MEMORANDUM

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Executive Director
Traffic Safety Commission

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Observational survey of car seat use, 2021

The Traffic Safety Commission of Puerto Rico (CST by its Spanish acronym), with the collaboration of Estudios Técnicos, Inc., conducted the Puerto Rico Observational Survey of Seat Belt Use for 2022. The CST also asked Estudios Técnicos, Inc., to measure the car seat or protected seat use in vehicles with occupants of 0 to 8 years, using the methodology of the 2022 Observational Survey of Seat Belt Use.

The sample used in this study was a probabilistic multistage stratified sample with two units. The primary sample units (PSU) were composed by counties, and the secondary sampling units (SSU) were composed by road segments, followed by time segments, road directions, lanes, and vehicles selection. The PSU were stratified using the five (5) geographical regions established by the Highway and Transportation Authority of Puerto Rico. Inside each county, the SSU stratification was established by road type[1].

The fieldwork team was composed of eleven (11) members. All team members participated in a one-day training session on August 16, 2022 that included all the different aspects for the observations and quality control. The training was organized in two sections. The first section addressed the objectives of the survey, operational definitions concerning field observations, and data gathering protocols. The second section consisted of examples and the recreation of the

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[1] For details refer to the document *Puerto Rico Observational Survey of Safety Belt Use, 2020*.

different situations and possible scenarios in the field. This second part also included role playing exercises for observers, counters, and quality control monitors.

Observations were conducted from August 23 to September 7, 2022. Seventeen (17) counties were visited, for a total of 6,800 vehicle observations. Of the 6,800 observed vehicles in the 68 segments, 80 occupants of 0 to 8 years were observed in 38 segments (in 30 segments no occupants of 0 to 8 years were observed).

All the procedures related with the estimated rate of car seat usage followed the sample design of the Puerto Rico Observational Survey Safety Belt Use, 2022. As established in that design, in the rate estimates of the car seat usage, weight was applied to each observation. For the weight criteria, the different sample units were used: counties (region to which it belongs), road segment (road type), time, road direction, total amount of lanes and vehicles (total amount of observed vehicles in relation with passing vehicles). Considering all these aspects, 90.5% of car seat usage is estimated, with a standard error of 6.5%.

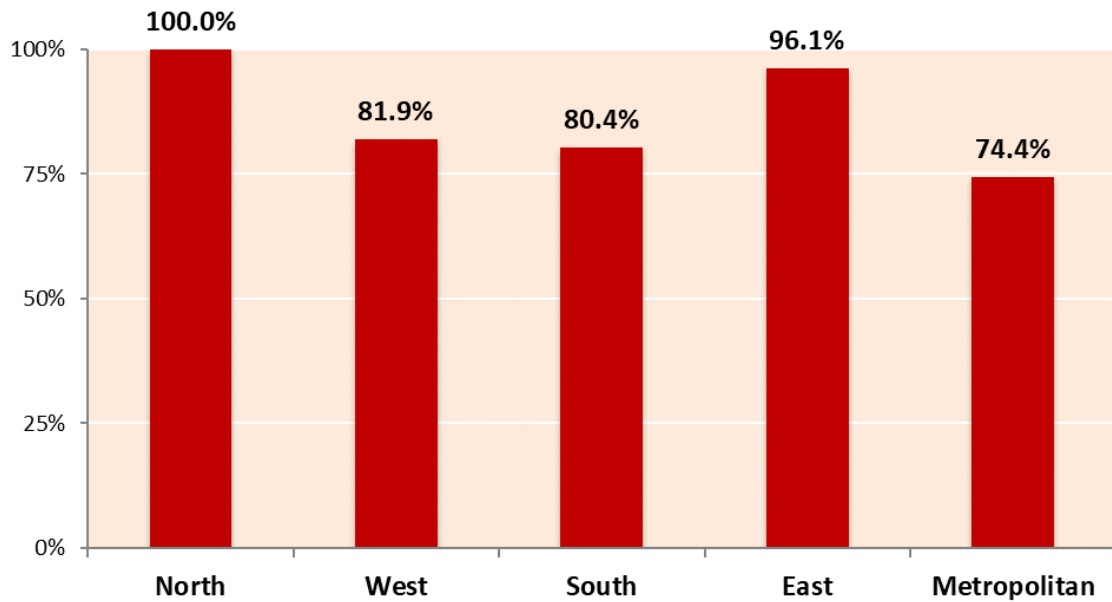| Rate of car seat use	Standard Error	95 Percent Confidence Interval	
90.5%	6.5%	77.7%	100.0%
n = 80			

The standard error (SE) was calculated using a similar procedure as the Puerto Rico Observational Survey of Safety Belt Use, 2022, because both sample designs are the same. In the sample design, PSUs are stratified and selected with unequal probabilities (PPS) and may have large sampling fractions. According to NHTSA, a specialized software procedure may calculate the SE. This study uses the RTI International's SUDAAN software to calculate the SE. Given the sample design and sample rates of the first two stages of sampling (counties –PSU- and road segments – SSU -), the Taylor Method of Variance Estimation included in this software was used.

It is worth mentioning that, when analyzing the results by different variables (such as type of road, type of vehicle or time intervals) the size of each of the sub-sample groups was taken in consideration. This is because in subgroups that are too small,
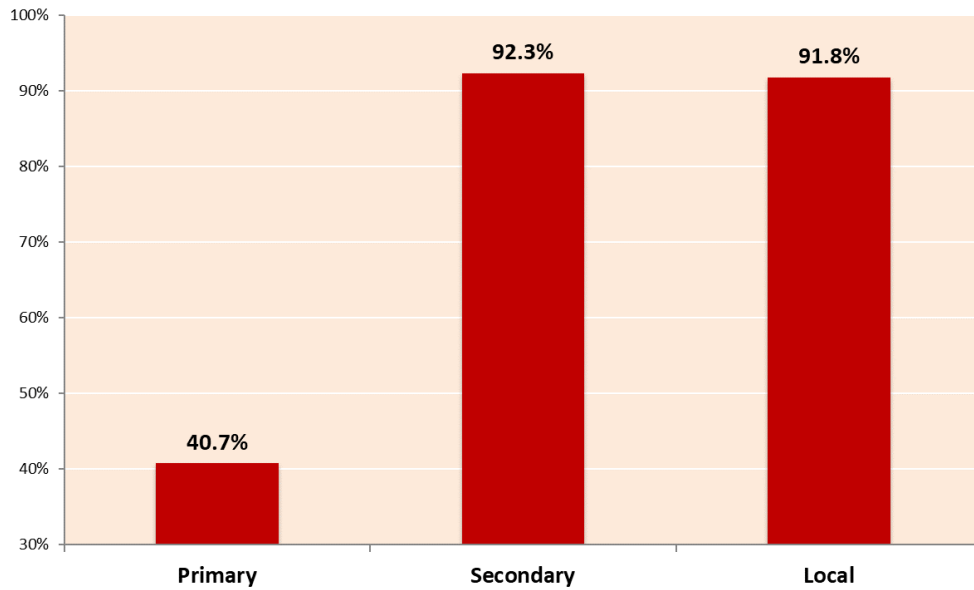
with also the application of a certain weight, the results may conduct to an erroneous conclusion.
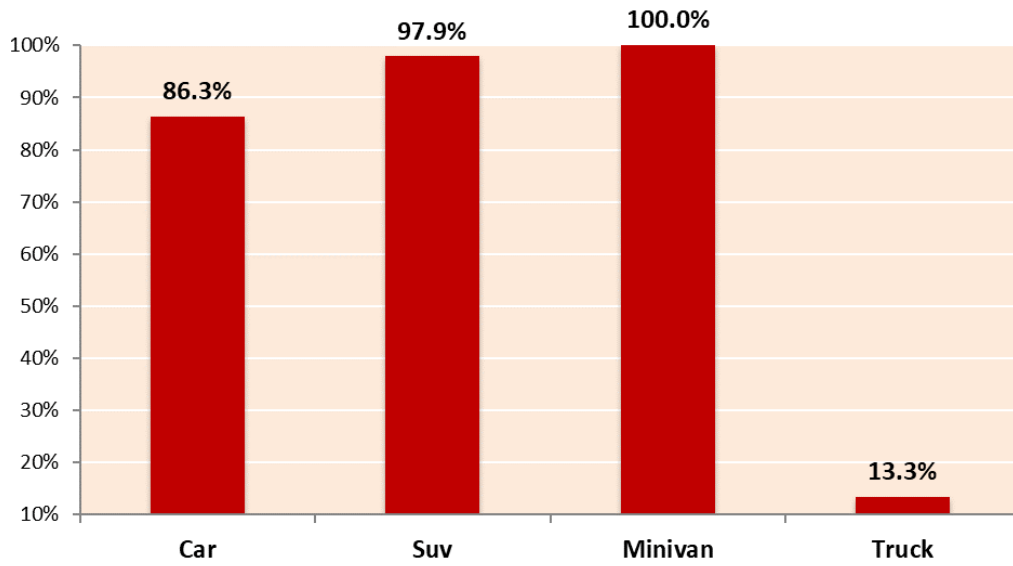
Graph.1: Observed Car Seat Use by Region

Region	Observed Car Seat Use
North	100.0%
West	81.9%
South	80.4%
East	96.1%
Metropolitan	74.4%

Graph.2: Observed Car Seat Use by Road Type

Road Type	Observed Car Seat Use
Primary	40.7%
Secondary	92.3%
Local	91.8%

Graph.3: Observed Car Seat Use by Vehicle Type

Bar chart values — Car: 86.3%, Suv: 97.9%, Minivan: 100.0%, Truck: 13.3%

Graph 4: Observed Car Seat Use by Time Intervals

Bar chart values — 7am-9:14am: 87.9%, 9:15am - 11:29am: 98.8%, 11:30am - 1:44pm: 88.9%, 1:45pm - 3:59pm: 80.4%, 4:00pm - 6:00pm: 100.0%