Seat Belt Use on the Colville Indian Reservation in Washington State, 2019

An Observational Survey

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November 2019

Publication and Contact Information

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Special thanks to the Confederated Tribes of the Colville Indian Reservation and the representatives that made this project possible.

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Thanks to our Contractor for your reliable and quality work!

Almeida's Consulting and Training, LLC
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SUMMARY

In 2016 the Washington Traffic Safety Commission partnered with the Confederated Tribes of the Colville Reservation to conduct an observational seat belt survey in order to establish a baseline estimate of seat belt use on the reservation. A follow-up survey was conducted in 2019. The same method for conducting the Washington State seat belt use estimate was tailored to the Colville Indian Reservation roadway network. Ninety sites on the reservation were randomly selected for observation.

In 2016 there were 719 vehicles and 917 front seat occupants observed over a two week period in May. The 2016 baseline estimate for seat belt use on the Colville Indian Reservation was 64.1 percent (+/- 7.0 percent). The seat belt use estimates varied between the four regions on the reservation and local routes had a lower seat belt use rate than state routes.

In 2019 there were 1,989 vehicles and 2,897 front seat occupants observed over a two week period in May. The 2019 follow-up estimate for seat belt use on the Colville Indian Reservation is 54.4 percent (+/- 4.2 percent), a ten percentage point decrease from the 2016 estimate, although not a statistically significant decrease within the limitations of this observation survey. Both state routes and local routes experienced percentage point decreases in seat belt use since 2016, but again these were not statistically significant reductions in seat belt use rates. In 2019 the seat belt use rate on local routes (49.7 percent) continues to be statistically significantly lower than the rate on state routes (61.6 percent), and all rates are significantly lower than the state rates.

Among the four Colville Indian Reservation regions, three regions experienced percentage point decreases in seat belt use rates; two of these decreases were statistically significant. The Inchelium region seat belt use rate decreased from 61.9 percent to 37.6 percent and the Nespelem seat belt use rate decreased from 83.3 percent to 59.2 percent. The Omak region seat belt use rate increased ten percentage points from 61.6 percent to 72.6 percent, although this increase was not statistically significant.

Given the overall much lower seat belt use rate on the Colville Indian Reservation as compared to Washington State (54.4 percent versus 92.3 percent), effective countermeasure strategies for increasing seat belt usage should be implemented by the tribes.

INTRODUCTION

Seat belts are highly effective for reducing the severity of traffic injuries. Seat belt use by all motor vehicle occupants is both a national and Washington State priority. Over the past three decades, dramatic increases in seat belt use have been achieved through the enactment of mandatory use laws, law enforcement strategies, and public education campaigns. Washington enacted a secondary enforcement seat belt law in 1986, and in 2002 enacted a primary seat belt law.

Research has shown that Native Americans are less likely than all other race/ethnicity categories to wear a seat belt (Iragavarapu & Carlson, 2015; Grossman, et al., 1997; Gross, Axberg, & Mathieson, 2007). In addition to lower seat belt use among Native American people, studies have shown that seat belt use on American Indian reservations is lower than off reservations (NCAI, 2013; Gross, Axberg, & Mathieson, 2007).

Fatal crash data from the Fatality Analysis Reporting System (FARS) for Washington State shows that from 2008-2017 American Indians/Alaska Natives (AIAN) had a traffic fatality rate of 28.5 per 100,000 population, nearly four times higher than the next highest rate. The fatality rate for AIAN unrestrained vehicle occupants was 12.1 per 100,000 population, nearly five times higher than the next highest rate (Table 1). Of the 176 AIAN passenger vehicle occupant traffic deaths that occurred 2008-2017 in Washington State, 109 (61.9 percent) were not restrained or were improperly restrained. This traffic mortality disparity has been documented in other states as well as nationwide (Iragavarapu & Carlson, 2015).

Table 1: Traffic Fatality Rates per 100,000 population	*American Indian/Alaska Native (AIAN)*	*Hispanic*	*Black*	*White*	*Asian/Pacific Islander*
Traffic Fatality Rate	27.6	4.9	7.3	7.3	3.2
Unrestrained Vehicle Occupant Fatality Rate	12.1	1.2	2.0	1.5	0.4

More than half of the counties in Washington (20/39, or 51.3 percent) have American Indian reservations partially or wholly within their boundaries. Twelve counties out of 39 (30.8 percent) have traffic fatality populations wherein AIANs are overrepresented when compared to the AIAN population of that county.

The Colville Indian Reservation overlaps southeastern Okanogan County and southern Ferry County, and is bordered on the south by Douglas and Lincoln counties (across the Columbia River), and on the east by Stevens County (also across the Columbia River). Of the five counties overlapping or bordering the Colville reservation, two suffer overrepresentation among AIAN peoples in traffic deaths (Okanogan and Lincoln). Only Yakima County (which overlaps with Yakama Nation – the largest Indian Reservation in Washington) has a higher overrepresentation of AIAN traffic deaths, followed by Okanogan and Lincoln counties.

The Colville Indian Reservation is the second largest Indian Reservation in Washington State and they enforce a primary seat belt law on the reservation. According to information provided by the Confederated Tribes of the Colville Reservation (CTCR), the Colville Indian Reservation is comprised of 1.4 million acres with a population of 9,500 tribal members and 6,000 non-tribal residents. The road network on the Colville Indian Reservation consists of 1,800 miles of tribal roads, 800 miles of county roads, and 220 miles of state highways.

Although the CTCR has participated in national seat belt use observation surveys in the past (Chaffe, Solomon, & Leaf, 2008), the sample was insufficient to derive a reliable estimate for the Colville Indian reservation. Estimates of seat belt use rates in Indian Country have shown improvements over the past several years (Bureau of Indian Affairs, 2016). However, these estimates still remain below national estimates. In order to monitor seat belt use on the Colville Reservation, the WTSC partners with CTCR to conduct observation surveys. The first seat belt observation survey was conducted in 2016 to establish the baseline. This report offers the 2019 follow-up results.

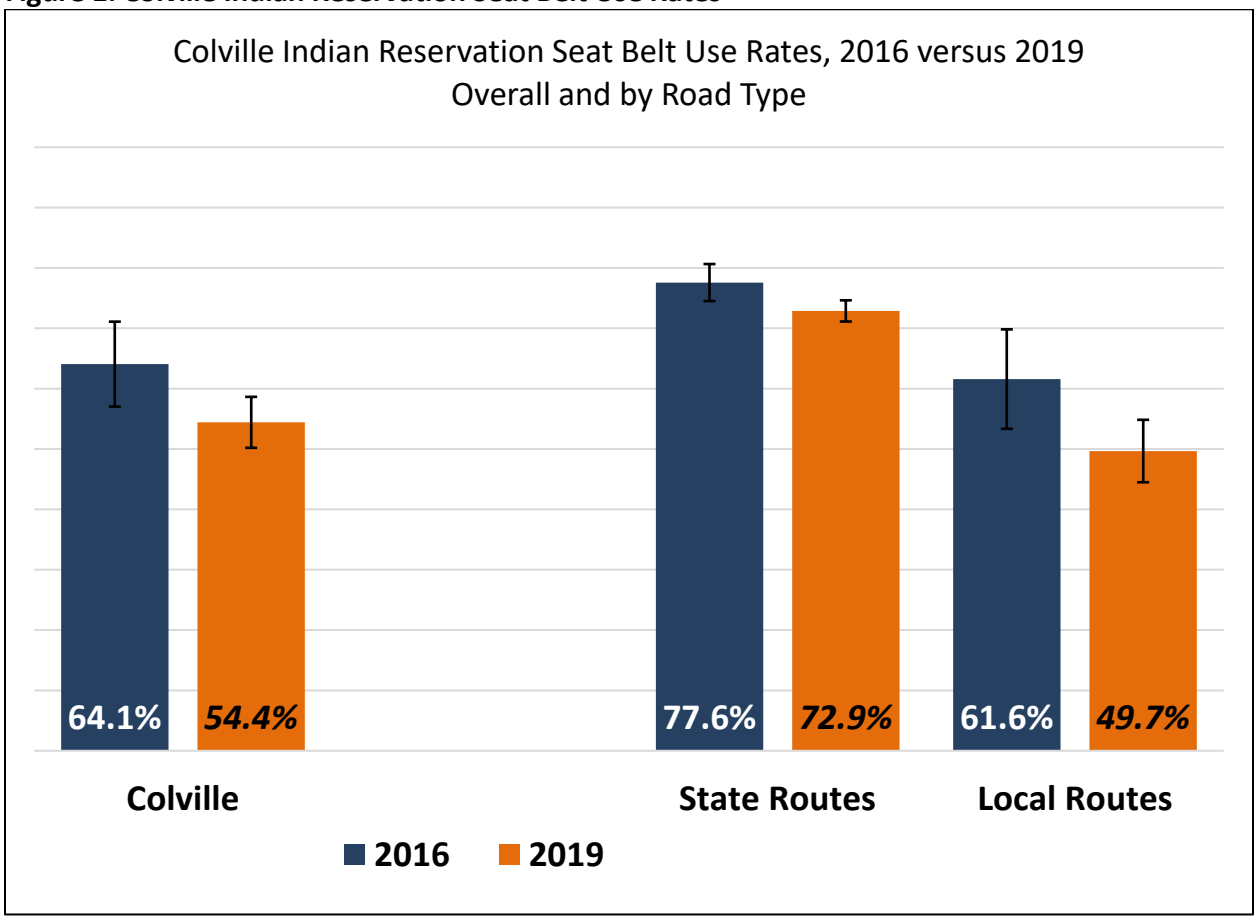
RESULTS

The Colville survey team conducted front seat occupant seat belt use observations at 90 pre-mapped sites on the Colville Indian Reservation May 9-17, 2016 and again April 27 to May 12, 2019. In 2016, 18 sites had no traffic during the observation time. Among the remaining sites, 719 vehicles with 917 front seat occupants were observed. In 2019 there were only seven sites with no traffic, and 1,989 vehicles and 2,897 front seat occupants were observed. The increase in observations (and therefore survey confidence) is due to the decrease in non-responsive sites and also a survey method change. In 2016 the observers collected data for two 20-minute intervals at each site; one interval only for sedan-type passenger vehicles, and the second only for SUVs, trucks, and vans. In 2019 the observers collected data on all vehicle types for 60 minutes. This change was also made to the statewide survey that the Colville survey is modeled after. Table 2 shows the weighted seat belt use rates and associated confidence intervals.

Table 2: Colville Indian Reservation Seat Belt Use Rates	**2016**	**2019**
Seat Belt Use Rate For:	*Seat Belt Use Rate Estimates (95% Confidence)*	*Seat Belt Use Rate Estimates (95% Confidence)*
Colville Indian Reservation – ALL	64.1% (57.0 – 71.1%)	54.4% (50.2 – 58.6%)
State Routes	77.6% (74.5 – 80.6%)	72.9% (71.1 – 74.6%)
Local Routes	61.6% (53.3 – 69.8%)	49.7% (44.5 – 54.8%)
Omak Region	61.6% (52.3 – 70.9%)	72.6% (68.0 – 77.1%)
Nespelem Region	83.3% (72.1 – 94.5%)	59.2% (49.9 – 68.5%)
Keller Region	72.5% (56.6 – 88.3%)	54.6% (43.2 – 65.9%)
Inchelium Region	61.9% (48.5 – 75.3%)	37.6% (30.1 – 45.1%)
Cars	71.8% (60.8 – 82.8%)	Not Collected
Trucks	46.4% (35.2 – 57.6%)	
SUVs	75.2% (60.4 – 90.0%)	
Vans	82.0% (64.7 – 99.3%)	

The 2016 baseline seat belt use estimate for the Colville Indian Reservation was 64.1 percent (+/- 7.0 percent). The 2019 follow-up estimate for seat belt use on the Colville Indian Reservation is 54.4 percent (+/- 4.2 percent) – a ten percentage point decrease from the 2016 estimate, although not a statistically significant decrease within the limitations of this observation survey. Both state routes and local routes experienced percentage point decreases in seat belt use since 2016, but again these were not statistically significant reductions in seat belt use rates. In 2019 the seat belt use rate on local routes (49.7 percent) continues to be statistically significantly lower than the rate on state routes (61.6 percent). Figure 1 shows these comparisons.

Figure 1: Colville Indian Reservation Seat Belt Use Rates



Among the four regions within the Colville Indian reservation, the Nespelem region had the highest seat belt use rate in 2016 (83.3 percent +/- 11.2 percent). However, in 2019 the Omak region has the highest seat belt use rate (72.6 percent +/- 4.6 percent) and is also the region with the highest proportion of state routes. The 2019 seat belt use rate in Omak represents an increase over the 2016 rate, though this increase is not statistically significant. Conversely, the seat belt use rate decrease in the Nespelem region is statistically significant. The Inchelium region also experienced a statistically significant decrease in the seat belt use rate, representing the largest decrease in seat belt use (-24.3 percentage points), the lowest seat belt use among all four regions (37.6 percent +/- 7.5 percent), and is also the only region with no state routes. Figure 2 shows the region rates.

Figure 2: Colville Indian Reservation Seat Belt Use Rates by Region

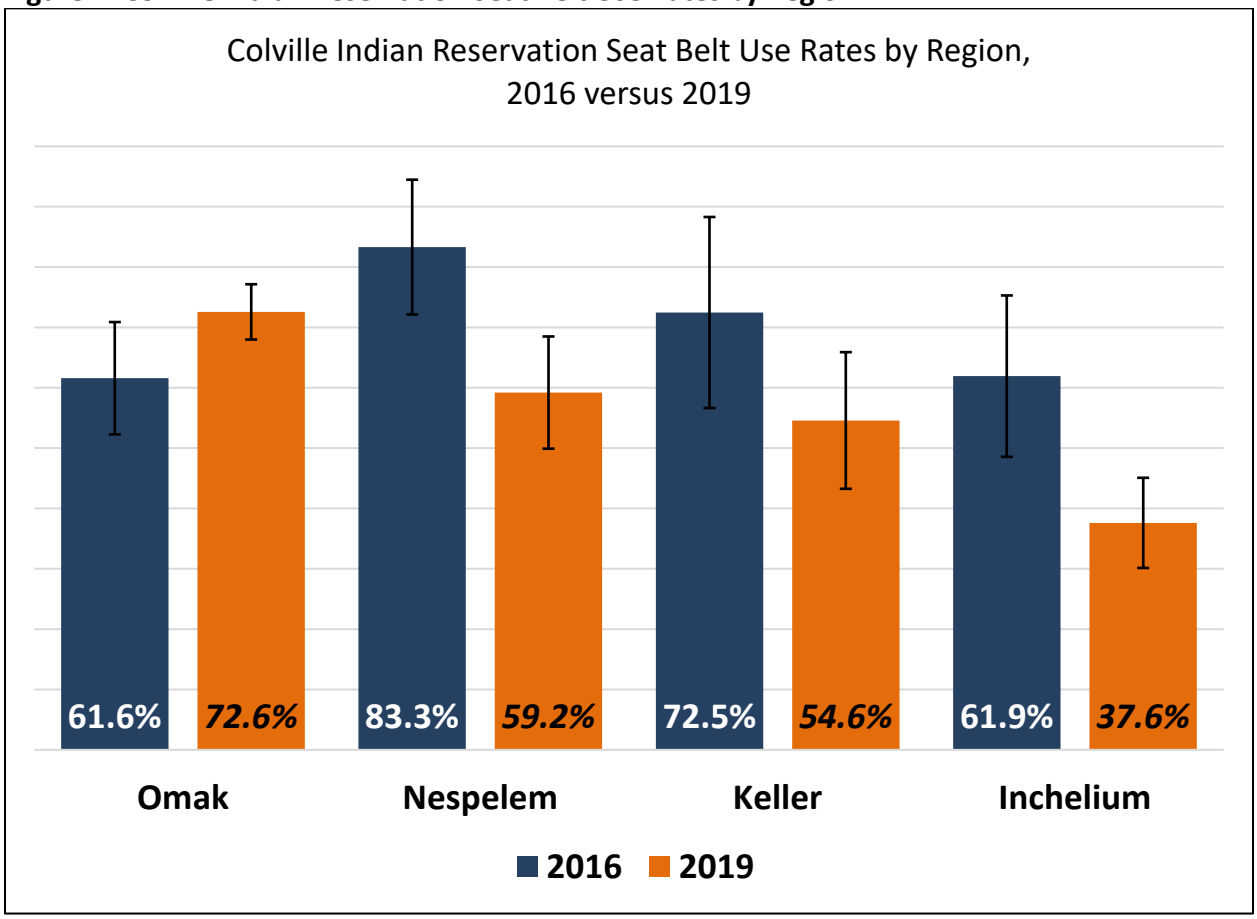
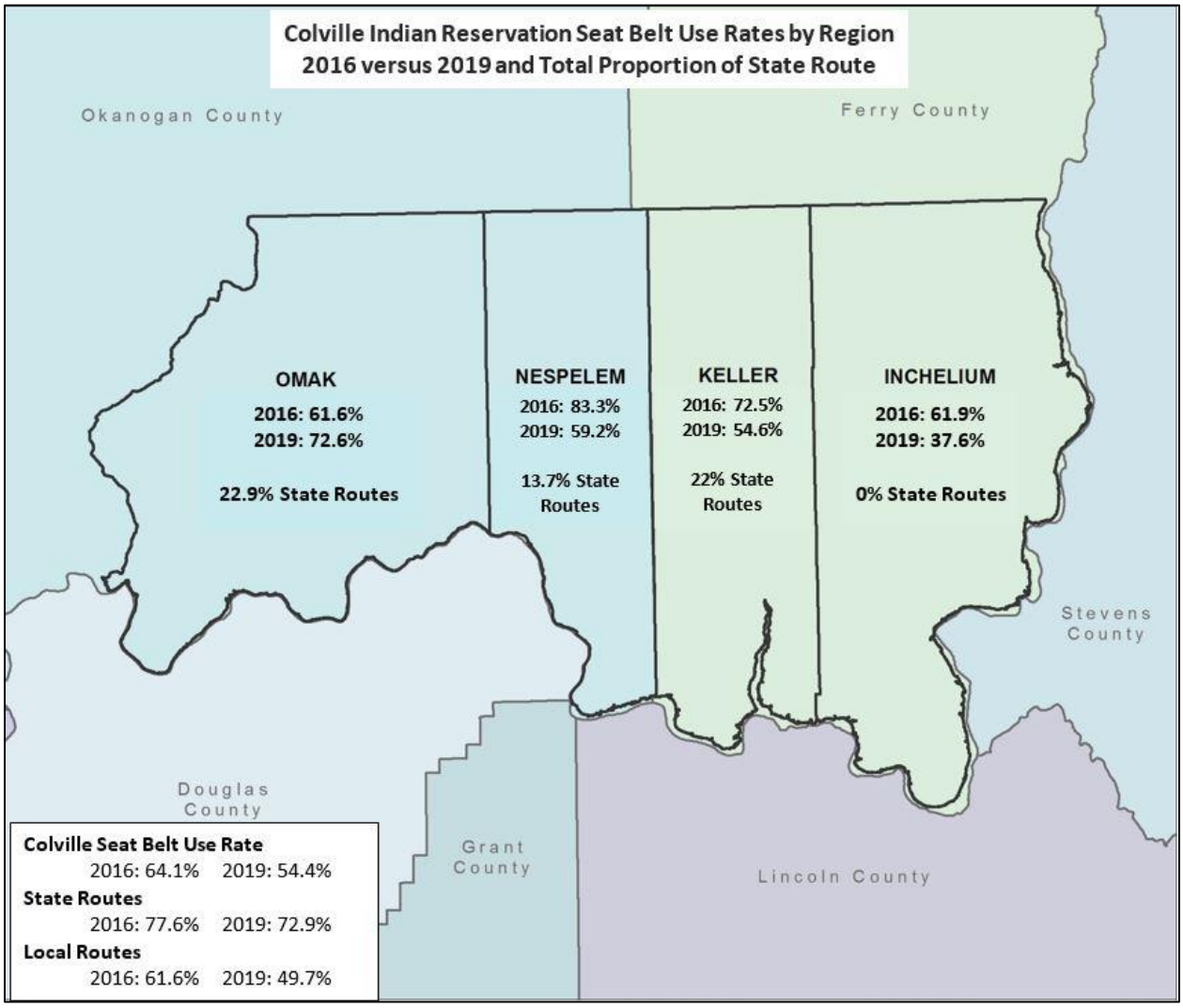


Figure 3 is a geographical representation of the seat belt use rates by region. Seat belt use declined in 2019 across all road types and regions except for the Omak region. The Omak region also has the highest proportion of state routes.

Figure 3: Colville Indian Reservation Seat Belt Use Rate Map



DISCUSSION

This report establishes the baseline and first follow-up estimate of seat belt use on the Colville Indian reservation in Washington State. The CTCR has earned the reputation in Washington State as a traffic safety leader in Indian Country. The CTCR may implement many countermeasure strategies to improve seat belt use on the reservation. Based on this follow-up survey, the WTSC has three primary recommendations for immediate focus:

1) Conduct community outreach and education on the importance of seat belt use.
2) Enforce the primary seat belt law on the reservation. Actively participate in the state's high visibility enforcement campaigns for seat belt use (*Click It or Ticket*).
3) Encourage departments within the tribal government to implement seat belt policies for its workers.

All law enforcement agencies can and are encouraged to participate in the state's high visibility enforcement campaigns. Overtime funds are available to law enforcement agencies agreeing to

participate and provide activity reports. The CTCR has conducted resident outreach through paid media. Its work included culturally-relevant radio and print advertising developed by CTCR representatives. The WTSC encourages continued education and paid media outreach during these campaigns, to include increased emphasis enforcement.

The observers noted during data collection that there were several tribal vehicles from public works, transportation, and law enforcement with unbelted operators. A practical focus for change would be to start with the agencies in which the example of model behavior should be set. The WTSC encourages all CTCR departments and public service offices to adopt and enforce seat belt policies for its employees.

Although these are the three primary recommendations for this report period, the CTCR should tailor the implementation of countermeasures to its population and resources. Given the overall much lower seat belt use rate on the Colville Indian Reservation as compared to Washington State (54.4 percent versus 92.3 percent), effective countermeasures for increasing seat belt usage should be implemented by the tribes. The complete suite of Target Zero tribal and statewide occupant protection countermeasure strategies is available in Appendix A.

APPENDIX A: TARGET ZERO STRATEGIES

TARGET ZERO STRATEGIES FOR REDUCING UNRESTRAINED VEHICLE OCCUPANT (UVO) FATALITIES AND SERIOUS INJURIES on TRIBAL RESERVATIONS

Objective	Strategies	Implementation Area
TRB.5. Increase Use of Child Passenger Safety Systems	TRB.5.1. Enact and strengthen laws that require children riding in motor vehicles to be restrained in appropriate and approved child passenger safety systems based on their age, height and weight. (P, CTW)	Leadership
	TRB.5.2. Provide approved child passenger safety systems to parents and caregivers, combined with scheduled locations and dates/times for inspections of child passenger safety system installation, and education that instructs parents and caregivers on installation. (R, CTW)	Education
	TRB.5.3. Conduct community-wide Information and Enhanced Enforcement Campaigns based on beliefs, attitudes and behaviors of tribal members that include mass media, information and publicity, child passenger safety system displays, and other targeted strategies such as checkpoints, dedicated law enforcement officials, or alternative penalties. (R, CDC)	Education
	TRB.5.4. Provide incentive and education programs that offer rewards to parents, caregivers, and/or children for properly using child passenger safety systems, and education that varies in content, duration, intensity and delivery methods. (R, CDC)	Education
TRB.6. Increase Use of Seat belts	TRB.6.1. Enact or strengthen seat belt laws that require motor vehicle occupants to wear seat belts. This works best if it covers all drivers on the reservation, regardless of destination, but an incremental strategy is for tribes to mandate use of seat belts by tribal employees when they are using tribal vehicles or when using other vehicles for tribal business. (P, CTW)	Leadership

Objective	Strategies	Implementation Area
TRB.6. Increase Use of Seat belts	TRB.6.2. Enact primary (vs. secondary) seat belts enforcement laws. Primary enforcement laws allow police to stop motorists because someone in the vehicle is unbelted. (P, CTW)	Leadership
	TRB.6.3. Conduct enhanced seat belt enforcement that includes publicity, increased citations, and increased numbers of officers on patrol. (P, CTW)	Enforcement
	TRB.6.4. Conduct sustained education programs based on beliefs, attitudes and behaviors of tribal members that educate drivers about the importance of seat belts and use of seat belts during all trips with varying content, duration, and intensity and delivery methods. (R, FHWA)	Education

TRB=Tribes and Target Zero, P=Proven, R=Recommended, U=Unknown

TARGET ZERO STRATEGIES FOR REDUCING STATEWIDE UNRESTRAINED VEHICLE OCCUPANT (UVO) FATALITIES AND SERIOUS INJURIES

Objective	Strategies	Implementation Area
UVO.1. Strengthen efforts to increase compliance, enforcement, and adjudication of the seat belt and child restraint laws.	UVO.1.1 Engage and collaborate with all levels of law enforcement to effectively carry out high-visibility communications, outreach, and enforcement of seat belt use, such as the Click It or Ticket campaign. (P, CTW)	Education, Enforcement
	UVO.1.4 Implement Click It or Ticket-style child car seat short-term, high-visibility education and enforcement campaigns. (P, CTW)	Education, Enforcement
	UVO.1.2 Identify population groups with lower than average restraint use rates and implement communications, outreach, and enforcement campaigns directed at groups/areas where restraint use is lowest, particularly rural areas. (R, CTW)	Education, Enforcement, Evaluation

Objective	Strategies	Implementation Area
UVO.1. Strengthen efforts to increase compliance, enforcement, and adjudication of the seat belt and child restraint laws.	UVO.1.3 Conduct nighttime patrols during Click it or Ticket statewide seat belt mobilizations. Combine short-term, high-visibility seat belt use enforcement with nighttime enforcement programs. (R, CTW)	Education, Enforcement
	UVO.1.5 Encourage law enforcement and other emergency responders to adopt seat belt use policies for their employees. (R, NHTSA)	Leadership
	UVO.1.6 Host car seat awareness and instruction classes, especially in diverse community locations with populations that have lower than average proper car seat use. Target child transport agencies, hospitals, childcare centers, schools, etc. Collaborate with Target Zero Manager, SafeKids Coalition, or local Child Passenger Safety Team. (R, CTW)	Education, Evaluation
	UVO.1.7 – Promote use of currently available online continuing education instruction for current law enforcement officers to train them about what to look for in enforcing child passenger safety law and work with WA's Criminal Justice Training Commission and the WA State Patrol Academy to conduct trainings for new law enforcement officers and seasoned officers on Washington's child restraint law. (R, CTW)	Education, Enforcement
	UVO.1.8 –Promote child car seat distribution programs. (U)	Education
UVO.2. Promote Washington's restraint use laws through education and development of accurate and culturally-appropriate educational materials.	UVO.2.5 Ensure educational materials follow the most recent recommendations issued by the American Academy of Pediatrics. (P, AAP)	Education
	UVO.2.1 Ensure that education about proper child restraint use is provided to people who transport foster children and Medicaid participants. (R, ABACCL)	Education
	UVO.2.2 Ensure that people who provide medical and other transport receive education about not allowing unrestrained humans in the back of moving pickup trucks. (R, IIHS)	Education

Objective	Strategies	Implementation Area
UVO.2. Promote Washington's restraint use laws through education and development of accurate and culturally-appropriate educational materials.	UVO.2.3 Provide education to city and county governments about the science involved with using photo enforcement to increase seat belt compliance. (U)	Education, Leadership
	UVO.2.4 Develop a briefing paper regarding the effects of adding a $25 administrative fee for violators to fund child passenger safety efforts. (U)	Leadership, Evaluation
UVO.3. Maintain and support the statewide network of child passenger safety technicians.	UVO.3.1 Support opportunities for child car seat inspection events, CPS Technician certification courses, and recertification of technicians. Work collectively with Washington's Target Zero managers, SafeKids Coalitions, and local child passenger safety teams. (R, CTW)	Education, Leadership
	UVO.3.2 Continuously monitor fatality and serious injury crash data involving unrestrained or improperly restrained child passengers to help direct geographic/demographic areas of focus. (R, DDACTS)	Evaluation
	UVO.3.3 Convene a group of CPS stakeholders from different disciplines and areas of the state, including existing network of Washington's Target Zero managers, SafeKids Coalitions, and other local child passenger safety teams, to participate in product review, media efforts, trainings, and local project implementation. (R, WTSC)	Leadership
	UVO.3.4 Explore options for gaining a measure of statewide child restraint use. (R, WTSC)	Evaluation
	UVO.3.5 Establish a database to collect all of Washington's car seat inspection data. Analyze information received to determine major misuse issues; share with statewide CPS network; incorporate findings into media campaigns. (U)	Evaluation

Objective	Strategies	Implementation Area
UVO.4. Increase visibility of child passenger safety issues in Washington.	UVO.4.1 Provide access to appropriate information, materials, and guidelines for implementing media and programs to increase proper child restraint use. (R, CTW)	Education
	UVO.4.2 Develop and implement media campaigns targeting major misuse issues in Washington State, which are currently booster age children and riding in the front seat. (R, CTW)	Education
	UVO 4.3 – Utilize Safest Rides protocols to offer positive reinforcement to parents/guardians correctly transporting children. (R, DOH)	Education

UVO=Unrestrained Vehicle Occupants, P=Proven, R=Recommended, U=Unknown

APPENDIX B: SURVEY METHODS

The Colville survey team consisted of the project manager (who conducted all observation site mapping and quality control reviews), an observer, and a recorder. With the assistance of the CTCR Natural Resource Enforcement Office, the team obtained permission to camp on the reservation during survey data collection since there are no hotels in the immediate vicinity. The CTCR Transportation Department provided the necessary roadway information for site selection.

Road Segmentation and Site Selection

The CTCR transportation planner provided road network shapefiles for Okanogan and Ferry counties, Bureau of Indian Affairs roads, CTCR official routes, and reservation district boundaries. Extraneous segments were removed to assure a single line feature for any given road. Roads were clipped to the reservation district boundaries so that any given road centerline was wholly in one of four districts. The road shapefiles were then segmented into portions of 5,280 feet (1,610.4 meters). Tag-ends of road less than 1,000 feet (305 meters) in length were merged with the immediate preceding segment. In some instances shorter road segments were created, such as roads spanning multiple reservation districts and roads shorter than 5,280 feet in total.

Based on available resources, 90 sites were selected for observation (8.8 percent of all segments in the network).Total road segments were tallied by region and assigned either a major designation (state routes) or minor designation (tribal and county roads). The number of sites randomly sampled from each Colville Indian Reservation region was representative of the total proportion of segments in the region, and representative of the major/minor proportions within regions. Additional segments were sampled in each sampling unit in order to provide alternative site locations in incidences when original sample sites were not observable. Sites were considered not observable when roads were not paved, the road/area more resembled recreational travel rather than public travel, or when the site was inaccessible.

The site mapper received coordinate information for the center of each road segment. Once on site, the mapper would deviate from the center up to half a mile in either direction on the road in order to identify an observable location or remove the site from the list if unobservable. Due to the deviation as needed, the final sample proportions did not equal the total proportions of the road segment inventory. This is discussed in more detail in the limitations section. Table 2 shows the total number of road segments in each region and the final number of sites that were observable from the randomly selected sample. In order to correct for the road segment over/under sampling by region, post-stratification weight adjustments were made.

Region and Road Segment Designations	Total Road Segments	Within Region and Region Proportions	Sampled Road Segments	Sampled Within Region and Region Proportions	Post-stratification Weight Adjustments
Omak – Major	75	7.30%	18	20.00%	0.37
Omak – Minor	253	24.63%	14	15.56%	1.58
Omak – TOTAL	328	31.94%	32	35.56%	
Nespelem – Major	28	2.73%	3	3.33%	0.82
Nespelem – Minor	175	17.04%	13	14.44%	1.18
Nespelem – TOTAL	203	19.77%	16	17.78%	
Keller – Major	48	4.67%	13	14.44%	0.32
Keller – Minor	169	16.46%	10	11.11%	1.48
Keller – TOTAL	217	21.13%	23	25.56%	
Inchelium – Major	0	0%	0	0%	
Inchelium – Minor	279	27%	19	21%	1.29
Inchelium – TOTAL	279	27.17%	19	21.11%	

Road segments within each road designation category and region were assigned the same probability of selection based on the total number of segments within each region-road designation category. Additional selection stages determined the observation period, travel direction, number of lanes to observe, and vehicles to observe for each segment. The locations of the data collection sites were described on "Site Assignment Sheets" for each region and maps were developed to aid the data collectors and quality control monitor in travelling to the assigned locations.

Observation Procedures

All passenger vehicles and commercial vehicles with a gross vehicle weight of 10,000 pounds or less were included in the survey. The target population was all drivers and right front seat passengers (excluding children harnessed in child safety seats) traveling in those vehicles on public roads between the hours of 7 a.m. and 6 p.m. during the month of May. In 2016 the observer and recorder spent 20 minutes observing regular automobiles and another 20 minutes observing all other vehicle types including pickups, SUVs, and vans. In 2019 the observer and recorder spent 60 minutes observing all traffic irrespective of vehicle type and did not collect the type of vehicle. The observer and recorder used iPads loaded with the seat belt observation data collection application that was developed for the Washington statewide seat belt observation survey.

Sampling Weights and Error Estimations

The sampling weight formula and method was adopted directly from the Washington State Seat Belt Use Survey Design for conducting the statewide seat belt observation survey. Sampling weights were applied using the sampling unit's inverse selection probability. The probability

that a particular vehicle is observed during the study is the direct product of the sampling selection probabilities within each subgroup:

c = region
r = road type
s = road segment
t = time of day
d = direction
l = lane
v = vehicle type
o = front-seat occupant

Each vehicle in the study was observed with some probability that results from the multi-stage sampling described earlier. These joint probabilities can be generated at any level at which data need to be summarized. Under this design, the probability (Pr) for vehicle inclusion is defined as:

$$Pr_{crstdlv} = Pr_c Pr_{rs|c} Pr_{t|crs} Pr_{d|crst} Pr_{l|crstd} Pr_{v|crstdl}$$

The corresponding sampling design weight, w, for vehicle, v, is defined as the inverse of the probability product outlined above:

$$w_{crstldv} = \frac{1}{Pr_{crstdlv}}$$

$Pr_{crstdlv}$ equals the joint selection probability for vehicle, v, within a given county, road type, segment, time, direction, and lane. Once the inverse selection probability was calculated it was multiplied by the time spent on each segment, calculated as the segment length divided by the posted speed limit. Seat belt use rates are estimated using the weighted front-seat occupant belt status at the appropriate scale. The seat belt use rate estimator is merely a summed ratio of the weighted belted drivers/passengers over all (weighted) driver/passengers observed. For purposes of estimating use rates at levels nested within the reservation, the same approach was utilized, but the summation procedure and probability calculations are limited to the stratum of interest. In order to compensate for the over-sampling of major road segments in each region, a post-stratification weighting adjustment was applied. To summarize the variance for the rate estimator described above, a weighted bootstrapping method was used.

APPENDIX C: REFERENCES

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