

# **Seatbelt Usage Among Drug and Alcohol Impaired Drivers in the Bakken Oil Fields compared to greater Montana**

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## **Abstract**

**Introduction:** Montana has the highest rate of deaths due to impaired driving in the nation and the fifth lowest rate of seatbelt utilization. This study seeks to examine the relationship between these two issues in urban, rural, and Bakken-region Montana counties.

**Methods:** Crash data for the years 2008 and 2012 were collected from the Montana Department of Transportation (MDT). These data were separated by year as well as category based on drug or alcohol and seatbelt use. Risk ratios were calculated and compared by year and county.

**Results:** There was a strong association between the use of drugs or alcohol before driving and the failure to wear a seatbelt. Rates were highest among drivers in the Bakken region of Montana, followed by those in rural and urban Montana counties.

**Discussion:** The results of this study can be used as evidence of the need for increased funding for local police officers in rural Montana, as well as in the Bakken region of Montana. Additionally, the implementation of a primary seatbelt law in Montana would be beneficial. The implementation of both of these policies could help increase seatbelt utilization among drug and alcohol impaired drivers in Montana.

## **Introduction**

In 2009, over 33,000 people were killed in motor vehicle accidents in the United States, and over half were not wearing seatbelts (CDC, 2011). By keeping occupants restrained inside of a vehicle during a collision, fatalities are drastically reduced. In Montana, approximately 900 people per year are hospitalized with injuries caused by motor vehicle accidents where seat belts were not used. Medical costs exceed 36 million dollars annually (Harborview, 2009). Unbelted occupants and drivers of motor vehicles also are responsible for approximately 10 million dollars in preventable emergency services in Montana alone (Harborview, 2009). Despite the benefits of seatbelt use, rates of utilization in Montana remain among the lowest in the nation (NHTSA, 2013). According to the Centers for Disease Control and Prevention (CDC), “as locations became more rural, the number of Americans who reported always wearing a seat belt decreased” (CDC, 2011). The CDC also points out the fact that seatbelt use was much higher among rural areas with a primary seatbelt law in place. One of the main reasons cited for the failure to utilize seatbelts is a negative attitude toward seatbelt use. The NHTSA conducted a study of eight focus groups comprised of males who regularly drive pickup trucks to further examine these attitudes (NHTSA, 2004). Reasons cited for not wearing seatbelts varied. First, the respondents were worried about becoming trapped inside of the vehicle in the event of a collision. Secondly, the men in this survey reported that the size of their vehicle would provide protection. Finally, the respondents of this survey reported that it is not the government’s place to enforce safety regulations such as seatbelt usage (NHTSA, 2004). Despite all that is known about the benefits of wearing a

seatbelt in the event of a collision, people continue to fail to wear them for a multitude of reasons.

In addition to the low rates of seatbelt use, Montana has a severe problem with impaired driving. According to the NHTSA's annual report on impaired driving, Montana has a rate of 0.91 deaths per 100 million vehicle miles traveled (VMT) due to impaired driving, the highest rate in the nation (NHTSA, 2007). This can be compared to Vermont, which has a rate of just 0.16 deaths per 100 million VMT (NHTSA, 2007). Additionally, Mothers Against Drunk Driving reports drunk drivers were responsible for 38% of all traffic fatalities in Montana in 2011 (MADD, 2013). Because rates of seatbelt use in Montana are low, and rates of impaired driving are high, this study sought to associate impaired driving as a risk factor for the failure to wear seatbelts. More specifically, we examined the association between impaired driving and seatbelt utilization in Montana counties encompassed by the Bakken oil fields, compared to non-Bakken counties, and in rural versus urban Montana Counties. Strong associations between rates of impaired driving and lack of seatbelt use will help Montana policy makers target areas that need additional resources for DUI patrols and other DUI prevention measures. Additionally, a positive correlation between drunk driving and the failure to wear a seatbelt among drivers in Montana could be used to support legislation for harsher penalties for DUI offenders. Finally, this study could provide evidence of Montana's need for a primary seatbelt law.

## **Literature Review**

### **The Bakken Oil Fields**

The Bakken Oil Fields are located in northeastern Montana and northwestern North Dakota. The oil boom in the Bakken began around 2008 and continues to expand. Since the sharpest increase in oil production in the Bakken region during 2008, violent crime has risen by 63 percent, while crime in the rest of Montana has decreased (Brown, 2013). Additionally, communities near the Bakken have had a difficult time maintaining and adding infrastructure needed to accommodate the drastic increase in population. One author writes in his article “Oil Impact on Montana: Tale of the Tip”, “resources are scarce to address the impact of oil-related spillovers on roads, sewage systems and other public services. Oil and gas production taxes paid by firms employing workers living in Montana accrue to North Dakota, not the Treasure State. Local governments in Montana see relatively little revenue from state oil and gas taxes because of production declines and lower effective tax rates compared with North Dakota” (Federal Reserve, 2013).

### **Impaired Driving and the Effects on Seatbelt Use**

The existing literature overwhelmingly suggests that drinking alcohol or using drugs before operating a motor vehicle is related to a decreased likelihood of wearing a seatbelt.

In one study examining the relationship between impaired driving and seatbelt use in Minnesota, researchers performed interviews with 2857 drivers entering parking lots in 16 communities (Foss, Bierness, and Sprattler, 1994). This study found that drivers who were above the legal blood alcohol or drug limit were far less likely to wear their seatbelt. Meanwhile, just over 50% of drivers with a blood alcohol content of 0-0.019% (not impaired) wore their seatbelts. Under 40% of drivers with a blood alcohol content over

0.15% (impaired) wore seatbelts. Additionally, this study found that passengers in the vehicles of impaired drivers were also less likely to wear seatbelts. Approximately 40% of passengers in the vehicles of drivers with blood alcohol contents of 0-0.019% were wearing seatbelts, compared to just 5% of passengers of drivers with blood alcohol contents of greater than 0.15%. The results of this study overwhelmingly suggested that drinking alcohol before operating a motor vehicle is related to the failure to wear a seatbelt among both drivers and their passengers (Foss et al., 1994).

In a separate study, Gross et al. (2007) examined the predictors of seatbelt use in American Indian populations. The primary purpose of this study was to determine if American Indians living off reservations were more likely to wear seatbelts than American Indians living on reservations. A multivariate analysis was performed that included alcohol as one of the variables. Data collected from over 2000 American Indians being treated for injuries sustained in motor vehicle collisions revealed that 42.7% of the patients living off reservations had been wearing their seatbelts at the time of the crash, while just 25.9% of patients living on reservations had been wearing their seatbelt at the time of their crash. Multivariate analysis results suggested that increased rates of impaired driving on reservations explained the discrepancy in seatbelt use observed among American Indians living in two separate locales. This study provided valuable evidence that the consumption of alcohol before driving is related to a decreased likelihood of wearing a seatbelt (Gross et al, 2007).

Additionally, Young-Jun Kweon (2004) conducted a secondary analysis of the NHTSA's Motor Vehicle Occupant Safety Survey to examine alcohol and seatbelt usage among both drivers and passengers of motor vehicles. Kweon reported that drivers who

drink alcohol frequently, as well as drivers who self report drinking and driving are some of the groups that are least likely to wear seatbelts.

While the above studies overwhelmingly suggested that driving while impaired drastically reduces seatbelt usage, studies examining the relationship between impaired driving and seatbelt usage in Montana are lacking.

### **Current Montana Seatbelt Laws**

Currently, Montana only has a secondary seatbelt law (Buckle Up Montana, 2014). This means that a police officer cannot stop a driver primarily for failure to wear a seatbelt. Implementation of a primary seatbelt law would allow police officers to make traffic stops based solely on the failure to wear a seatbelt, which would lead to increased seatbelt utilization (NHTSA, 2004).

### **Methods**

A secondary analysis of data retrieved from the Montana Department of Transportation (MDT) was performed for this study. The objective of this study was to seek an association of impaired driving as a risk factor for the failure to wear seatbelts. Mark Keeffe of the MDT provided crash data from Montana for the years 2008-2012, which contained several categories of motor vehicle collisions. The categories included “improper seatbelt use by intoxicated drivers”, “proper seatbelt use by intoxicated drivers”, “proper seatbelt use by intoxicated drivers”, “improper seatbelt use by sober drivers”, and “proper seatbelt use by sober drivers”. The above years were selected to reflect recent trends in impaired driving and seatbelt use, and to span a rapid population



growth period in rural Montana caused by the Bakken oil boom. The data retrieved were separated by county, year, and the above information regarding impairment and seatbelt use.

Data from 2008 and 2012 were analyzed for ten Montana counties. Counties were selected on the basis of population. Urban counties were defined as those counties with greater than an 80,000 population, and rural counties were defined as counties with less than a 15,000 population. Additionally, the rural counties selected for comparison bordered the urban counties. Finally, the two counties most closely associated with the Bakken Oil development (i.e., Roosevelt and Richland) were also selected for analysis.

Risk ratios (RRs) were calculated to determine if an association between impaired driving and failure to wear a seatbelt existed for each county studied. Additionally, prevalence of seatbelt use among drug and alcohol impaired drivers, as well as among sober drivers were calculated.

For this analysis, impaired driving was considered the exposure and seatbelt usage was defined as the outcome. A risk ratio calculated greater than one indicated that drivers were at a greater risk for failing to wear their seatbelt while impaired. “Impaired driving” is defined in the state of Montana as a blood alcohol or drug content greater than 0.08 percent (DMV, 2013). “Seatbelt Use” is defined by the state of Montana as a system using a lap belt, a shoulder belt, or other belt or combination of belts installed in a motor vehicle to restrain occupants, which system conforms to federal motor vehicle safety standards (Montana Annotated Code, 2013). Failing to wear a seatbelt, as well as failing to properly apply a safety restraint system included in the definition above is considered a failure to wear a seatbelt. The above definitions were used to identify

impaired drivers and proper seatbelt use among drivers included in the crash-data set analyzed for this study.

Carroll College Institutional Review Board approval was not needed for this study for a number of reasons. First, the data set retrieved from the MDT contained no personal identifiers. Second, the data used in this study is publically available. The MDT previously took all ethical considerations into account before the data were made available to the public.

## **Results**

This study aimed to find an association between driving while impaired by drugs or alcohol, and failure to use a seatbelt among urban, rural, and Bakken oil field associated counties in Montana. Risk ratios were calculated for each Montana county included in the study, and data from both 2008 and 2012 were analyzed. The results of this analysis suggested that in both 2008 and 2012, all but one county (Bighorn) included in this study showed a positive association between impaired driving and lack of seatbelt use with RR ranging from 0.97 to 3.35 (Figure 1, Figure 2). These results suggested that driving under the influence of alcohol does, in fact, decrease the likelihood of a driver properly utilizing their seatbelt. Because the outcome in this study was defined as seatbelt use and the exposure was defined as drug or alcohol use, a risk ratio greater than one indicates that drivers are at a greater risk for failing to wear their seatbelt if they are impaired.

In 2008, Chouteau County showed the highest association between exposure and outcome (RR=2.34). This suggested that, in 2008, drivers in Chouteau County were 2.34

times less likely to wear their seatbelts properly if they were driving while impaired by either drugs or alcohol. The smallest risk ratio calculated during 2008 was in Bighorn County at 0.97. This value is very close to one, meaning that there was no difference in seatbelt usage among drivers who were sober or impaired. In 2012, the measure of association was highest in Bighorn County (RR=3.35), meaning that drivers in Bighorn County were 3.35 times less likely to wear their seatbelt if they had used drugs or alcohol before operating a motor vehicle. The lowest measure of association in 2012 was in Chouteau County (RR=1.05) suggesting that there was little difference in seatbelt usage among sober or impaired drivers.

Data were also compared between rural and urban counties. In 2008, the average measure of association in the ten counties included was RR=1.42 (range of RR=1.25 to RR=1.57). This number is relatively low when compared to the four non-Bakken, rural Montana counties included in this study. The average measure of association for these counties was RR=1.69 (range of RR=0.97 to RR=2.19). These data suggested that drivers in rural Montana are about 19% less likely than drivers in urban Montana to wear their seatbelts if they are driving impaired. The average measure of association for both urban and rural counties in 2012 stayed very similar to those calculated for 2008. In 2012, the average measure of association among the four urban counties in Montana was calculated as RR=1.35 (RR=1.21 to RR=1.47). In 2012, the average measure of association in the four rural counties was RR=1.70 (RR=1.05 to RR=3.35).

The four urban counties were also compared specifically to the two counties in the Montana Bakken region. As stated above, the average measure of association in 2008 for the urban counties studied was RR=1.42. The average measure of association in 2008

for the two Bakken counties was  $RR=1.66$ . In 2012, the average measure of association for the urban counties decreased, but increased drastically in the Bakken counties. In 2012, the average measure of association in the urban counties of Montana shrunk to  $RR=1.35$ , while the average measure of association in the Bakken rose to  $RR=2.44$ . The average measure of association in the two Bakken counties nearly doubled from 2008 to 2012.

Finally, the average measures of association for the rural Montana counties included in this study were compared to those of the Bakken region of Montana. The average measures of association between these two groups of counties were very similar in 2008. The average measure of association for the rural counties was ( $RR=1.69$ ) and ( $RR=1.66$ ) for the Bakken counties; this drastically changed in 2012. The average measure of association for the rural counties stayed fairly consistent ( $RR=1.70$ ), but the average measure of association in the Bakken counties rose to ( $RR=2.44$ ).

The prevalence of those who failed to wear seatbelts while driving impaired increased significantly in one of the Bakken counties studied, and remained relatively constant in the other from 2008 to 2012. In Roosevelt County, the prevalence of drug and alcohol influenced drivers who failed to wear seatbelts decreased by approximately 2% from 2008 to 2012 (Figure 3, Figure 4). Though, in Richland County, the prevalence increased from 14.8% in 2008 to just fewer than 40% in 2012 (Figure 3, Figure 4).

For the most part, the prevalence of drug or alcohol impaired drivers who failed to wear seatbelts remained relatively constant from 2008 to 2012 in the urban counties of Montana. The one exception to this was Missoula County; Missoula County's prevalence decreased by over 12% (Figure 3, Figure 4).

The prevalence of drug or alcohol impaired drivers who failed to wear seatbelts decreased significantly from 2008 to 2012 in rural Montana. The average decrease in the four rural Montana counties was 28.7% (Figure 3, Figure 4).

These results strongly suggest that driving under the influence of drugs or alcohol decreases the likelihood of a seatbelt being worn by drivers in Montana, especially drivers in rural Montana and the Bakken region of Montana.

## **Discussion**

Previous studies examining the relationship between impaired driving and seatbelt usage demonstrated that drivers were less likely to wear a seatbelt if they were impaired. The results of this study were consistent with the findings of the existing literature.

The results of this analysis also suggested that the risk of failing to wear a seatbelt while impaired was the smallest among Montanans living in urban counties, and increased among those living in rural counties and in the Bakken regions of Montana. Further studies are needed to determine the reasons for the differences among the populations of Montanans studied, but a number of studies have suggested why these discrepancies exist.

The NHTSA suggested that seatbelt use is lower in rural communities, in general, because there is a lack of law enforcement (NHTSA, 2001). Often times in rural counties, sheriff's departments are expected to cover a greater area with fewer deputies than are available in more urban areas. Additionally, the NHTSA suggested that officers in rural areas are less likely to issue seatbelt citations to people that they know personally

(NHTSA, 2001) and that drivers are less likely to utilize seatbelts in states, such as Montana, that do not have primary seatbelt laws (NHTSA, 2001).

In a later study sponsored by the NHTSA addressing attitudes toward seatbelts among rural pickup truck drivers (NHTSA, 2004), reasons cited for no seatbelt use included the belief “that the size of their vehicle protects them and that safety belts are not necessary for short trips or work-related trips”, and that the seatbelt would trap them in the vehicle in the event of a collision (NHTSA, 2004). The reasons cited in this survey for failure to wear a seatbelt could be similar to the attitudes toward seatbelt use in rural Montana. Although it is not completely understood why people in rural areas are less likely to wear seatbelts, the findings of the NHTSA are consistent with the results of this study. Further studies are needed for a deeper understanding of this topic.

One of the greatest strengths of the study herein was that the data set was obtained directly from a database at the MDT. Because data was obtained directly from the source responsible for data collection, the possibility of the introduction of bias into the data by a secondary entity prior to use in this analysis was eliminated. Additionally, this study was successful in the fact that it included data for urban and rural areas. This study aimed to compare urban and rural areas in terms of association of impaired driving as a risk factor for failure to wear a seatbelts, and the study was successful because data for both urban and rural areas were available for analysis.

Limitations of this study included a number of “unknowns” in the data collected from the MDT. For example, when Highway Patrolmen collected data at the scene of a crash, sometimes it was not possible for the Patrolman to identify victims as drivers or passengers. Patrolmen then listed victims as “unknown” when data was reported. This

was a possible source of error in the analysis. A second limitation to this study was the sample size of drivers in the rural Montana counties. For example, in 2008, Mineral County only had 19 reported crashes involving impaired drivers. Ideally, these sample sizes would be larger in future studies. Larger sample sizes are better indicators of events that occur in the population as a whole (Newsom, n.d.).

Further studies are needed for a greater understanding of the issues examined by this study. For example, future studies could help to answer the question as to why the rates of seatbelt use among drinking drivers in the Bakken region are so much lower than in other areas of the state. This is an important question that this study has raised that could be addressed by future studies.

The results of this study can be used to drive further public health policy promoting the implementation of a primary seatbelt law in Montana, as well as promoting the need for increased patrols for impaired drivers. According to Mothers Against Drunk Driving (MADD), there are several policies that are effective in combating impaired driving that do not exist in Montana, and this study could provide needed evidence for the implementation of these policies. First of all, sobriety checkpoints are an incredibly effective tool to combat drunk driving, but are not utilized in Montana. Sobriety checkpoints decrease impaired driving by an average of 20 percent (MADD, 2013). Sobriety checkpoints would also improve seatbelt utilization among Montanans because drivers would be ticketed at sobriety checkpoints for failing to utilize a seatbelt. Next, Montana does not currently require the installation of ignition interlocks for first time DUI offenders. Lastly, Montana does not currently participate in no-refusal events. For example, many states have weekends where drivers do not have the right to refuse a

blood alcohol breath-test if they are suspected of driving under the influence (MADD, 2013). Along with helping to alleviate Montana's impaired driving problem, no refusal events could also help to improve seatbelt utilization. For example, no-refusal events could be extended to create a temporary primary seatbelt law in Montana. All three of these policies would be valuable combatants to Montana's impaired driving problem, and the results of this study could be used to influence the implementation of policies such as these.

In conclusion, this study strongly suggests that drug and alcohol impaired drivers in Montana are less likely to wear seatbelts than sober drivers. This is yet another dangerous behavior exhibited by impaired drivers, and through the implementation of laws and public health improvement programs this problem can be reduced.



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**Figure 1**

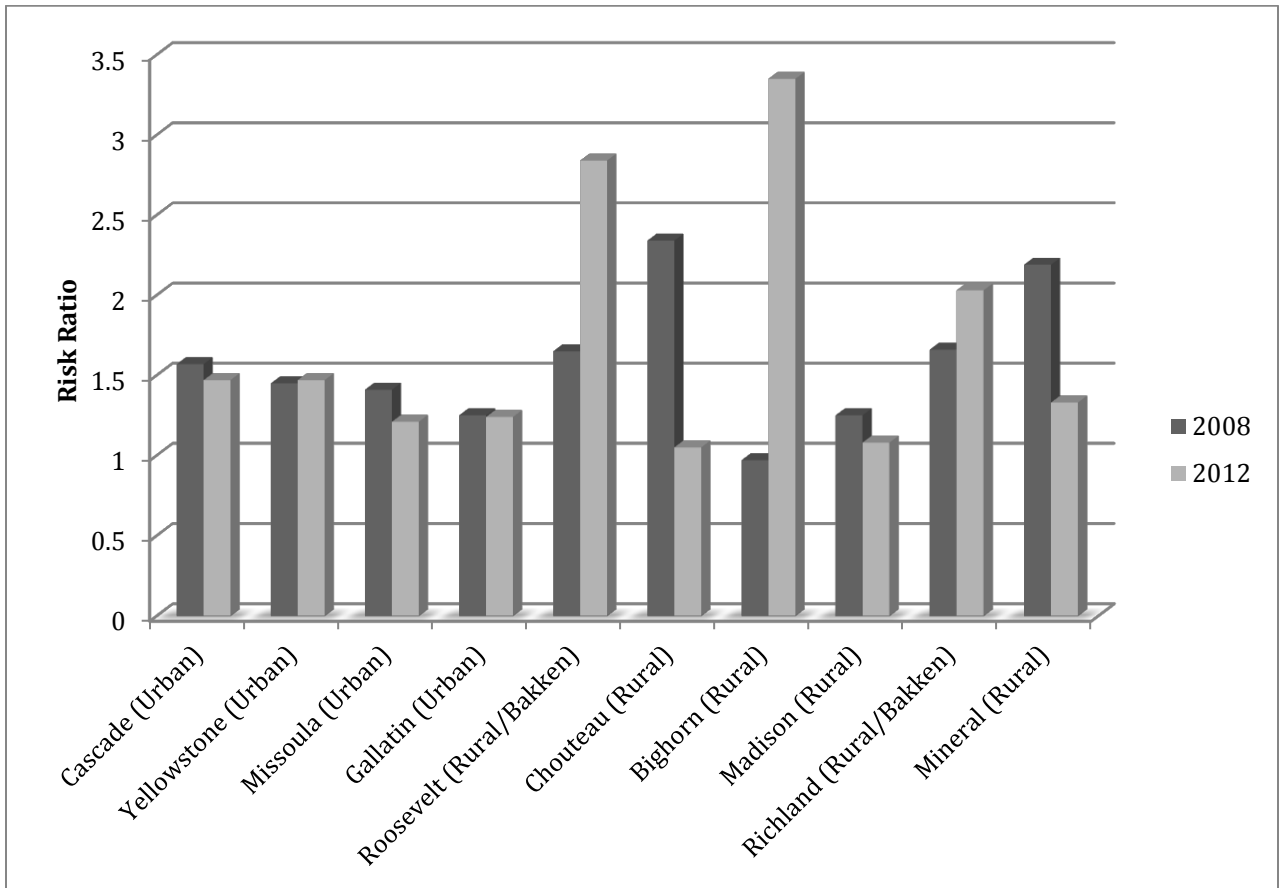
Risk Ratio by County and Year

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<b>County</b>	<b>Year</b>	<b>Risk Ratio</b>
Cascade (Urban)	2008	1.57
	2012	1.47
Yellowstone (Urban)	2008	1.45
	2012	1.47
Missoula (Urban)	2008	1.41
	2012	1.21
Gallatin (Urban)	2008	1.25
	2012	1.24
Roosevelt (Rural/Bakken)	2008	1.65
	2012	2.84
Chouteau (Rural)	2008	2.34
	2012	1.05
Bighorn (Rural)	2008	0.97
	2012	3.35
Madison (Rural)	2008	1.25
	2012	1.08
Richland (Rural/Bakken)	2008	1.66
	2012	2.03
Mineral (Rural)	2008	2.19
	2012	1.33

Figure 2

Risk Ratio by County and Year



**Figure 3**

## Prevalence of Seatbelt Usage Among Impaired Drivers

<b>County</b>	<b>Year</b>	<b>Prevalence of Drug / Alcohol Influenced Drivers Who Used a Seatbelt</b>	<b>Prevalence of Drug / Alcohol Influenced Drivers Who Did Not Wear a Seatbelt</b>
Cascade (Urban)	2008	36.1%	23.5%
	2012	32.1%	17.1%
Yellowstone (Urban)	2008	26.3%	22.0%
	2012	39.2%	22.2%
Missoula (Urban)	2008	48.7%	23.6%
	2012	46.1%	11.4%
Gallatin (Urban)	2008	58.8%	18.6%
	2012	62.0%	19.6%
Roosevelt (Rural/Bakken)	2008	46.1%	38.5%
	2012	27.3%	36.4%
Chouteau (Rural)	2008	33.3%	66.7%
	2012	75.0%	12.5%
Bighorn (Rural)	2008	32.4%	58.8%
	2012	15.6%	50.0%
Madison (Rural)	2008	59.3%	25.9%
	2012	60.0%	10.0%
Richland (Rural/Bakken)	2008	37.0%	14.8%
	2012	29.6%	39.4%
Mineral (Rural)	2008	42.1%	57.9%
	2012	55.6%	22.0%

**Figure 4(a)**

Prevalence of Seatbelt Usage Among Impaired Drivers (2008)

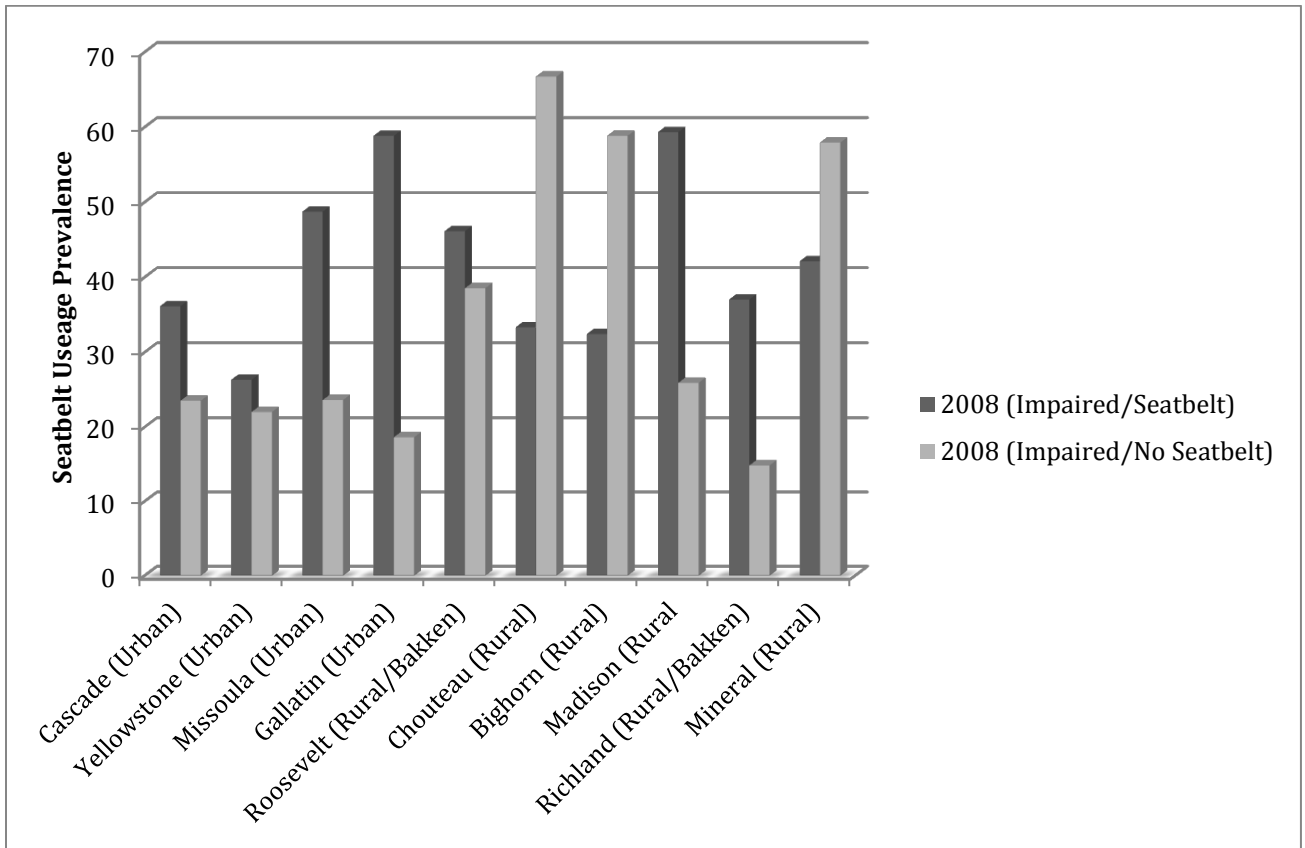
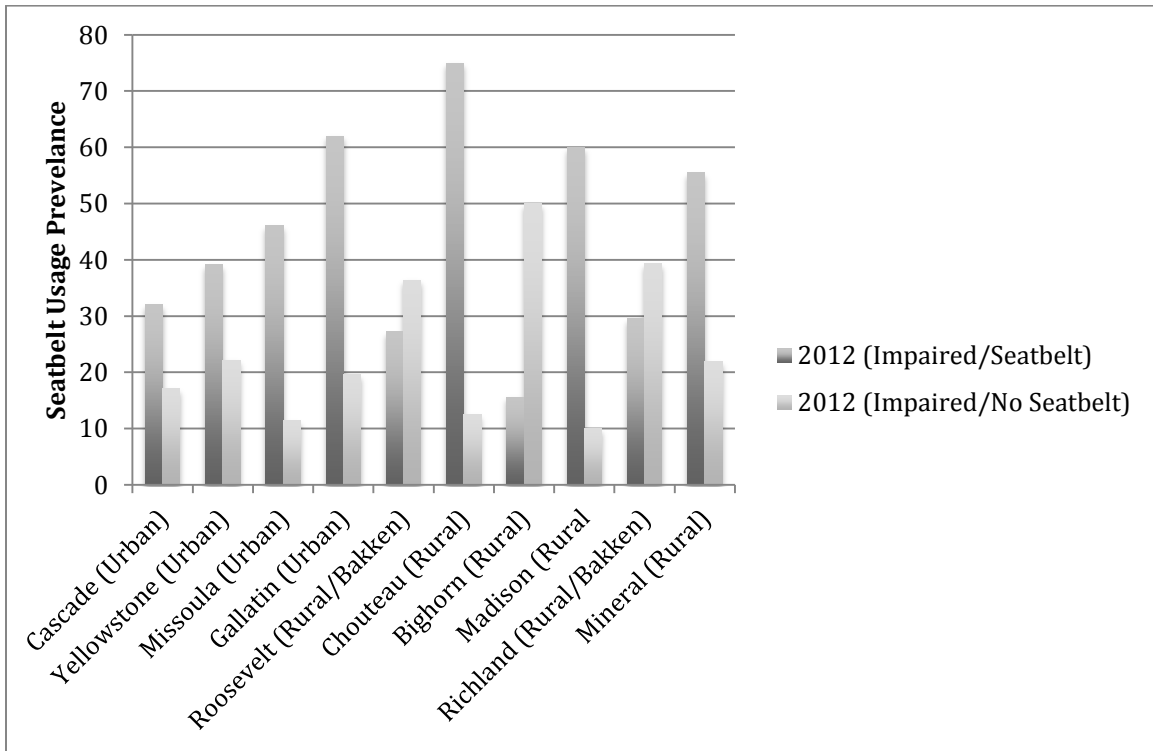


Figure 4(b)

Prevalence of Seatbelt Usage Among Impaired Drivers (2012)



**Figure 5**

Change in Average Risk Ratio, Bakken vs. Rural, 2008 to 2012

