ranked causes for adolescents with document alcohol or drug use. The remaining ranked causes were- for alcohol: other external causes, rank 4 (3.0%); for drug use: heart disease, rank 5 (2.7%) & other external causes, rank 7 (1.9%).

Table 3. Odds of Non-Natural Death by Alcohol or Drug Use, Youth (10-24), MN 2011-2017.

	Suicide vs. Natural			MVA vs. Natural			Accidental Poison vs. Natural			Any Accident vs. Natural		
	AOR	LCI	UCI	AOR	LCI	UCI	AOR	LCI	UCI	AOR	LCI	UCI
Alcohol												
No	1.0			1.0			1.0			1.0		
Yes	15.1	6.0	38.3	27.0	10.7	68.0	34.1	13.1	89.1	22.1	9.0	54.4
Drug Use												
No	1.0			1.0			1.0			1.0		
Yes	1.0	.6	1.7	.8	.4	1.4	66.2	41.9	104.7	9.3	6.3	13.7

Adjusted for sex, race/ethnicity, and urban/rural residence.

DISCUSSION

- Accidents (in total) are the leading cause of death for MN adolescents 10-24 (38%), comparable to the national rate of accidental death (41%).
 - MVA deaths in MN (19%) are less frequent than national MVA deaths (24%) but MN adolescents face a increased risk of accidental poisoning (36%) compared to their national cohort (29.6%).¹
 - Policies that address the dangers of accidental overdose in adolescents (the most common accidental poisoning) especially of opioids, should be considered.
- Suicide rates are increasing for all MN adolescents, making up 26% of all adolescent deaths.
 - White males, Asian males, and American Indians, are most at risk. American Indian females are at the highest risk of accidental poisoning among all adolescents.
 - Policies that address mental health may have many benefits.
 - Reduce deaths due to suicide.
 - Reduce other accidental death associate with alcohol and drug use (often associated with mental illness).
- Black males face a significant increase in risk of dying by homicide:
 - The odds of a black male dying of homicide is nearly 11 times the odds of a white male dying, controlling for other factors.
 - Neither alcohol or drug use were associated with black male homicide.
 - Policies addressing youth violence, with input from black communities, that focus on social factors in addition to substance abuse should be considered.

References

- CDC, NCHS. Multiple Cause of Death 1999-2017 on CDC WONDER Online Database, released December, 2018. Accessed at <http://wonder.cdc.gov/mcd-icd10.html> on Jun 15, 2019
- Olsen J. & Webster M. (2017). "Minnesota teen driving deaths plummet: Better drivers or fewer teens." *Star Tribune*, September 9.