2014 Statewide Estimates of Child Restraint Use Among Elementary Students

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Director
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Publication and Contact Information

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Executive Summary

Motor vehicle crashes are a leading cause of death among children in the United States. In Washington between 2010 and 2012, 26 child vehicle occupants age 12 and under died, and another 122 received serious injuries as a result of traffic crashes. The majority of these tragedies likely could have been avoided had these children been properly restrained according to Washington State law.

In order to gauge statewide child passenger restraint use, observational surveys were conducted at semi-randomly selected elementary schools across the state during the months of April through June 2014. Observations of 1,301 students from 16 elementary schools were weighted to obtain reasonable statewide and regional estimates.

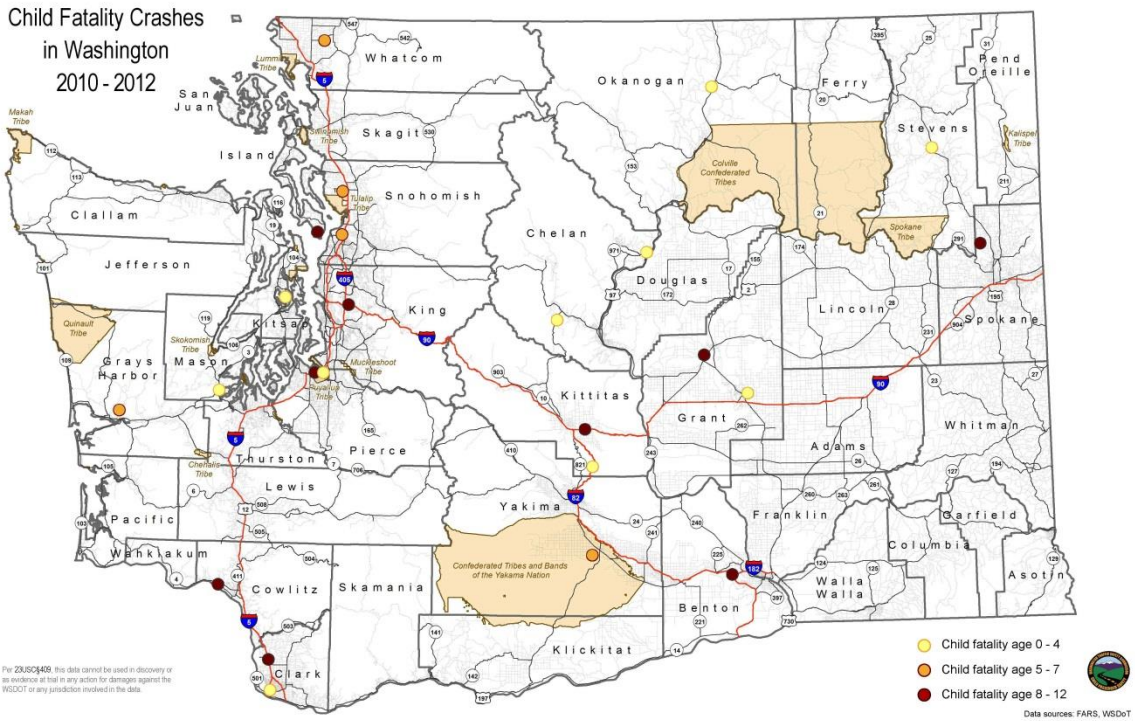
Approximately one in five children was illegally seated in the front seat. Overall, restraint use was approximately 80 percent, regardless of whether the child was seated in the front or the back. However, children seated in the back seat were much more likely to use a car seat or booster than children seated in the front seat. Even among back seat riders, only 41.5 percent were seated in a car seat or booster, and only 36.3 percent were riding in a car seat or booster, and also belted. An estimated 15.2 percent of children statewide were not in a car seat or booster, nor were they restrained.

The Central region (see map on page 4) showed the highest point estimate seat belt restraint use among children, but also had the second lowest car seat/booster use. In the Central region, over 90 percent of the children were restrained but only 20 percent were seated in a car seat or booster. The West region had the lowest point estimates with seat belt restraint use (77.3 percent) and car seat/booster use (20.2 percent, approximately the same as the Central region point estimate at 20.1 percent). Only one in five children were seated and restrained in a car seat/booster. In both the East and East Puget Sound regions, approximately one in three children were seated in a car seat/booster, compared to only one in five children in the Central and West regions. The percentages of children without a car seat/booster and also not restrained were much higher in the East Puget Sound (15.2 percent) and West (22.1 percent) regions than in the East (3.7 percent) and Central (2.3 percent) regions.

Despite having strong child passenger safety laws, and a well-developed statewide child passenger safety program, Washington's child passenger restraint use rates remain alarmingly low. Even with the program successes and efforts of the traffic safety community, Washington still faces a significant problem keeping our children safe on the roadways. Since the parent and child population is always turning over, continual educational outreach and enforcement must be done. Although this report provides only estimates of child passenger restraint use, the results clearly point to the need to reach further and do more. Together we can reach our goal of zero traffic fatalities and serious injuries by 2030!

Child Passenger Safety in Washington State

Motor vehicle crashes are a leading cause of death among children in the United States. Although motor vehicle deaths among children ages 12 and under have decreased nationally by 43 percent in the past decade, more than 9,000 children ages 12 and under died in crashes during that decade. In Washington, between 2010 and 2012, 26 child vehicle occupants ages 12 and under died in traffic crashes. Four of these children were not sitting in the back seat, the safest place for a child under age 12. Only 10 of these 26 children were seated in a child restraint (car seat or booster) and six were not restrained at all. Seven of these child deaths involved the child being ejected from the vehicle.



During this same period, an additional 122 child vehicle occupants suffered serious injury in a traffic crash. Seventeen of these were illegally riding in the front seat. Only 41 of these children were seated in a child car seat or booster and 17 were not restrained at all.

Unrestrained children in the front seat have the highest risk of injury during a crash and appropriately restrained children in the back seat have the lowest risk. Children under 16 years of age sitting in the front seat have a 40 percent greater risk of injury in a crash than children seated in the back seat (*Durbin, Chen, Smith, Elliot, & Winston, 2005*). Car seat and booster seat use in passenger vehicles reduces the risk of serious injury by 45 percent for children ages 4 through 8 years compared with seat belt use alone (CDC WISQARS). Despite the well documented safety benefits of child seating position

and restraint seat use, barriers to use and challenges with enforcement of child passenger safety laws still persist.

Decina, et. al., (2008), concluded that multiple barriers exist that reduce the benefits of enhanced child restraint enforcement programs: parent/caregiver ignorance of child restraint laws, low perception of risk to child passengers, lack of knowledge about the safety benefits of booster seats among law enforcement officers and members of the courts, low threat of being ticketed for violations, and lack of commitment to child passenger safety by law enforcement top management. There is concern that law enforcement officers are reluctant to enforce child restraint laws due to a number of factors including a lack of commitment by their department to enforce child passenger safety laws and a lack of knowledge on the part of officers on the subject of child restraints (*Decina, Temple, & Dorer, 1994; Decina, Lococo, Ashburn, Hall & Rose, 2008*).

Washington law (RCW 46.61.687) requires that child passengers use child restraint systems (car seats or boosters) until they reach the age of eight years old, or a height of 4 feet 9 inches or taller. The law further states that a child who is eight years of age or older, or 4 feet 9 inches or taller, shall be properly restrained with the seat belt properly adjusted and fastened, or continue using an appropriately fitting child restraint system. Children under age 13 shall ride in a back seat position when it is practical to do so. Washington also requires that every person 16 years of age or older, operating or riding in a motor vehicle, wear the safety belt assembly in a properly adjusted and securely fastened manner.

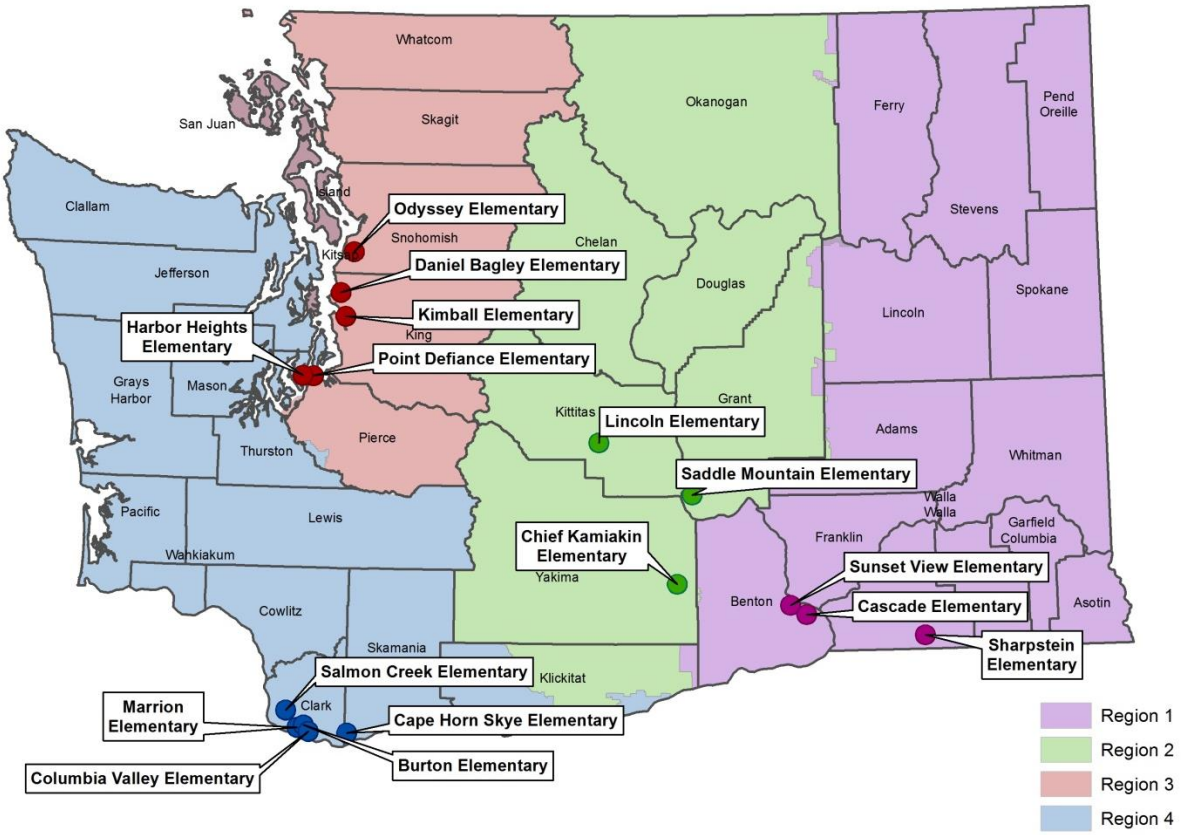
The primary purpose of this survey was to report a statewide estimate of compliance with the Washington child passenger safety law as it applies to booster seat use and requiring children up to age 13 to ride in the back seat. Observational surveys were conducted at randomly selected elementary schools across the state during the months of April - June 2014.

Estimates of Child Restraint Use Among Elementary Children

Statewide Estimates

Observational surveys of child restraint use were conducted at randomly selected elementary schools across the state during the months of April - June 2014. The methodology for restraint use observations (Appendix B) was designed to assume that the children being observed were over age five and under age 13, less than 4 feet 9 inches tall, and by law should have all been riding in the back seat, belted, and seated with a car seat or booster. Sixteen schools agreed to participate in the survey, resulting in 1,301 total student observations. In addition to statewide estimates, information obtained from the Office of Superintendent of Public Instruction (OSPI) allowed for regional estimates and comparisons of child passenger restraint use.

Child Restraint Use Observation Sites, 2014



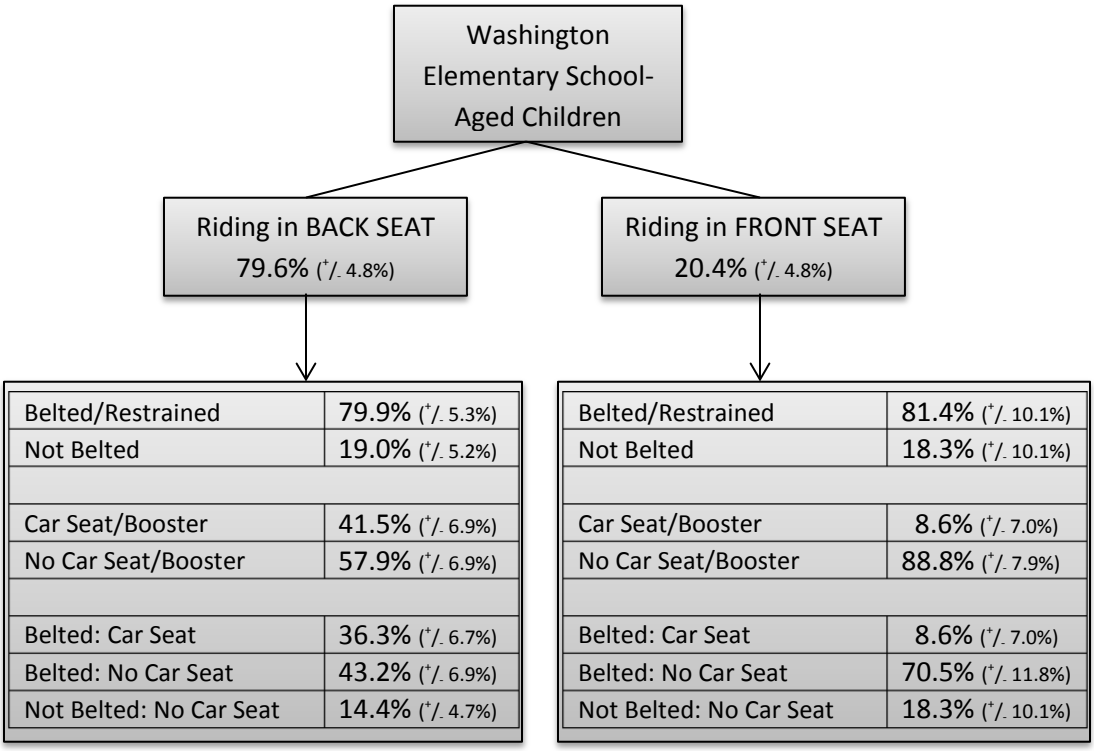
Based on these observations, the following estimates for elementary school-aged children (over age five and under the age of 13) were derived for Washington State:

- 79.6 percent (+/- 4.8%) of children ride in the back seat
- 80.2 percent (+/- 4.6%) of children are belted or restrained

- 34.8 percent (+/- 5.9%) of children use a car seat or booster
- 30.6 percent (+/- 5.7%) of children are belted or restrained and in a car seat or booster

- 48.8 percent (+/- 6.1%) of children are belted or restrained, but not in a car seat or booster
- 3.7 percent (+/- 2.1%) of children are in a car seat or booster, but are not belted or restrained
- 15.2 percent (+/- 4.3%) of children are not in a car seat or booster, nor are they belted or restrained

Restraint and Car Seat/Booster Use by Seating Position



Restraint use was approximately 80 percent, regardless of whether or not the child was seated in the front or the back. However, children in the back seat were much more likely to use a car seat than children in the front seat. Even among back seat riders, only 41.5 percent were seated in a car seat or booster.

Regional Estimates

Regional estimates of child restraint use were obtained using the methods described in Appendix B. Due to the small sample of schools participating in the surveys these results should be interpreted with caution.

Child Passenger Restraint Use	**Region 1 - East**	**Region 2 - Central**	**Region 3 – East Puget Sound**	**Region 4 – West**
Back Seat	78.7% (+/- 4.1%)	80.6% (+/- 4.0%)	79.7% (+/- 5.3%)	77.9% (+/- 5.9%)
Front Seat	21.3% (+/- 4.1%)	19.4% (+/- 4.0%)	20.3% (+/- 5.3%)	22.1% (+/- 5.9%)
Belted/Restrained	87.6% (+/- 3.3%)	91.5% (+/- 2.8%)	80.0% (+/- 5.1%)	77.3% (+/- 6.1%)
Not Belted	4.8% (+/- 2.2%)	2.6% (+/- 1.6%)	19.2% (+/- 5.1%)	22.7% (+/- 6.1%)
Car Seat/Booster	32.5% (+/- 4.7%)	20.1% (+/- 4.1%)	35.9% (+/- 6.5%)	20.2% (+/- 5.9%)
No Car Seat/Booster	53.4% (+/- 5.0%)	74.1% (+/- 4.5%)	63.4% (+/- 6.5%)	79.8% (+/- 5.9%)
Belted: Car Seat	31.5% (+/- 4.7%)	19.9% (+/- 4.1%)	31.5% (+/- 6.3%)	19.6% (+/- 5.8%)
Belted: No Car Seat	48.5% (+/- 5.0%)	68.9% (+/- 4.7%)	48.0% (+/- 6.7%)	57.7% (+/- 7.1%)
Not Belted: No Car Seat	3.7% (+/- 1.9%)	2.3% (+/- 1.5%)	15.2% (+/- 4.7%)	22.1% (+/- 6.0%)

*Percents do not total 100% -- the remainder is attributed to "can't tell" observations.

- There was little regional variation in child seating position. In each region, as well as statewide, approximately one in five children was improperly seated in the front seat.

- The Central region had the highest point estimate restraint use among children, but also had the second lowest point estimate car seat/booster use. In the Central region, over 90 percent of the children were restrained, but only 20 percent were seated in a car seat or booster.

- The West region had the lowest point estimate restraint use (77.3 percent) and car seat/booster use (20.2 percent, approximately the same point estimate as the Central region at 20.1 percent). Only one in five children was seated and restrained in a car seat/booster.

- In both the East and East Puget Sound regions, approximately one in three children were seated in a car seat/booster, compared to only one in five children in the Central and West regions.

- The point estimate percentage of children not riding in a car seat/booster and also not restrained was much higher in the East Puget Sound (15.2 percent) and West (22.1 percent) regions than in the East (3.7 percent) and Central (2.3 percent) regions.

Summary and Conclusions

Despite having strong child passenger safety laws and a well-developed statewide child passenger safety program, Washington's child passenger restraint use rates remain alarmingly low. It is estimated that statewide, one in five children are illegally riding in the front seat. Although the majority of children are restrained by a seatbelt (approximately 80 percent), less than one-third are actually properly restrained in the back seat with a car seat or booster. The majority of the 26 child vehicle occupant traffic deaths that occurred in Washington State between 2010-2012 likely could have been avoided had the child been properly restrained according to Washington State law.

Washington's comprehensive child passenger safety program supports safety efforts at the state as well as the local level. This network includes 20 Target Zero Traffic Safety Task Forces, 16 SafeKids Coalitions, and four community child passenger safety teams. In addition, grant funding is available to qualifying schools, government agencies, and nonprofits that provide child passenger safety efforts intended to reduce the number of deaths and serious injuries to children resulting from traffic crashes. (The Strategic Highway Safety Plan: Target Zero, 2013.)

The child passenger safety program also supports the retention and recruitment of nationally certified Child Passenger Safety Technicians (CPSTs), offering training courses and continuing education unit opportunities. CPSTs manage safety inspection stations across the state. Law enforcement also conduct visual inspections of child restraint use and issue violations to drivers found to be non-compliant with the law. However, if the driver can provide proof of acquisition of an approved child passenger restraint system within seven days of the traffic infraction, the jurisdiction may dismiss the infraction. (The Strategic Highway Safety Plan: Target Zero, 2013.)

Even with the program successes and efforts of the traffic safety community, Washington still faces a significant problem keeping our children safe on the roadways. Continual educational outreach and enforcement must be conducted as the parent and child population is constantly evolving. New parents are made everyday so new efforts are constantly needed to target this ever changing population. Although this report provides only estimates of child passenger restraint use, the results clearly point to the need to reach further and do more. Together we can reach our goal of zero traffic fatalities and serious injuries by 2030!

Appendix A: References

Centers for Disease Control and Prevention (CDC), Web-based Injury Statistics Query and Reporting System (WISQARS). http://www.cdc.gov/injury/WISQARS/

Decina, L.E., Temple, M.G., & Dorer, H.S. (1994). Increasing child safety-seat use and proper use among toddlers: Evaluation of an enforcement and education program. *Accident Analysis and Prevention*. 26(5), 667-673.

Decina, L.E., Lococo, K.H., Ashburn, W., Hall, W.L., & Rose, J. (2008). *Identifying Strategies to Improve the Effectiveness of Booster Seat Laws*. DOT HS 810 969. Washington D.C.: National Highway Traffic Safety Administration.

Durbin, Chen, Smith, Elliot, & Winston. (2005). Effects of seating position and appropriate restraint use on the risk of injury to children in motor vehicle crashes. *Pediatrics*. 115(3), e305-e309.

The Strategic Highway Safety Plan: Target Zero, 2013. http://www.targetzero.com/

Appendix B: Methodology and Weighting

Sampling Plan and School Participation

The total pool of eligible elementary schools was identified based upon the following criteria:

- Included in the October 3 enrollment reports obtained from the OSPI
- Excluded schools with any enrollment in grades 7-12 (high school and intermediate schools)
- Excluded schools with grade 6 enrollment (strengthen the under 4 feet 9 inches assumption for analysis)
- Excluded schools with Pre-5 total enrollment less than 400 students
- The resulting selection sample was **417** elementary schools

Schools were randomly selected proportionate to the number of elementary schools in four regions (East, Central, East Puget Sound, and West). The resulting proportions and total sample allocated to the region is reflected here:

Region	***Proportion***	***Probability of Selection - Region***	***Total Schools Invited***	***Total Schools Sampled***
1=East	52 (0.12)	0.0192	**10**	3
2=Central	56 (0.13)	0.0179	**10**	3
3=E. Puget Sound	236 (0.57)	0.0042	**44**	5
4=West	73 (0.18)	0.0137	**14**	5

A two-step sampling approach was employed resulting in a stratified, semi-random sample. The sample of 417 elementary schools was exported to excel and a random number assigned to each school. Schools were separated by region and then sorted low to high by the random number assigned. The schools with the lowest random number assignments were selected as invitation schools. Selected schools were sent an email from the Director of the Washington Traffic Safety Commission (Appendix C). The majority of invited schools chose not to participate, and administrators provided various reasons for non-participation. The resulting sample did not match the regional proportions so observations were adjusted using the weighting formula described in the next section.

School district transportation data was used to derive estimated parent-transport proportions. Transportation data includes AM+PM counts of bus transport, special bus transport, transit bus transport, and students within the walking route. These estimates were totaled and divided by 2 to get a district-level estimate of spring AM parent-student transport. This amount was multiplied by the enrollment proportion of the sample schools in each district. Using the available information, parent-student transport proportions were estimated at the district level and included as a weighting adjustment described in the next section.

Data Collection

Prior to the initiation of data collection, every site was visited to identify the area of observation (including which lane to observe if there was multiple drop off lanes), location of the observers, and the facing direction of the observer. Observers first looked through the front windshield of the vehicle. From this position, they recorded driver gender and whether or not the driver was buckled up, the number of children exiting the vehicle and whether or not they appeared to be buckled. When the children open the vehicle door to exit the vehicle, the observer noted whether a child seat or booster was in the vehicle. Observers also noted if tinted windows created a problem seeing into the vehicle or if the vehicle did not have a backseat. Only children exiting the vehicle were observed for restraint use.

There was also an observer at the entrance of each drop-off zone recording the number of students actually unbuckling prior to reaching the data collection observers. Of the 1,301 children included in analysis, 146 of them were observed unbuckling at entry. Unbuckling prior to entry was an issue identified in early pilots of the observation survey. Unfortunately, with the exception of this notation, the final estimates could not be adjusted for this issue.

School drop-off zones varied substantially between sites, ranging from controlled and monitored drop-off lanes in a designated area to having no designated drop-off zone and children being dropped off in the surrounding school block. Because of this range, general safety of school drop-off zones also varied. Each school that participated received a survey debriefing summary that included raw observations and observer feedback on the safety of the school's parent drop-off procedures for their administrative consideration. Schools were encouraged to use these results in their own child passenger safety messaging and education.

A flyer was available to drivers explaining that a survey was underway and information about Washington's child passenger safety law. Additionally, a sign stating "Child Safety Research" was visible to drivers as they left the drop-off location. A form application was developed and employed on iPad units for electronic data collection. Screen shots of this application are available in Appendix D.

Sample Weighting

Schools were assigned a probability of selection based on the number of schools in the sampling region. The design weight is the inverse of the probability of selection (P_s). Transportation and enrollment data were used to estimate the total number of AM students transported by parents (PT_e) by district. The transportation post-stratification weight is the estimated total number of AM students transported by parents (PT_e) divided by the number of students observed (PT_o) by district. Since the number of sampled schools (R_S) did not match the regional proportions (R_P), a post-stratification adjustment was also made for regional proportions. The final weight used for statewide and regional estimates is the design weight multiplied by the transportation and regional proportion post-stratification weights. The resulting weighting formula is:

$$\text{Final Weight} = (1/P_s)*(PT_e/PT_o)*(R_P/R_S)$$

Appendix C: Email to Selected Elementary Schools

Greetings:

Your school has been randomly selected to participate in a project to gauge proper child restraint use in Washington. Why your school? Enrollment reports were obtained from our Commission agency partner, the Office of the Superintendent of Public Instruction, to identify elementary schools with 400 or more pre-5th grade students. From this sample of 417 schools, 30 were randomly identified for observations.

A process previously performed at several elementary schools across the state was shown to result in no disruption to drop-off traffic flow. To conduct the observations, trained staff will be present during one morning parent drop-off period. Staff will provide an educational brochure to parents dropping off their children while visually observing child restraint use. No questions will be asked of the driver or child and all information collected is anonymous.

You may be familiar with the Washington Traffic Safety Commission (WTSC) as we provide grants to elementary schools throughout Washington to help maintain school zone crossing guard programs. WTSC adopted a bold vision to eliminate traffic deaths and serious injuries on our roads by 2030. Despite tremendous progress towards Target Zero, there is much more work to be done.

Our state has one of the strongest child restraint laws in the nation yet there were 28 traffic deaths and 163 serious injuries in 2010-2012 involving children 14 years and younger.

Belt-positioning booster seat use reduces the risk of serious injury by 59 percent for children 4-7 years of age, compared with seat belt use alone.

Information collected will help us align resources for our Washington Child Passenger Safety Program. If you agree to participate in this important effort, you will receive valuable information about your own school and parents' current safety practices. We will help you identify any available local resources and provide free educational materials for your families.

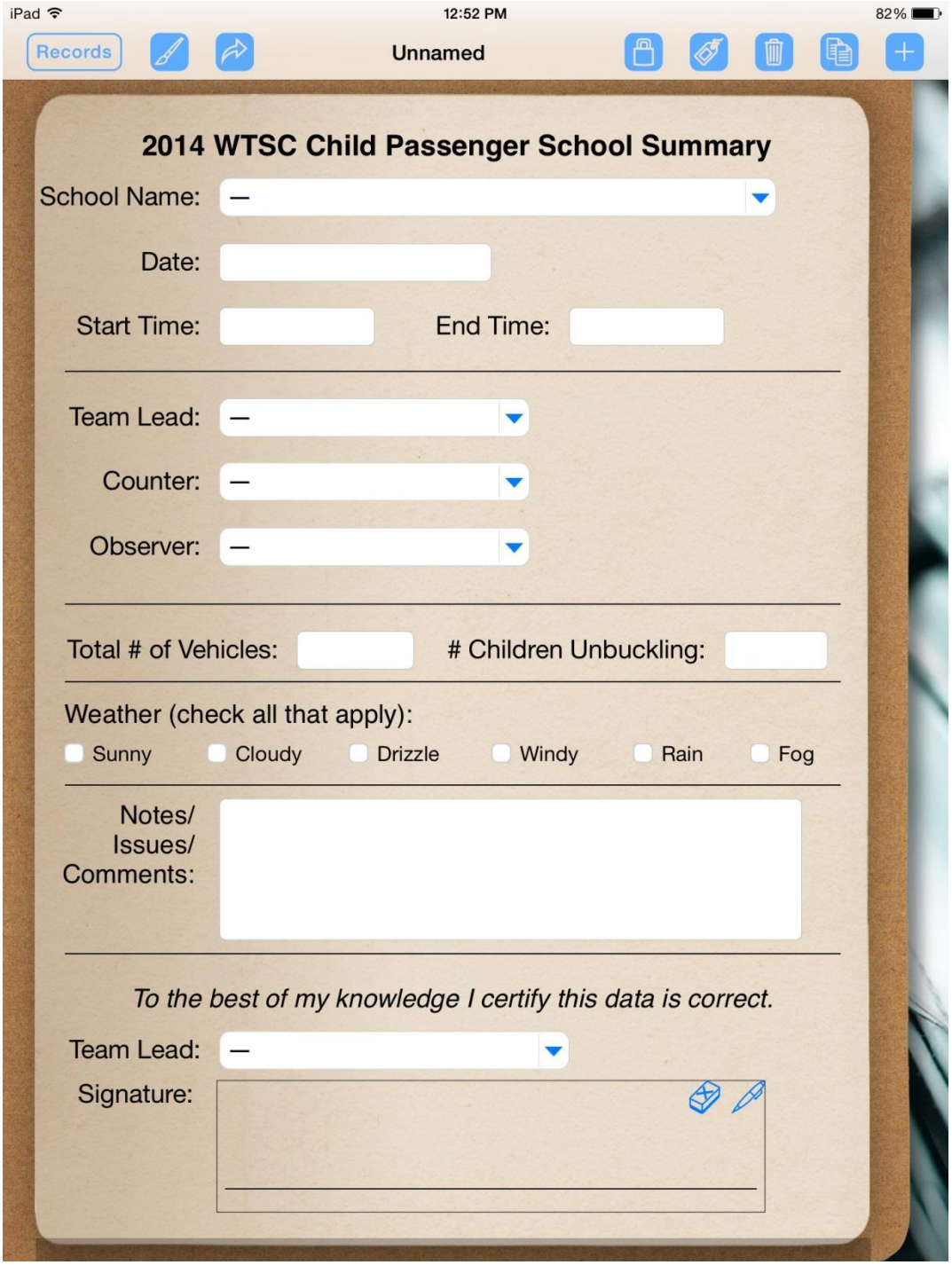
You will be contacted soon by representatives of the WTSC to discuss your participation and answer any questions you may have. Your participation is vital to this effort. If you have immediate questions, please contact our statewide Child Passenger Safety Project Manager, Cesi Velez of the Bonney Lake Police Department at (253) 447-3257 or velezc@ci.bonney-lake.wa.us.

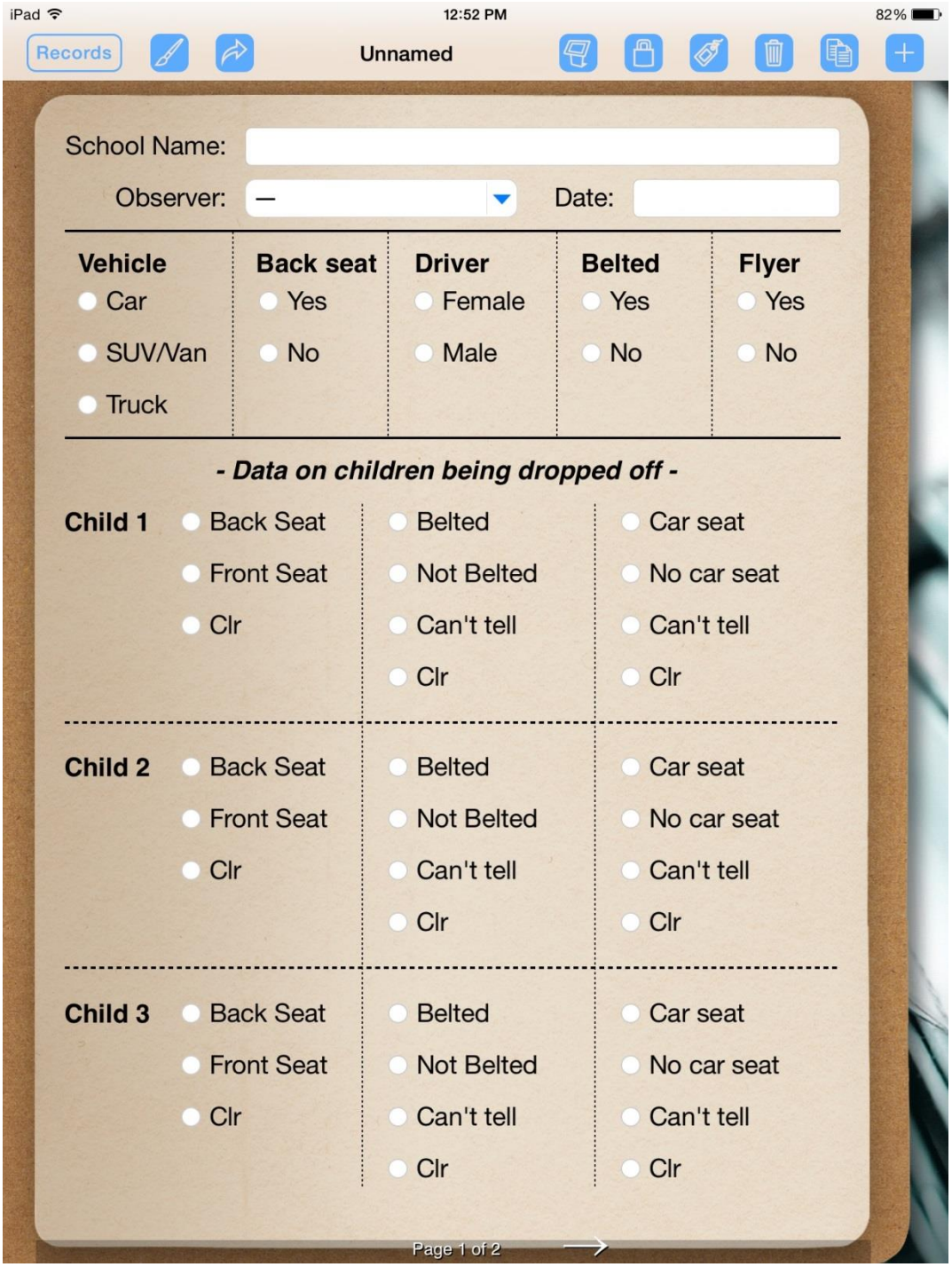
Thank you for making Washington Roadways safer for our children!

Darrin T. Grondel
Director
Washington Traffic Safety Commission

Appendix D: Data Collection Application

School Summary Screen



Data Collection Screen

Data was collected on up to six children exiting vehicles in the observation drop-off zones.