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Awareness and Availability Of Child Passenger Safety Information Resources

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16. Abstract

Child restraint systems (CRSs) are an effective method to reduce the risk of child injury in motor vehicle crashes. Research indicates that hands-on instruction demonstrating the installation and use of CRSs is effective in reducing misuse of CRSs. Child passenger safety technicians (CPSTs) currently provide one-on-one instruction on the proper use and installation of CRSs at thousands of child car seat inspection stations nationwide. The primary objective of the Awareness and Availability of Child Passenger Safety Information Resources (AACPSIR) survey was to estimate the degree of awareness parents and caregivers have of CPST inspection stations. The researchers recruited a nationally representative sample of caregivers who drove children regularly. Key data analysis methods included descriptive analyses, cross-tabulation analyses, weighted linear regression or logistic regression analyses, and causality analysis to determine the effects of distance on the use of child car seat inspection stations. In addition, exploratory linked analysis to the National Survey of the Use of Booster Seats (NSUBS) data was conducted to examine the relationships among selected AACPSIR outcome variables and selected explanatory variables from the AACPSIR and NSUBS data. The study found that two-thirds of adults who drove children on a regular basis had heard of inspection stations (67%). Drivers who transport children frequently indicated they were confident their CRSs were installed correctly. However, the AACPSIR survey found that 19 percent of children were not riding in the correct CRS for their height and weight. There were higher rates of improper selection in the 2- to 3-year and the 8- to 9-year age groups than among other ages.

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Executive Summary

Child restraint systems (CRSs) are an effective method to reduce the risk of child injury in motor vehicle crashes. Rates of CRS use have increased in large part because considerable efforts have been made to promote child passenger safety. However, 38 percent of children killed in crashes in 2016 were unrestrained (NCSA, 2018). Moreover, children are injured because CRSs are frequently used inappropriately. An example of misuse is the premature graduation to restraint types that are not appropriate for the child's age, height, and weight.

Research indicates that hands-on instruction demonstrating the installation and use of CRSs is an effective method to reduce the misuse of CRSs. To assist parents in selecting and installing CRSs correctly, the National Highway Traffic Safety Administration implemented a program for training and certifying child passenger safety technicians (CPSTs). CPSTs currently provide one-on-one instruction on the proper use and installation of CRSs at thousands of child car seat inspection stations nationwide.

The primary objective of the Awareness and Availability of Child Passenger Safety Information Resources (AACPSIR) survey was to estimate the degree of awareness parents and caregivers have of CPST inspection stations. The AACPSIR was designed to evaluate the relationships among parent and caregiver confidence, risk perception, and intent to visit an inspection station. Finally, the study identified barriers that result in underutilization of the hands-on instruction provided at inspection stations. The AACPSIR web-based survey targeted adults 18 or older who drive children up to 9 years old in personal vehicles at least twice per month. Data were collected from 1,565 respondents in a nationally representative sample.

This **AACPSIR Final Report** provides a detailed description of the pre-survey phase, including survey design and development, and sample design, the data collection process, respondent recruitment methods, weighting and analysis procedures, and findings. Key analysis methods included descriptive analyses, cross-tabulation analyses, weighted linear regression or logistic regression analyses, and causality analysis to determine the effects of distance on the use of child car seat inspection stations. In addition, exploratory linked analysis to the National Survey of the Use of Booster Seats (NSUBS) data was conducted to examine the relationships among selected AACPSIR outcome variables and selected explanatory variables from the AACPSIR and NSUBS data through regression.

The study found that two-thirds of adults who drove children on a regular basis had heard of inspection stations (67%). Among those who indicated they were aware of inspection stations, only 44 percent reported that they had used an inspection station. Drivers who transport children frequently indicated they were confident their CRSs were installed correctly. However, the AACPSIR survey found that 19 percent of children were not riding in a proper CRS. There were higher rates of improper selection in the 2- to 3-year-old and the 8- to 9-year-old age groups than among other ages. The study found a subgroup of parents and other caregivers who did not access an inspection station and did not intend to get assistance from a CPST because they didn't think it was necessary. They indicated that they already knew how to install the CRS and pointed to other inconveniences such as time needed for a visit or having to book an appointment. These people were more likely to indicate that in certain scenarios it was acceptable for a child to ride without a CRS, such as riding in a taxi or rideshare vehicle, going a short distance, or riding in a carpool.

1. Introduction

Motor vehicle crashes are a leading cause of mortality and morbidity for children under 14 (CDC, 2017). Based on data from the Fatality Analysis Reporting System (FARS), in 2016, on average, 3 children were killed every day in crashes. In 2016, about 74 percent of the child fatalities (908 children) were motor vehicle occupants (NCSA, 2018). Seat belts and other restraint systems are designed to minimize injuries to motor vehicle passengers during a crash by reducing risk of ejection and distributing the energy load of the crash on the stronger bones of the occupants' bodies.

CRSs provide better fit for young occupants and include different types of seats including rear-facing seats, forward-facing seats, high-back booster seats, and low-back booster seats. CRSs with harness straps (rear-facing and front-facing CRSs) have been shown to reduce the risk of fatal injury by 71 percent for infants under 1 year old and by 54 percent for toddlers 1 to 4 years old in passenger cars (NCSA, 2018). Using booster seats with vehicle seat belts to attain better fit resulted in a 45 percent lower likelihood of injury compared to seat belts alone (Arbogast et al., 2009). Additionally, based on a matched cohort analysis of FARS data, booster seats were found to reduce the risk of fatal injuries by 67 percent for 4- and 5-year-olds and 55 percent for 6- to 8-year-olds when compared to unrestrained adults and children (Rice et al., 2009).

Considering the importance of CRSs for preventing injuries, NHTSA provides recommendations for parents and caregivers regarding the use of child restraints (NHTSA, n.d.), as follows.

- Children under age 1 should always ride rear-facing. Keep the child rear-facing as long as possible, until the child reaches the top height or weight limit allowed by the CRS manufacturer.
- Once the child outgrows the rear-facing car seat, the child is ready to travel in a forward-facing car seat with a harness and tether. Keep the child in a forward-facing car seat with a harness and tether until the child reaches the top height or weight limit allowed by the CRS manufacturer.
- Once the child outgrows the forward-facing car seat with a harness, the child should travel in a booster seat in the back seat until big enough to fit properly in a seat belt.
- For a seat belt to fit properly, the lap belt must lie snugly across the upper thighs, not the stomach. The shoulder belt should lie snugly across the shoulder and chest and not across the neck or face.
- All children younger than 13 should ride in the back seat because it's safer there.

The American Academy of Pediatrics (AAP) provides car seat recommendations for parents and caregivers that are updated periodically. The most recent recommendations are similar to those from NHTSA with the addition of ages for each stage, if appropriate (Durbin & Hoffman, 2018):

- Infants and toddlers should ride in a rear-facing car safety seat as long as possible, until they reach the highest weight or height allowed by their seat. Most convertible seats have limits that will allow children to ride rear-facing for 2 years or more.

- Once they are facing forward, children should use a forward-facing car safety seat with a harness for as long as possible, until they reach the height and weight limits for their seats. Many seats can accommodate children up to 65 pounds or more.
- When children exceed these limits, they should use a belt-positioning booster seat until the vehicle's lap and shoulder seat belt fits properly. This is often when they have reached at least 4 feet 9 inches in height and are 8 to 12 years old.
- When children are old enough and large enough to use the vehicle seat belt alone, they should always use lap and shoulder seat belts for optimal protection.
- All children younger than 13 years should be restrained in the rear seats of vehicles for optimal protection.

Considerable efforts have been made to promote the use of CRSs, including updates to legislation, improved education, public awareness, and enforcement campaigns. Pediatricians and other health care providers have also served as sources for child passenger safety (CPS) information (Burstein et al., 2017; Mirman et al., 2017; Durbin & Hoffman, 2018). As a result, child restraint use has increased significantly over the years. In reviewing a large sample of children 8 and younger in crashes between 1999 and 2007, the overall reported use of CRSs increased from 51 percent to 80 percent (PCPS, 2008). Observed rates of restraint use in the most recent NSUBS included rear-facing restraint use for infants under age 1 at 92 percent, rear- and forward-facing restraint use for toddlers 1-3 at 85 percent, and for children 4-7, 68.5 percent were restrained either in forward-facing car seats or in booster seats. Overall, restraint use for children under 13 years old was found to be 90 percent (Li & Pickrell, 2018). From 2006 to 2017 NSUBS has reported steady increases in rear-facing restraint use for infants under 1 that have remained around 90 percent in recent years. Forward-facing and rear-facing restraint use among children 1 to 3 years old also initially increased but has remained stable recently. However, any restraint use and booster seat use have remained relatively stable across data collection years (Pickrell & Ye, 2010, 2013; Pickrell & Choi, 2014, Li & Pickrell, 2018).

Despite the increased use of CRSs, many children are still fatally injured because of MVCs. While the child fatality rate per 100,000 children decreased by 27 percent from 2007 to 2016, the rate dropped most for the oldest age group, 13 and 14 years old (49%), with lower reductions for age groups 0 to 1-year-old (28%), 1 to 3 years old (23%), and 4 to 7 years old (18%) (NCSA, 2018). In addition, for every child fatality in a crash in 2016 approximately five children under 14 were hospitalized and more than 130 received treatment in an emergency department (CDC, 2018). Among fatally injured children, a high percentage were riding unrestrained (39% of children for whom restraint use was known) (NCSA, 2018). Restraint use is consistently lower for children riding with unrestrained drivers as reported in both observational studies and injury data (NCSA, 2018). Previous research has also found that rates of misuse and non-use of CRSs were higher among certain demographic groups, including parents or caregivers with less education, lower income, and certain race-ethnicity groups (Macy et al., 2014; Hoffman et al., 2016; Li & Pickrell, 2016, 2018).

In addition to child passengers riding unrestrained in vehicles, their restraints are frequently used inappropriately. Even in countries where rates of CRS use are high, misuse rates are as high as 60 percent to 80 percent (Bendjellal, 2008; Decina & Lococo, 2005; Koppel & Charlton, 2009). Studies point to even more prevalent misuse for newborns (Tessier, 2010; Hoffman et al., 2016). Misuse scenarios commonly observed in the aforementioned studies include restraint in a CRS that is inappropriate for the child's age, height or weight, inadequate use of the harness straps, and incorrect installation in the vehicle. The National Child Restraint Use Special Study (NCRUSS), conducted in 2011, observed and interviewed a nationally representative sample (n = 4,167) of drivers with child passengers (Greenwell, 2015). The results revealed five common mistakes regarding child safety seats: (1) wrong harness slot used, (2) improper harness retainer/chest clip position, (3) loose CRS installation, (4) loose harness straps, and (5) improper lap belt placement. Additional instances of misuse have been reported in observational studies, including improper use of the top tether and failure to secure the seat belt used to install the CRS (Koppel & Charlton, 2009; Bachman et al., 2016).

Furthermore, research has found many children are prematurely graduated to an adult seat belt (Decina & Knoebel, 1997; Eby & Kostyniuk, 1999; Duchossois et al., 2008; Bachman et al., 2016). In 2017 the NSUBS found premature graduation to restraint types that are not appropriate for children's age, height, and weight. Among the 4- to 7- year old children, the rate of premature transition to a seat belt is especially high at 20.8 percent. (Li & Pickrell, 2018). Crash test studies indicate CRS misuse potentially places a child at increased risk of both fatal and non-fatal injuries (Lesire et al., 2007; Tylko et al., 2012).

A variety of factors contribute to CRS misuse, including the myriad array of CRS models, each with their own installation procedures. Many parents and caregivers may be uninterested in reading instructions or may be overwhelmed by wording or confused by drawings in the CRS manuals. In an earlier study, the readability of instruction manuals ranged from 7th to 12th grade, with an average reading level of 10.34. This level is above the average reading level of many U.S. consumers; experts in health literacy recommend that written material be targeted to the 5th or 6th grade reading level (Wegner & Girasek, 2003). More recent research points to similar difficulties interpreting CRS labels and instructions (Klinich et al., 2012; Mirman et al., 2017; Hall et al., 2018). Another issue is the incompatibility of vehicle restraint systems and vehicle seats with particular CRS models. New vehicles are continually introduced to the fleet, and CRSs continue to evolve each year. Additionally, there is a continuous flow of new parents and caregivers who need to be educated on CRS use, while experienced parents and caregivers often forget or do not apply knowledge gained in the past with their newborns (Weaver et al., 2013). Finally, parents and caregivers may overestimate their own abilities in selecting and installing a CRS in the vehicle and securing the child in the CRS (Mirman et al., 2013).

A variety of resources are available to parents and caregivers to aid in correct CRS selection and installation, including informational brochures, guidelines on the web, and hands-on instruction. Presently, thousands of CPSTs and child car seat inspection stations nationwide provide parents and caregivers an opportunity to receive one-on-one instruction regarding proper use of CRSs (NHTSA, n.d.). Research has shown hands-on instruction that covers CRS installation and use is effective in reducing misuse of seats (Duchossois et al., 2008; O'Neil et al., 2013; MacKay et al., 2017; Mirman et al., 2017). For example, in an observational survey in New South Wales,

Australia, less than a third of the caregivers reported that they had previously visited a fitting station. Those who had not visited a station were 1.8 times more likely to be using their restraints incorrectly (Brown et al., 2011). Hands-on instruction has also been effective for expectant parents (Tessier, 2010; Hoffman et al., 2016). Unfortunately, many parents and caregivers do not visit inspection stations or receive hands-on instruction from a CPST. In the NCRUSS study, participants indicated that only 3 percent (backless booster seat) to 19 percent (rear-facing seat) of CRSs were inspected by a CPST (Greenwell, 2015).

2. Objectives

One of NHTSA's goals is to improve child passenger safety by encouraging the proper selection and installation of CRSs. To this end, CPST inspection stations nationwide provide hands-on instruction on CPS and CRS installation.

Overall, there were three primary objectives for this project.

1. Estimate the degree and determinants of awareness parents and caregivers have of CPST inspection stations.
2. Determine the relationships among parent and caregiver confidence, risk perception, and the intent to visit an inspection station.
3. Identify the barriers that result in underutilization of inspection stations.

Ultimately, an evaluation of these barriers and an understanding of the reasons for the low attendance rates will allow NHTSA and other stakeholders to develop suitable programs to encourage use of this important, life-saving resource.

3. Survey Design

The AACPSIR survey questionnaire was developed to assess general CRS knowledge and focused on respondents' experiences, awareness, and intent to use CPST services and inspection stations. Following a review of the literature and survey tools, the research team determined that many of the topics covered in the AACPSIR survey were not previously investigated in surveys with caregivers. Therefore, much of the questionnaire was original work. The questionnaire was developed collaboratively by subject matter experts from NHTSA and from Westat's Center for Transportation, Technology & Safety Research, in conjunction, with survey methodologists from Westat's Instrument Design, Evaluation, and Analysis (IDEA) Services. In addition, Emilie Crown, who served as the program manager of Montgomery County, Maryland's SafeKids program, provided expertise in the survey design process. The IDEA group worked closely with the project team throughout the stages of survey design to ensure that the questionnaire and respondent material were designed to effectively address the research questions, improve data quality, reduce measurement error, and minimize burden for respondents. The survey design process included identification of survey topics, development of research questions, creation of a draft questionnaire, and cognitive testing, as described below.

3.1 Identification of Survey Topics

Table 3.1: Survey topics

Awareness of CPST services and inspection stations
Confidence in CRS installation ability
Perception of risk associated with incorrect CRS use and related to risk of injury in a crash
Intent to visit inspection stations
Barriers to utilization of CPST services and inspection stations
Proximity of CPST services and inspection stations
Availability of CPST services and inspection stations
Previous experience using CPST services and inspection stations
Preferred features of a CRS installation service
Exposure to information on CPS and inspection stations
Sources for CPS information
Knowledge of best practices for CRS use and installation
Knowledge of local laws and fines for incorrect CRS use
Frequency of CRS installation and removal
Demographics

3.2 Development of Research Questions

Survey topics were developed into research questions, subtopics, and initial question areas. The research questions were designed to directly correlate with the study objectives and served as the basis for developing the survey questions. The questions were prioritized in order of importance and relevance to the study objectives. This systematic approach allowed project staff to develop a questionnaire that accurately measured issues that were important to NHTSA.

3.3 Development of the Draft Questionnaire

The draft questionnaire was divided into the following sections.

- Screener
- Current Use of Car Seats
- Experience Searching for Car Seat Information
- Experience Attaching a Car Seat
- Awareness and Use of Car Seat Services
- Experience With Car Seat Help
- About You

Once the draft questionnaire was prepared, members of the IDEA group conducted a review of the survey. The IDEA group provided feedback on the draft questionnaire, including question development, wording, order, and skip patterns. The draft questionnaire was sent to the web survey developers to review for logic checks and flow. The final version was submitted to the Institutional Review Board at Westat for approval prior to cognitive testing.

3.4 Cognitive Testing

Westat conducted cognitive testing of the survey s and material. The testing method used an in-depth, semi-structured interview to assess the cognitive sources of potential misinterpretation (Willis, 2005; Collins, 2015). This qualitative methodology focused on examining the respondents' thought processes, allowing identification and refinement of question wordings that were either misunderstood or understood differently by different respondents, instructions that were insufficient, overlooked, or misinterpreted, and confusing response options. In addition to question wording, cognitive testing examined any potential issues with the visual presentation of the survey and material.

Westat limited the cognitive testing to nine respondents. Westat recruited subjects using a company database that contains respondent information originally gathered on a volunteer basis, and they contacted a variety of potential respondents representing different income levels and types of caregivers. The testing was conducted at Westat headquarters in Rockville, Maryland, in the cognitive testing laboratory facility.

The cognitive interviewing was led by a senior survey methodologist with extensive experience using cognitive interview methods to test survey questionnaires and material. The interviewer delivered scripted probes designed to elicit information about respondent comprehension of the question wording, instructions, and response categories, as well as perceived ease or difficulty in

answering the questions. The interviewer also utilized unscripted probes to expand on any unexpected facial expressions (raised eyebrows, frowns, smiles, etc.) or nonverbal reactions (long pauses, sighs, etc.).

Westat conducted the cognitive testing using two qualitative pretesting methods, cognitive interviewing and usability testing. Following each phase of testing, the senior survey methodologist compiled the interview results, conducted a content analysis, identified any problematic items, and provided recommendations for any changes to the questionnaire or material (Willis, 2015).

Prior to programming the survey, five cognitive interviews were conducted on the survey questionnaire document. The objective of the five interviews was to identify potential issues in the questionnaire language and question order. Feedback from the initial cognitive interviews was incorporated and served as the basis for the web survey programming.

Once the survey was programmed, the final four interviews were conducted to identify any problems respondents encountered while using the web interface. Although the main focus of this phase of testing was the usability of the web survey, the interviewers continued to monitor respondents' question comprehension and other respondent issues that indicated further need for modifying the question wording and order. Upon completion of the testing, recommended revisions were made to the survey.

3.5 IRB and OMB Clearance

Throughout the survey development process, Westat staff provided all necessary documentation and implemented any required changes needed to secure Institutional Review Board approval for the final survey, invitation letter, and postcard. Westat also worked with NHTSA staff to complete the required request for approval from the Office of Management and Budget (OMB). OMB clearance was received on May 22, 2017 (OMB Control Number: 2127-0726).

4. Survey Development

Westat developed a survey platform for the AACPSIR study that included the public survey website, online survey, and survey management system (see Figure 4.1). Data collected in the survey were fed into a PostgreSQL database so that Westat could efficiently extract and clean the data to prepare the final survey data set for analysis.

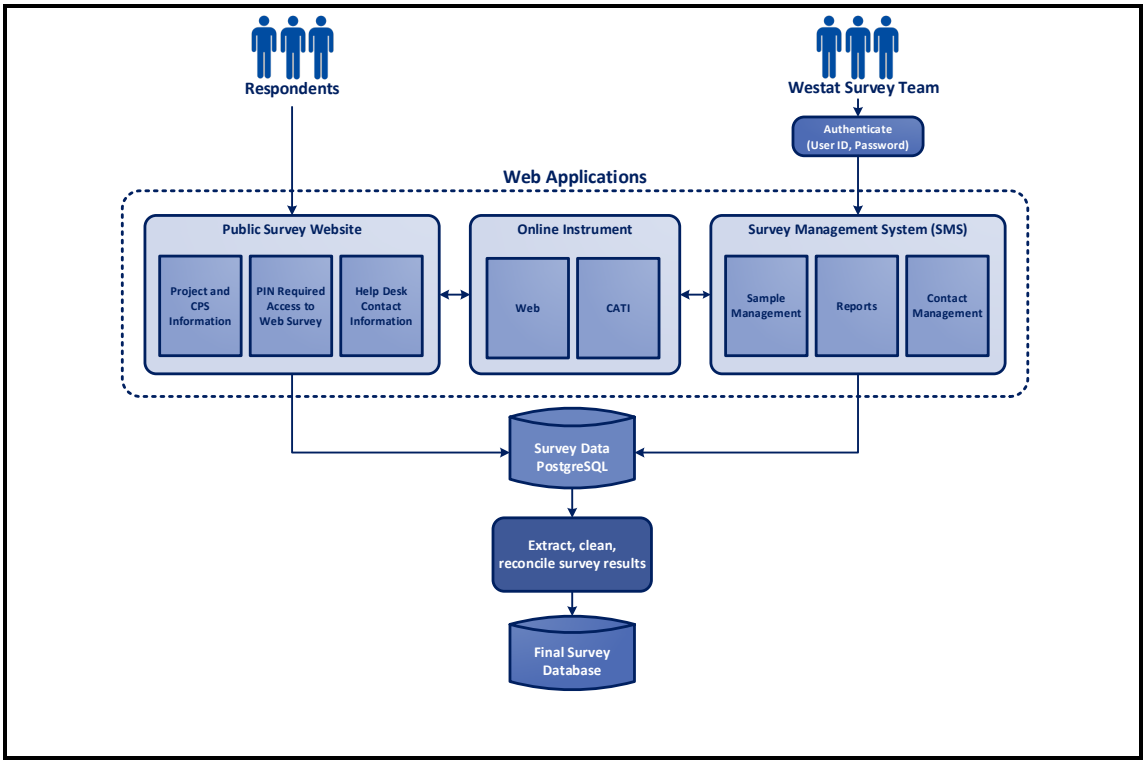

Figure 4.1: Survey Management System

4.1 Public Survey Website

The public website, www.childsafetysurvey.com, provided information about the project and a description of the survey. Links to NHTSA were displayed on the home page to indicate NHTSA's involvement in and knowledge of the project. Research staff collaborated with web developers to build a website that incorporated standard survey research designs and ensured Section 508 compliance.

At the top of the public website was the personal identification number (PIN) box for quick and secure access to the survey (see Figure 4.2). The public website contained information about the survey (see Figure 4.3), frequently asked questions (FAQs) (see Figure 4.4), and a "Contact Us" form. The FAQs focused on the importance of the survey and addressed typical questions. The introductory screen also included the required OMB approval number and information on the

Paperwork Reduction Act. The "Contact Us" form was available to respondents who wanted to submit questions, request their PINs, report operational difficulties, or ask for help.

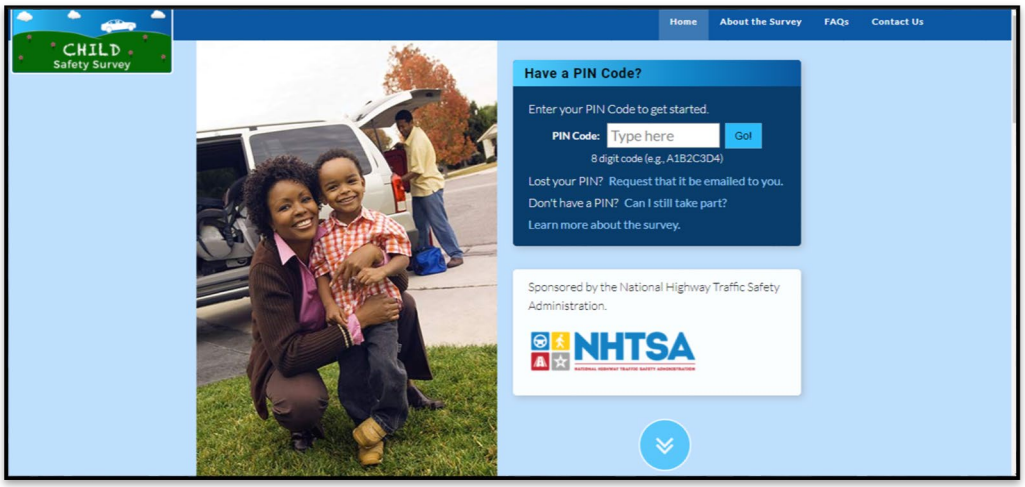

Figure 4.2: Public website home page with PIN code box

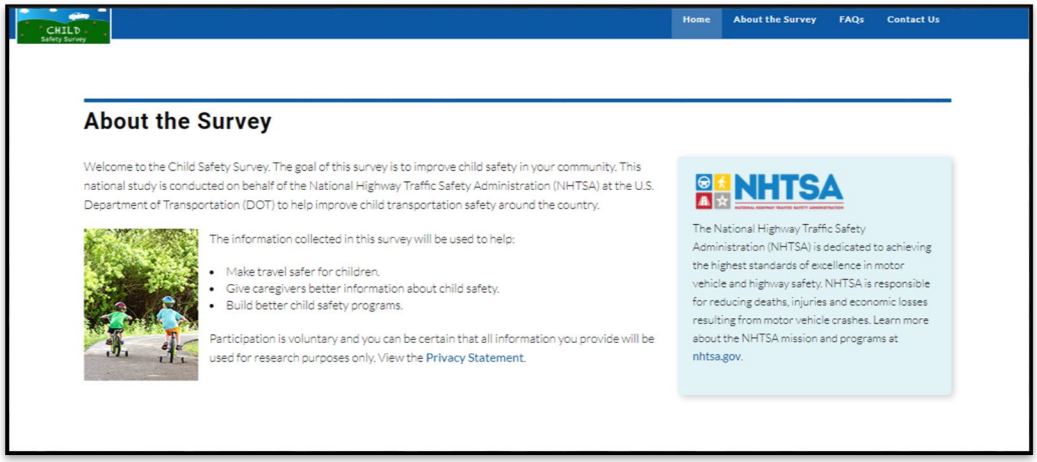

Figure 4.3: Public website information about the survey

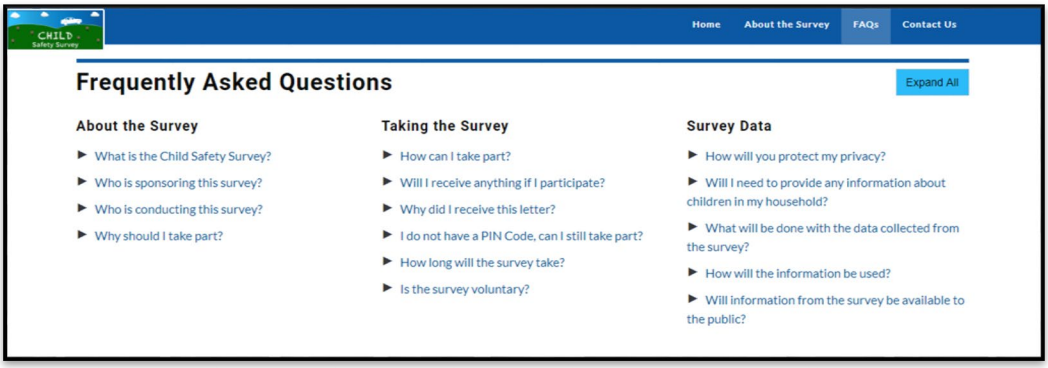

Figure 4.4: Public website Frequently Asked Questions

4.2 Online Survey

The public website served as the access point for the self-administered, web-based, survey. Appendix A presents the final questionnaire for the online survey. The design follows recommended practices for web surveys (Couper, 2008).

Respondents accessed the online survey via the individual PINs provided in the invitation letters (as described in Section 6.1.1) and reminder postcards (see Appendices B and C). The survey began with an introductory page that explained how much time the survey was expected to take (10 to 15 minutes). Following the introductory page, the survey collected household-level information to assist with determining eligibility. The screener collected information on whether the respondent drove with a child (age up to 9) in a personal vehicle on a regular basis (at least twice per month). If someone in the household drove with a child more frequently, the member of the household who drove with children most frequently was asked to provide additional information about their travel with children. This step was an attempt to establish the most knowledgeable member of the household to serve as the respondent. If a household had at least one eligible person, the respondent proceeded into more specific person-level questions about traveling with children. Demographic data were collected from all households.

The survey was divided into topics with each section labeled with a unique heading as recommended in the cognitive testing. The headers allowed the respondents to follow the topic and assess their progression through the survey. The survey included skips to ensure only appropriate questions were asked among those who were qualified (e.g., only those respondents who reported that they visited an inspection station were asked about their experience at inspection stations). In addition, other data quality checks were programmed to ensure responses were consistent and rational.

To improve usability, a variety of design features were implemented, including:

- Appearance of a pop-up message on the respondent's browser offering the Help Desk phone number for additional support or after a period of inactivity;
- Use of images with supporting text to increase recognition of CRS types;
- Provision of clear instructions for grids;
- Use of shading to differentiate table rows;
- Use of traditional HTML structural tags (h1, h2) to express the site hierarchy (preferable for screen readers); and
- Use of colors that passed contrast tests for low-vision users.

The online survey underwent rigorous testing prior to launch. Westat Testing Services Group checked the data capture and output for an exhaustive list of scenarios.

4.3 Survey Management System

The Survey Management System (SMS) was the central component of the survey platform, supporting sample loading and releasing, survey operations, management, monitoring, and reporting. The SMS served as the interface used by survey support staff to view the status of a household, review contact and communication logs, complete the survey over the phone with respondents, retrieve and respond to voicemail messages, and check on the status of incentive payments.

The SMS also allowed survey staff to easily search for and identify household information for a given survey respondent. The SMS displayed all contacts made with a household. For those households that reached out to the Help Desk, the SMS provided the portal for the interviewer to have direct contact with a household to conduct the survey (see Figure 4.5).

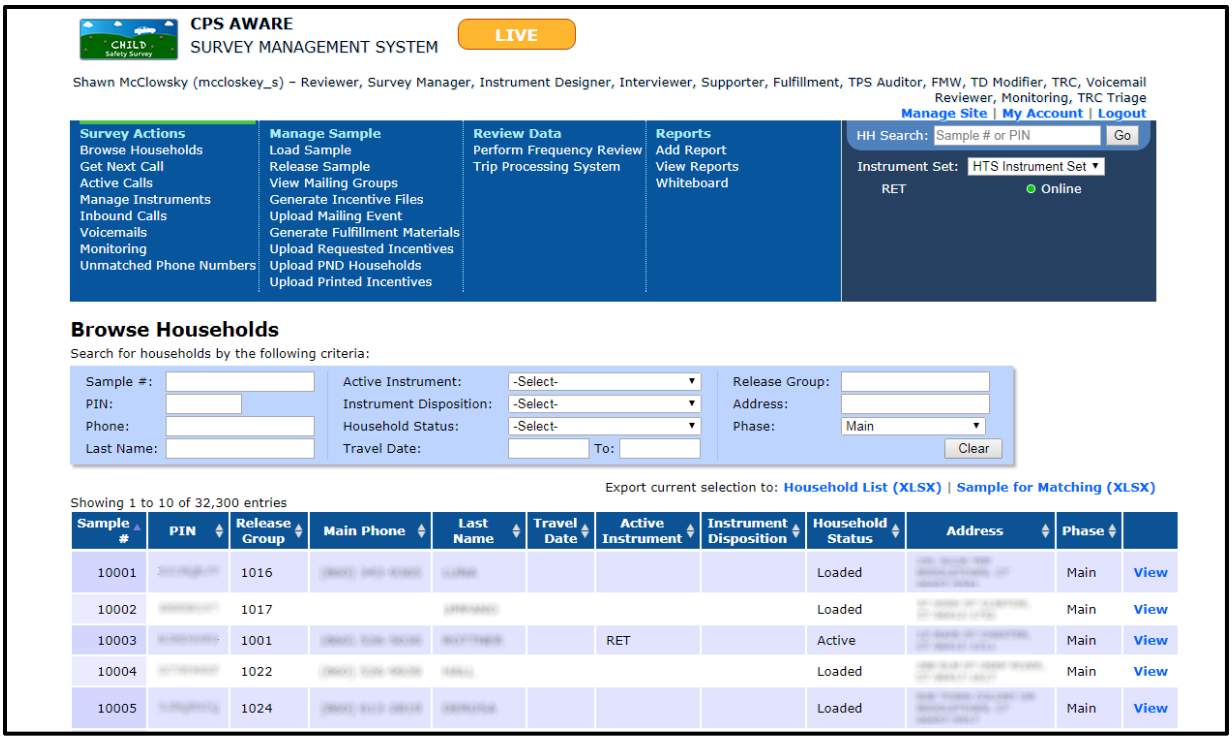

Figure 4.5: AACPSIR Survey Management System Site

The SMS also included a voicemail page that displayed active messages and allowed Help Desk staff to respond to and resolve messages. Classifications were used by Help Desk staff to organize the voicemails into different categories based on the reason for the call: general survey question, joining the survey, uses of the data, technical help, general feedback, and contact regarding a lost PIN. See Section 6.1.3 for more details on the Help Desk.

5. Sampling

5.1 Sample Design

The target population of the AACPSIR survey was adults 18 or older who drive children up to 9 years old in personal vehicles at least twice per month. To reach the target population, a cluster design sampling approach was used. The cluster design first selected Primary Sampling Units (PSUs), which were geographic clusters of households, and then selected households from the sampled PSUs using an address based sample (ABS) frame obtained from the Marketing Systems Group (MSG)[1] database of U.S. addresses. This cluster sampling method was used in lieu of the direct sampling approach where households are selected directly from the national frame of households.

This clustered approach allowed for use of the NSUBS sample frame and design structure to select the household sample. Linking the two surveys was expected to enhance the analysis capacity. NSUBS collects observation and interview data on restraint use and demographic information for children up to 12 years old and adult occupants in vehicles at select sites, including gas stations, recreation centers, day care centers, and fast food restaurants (Lee et al., 2015). To maximize the power of the linked analysis, all 30 NSUBS PSUs were included in the AACPSIR PSU sample. As described below in Section 5.2, An additional 30 PSUs were selected from the NSUBS sample frame for a total of 60 AACPSIR PSUs.

Based on experience with other web-based surveys, data from NHTSA's Motor Vehicle Occupant Safety Survey (MVOSS), and eligibility data from the 2014 American Community Survey on household surveys, an overall response rate of 5 percent was assumed.[2] Based on this assumption, the required field sample size was determined to be 28,000 to obtain 1,400 respondents (see Table 5.1).

Table 5.1: Estimate of sample sizes and design effect for the AACPSIR survey

Sample Design	Effective Sample size	Design Effect	Respondent Sample size	Estimated Field Sample Size
Cluster Design With 60 PSUs	625	2.2	1,400	28,000

To derive the effective sample size[3] given in Table 5.1, the target margin of error was 0.04 for the 95 percent confidence interval to estimate a population proportion of 50 percent. This

[1] MSG is a vendor that provides the address-based sampling frame for household surveys (www.m-s-g.com/Web/index.aspx).

[2] The overall response rate of 5 percent was based on a 25 percent screener response rate, 25 percent eligibility rate among the screener respondents, of which 80 percent were assumed to respond to the main survey.

[3] The effective sample size was the sample size under the simple random sample (SRS) design. It is useful in deriving the required sample size for a complex sample design to meet a desired precision because it is much easier to calculate the required sample size under the SRS design. The design effect (DEFF), which is defined as the ratio of the variance under the complex design to the variance under the SRS design with the same sample size, is used

estimate required a sample with an effective sample size of 625, which should be multiplied by the design effect (DEFF) to determine the respondent sample size. Since there was no previous similar survey from which to estimate the DEFF, it was assumed that the intra-cluster correlation would be 0.05 and the weighting factor of the final weight (loss of sampling efficiency due to variable weights) in estimation of the DEFF would be 1.5. Although it was expected to select a nearly equal probability sample of households, it was also expected that the final weight would be quite variable due to nonresponse adjustment. Applying the Kish formula[4] to these assumed values, it was estimated that the DEFF would be 2.2 (Kish, 1987). Then, the required respondent sample size was determined to be 1,400, which was the rounded number of the multiple of the effective sample size (625) and the estimated DEFF (2.2). In addition, a reserve sample of 4,000 addresses was drawn for use if the overall participation rate was lower than the expected 5 percent. The reserve sample increased the potential field sample size to 32,000 addresses if necessary.[5]

However, data collection with the base sample reached only 51 percent of the target sample size. Therefore, a supplemental sample of 18,000 was selected and released along with the reserve sample of 4,000 selected earlier. The final, total sample size was 50,000 households.

5.2 PSU Sample Selection

The NSUBS PSU frame, with 1,601 PSUs, was used to select the sample of 60 AACPSIR PSUs. As indicated above, to maximize the power of the linked analysis with the NSUBS survey data, Westat included the entire set of 30 NSUBS PSUs in the PSU sample for the AACPSIR survey. Using the same sample design as NSUBS in terms of stratification of the PSUs, an additional 30 PSUs were selected.

The sampling method was the probability proportional to size (PPS) method with the same measure of size (MOS) that NSUBS used, which was defined using the 2012 (projected) Census population data by the number of children up to 7 years old. NSUBS uses eight strata defined by four Census Regions crossed by two stricter child restraint use laws.[6] The NSUBS PSUs are distributed among the eight strata as shown in Table 5.2. Sample allocation based on the proportionality to the total stratum MOS is also shown in the table for NSUBS and AACPSIR. When the allocated sample size was less than two for AACPSIR, it was increased to two to facilitate variance estimation.

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along with the effective sample size to derive the required sample size for the complex design used to conduct the survey (e.g., the stratified multi-stage cluster design for the AACPSIR survey). The required sample size for the complex design is given by the effective sample size times DEFF.

[4] The Kish formula is given by $(1+F)\{1+(C-1)\rho\}$, where F is the squared coefficient of variation of the final weights, C $\left(10 \cong \frac{625}{60}\right)$ is the average cluster size, and ρ $(= 0.05)$ is the intra − cluster correlation. We assume that the weighting factor $(1+F)$ is 1.5.

[5] We assume a 24 percent screener response rate, 24 percent eligibility among the screener respondents, and 76 percent response rate for the main survey among the eligible screener respondents.

[6] All States and the District of Columbia have child restraint use laws; some States implement a stricter law than others. For stratification, based on the 2014 information, we required that the law cover children up to at least 7 years old and considered that any law that covers an upper age that is less than 7 is less strict. There are 30 States and DC that had stricter laws at the time of sampling.

Presenting the sampling methodology in mathematical terms, requires notation. The stratum was indexed by $h, h = 1,2,3, \ldots,8$. The stratum PSU population and sample sizes were denoted by N_h and n_h, respectively (values of these variables are shown in Table 5.2).

Table 5.2: PSU sample allocation over the strata for NSUBS and AACPSIR

Stratum Number (h)	Census Region	Law Status	Number of PSUs (N_h)	Total Stratum MOS	NSUBS PSU Sample Size (n_h^*)	AACPSIR PSU Sample Size (n_h)
1	1	Yes	160	4,730,497	4	8
2	1	No	17	432,320	1	2
3	2	Yes	388	6,169,676	6	11
4	2	No	81	698,662	1	2
5	3	Yes	417	7,611,901	7	14
6	3	No	325	4,726,094	4	9
7	4	Yes	158	6,906,757	6	12
8	4	No	55	814,871	1	2
Total			1,601	32,090,778	30	60

For the AACPSIR sample, the desired PPS probability of selection for PSU i in stratum h was defined by:

$$\pi_{hi} = \frac{n_h M_{hi}}{\sum_{j=1}^{N_h} M_{hj}} \quad (1)$$

where M_{hi} was the MOS for PSU i in stratum h. Notation superscripted by an asterisk $(*)$was used to denote similar notation for NSUBS. For example, π_{hi}^* was the PSU selection probability for PSU i in stratum h for NSUBS.

To include the 30 NSUBS PSUs in the AACPSIR sample through the sampling procedure, a probability conditional on whether a PSU was selected in the NSUBS sample was used. If a PSU was selected in the NSUBS sample, it was selected conditionally with a probability of 1. The remaining 30 PSUs, with a modified (conditional) probability from outside the NSUBS sample, were selected as follows:

$$\varphi_{hi} = \begin{cases} 1 & \text{if } hi \in S_{NSUBS} \\ \dfrac{\pi_{hi} - \pi_{hi}^*}{1 - \pi_{hi}^*} & \text{if } hi \notin S_{NSUBS} \end{cases}$$

where S_{NSUBS} was the NSUBS sample of 30 PSUs.

The unconditional probability that PSU i in stratum h was selected in the AACPSIR sample was then given by,

$$\begin{aligned}\text{Prob}(hi \in S_{CPS}) &= \text{Prob}(hi \in S_{NSUBS}) \times \text{Prob}(hi \in S_{CPS} | hi \in S_{NSUBS}) \\ &\quad + \text{Prob}(hi \notin S_{NSUBS}) \times \text{Prob}(hi \in S_{CPS} | hi \notin S_{NSUBS}) \\ &= \pi_{hi}^{*} \times 1 + (1 - \pi_{hi}^{*}) \times \frac{\pi_{hi} - \pi_{hi}^{*}}{1 - \pi_{hi}^{*}} \\ &= \pi_{hi}\end{aligned}$$

where S_{CPS} was the sample of 60 PSUs for the AACPSIR. Note that the unconditional probability was the same as the desired probability defined in equation (1). This procedure was a special case of the Keyfitz procedure (Keyfitz, 1951). Applying the procedure described above, we selected the 60 PSUs presented in Appendix D.

5.3 Household Sample Selection

To obtain a self-weighting sample (i.e., equal weight), a sample of an equal number of households from each sampled PSU was selected. This procedure, however, does not produce a truly self-weighting sample due to using a proxy MOS.

The MOS used for PSU selection was the number of children up to 7 years old, as indicated above. The AACPSIR coverage are 0-9, but the discrepancy does not affect the PSU sampling probability because the correlation was very high. However, the MOS was not expected to be perfectly aligned with the actual measure of size in terms of households with drivers of children up to age 9. Therefore, the actual selection probabilities of households were not equal. To mitigate this problem, the estimate of the number of households with children up to 9, based on ACS data, was used to adjust the number of households selected from each sampled PSU. The adjustment factor for PSU i was calculated using the following formula:

$$A_i = k \frac{S_{1i}}{S_{0i}}$$

where S_{0i} and S_{1i} were, respectively, the proxy size based on the number of children up to age 9 and the estimated size based on the ACS data for PSU *i* and *k* was a constant scale factor that adjusted the scale difference between the two size measures (S_{0i} and S_{1i}). The adjustment factor A_i was greater than 1 if the proxy size was smaller than it was supposed to be (i.e., kS_{1i}), and vice versa.

County-level ACS data were used to provide household (HH) counts for three types of households with children: (1) households with children under age 6 only (denoted as HH1), (2) households with children under age 6 as well as 6 to 17 years old (denoted as HH2), and (3) households with children 6 to 17 only (denoted as HH3). The count of households with children up to age 9 was estimated by assuming that each age group was equally represented in the second and third types of households. The estimating equation was given by:

$$M = HH1 + HH2 \times \frac{10}{18} + HH3 \times \frac{4}{12}$$

where M was the estimated number of households with children up to 9. Table 5.3 provides descriptive statistics about the A factor defined above, allocated household sample size, and PSU and overall household weights.

Table 5.3: Descriptive statistics for various sampling parameters and weights

Variable	Mean	Minimum	Median	Maximum	Std. Dev.	Sum
A Factor	1.0000	0.4138	0.9842	1.8115	0.2544	60
Main Sample Size	466.67	193	459	845	118.73	28,000
Reserve Sample Size	66.67	28	66	121	17.02	4,000
PSU Weight	23.70	1.00	10.82	127.51	30.31	1,422
Overall Household Weight	395.34	394.64	395.34	396.43	0.37	23,720

The adjustment factor (A factor) was quite variable, which means that the adjustment by the factor substantially improved the sampling plan. This improvement was also demonstrated by the statistics of the overall household weight, which incorporated the PSU weight. The overall household weight was almost equal even though the PSU weight was highly variable.

An equal probability sample of households was selected with the adjusted sample size given in Table 5.3 from each sampled PSU from the MSG database of U.S. addresses. The geographic variables (address, longitude, and latitude, etc.) are considered most reliable from previous research (Roth et al., 2013).

The address based sample was then randomly divided into 28 release groups with 1,000 households in each group for the main sample and 4 release groups with 1,000 households each for the reserve sample. Upon realizing that the base sample was too small to reach the target respondent sample size (1,400), a supplemental sample of 18,000 addresses was selected. The supplemental sample size for each PSU was determined based on the number of respondents realized from the base sample. The additional sample was selected in each PSU so that the total number of expected respondents equaled the target respondent sample size for each PSU. The final sample size was 50,000, which included the base sample of 28,000, the reserve sample of 4,000, and the supplemental sample of 18,000.

6. Data Collection

The AACPSIR data collection period was conducted in two phases. Phase 1 began July 31, 2017, and consisted of four mailing groups of 7,000 letters each. After four weeks of mailouts, the base sample total of 28,000 letters was released. Phase 2 began March 9, 2018, and consisted of an additional four mailing groups. The first group included 4,000 letters, and the subsequent three groups were comprised of 6,000 letters each. In total, 50,000 invitation letters were sent to selected addresses in the 60 PSUs.

6.1 Respondent Recruitment

A variety of methods was used to recruit respondents and increase response rates. A customized invitation letter and reminder postcard were developed and tested to attract respondents. A prepaid cash incentive was provided with the invitation letter with a promised incentive upon survey completion. In addition, a specialized Help Desk was created to respond to questions and conduct interviews with respondents who preferred to complete the survey over the phone or encountered difficulties conducting the survey independently on the internet.

6.1.1 Invitation Letter

Westat created an invitation letter designed to capture respondent interest (see Appendix B). Research has shown that an advance invitation letter, sent via regular mail, more often convinces respondents to participate in a survey; whereas, initial email or postcard invitations are not as effective (Tourangeau et al., 2013). Additionally, to increase participation among Spanish speaking respondents, the invitation letter was presented in English on one side and in Spanish on the other side.

The letter described the survey and provided participation instructions. Branded material and a survey logo were developed and used on the invitation letter and the survey website to increase respondent recognition of the survey. The letter included the survey website URL and a unique PIN for each household. In addition, the letter referenced the Help Desk number for respondents who wanted to talk to a study team member. The letter also contained a link to a NHTSA-hosted web page that verified the authenticity of the survey. The Spanish language letter directed respondents to the Help Desk and a translation service if they chose to participate in the survey in Spanish.

The letter included a $1 cash incentive to encourage participation. A prepaid incentive has been found to increase response rates significantly (Mercer et al., 2015). The letter indicated that an additional $5 would be sent to households that completed the survey.

6.1.2 Reminder Postcard

Westat created a reminder postcard following design guidelines similar to those used for the invitation letter (see Appendix C). The reminder postcard was sent to households 10 days after the initial mailout of the invitation letter, and it included the survey logo, survey website URL, and the unique household PIN. The postcard reminded households of the importance of their participation in the survey and the opportunity to receive a $5 incentive for completing the survey. In the second phase of the survey, a second reminder postcard was sent out to the sampled households 25 days after the first mailout to further boost response rates.

6.1.3 Help Desk

The "Contact Us" section of the public survey website included a toll-free Help Desk number. Westat maintained a Help Desk to assist respondents throughout the survey period. The Help Desk number was available for respondents without internet access, with language barriers, or those who experienced technical problems. If requested, Help Desk staff conducted the survey via telephone. The SMS provided a CATI version of the survey for Help Desk staff. The CATI version closely mimicked the web version of the survey, but was customized to make it easier for a Help Desk staff member to administer. The web and CATI surveys were integrated through the SMS, allowing Help Desk staff to resume the survey wherever a respondent had stopped.

Help Desk staff received special training as interviewers, including instructions on how to motivate respondents to participate and to provide accurate information in their responses. Additional training for Help Desk staff covered the technical aspects of the survey website, how to login and complete the survey, and how to address respondents' questions or concerns. In total, the Help Desk responded to 140 calls and conducted 106 CATI interviews, 26 of which were complete eligible respondents. Other calls included respondents requesting their PIN, inquiring about their incentive status, or validating the survey.

6.2 Differences in Data Collection Phases

There were a number of differences between the two phases of AACPSIR survey data collection. The table below presents the final survey completes by data collection phase.

Table 6.1: Sample and completion sizes by data collection phase

Phase	Sample Size	Complete Size	Completion Rate (%)
1	28,000	722	2.6
2	22,000	843	3.8
Total	50,000	1,565	3.1

The difference in the completion rates between data collection phases were attributed to multiple factors as described below.

Salutation approach

The first phase of the survey included an experimental approach for the salutation used on the invitation letter envelope and postcard. The sample was split into two salutation types:

1. Method A included a personalized approach, the actual name, if available, based on the MSG database. In Method A, the mailings were addressed: [Actual Name] or [City] Resident.
2. Method B was more generic and stated the locality only. In Method B, the mailings were addressed: [City] Resident.

Methods A and B were alternated in the release of each 1,000 addresses. The release groups were evenly distributed, with all odd groups using Method A and all even groups using Method B. This designation of salutation type was tracked throughout the survey process. Based on results

in the first phase, where the personalized approach yielded lower responses, only Method B was used for the second phase.

Design of envelope
The first phase envelope featured both the survey logo and NHTSA logo on the front in the upper left corner. Both logos were in color with the survey name displayed underneath. The envelope for the second phase did not feature the survey logo. The U.S. Department of Transportation and NHTSA were listed as survey sponsors in the upper left corner. Under the return address there was text identifying that the envelope was used for official business and subject to fine if used for private use. A black and white version of the NHTSA logo was displayed on the back flap.

Type of postage
The first phase was mailed via standard mail and the second phase was mailed via first-class mail. Mail sent using first-class postage reached respondents on average four days sooner and provided Postal Non-Deliverable (PND) service, returning non-deliverable mail.

Reminder postcard
The first phase of the survey included the mailout of a single reminder postcard; whereas, the second phase of the survey included the mailout of a second reminder postcard that resulted in a boost of an additional 10 percent response (as determined by survey completion dates).

Time of year
Phase 1 began mid-summer and continued into early fall; Phase 2 took place in the spring.

6.3 Response Rates

As indicated above, there were differences in the response rates between the two phases of the survey. Some of the factors that may have potentially increased screener response rates in the second phase included the type of envelope, salutation method, use of an additional reminder postcard and season. The final eligibility and response rates are presented in the table below.

Table 6.2: Breakdown of final eligibility and response rates

Eligibility	Sample	Response Rates	Sample
Total Contacts Approached	50,000	Complete Screeners	4,192
Rate of Household Eligibility	39.0%		
Rate of Screener Completion	8.8%	Complete Interviews	1,565
Rate of Interview Completion among Eligible Households	91.8%	Partial Interviews	174
Known Eligible Households	1,705	AAPOR Response Rate w/ Partials	40.67%
Estimated Eligible among Unknowns (No screener)	2,487	AAPOR Response Rate w/o Partials	37.33%

Note: American Association for Public Opinion Research. (2016). Standard Definitions: Final Dispositions of Case Codes and Outcome Rates for Surveys. 9th edition.

7. Weighting

Weights were applied to the AACPSIR survey data to compensate for selection probabilities and a variety of other factors, some resulting from the sample design and some from the administration of the survey. The respondent data were weighted for analysis in three steps, as indicated below:

Step 1: Screener base weighting and nonresponse weighting;
Step 2: Main survey weighting using the screener nonresponse adjusted weight; and
Step 3: Calibration (benchmarking) of the survey weight to conform the final weight to reliable external demographic data.

7.1 Screener Weighting

The entire sample consisted of three samples of households selected at two points in time. Phase 1, which was selected first, included the base sample of 28,000 and the reserve sample of 4,000. Phase 2 included a supplementary sample of 18,000, which was selected later.

These two phases of data collection had implications for the screener weighting because the data collection process and the subsequent respondent behavior in response to the survey were not the same in the two phases of collection (as indicated in Section 6.2).

A screener eligible household was an occupied household with a valid address in the frame. Including completes, partial completes, and postal non-deliverables (PND), the unweighted screener response rate was 11 percent, meaning that there was no information for the remaining 89 percent of sampled households to determine screener eligibility.

There are four categories in the screener disposition code:

1. **Complete** - completed the screener survey
2. **Partial** - did not complete but provided partial information
    a. **Partial1** - a household answered enough to determine whether it was eligible for the main survey
    b. **Partial2** - eligibility cannot be determined
3. **Unknown** - did not respond and therefore had an unknown screener eligibility
4. **Postal Non-Deliverables**

It is reasonable to declare the **PND** cases ineligible because the survey material could not be delivered to their addresses. However, it is important to recognize that **PND** rates only apply to the second phase of data collection. In the first phase, standard mail was used, which did not provide PND service. In the second phase of data collection, first class mail was used and PND service was provided. If an address was not PND in the second phase of data collection, it was assumed to be a valid address and therefore eligible for the screener. Consequently, those addresses with a disposition code of **Unknown** in the second phase of data collection were treated as screener eligible nonresponses. However, we cannot do the same for **Unknown** cases in the first phase of data collection because no PND information was available.

Unambiguously, 174 partial completes (**PARTIAL1**) were classified as screener eligible. The breakdown of the screener disposition by data collection phase, screener eligibility, and response status is given in Table 7.1.

Table 7.1: Distribution of screener disposition by data collection phase

Phase	Screener Disposition	Screener Eligibility/Response Status	Frequency	Percent (%)
1	Unknown	UNKNOWN	26,190	52.38
1	Complete	ELIGIBLE RESPONSE	1,732	3.46
1	Partial1	ELIGIBLE NONRESPONSE	65	0.13
1	Partial2	ELIGIBLE NONRESPONSE	13	0.03
2	Complete	ELIGIBLE RESPONSE	2,460	4.92
2	Partial1	ELIGIBLE NONRESPONSE	109	0.22
2	Partial2	ELIGIBLE NONRESPONSE	19	0.04
2	Unknown	ELIGIBLE NONRESPONSE	18,228	36.46
2	PND	INELIGIBLE NONRESPONSE	1,184	2.37
Total			50,000	100.00

The treatment of the second phase **Unknowns** as screener eligible helped reduce the percentage of true **Unknowns** to 52 percent. Eligibility for these cases was still required for weighting. For this, a prediction approach was implemented using the information available in the data and available from external sources.

Potential sources of external data were examined for use in weighting as auxiliary data not only for the determination of the eligibility for unknown cases but also for the response analysis of the screener and main surveys. The ABS sampling frame created from the MSG database contained many household-level auxiliary variables. However, previous research indicated these data were unreliable and seldom used for weighting. Instead, the 5-year (2012-2016) American Community Survey (ACS) data were used. Data at the census tract level were used when available, and data at higher geographic levels (U.S., Region, and PSU) were used for some variables. Using these auxiliary data, the eligibility status of the screener sample was then imputed by Westat's proprietary imputation system, AutoImpute. Table 7.2 shows the auxiliary variables used in the imputation. This process allowed for imputation of **PND** status among Phase 1 **Unknowns**. Among the total of 26,190 addresses that were Phase 1 Unknowns, the system imputed 1,286 addresses to be **PNDs**. Therefore, after the imputation, the sample data file contained 47,530 screener eligible households, out of which 4,192 completed the screener survey. The unweighted screener response rate was 8.8 percent (= 4,192/47,530).[7] The unweighted screener yield rate was 8.4 percent (= 4,192/50,000).[8]

[7] The unweighted response rate was the ratio of the number of eligible respondents to the number of eligible units.
[8] The unweighted yield rate was the number of eligible responses/the total sample size.

Table 7.2: List of American Community Survey auxiliary variables used in imputation of missing screener eligibility status

Variable Name	Label
Population under 9	Percent population ages 0-9
Minority	Percent minority (other than non-Hispanic White)
Foreign Born	Percent foreign born
Living in Same House	Percent in same house 1 year ago
Children Living With Parents	Percent children under 18 living with parents
Female Head of Household	Percent female head of household
Married Couples With Children	Percent HHs with children under 18 that are married couple HHs
Less than HS Education	Percent less than HS education
Average Years Education	Average years of schooling (estimated)
Non-English Speakers	Percent non-English speakers
Public Assistance	Percent HHs on public assistance
Crowded Households	Percent HHs with more than 1 person per room
Households With No Telephone	Percent HHs with no telephone
Households With Vehicle Available	Percent HHs with a vehicle available
Median Home Value	Median home value (dollars)
Working Class	Percent working class (Krieger modified definition)
Linguistically Isolated Households	Percent linguistically isolated households
Below Poverty Line	Percent below poverty level
Unemployed	Percent Unemployed
Homeowners	Percent owner-occupied housing units
Renters	Percent renter-occupied housing units
Median Household Income	Median household income (dollars)
Population Density	Population density (people per square mile)
Urbanicity	Percent pop living in urban areas
Hispanic	Percent Hispanic
Caucasian	Percent White (non-Hispanic)
Black	Percent Black (non-Hispanic)

Once the eligibility of all screener sample units was determined, screener weighting, which started with calculation of the base weight, was conducted. The base weight was the inverse of the sampling probability (see Section 5). This base weight was adjusted for screener nonresponse for the 4,192 screener respondents using the propensity score method for nonresponse adjustment. The TWANG package (Griffin et al., 2014) was used to calculate the response propensity, and the nonresponse adjusted screener weight was computed by dividing the base weight by the estimated response propensity score.

A jackknife variance estimator was also used. Its basic structure was laid out at this stage by defining 60 replicates, each corresponding to each PSU, following a standard jackknife procedure for a stratified, two-stage sample design. It was essential to carry out all nonresponse adjustments to the full sample weight and to the replicate weights so that the jackknife variance estimation incorporated the nonresponse adjustment.

7.2 Main Survey Weighting

Including 174 partial completes, 4,366 screener respondents provided enough information to determine their eligibility status for the main survey. Of the 1,705 eligible respondents (39%), 1,565 households completed the main survey questionnaire. Table 7.3 presents the distribution of the screener respondents by screener disposition and eligibility. The unweighted completion rate was 91.8 percent (= 100*1,565/1,705). The unweighted overall response rate was 8.1 percent (= 100*0.088*0.918). However, the overall yield rate incorporating the eligibility rate (i.e., households that were screener eligible and completed the final questionnaire) was much lower than the overall response rate at 3.1 percent (= 100*1,565/50,000).

Table 7.3: Distribution of screener respondents by screener disposition and main survey eligibility

Screener Disposition	Main Survey Eligibility	Frequency	Percent (%)
Complete	No	2,627	60.17
Complete	Yes	1,565	35.85
Partial1	No	34	0.78
Partial1	Yes	140	3.21
Total		4,366	100.00

The main survey nonresponse adjustment was conducted using the main survey eligible respondents of 1,705 households and their screener nonresponse adjusted weight. This weight was further modified to obtain the nonresponse adjusted main survey weight for the 1,565 main survey respondents. The same methodology used for the screener nonresponse adjustment was also used for the main survey nonresponse adjustment except household demographic data from the screener respondents, which could not be used for the screener nonresponse adjustment. The TWANG package was run to calculate the response propensity, and the estimated propensity score was used to calculate the nonresponse adjusted main survey weight. This process required imputation of missing values for demographic variables, which was done using the AutoImpute imputation package. The imputation rates were all below 5 percent except for one variable that had 7.6 percent missing. This rate falls below 10 percent (the generally accepted threshold to ignore the imputation error in the variance estimation[9]).

The next step was to calibrate (benchmark) the nonresponse adjusted main survey weight to produce the final weight.

[9] Imputation incurs error, which causes underestimation of the variance if ignored. However, the underestimation is usually limited if the imputation rate is below 10 percent and may be ignored.

7.3 Calibration Weighting of the Main Survey Weight

The benchmark weighting process calibrated the weight sum to match the true, or at least highly reliable, population totals. The technique was employed to help enhance the efficiency of weighted estimation and analysis.

Three ACS demographic variables were used to calibrate the weights by the raking procedure: (1) Census region, (2) race-ethnicity, and (3) income. Each of these variables has four levels as shown in Table 7.4.

Table 7.4: Raking variables and their levels

Variable	Level 1	Level 2	Level 3	Level 4
Census Region	Northeast	Midwest	South	West
Race-Ethnicity	Hispanic	Non-Hispanic White	Non-Hispanic Black	Non-Hispanic Other
Income	<$25K	$25 - <$50K	$50 - <$75K	$75K+

The sampling unit of the survey was the household; benchmark totals (marginal totals for raking variables) were compiled for households with children up to age 9 and vehicle ownership using the ACS Public Use Microdata Sample (PUMS) data.[10]

Westat's proprietary raking system was used to trim extreme weights but maintain the benchmark feature.

[10] From the Census Bureau website, we downloaded **acs_2016_pums_hh.sas7bdat** (n= 269,181).

8. Analysis

The analysis plan was designed to respond to the key objectives of the AACPSIR survey: estimate the degree of awareness that parents and caregivers have of CPST inspection stations; determine the relationships among parents and caregivers' confidence, risk perception, and intent to visit an inspection station; and identify the barriers that result in underutilization of hands-on instruction provided at inspection stations.

The AACPSIR survey variables were derived from the survey questionnaire presented in Appendix A and described in the data dictionary presented in Appendix E. Table 8.1 presents key variables that were used in the analysis, including the variable name used in the report, description, the survey question number, description, and response options.

Table 8.1: AACPSIR key analysis variables

Variable	Description	Question No.	Response Options
Awareness of Inspection Stations	Awareness of CPST services and inspections stations	4-1	1 – Yes 2 – No
Inspection Station Use	Received help at a car seat inspection from someone with formal training	4-4	1 – Yes 2 – No
Proper CRS Selection	Proper selection of the CRS as determined by NHTSA recommendations based on child age, height, and weight (see Section 8.2)	Derived (S7, S8, S9, S10, S11, S12, S16)	0 – Misuse 1 - Proper Selection
Intent to Visit Inspection Station	Respondents who intend to get additional help at a station or did not previously visit an inspection station but called or considered going	Derived (5-12, 5-13, 5-14)	0 - No intent to visit 1 - Intent to visit
Confidence in Seat Installation	Confidence that the child car seat is attached correctly	1-3	1 - Extremely confident 2 - Very confident 3 - Moderately confident 4 - Slightly confident 5 - Not at all confident
Acceptability of CRS Non-Use	Overall score indicating the acceptance of car seat nonuse in a variety of situations	Derived (1-7)	0 – Not acceptable to 8 – Completely acceptable

Variable	Description	Question No.	Response Options
CRS Usefulness in Preventing Injury in Low-Speed Crash	Usefulness of car seat preventing injury during a low-speed crash	1-8	1 - Extremely useful 2 - Very useful 3 - Moderately useful 4 - Slightly useful 5 - Not at all useful
Injury Likelihood With Improper CRS Selection	Likelihood that child is injured in crash if CRS not used correctly	1-9	1 - Very likely 2 - Somewhat likely 3 - Neither likely nor unlikely 4 - Unlikely 5 - Very unlikely
Number of CRS Information Sources	Information about CRS: Overall score for all sources of information	Derived (3-3)	0 - Zero to 11 - Eleven

* N = numeric variable

Westat's analysis plan included the following types of analyses using the sample weights:

1. Descriptive analyses: proportions, means, confidence intervals;
2. Cross-tabulation analyses to examine associations among two or more categorical variables and comparisons of key variables between groups, such as differences across the demographic groups;
3. Weighted linear regression or logistic regression analyses to investigate the important predictors that are associated with the key analysis variables (e.g., parent/caregiver confidence, risk perception, and the intent to visit an inspection station);
4. Causality analyses using the observational study technique of propensity score modeling. Listed below are the extant variables that were used in this analysis.
   - Distance from the respondent's household to the nearest inspection station
   - State law concerning children's restraint use
   - Urbanicity of respondent's household from 2010 Census Urban and Rural Classification;
5. Linked analysis to the NSUBS data. Listed below are the NSUBS variables at the PSU-level that were used for the linked analysis.
   - Children's restraint use rate
   - Rate of incorrect use of CRS based on child's weight, height, and age
   - Drivers' restraint use rate
   - Children's and drivers' demographic information (age and race/ethnicity)

8.1 Nonresponse Bias Analysis

The unweighted overall response rate (the product of the unweighted screener response rate of 8.8 percent and the high completion rate of 91.8%) was very low at 8.1 percent. If serious bias resulted from nonresponse, it would be more likely due to the low screener response rate. Therefore, the focus of the nonresponse bias analysis was on the screener respondents. If the weighted screener respondents provided unbiased results, it was almost certain to result in unbiased main survey results.

The approach to nonresponse analysis compared the estimates obtained from the entire eligible base-weighted sample and the estimates obtained from the screener respondent sample with the screener nonresponse adjusted weight for auxiliary variables available for both respondents and nonrespondents.

There were only two auxiliary variables that were available at the individual household level. The first variable was **Distance to Nearest Inspection Station**, which can be a good auxiliary variable for nonresponse bias analysis because it is correlated with survey variables. This variable reflects the straight-line distance between a household and an inspection station. The second auxiliary variable was **Urbanicity**, which was obtained through geocoding household addresses. There were three **Urbanicity** categories, **Urbanicity: Urban Cluster**, **Urbanicity: Rural**, and **Urbanicity: Urban Area** (refer to the Census website to find definitions of these categories).[11] Each category was separately defined by a 0/1 dummy variable.

ACS and NSUBS data were also used as auxiliary data sources for the comparison.[12] Although the auxiliary data were not at the individual household-level but at an aggregate level (Census tract-level for ACS and PSU-level for NSUBS), the comparison provided some indication of whether the nonresponse bias at the screener level, and at the main survey by extension, was serious. The auxiliary variables at the aggregate-level were mostly defined as percentage values. For example, race could not be assigned to people in each household; but, the percentage of each race category for those in that particular Census tract (e.g., percentage white) could be used.

T-tests were used to examine whether the difference between the weighted estimates from the full screener eligible household sample and the weighted estimate from the screener eligible respondents was statistically significant at the 5 percent level for each comparison. The results are shown in Table 8.2. To the extent that the respondents and nonrespondents were similar with respect to those auxiliary variables, the nonresponse bias was not serious. There were only two variables (Female Drivers and CHILD 1 TO 3 YEARS) from NSUBS and none from the other sources for which the difference was significant.

This analysis resulted in the conclusion that the bias due to nonresponse was not serious for the survey variables that were correlated with auxiliary variables used in the comparison.

[11] Go to this website for detail, www.census.gov/geo/reference/urban-rural.html.

[12] Auxiliary variables used for the nonresponse bias analysis except for the **Distance to Nearest Inspection Station** and **Urbanicity** are given in Tables 7.2 and 8.19.

Table 8.2: Significance test results to compare the two weighted estimates from the full sample and respondents

Data Source	Variable	Estim1	Estim2	Diff	StdErr	t-Value	Probt	Signif Diff
ACS	Population Under 9 %	12.41	12.39	0.021	0.069	0.31	0.761	no
	Minority %	35.65	34.97	0.684	0.652	1.05	0.299	no
	Foreign Born %	12.76	12.30	0.458	0.417	1.10	0.276	no
	Living in Same House %	85.24	85.25	-0.006	0.144	-0.04	0.966	no
	Children Living With Parents %	88.44	88.54	-0.098	0.122	-0.80	0.424	no
	Female Head of Household	12.80	12.61	0.191	0.143	1.34	0.187	no
	Married Couples With Children	63.95	64.15	-0.209	0.315	-0.66	0.510	no
	Less than HS Education	12.50	12.21	0.288	0.178	1.62	0.110	no
	Average Years Education	14.02	14.04	-0.026	0.016	-1.61	0.114	no
	Non-English Speakers	1.22	1.11	0.107	0.079	1.35	0.181	no
	Public Assistance	14.33	14.21	0.118	0.248	0.47	0.638	no
	Crowded Households	3.03	2.91	0.118	0.073	1.61	0.113	no
	Households With No Telephone	2.49	2.49	0.002	0.034	0.05	0.964	no
	Households With Vehicle Available	92.10	92.28	-0.178	0.170	-1.04	0.300	no
	Median Home Value	228665.99	227135.87	1530.120	3797.530	0.40	0.688	no
	Working Class	61.33	60.86	0.471	0.252	1.87	0.066	no
	Linguistically Isolated Households	4.33	4.06	0.276	0.218	1.27	0.210	no
	Below Poverty Line	14.40	14.23	0.171	0.210	0.81	0.419	no
	Unemployed	7.63	7.53	0.103	0.087	1.18	0.243	no
	Homeowners	63.86	64.27	-0.408	0.364	-1.12	0.268	no
	Renters	36.14	35.73	0.408	0.364	1.12	0.268	no
	Median Household Income	62401.22	62475.35	-74.130	603.140	-0.12	0.903	no
	Population Density	3987.91	3876.83	111.090	136.640	0.81	0.419	no
	Urbanicity	82.98	83.05	-0.075	0.500	-0.15	0.882	no
	Hispanic	13.80	13.19	0.610	0.511	1.19	0.238	no
	Caucasian	65.92	66.68	-0.761	0.655	-1.16	0.250	no
	Black	12.86	12.57	0.291	0.398	0.73	0.466	no
NSUBS	Female Drivers	64.81	64.38	0.429	0.160	2.69	0.009	yes
	Belted Drivers	89.90	89.83	0.071	0.237	0.30	0.765	no
	Drivers Under 25	2.17	2.21	-0.033	0.071	-0.47	0.641	no
	Drivers Age 25 to 69	96.21	96.13	0.071	0.070	1.01	0.318	no

Data Source	Variable	Estim1	Estim2	Diff	StdErr	t-Value	Probt	Signif Diff
	Drivers Over 70 Years	1.62	1.66	-0.037	0.065	-0.57	0.571	no
	White Drivers	57.97	58.16	-0.188	0.586	-0.32	0.750	no
	Black Drivers	19.53	19.43	0.100	0.491	0.20	0.839	no
	Other Race Drivers	4.52	4.53	-0.013	0.103	-0.13	0.900	no
	Hispanic Drivers	13.50	13.31	0.193	0.496	0.39	0.699	no
	Rear Law < Age 6	0.20	0.19	0.008	0.011	0.70	0.487	no
	Rear Law < Age 8	0.20	0.19	0.008	0.011	0.70	0.487	no
	Rear Law < Age 13	0.06	0.06	0.000	0.005	0.08	0.938	no
	Child Belted	89.93	89.74	0.191	0.171	1.12	0.267	no
	Improper Car Seat Use	25.21	25.27	-0.061	0.251	-0.24	0.808	no
	Child Female	48.65	48.63	0.025	0.080	0.31	0.755	no
	Child Under 1 Year	5.12	5.11	0.010	0.047	0.22	0.829	no
	Child 1 to 3 Years	28.65	28.12	0.526	0.262	2.01	0.049	yes
	Child 4 to 7 Years	39.60	39.71	-0.102	0.119	-0.86	0.396	no
	Child 8 to 12 Years	26.63	27.06	-0.435	0.241	-1.81	0.076	no
	Child White	53.43	53.65	-0.219	0.591	-0.37	0.713	no
	Child Clack	19.44	19.35	0.094	0.500	0.19	0.852	no
	Child Other Race	11.22	11.33	-0.103	0.189	-0.55	0.586	no
	Child Hispanic	15.91	15.68	0.228	0.558	0.41	0.684	no
GPS	**Distance to Nearest Inspection Station**	5.13	4.98	0.152	0.091	1.66	0.102	no
	Urbanicity: Urban Cluster	0.10	0.10	0.001	0.008	0.08	0.933	no
	Urbanicity: Rural	0.17	0.17	-0.002	0.006	-0.36	0.718	no
	Urbanicity: Urban Area	0.72	0.72	0.002	0.011	0.15	0.884	no

8.2 Imputation

Traditionally, single imputation is used along with an ordinary variance estimator. However, treating imputed values as observed in the variance estimation causes underestimation of the true variance. The magnitude of underestimation depends on the amount of missing values. With high missing rates for **Child Height (Child Height in Inches and Child Height in Feet)** and **Child Weight,** the underestimation can be severe. Some authors propose valid variance estimators for specific single imputation methods (Lee et al., 1994, 2000; Rao, 1996), but their versatility is limited. Alternatively, multiple imputation is often proposed as a general tool to address variance estimation problems for imputed data (Rubin, 1987). Multiple imputation uses the ordinary variance estimator with a simple aggregation formula, but it requires imputation of a missing value by multiple values.

A key outcome variable in the AACPSIR was **Proper CRS Selection**. Classifications of proper restraint use, misuse, and no restraint use for children were based on the current NHTSA recommendations for CRS use. In order to operationalize analysis based on NHTSA recommendations, the data on the age, height, and weight of the child was used. CDC growth charts were used to assist with classification of proper selection groups. This classification of proper selection did not include misuse-related to mistakes in installation of the CRS into the vehicle or seating the child in a CRS. **Proper CRS Selection** for a child was defined as follows:

1. If the child was 1 year old or younger (**Child Age in Months** <= 12) regardless of his/her weight), s/he had to have used an infant seat or rear-facing CRS (**Car Seat Type** in [1, 2]).
2. If the child was 1-2 years old (**Child Age in Months** >=13 and <24) and weighed between 20 - 85 pounds. (**Child Weight** is >=20 and <=85), s/he could have used an infant seat, rear-facing CRS or a forward-facing CRS (**Car Seat Type** in [1,2,3]). If the child weighed between 0 - 20 pounds (**Child Weight** <=20), s/he had to have used an infant seat or rear-facing CRS (**Car Seat Type** in [1, 2]).
3. If the child was 2 years old (**Child Age in Years** = 2), s/he could have used an infant seat, rear-facing CRS or a forward-facing CRS (**Car Seat Type** in [1,2,3]).
4. If the child is 3 years old (**Child Age in Years** = 3), s/he could have used a rear-facing CRS or a forward-facing CRS (**Car Seat Type** in [2,3]).
5. If the child was 4 - 7 years old (**Child Age in Years** >=4 and <=7), s/he could have used a rear facing seat, forward-facing seat, or booster seat (**Car Seat Type** in [2,3,4,5]).
6. If the child was 8 - 9 years old (**Child Age in Years** >=8 and <=9) and his/her height was less than 57" (**Child Height in Feet** + **Child Height in Inches** < 57), s/he could have used a forward-facing seat or booster seat (**Car Seat Type** in [3,4,5]).
7. If the child was 8 - 9 years old (**Child Age in Years** >= 8 and <=9) and his/her height was greater than or equal to 57" (**Child Height in Feet** + **Child Height in Inches** >= 57), s/he could have used a vehicle seat belt (**Car Seat Type** in [6]) regardless of weight.
8. If the child at any age was unrestrained (**Car Seat Type** = 7), restraint use was classified as misuse.

Given that **Proper CRS Selection** was defined for some of the categories by a child's age, weight, and height, any missing values in those attributes affected the categorization of **Proper CRS Selection**. Therefore, imputation was used to handle the missing values, and multiple imputed data were used for variance estimation. The analysis was conducted to review the results of multiple imputation compared with single imputation. The extent of underestimation of the ordinary variance estimate for single imputation was examined assuming that the multiple imputation variance estimate was unbiased.

There is no consensus regarding the number (denoted as m) of multiple imputations to be used. Earlier recommendations were 5-10, but more recently some authors have argued that it should be equal to or greater than the percentage of missing values. For example, the missing rate for **Child Height** was 40 percent, and the number of multiple imputations should be $m = 40$. To be

thorough, both the 5 and 40 repetitions were tested. Additionally, two multiple imputation (MI) programs were used: SAS procedure MI and IVEware.

The remainder of this section presents the results of MI imputation and single imputation. The child dataset has 2,613 records. The missing rate for **Child Weight** was 17 percent, whereas it was 40 percent for **Child Height**. Table 8.3 provides the variables included in the imputation model.

Table 8.3: List of auxiliary variables used for imputation

Variable Name
Child Age in Months
Child Gender
Child Height in Feet
Child Height in Inches
Child Weight
Person-Level Final Weights
Combined Stratum and Cluster Identifier

The last two variables are related to the complex sample design, the **Person-Level Final Weight**, and the **Combined Stratum and Cluster Identifier**. If design variables were not included in the imputation model, the MI variance estimator would underestimate the variance for complex survey data.

After running the imputation, **Proper CRS Selection** was derived from multiply imputed datasets and compared to the variable defined from single imputation. Table 8.4 shows that the results from the 5-imputation dataset with 13,065 (= 5*2,613) records were very similar to that obtained from the 40-imputation dataset with 104,520 records. In both datasets, there was a high level of agreement for **Proper CRS Selection** values (98.4% of all 0s or all 1s). Only a small proportion of values (1.6%) had some disagreement among the three imputation methods. More relevant comparisons were the ones between Single and PROC MI, and Single and IVEware, where, respectively, only about 1 percent disagreement rates were found. The reason for this remarkable agreement was that **Child Age** was the most important variable in defining **Proper CRS Selection**, and there were virtually no missing values for age. Furthermore, child height and weight were highly correlated with child age.

Table 8.4: Comparison of proper CRS selection derived from different imputed datasets

Proper CRS Selection (with 5 imputations)				
SINGLE	**PROC MI**	**IVEware**	**Frequency**	**Percent (%)**
0	0	0	2,293	17.55
0	0	1	43	0.33
0	1	0	56	0.43
0	1	1	8	0.06
1	0	0	59	0.45
1	0	1	26	0.2
1	1	0	20	0.15
1	1	1	10,560	80.83
Total			13,065	100.00

Proper CRS Selection (with 40 imputations)				
SINGLE	**PROC MI**	**IVEware**	**Frequency**	**Percent (%)**
0	0	0	18,405	17.61
0	0	1	334	0.32
0	1	0	387	0.37
0	1	1	74	0.07
1	0	0	485	0.46
1	0	1	177	0.17
1	1	0	194	0.19
1	1	1	84,464	80.81
Total			104,520	100.00

This comparison indicated that to analyze **Proper CRS Selection**, single imputation was quite acceptable. However, if the child data were used for purposes other than defining **Proper CRS Selection**, this simple approach may not be valid.

The MI variance estimates and their standard errors were computed and compared with the single imputation variance estimate and standard error for child height and weight and for **Proper CRS Selection**. The results of this comparison are shown in Table 8.5. The last column of the table shows the ratio of the MI standard error to the single imputation standard error. A ratio greater than 1 means that the length of the confidence interval formed using the MI standard error was longer than that formed by the single imputation standard error. For example, the ratio for **Proper CRS Selection** under IVEware is 1.02, which means that the confidence interval for the estimate of **Proper CRS Selection** constructed with the IVEware MI standard error was 2 percent longer than that formed by the single imputation standard error. In other words, the single imputation confidence interval is 2 percent too short.

Table 8.5: Means and variances of child weight, child height in inches, and proper CRS selection by imputation method

Number of Imputations	Variable	Imputation Method	Mean	Variance	Ratio of Standard Errors
5	Child Weight	SINGLE	44.5696	0.3102	1.00
		PROC MI	44.6154	0.3836	1.11
		IVEWARE	44.5623	0.3952	1.13
	Child Height in Inches	SINGLE	40.7157	0.0547	1.00
		PROC MI	40.7503	0.0630	1.07
		IVEWARE	40.7943	0.0669	1.11
	Proper CRS Selection	SINGLE	0.807166	0.000100	1.00
		PROC MI	0.805542	0.000108	1.04
		IVEWARE	0.804301	0.000108	1.04
40	Child Weight	SINGLE	44.5696	0.3102	1.00
		PROC MI	44.5974	0.3926	1.13
		IVEWARE	44.6401	0.4016	1.14
	Child Height in Inches	SINGLE	40.7157	0.0547	1.00
		PROC MI	40.7773	0.0596	1.04
		IVEWARE	40.8051	0.0634	1.08
	Proper CRS Selection	SINGLE	0.807166	0.000100	1.00
		PROC MI	0.805412	0.000103	1.01
		IVEWARE	0.804221	0.000105	1.02

Note: This is the ratio of the multiple imputation standard error to the single imputation standard error. It gives the difference in the length of the MI-based confidence interval to that of the single imputation based confidence interval.

The underestimation by the single imputation variance estimate was moderate for **Child Weight**, fairly contained for **Child Height**, and negligible for **Proper CRS Selection**. The 5 multiply imputed datasets were almost as good as the 40 multiply imputed datasets in terms of variance estimation.

The complex survey variance estimate was defined with simplifying assumptions such as that PSUs were selected with replacement even though they were not. This process overestimated the variance. The magnitude of overestimation cannot be qualified. However, this overestimation lessened the actual underestimation of the single imputation variance estimate to a certain degree.

Based on these findings, single imputation was used to analyze **Proper CRS Selection**. In the future, if it is necessary to analyze **Child Height** and **Child Weight** apart from **Proper CRS Selection**, it is recommended to use the MI dataset.

8.3 Descriptive Analysis

To study the degree of awareness caregivers have of CPST or inspection stations, the weighted descriptive statistics, including means, proportions, associated standard errors, and confidence intervals were produced for all meaningful survey variables.

8.4 Cross-Tabulation Analysis

Cross-tabulation between key categorical variables was used as part of the descriptive analysis and to examine associations between categorical variables. For example, for key variables such as **Awareness of Inspection Stations**, **Inspection Station Use**, and **Proper CRS Selection**, the cross-tabulations were produced between these key variables and many other variables, such as risk perception (**CRS Usefulness in Preventing Injury in Low-Speed Crash**, **Likelihood of Child Injury With Improper CRS Selection**), who installed the CRS (**Attached by Self, Attached by Spouse/Partner, Attached by Daughter/Son, Attached by Another Relative, Attached by Friend,** and **Attached by Person Formally Training in CRS**), **Actions Taken in First Installation**, and **Intent to Visit Inspection Station**. **Intent to Visit Inspection Station** was derived from three variables (**Consider Additional Inspection Station Use**, **Conditions for Additional Inspection Station Use**, and **Reasons for No Additional Inspection Station Use**).

The cross-tabulations showed the shared distribution of the variables. The degree of association between the two variables was assessed by the weighted chi-square tests using jackknife replicate weights. Significant Rao-Scott chi-square tests ($p<0.05$) indicated larger than expected differences in the percentages within a cell.

8.5 Weighted Linear Regression and Logistic Regression Modeling

The analyses explored the relationships among the key categorical outcome variables of **Intent to Visit Inspection Station**, **Awareness of Inspection Stations**, **Satisfaction With Service Received at Inspection Station**, **CRS Usefulness in Preventing Injury in a Low-Speed Crash and Injury Likelihood With Improper CRS Selection**, **Confidence in Seat Installation,** and the key continuous outcome variables of **Number of CRS Information Sources**, and **Acceptability of CRS Non-Use**, and demographic and socio-economic variables and other predictors such as the distance between the household and inspection stations.

The relationships among the key outcomes and predictor variables were examined through weighted linear regression (when the outcome was continuous) or weighted logistic regression analysis (when the outcome was categorical) using the jackknife replicate weights to account for the complex sample design.

8.6 Casualty Analysis

It was hypothesized that distance to an inspection station would be a barrier for caregivers to use the services provided by the inspection stations. If this hypothesis were true, there should be a strong relationship between the distance from the caregivers' home to the nearest inspection station and the use of a station. To explore whether this hypothesis was valid, a logistic regression with **Inspection Station Use** as the response variable and **Distance to Nearest Inspection Station** as the single independent variable was conducted. The **Distance to Nearest Inspection Station** was measured in miles as the straight-line distance from a respondent's house to the nearest inspection station through GPS geocoding. This analysis targeted those who were aware of the existence of any inspection station near them. The group of 1,048 respondents were identified in the dataset. See Table 8.6 for an unweighted cross-tab of **Awareness of Inspection Stations** and **Inspection Station Use**.

Table 8.6: Unweighted cross-tab of awareness of inspection stations and inspection station Use

Awareness of Inspection Stations	Inspection Station Use	Frequency	Percent (%)	Cumulative Frequency	Cumulative Percent (%)
1 (Yes)	**1 (Yes)**	475	30.35	475	30.35
1 (Yes)	**2 (No)**	573	36.61	1,048	66.96
2 (No)	**NA**	517	33.04	1,565	100.00

SAS procedure SURVEYLOGISTIC was used for logistic regression analysis, and results are shown in Tables 8.7 and 8.8. It uses maximum likelihood estimation to estimate regression coefficients.[13]

Table 8.7: SAS output of SURVEYLOGISTIC – global testing of the logistic model

Testing Global Null Hypothesis: BETA=0				
Test	**F Value**	**Num DF**	**Den DF**	**Pr > F**
Likelihood Ratio	0.77	1	60	0.3823
Score	0.60	1	60	0.4398
Wald	0.52	1	60	0.4747

Note: First-order Rao-Scott design correction 1.6448 applied to the likelihood ratio test.

[13] See: https://support.sas.com/documentation/cdl/en/statug/63033/HTML/default/viewer.htm#statug_surveylogistic_sect001.htm.

Table 8.8: SAS output of SURVEYLOGISTIC – regression coefficients

Analysis of Maximum Likelihood Estimates				
Parameter	**Estimate**	**Standard Error**	**t-Value**	**Pr >|t|**
Intercept	-0.1801	0.1072	-1.68	0.0983
Distance to Nearest Inspection Station	-0.0110	0.0153	-0.72	0.4747

Note: The degrees of freedom for the t-tests was 60.

Table 8.7 shows the test results of the global null hypothesis and indicates whether the logistic regression model holds. If distance to the nearest inspection station was a strong predictor (i.e., **Inspection Station Use** is strongly related to **Distance to Nearest Inspection Station**), then the test would be rejected with a small p-value. However, all three different tests, the Likelihood Ratio, Score, and Wald tests, had p-values far greater than the significance level of 0.05 (the threshold typically used to determine significance). Moreover, Table 8.8 shows that the regression coefficient for **Distance to Nearest Inspection Station** had a p-value of 0.4747, indicating that **Distance to Nearest Inspection Station** was not a significant predictor of a respondent's likelihood of using inspection stations.

Another way to examine the issue was to compare the average distance to the inspection station for users and non-users. Table 8.9 shows this comparison.

Table 8.9: Comparison of average distances between inspection station users and non-users

Inspection Station Use		**Average Distance**	**Standard Error**	**Difference**	**Standard Error**	**t-Value**	**P-Value**
1	**Yes**	4.42	0.46	0.23	0.43	0.54	0.5939
2	**No**	4.65	0.73				

The average distance for inspection station non-users (4.65) was slightly larger than that of the users (4.42), but the difference of 0.23 miles was not significantly different from 0 with a p-value of 0.5939. The **Distance to Nearest Inspection Station** was more widely dispersed in rural areas. Therefore, the impact of **Urbanicity** on inspection station users compared to non-users was also explored. This analysis is shown in Table 8.10, which presents the distribution of **Distance to Nearest Inspection Station** by **Urbanicity** as defined by the Census Bureau.[14]

[14] For the 2010 Census, an urban area comprised a densely settled core of census tracts and/or census blocks that met minimum population density requirements along with adjacent territory containing non-residential urban land used as territory with low population density included to link outlying densely settled territory with the densely settled core. To qualify as an urban area, the territory identified according to the criteria must encompass at least 2,500 people, at least 1,500 of which reside outside institutional group quarters. The Census Bureau identified two types of urban areas:

- Urbanized Areas (UAs) of 50,000 or more people; and
- Urban Clusters (UCs) of at least 2,500 and less than 50,000 people.

"Rural" encompassed all population, housing, and territory not included within an urban area.

Table 8.10: Distribution of the distance to nearest inspection station by urbanicity

Urbanicity	Sample Size	Mean	Min	25th Percentile	Median	75th Percentile	Max	Std. Dev.
Urbanicity: Rural	181	11.04	0.16	4.90	8.44	13.56	45.88	9.15
Urbanicity: Urban Cluster	116	5.27	0.08	0.95	1.98	5.07	28.50	7.42
Urbanicity: Urban Area	751	2.86	0.15	1.29	2.21	3.71	22.13	2.29
Overall	1048	4.47	0.08	1.45	2.60	4.95	45.88	5.77

The real question was whether the different distance distributions influenced the use rate. To answer this question, the use rates were compared by urbanicity as shown in Table 8.11.

Table 8.11: Comparison of use rate by urbanicity

Urbanicity[1]	Use Rate	Std. Err.
Rural	40.9	4.81
Urban Cluster	51.67	4.87
Urban Area	43.96	2.61
Overall	44.2	2.23

[1]Using Census definitions of urbanicity: https://www.census.gov/programs-surveys/geography/guidance/geo-areas/urban-rural/2010-urban-rural.html

It appeared that the use rate for the **Urbanicity: Urban Cluster** was much higher than that for the urban and rural areas; but, the standard errors were large and not significantly different. The contingency table analysis of **Inspection Station Use** and **Urbanicity** also showed that the two variables were not significantly associated with a p-value of 0.2603 for the Rao-Scott chi-square statistic.

Furthermore, investigations examined the causal relationship between the distance to the inspection station and non-users of the inspection station among those who were aware of the existence of the station. Several proximity groups of households were defined according to the distance to the nearest inspection station. The five groups were defined using quantiles of the distance for each urbanicity class separately, as shown in Table 8.12.

Table 8.12: Proximity group definition

Group	1	2	3	4	5
Urbanicity	**10th Percentile**	**25th Percentile**	**50th Percentile**	**75th Percentile**	**90th Percentile**
Rural	3.24	4.90	8.44	13.56	24.56
Urban Cluster	0.53	0.95	1.98	5.07	14.66
Urban Area	0.73	1.29	2.21	3.71	6.00

Treating the proximity groups as treatment groups, a causal analysis was conducted. To make sure that there were no strong confounding covariates unduly influencing the analysis, the propensity score method was used (Rosenbaum & Rubin, 1983). Propensity scoring used the background covariates, which included the demographic variables collected by the survey and ACS community level characteristics. If there were similar variables, the household-level variables took priority over ACS community-level variables. The entire set of covariates consisted of those ACS variables given in Table 7.2 and geographic and demographic variables shown in Table 8.13.

Table 8.13: List of geographic and demographic covariates used in the propensity score model

Variable Label	Response Categories
Urbanicity	Urban cluster, urbanicity: urban area, urbanicity: rural
Census Region	Northeast, Midwest, South, and West
Education Level	Less than 12th grade, high school diploma or GED, some college or associate's degree, bachelor's degree, graduate degree or professional degree
Respondent Age	18 – 110
Household Income	Less than $25,000, greater than $25,000 but less than $35,000, greater than $35,000 but less than $50,000, greater than $50,000 but less than $75,000, $75,000 or more
Respondent Gender	1 - Male 2 – Female
Race / Ethnicity	1 - Hispanic 2 - White 3 - Black 4 – Other

Note for the purposes of the Casualty Analysis, response categories were recoded and may differ from those presented elsewhere in this report.

Sixty-seven percent of respondents (n = 1,048) were aware of the existence of inspection stations, and 45 percent of those 1,048 used inspection stations, as noted in Table 8.6. The causal analysis focused on those 1,048 respondents who were aware of inspection stations.

The TWANG package (Griffin et al., 2014) was used to calculate the propensity score for the 1,048 survey respondents who were aware of the inspection station. The TWANG package was

run with the sampling weight specified in the weight option. The run gave good results in balance statistics for the covariates for Proximity Groups 2 and 3 based on the criterion of a standardized mean difference of 0.2 (the widely used as the cut-off).[15] Proximity Group 1 had two unbalanced variables, Proximity Group 4 had one, and Proximity Group 5 had four.

Logistic regressions with **Inspection Station Use** as the response variable and the proximity group indicator as the predictor were run for each proximity group using SAS PROC SURVEYLOGISTIC with the weight that combines the propensity score weight and the sampling weight. The combined weight was used to try to eliminate the effect of confounding variables on the analysis. None of the five proximity groups showed any significant results. Proximity Groups 1, 4, and 5, were also run using logistic regressions with unbalanced covariates included in the model. However, none of those variables were significant predictors. The results were the same as for the model without unbalanced covariates. Table 8.14 presents the results of the analyses in terms of model significance using the likelihood (LH) ratio test and the significance of the model parameter for the group indicator variables, which had a value of 1 if the unit fell below the corresponding group defining percentile and a value of 0 otherwise.

Table 8.14: Results of logistic regressions for the five proximity groups

Proximity Group	P-Values for Model Without Covariates		P-Values for Model With Covariates	
	Model (LH Ratio)	Group Indicator	Model (LH Ratio)	Group Indicator
1	0.7936	0.8881	0.5159	0.8241
2	0.9159	0.9350	NA	NA
3	0.4614	0.5186	NA	NA
4	0.4698	0.5882	0.4650	0.5945
5	0.2968	0.6154	0.4760	0.6599

Next, the **Inspection Station Use** rate was compared between households in the proximity group (scored a 1) and those not in the proximity group (scored a 0) as shown in the following table.

[15] The standardized mean difference is propensity score weighted mean difference between the user and non-user groups. The difference is divided by the standard deviation of the difference to neutralize the scale difference of covariates.

Table 8.15: Comparison of the inspection station use rate by proximity group

Proximity Group	Use Rate		Use Rate Difference	Standard Error	P-Value
	1	0			
1	0.4523 (0.0634)	0.4437 (0.0219)	0.0086	0.0609	0.8882
2	0.4407 (0.0346)	0.4436 (0.0244)	-0.0030	0.0363	0.9349
3	0.4348 (0.0254)	0.4560 (0.0300)	-0.0212	0.0326	0.5189
4	0.4407 (0.0229)	0.4668 (0.0478)	-0.0261	0.0481	0.5895
5	0.4383 (0.0232)	0.4780 (0.0783)	-0.0396	0.0788	0.6168

Note: The standard error for the use rate is given in parentheses. The column under "1" is for group indicator = 1 and "0" is for group indicator = 0.

If short distance encourages the use of inspection stations, the use rate for households in the proximity group should be higher than the use rate for households not in the proximity group, and the difference should be positive and significantly different from 0. However, the differences were negative except for Proximity Group 1, and they were not significantly different from 0 with p-values ranging from 0.52 to 0.93. The results confirmed what was observed in the analyses shown before.

Relying on straight line distance instead of actual driving distance could potentially lead to some weakness in analysis. To remedy this weakness, the distances were also calculated using the shortest Google map distance and then run through the same analysis. In Table 8.16, descriptive statistics for these two distances are shown. The Google distance was 41 percent longer on average. However, the correlation between these two distances was very strong at 0.975, and the relation was linear as shown in Figure 8.1.

Table 8.16: Descriptive statistics of straight line distance and Google distance

Variable	N	Mean	Minimum	Maximum	Std. Dev.
Straight Line Distance in Miles	1,565	4.47	0.08	45.88	5.77
Google Distance in Miles	1,565	6.32	0.11	72.05	8.34

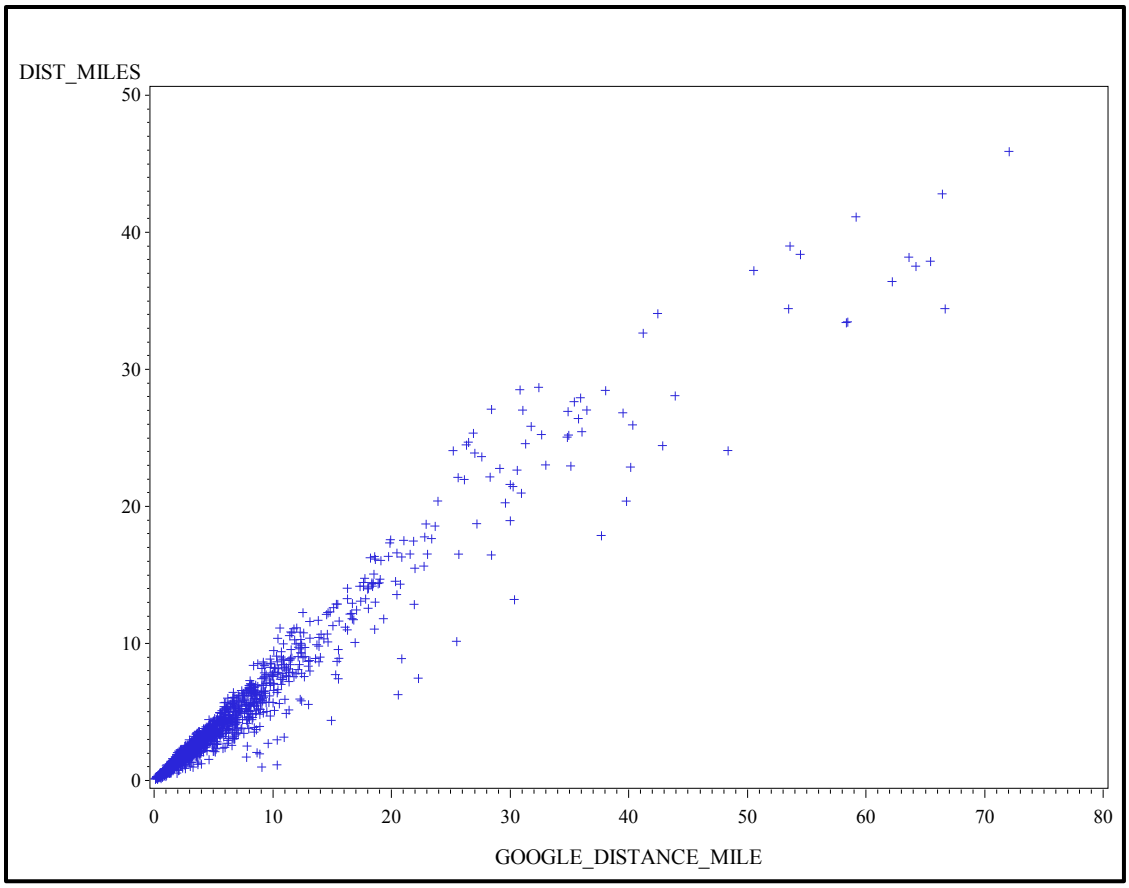


Figure 8.1: Scatter plot of straight line distance and Google distance

The **Inspection Station Use** rate was compared for the middle three proximity groups similarly defined as before but using the Google distance as presented in Table 8.17. Again, there was no significant difference between the use rates as seen with the straight-line distance.

Table 8.17: Comparison of the inspection station Use rate by proximity group defined by Google distance

Proximity Group	Use Rate[1]		Use Rate Difference	Standard Error	P-Value
	1	0			
2	0.4459 (0.0300)	0.4457 (0.0270)	-0.0003	0.0354	0.9944
3	0.4321 (0.0227)	0.4759 (0.0392)	0.0438	0.0387	0.2624
4	0.4452 (0.0221)	0.4393 (0.0677)	-0.0059	0.0678	0.9307

Note: The standard error for the use rate is given in parentheses. The column under "1" is for group indicator = 1 and "0" is for group indicator = 0.

8.7 Linked Analysis

The AACPSIR Study used the NSUBS sampling frame to select a sample of 60 PSUs, of which one half were from NSUBS. To exploit this large overlap with the PSU samples, Westat included the NSUBS data in the analysis of the AACPSIR data. To facilitate this analysis, a larger sample was selected from the overlapping PSUs, resulting in more completes from NSUBS PSUs, as shown in the table below.

Table 8.18: Breakdown of main survey completes by NSUBS PSU

NSUBS PSU	Total Completes	Eligible Completes	Percent Eligible
Yes	2,595	985	38.0%
No	1,597	580	36.3%
Total	4,192	1,565	37.3%

The NSUBS data provided percentages of various selected NSUBS variables at the PSU-level for overlapping PSUs. Table 8.19 shows the NSUBS variables used for linked analysis.

Table 8.19: NSUBS variables used in linked analysis

Variable Name	Label
Female Drivers	PSU Percentage of female drivers
Belted Drivers	PSU Percentage of belted drivers
Drivers Under 25	PSU Percentage of driver under age 25
Drivers Age 25 to 69	PSU Percentage of driver age 25-69
Drivers Over 70 Years	PSU Percentage of driver age 70+
White Drivers	PSU Percentage of non-Hispanic White driver
Black Drivers	PSU Percentage of non-Hispanic Black driver
Other Race Drivers	PSU Percentage of non-Hispanic driver of other race
Hispanic Drivers	PSU Percentage of Hispanic driver
Child Belted	PSU Percentage of restrained children
Improper Car Seat Use	PSU Percentage of improperly restrained children
Child Female	PSU Percentage of female children
Child Under 1	PSU Percentage of children age 0
Child 1 to 3 years	PSU Percentage of children age 1-3
Child 4 to 7 years	PSU Percentage of children age 4-7
Child 8 to 12 years	PSU Percentage of children age 8-12
Child White	PSU Percentage of children non-Hispanic White
Child Black	PSU Percentage of children non-Hispanic Black
Child Other Race	PSU Percentage of children non-Hispanic other race
Child Hispanic	PSU Percentage of children Hispanic

The analysis was exploratory, and the main goal was to examine the relationships among selected AACPSIR outcome variables and selected explanatory variables from the AACPSIR and NSUBS data through regressions. The following three variables were selected as outcome variables:

- **Awareness of Inspection Stations**;
- **Inspection Station Use**; and
- **Proper CRS Selection** (see Section 8.2 for definition).

Awareness of Inspection Stations was defined for the entire set of 1,565 respondents; whereas, **Inspection Station Use** was defined for only those respondents who said they were aware of inspection stations (i.e., 1,048 cases with **Awareness of Inspection Stations** = 1, see Table 8.6). **Proper CRS Selection** was defined for all 2,613 children included in the survey (every respondent that rostered at least one child), and analysis was performed with the combined PERSON data of 1,565 respondents and the CHILD data of 2,613 children. Analysis of **Awareness of Inspection Stations** and **Inspection Station Use** was performed using the PERSON data with some child variables for the primary child for which the child safety-related questions were asked.

In addition to the NSUBS variables given in Table 8.19, the AACPSIR variables presented in Table 8.20 were selected as explanatory variables for the regression models. The selection was based on their potential to have strong explanatory power for the outcome variables.
To address missing values (due to nonresponse) in variables list-wise deletion was used in regression analysis. Because of this approach, variables with a high missing rate caused by nonresponse (**Correct Knowledge of Fine for Violating State CRS Law**) were not used. Variables were also excluded for a high missing rate due to questionnaire skip (**Confidence in First Seat Installation** and **Number of Steps Taken in First Installation**). For **Inspection Station Use**, variables that were completely confined within the subpopulation defined by **Inspection Station Use** users were excluded (such as **Comfort Attaching CRS after Inspection**, **Satisfaction With Inspection Station Service**, and **Number of CRS Types for which Help was Received**). For **Proper CRS Selection**, another outcome variable, **Awareness of Inspection Stations** was used as an explanatory variable. For **Awareness of Inspection Stations**, **Proper CRS Selection** for the primary child was used as the explanatory variable because **Awareness of Inspection Stations** and **Inspection Station Use** were limited to the primary child.

The AACPSIR data had three types of variables: (1) continuous, (2) ordinal, and (3) categorical. Variables with Likert scale responses (e.g., **Confidence in Seat Installation**) and dichotomous variables with two statuses (0/1 type such as **Respondent Gender**) were treated as ordinary numerical variables as is typical in regression analysis. Ordinal variables such as **Household Income** and **Education Level** were treated as pure categorical variables; but, the inherent numerical order was completely ignored, resulting in the loss of order information. Therefore, they were treated as continuous variables. Pure categorical variables such as **Census Region** were used as categorical variables (class variable in SAS). The AACPSIR variables included in the analysis are listed in Table 8.20 with variable type indicators of N for numeric variables that

included continuous, scale, dichotomous, and ordinal variables, and C for pure categorical variables. Dropped variables are also indicated in the last column.

Table 8.20: AACPSIR outcomes and explanatory variables for the logistic regression models

Variable Label	Question Number	Response Categories*	Var Type	Drop
Child Gender (imputed)	S6	0 – Female 1 – Male	N	
Child Age in Months	S8 & S9	1 - One to 96	N	
Collapsed Car Seat Type	S16	1 - Infant car seat or rear facing car seat 2 - Forward facing car seat 3 - Booster seat 4 - Seat belt 5 - No use of CRS or seat belt	C	
Confidence in First Seat Installation	1-3	1 - Extremely confident 2 - Very confident 3 - Moderately confident 4 - Slightly confident 5 - Not at all confident	N	
CRS Usefulness in Preventing Injury in Low-Speed Crash	1-8	1 - Extremely useful 2 - Very useful 3 - Moderately useful 4 - Slightly useful 5 - Not at all useful	N	
Likelihood of Child Injury With Improper CRS Selection	1-9	1 - Very likely 2 - Somewhat likely 3 - Neither likely nor unlikely 4 - Unlikely 5 - Very Unlikely	N	
Attached by Self	2-1	0 - No 1 – Yes	N	
Attached by Spouse/Partner	2-1	0 - No 1 – Yes	N	
Attached by Daughter/Son	2-1	0 - No 1 – Yes	N	
Attached by Another Relative	2-1	0 - No 1 – Yes	N	
Attached by Friend	2-1	0 - No 1 – Yes	N	
Attached by Person Formally Trained in CPS	2-1	0 - No 1 – Yes	N	

Variable Label	Question Number	Response Categories*	Var Type	Drop
Confidence in First Seat Installation	2-3	1 - Extremely confident 2 - Very confident 3 - Moderately confident 4 - Slightly confident 5 - Not at all confident	N	Yes
Awareness of Inspection Stations	4-1	0 - No 1 – Yes	N	
Inspection Station Use	4-4	0 - No 1 – Yes	N	
Comfort Attaching CRS After Inspection	5-10	1 - Extremely comfortable 2 - Very comfortable 3 - Moderately comfortable 4 - Slightly comfortable 5 - Not at all comfortable	N	Yes
Satisfaction With Inspection Station Service	5-11	1 - Extremely comfortable 2 - Very comfortable 3 - Moderately comfortable 4 - Slightly comfortable 5 - Not at all comfortable	N	Yes
Hispanic or Latino Origin (imputed)	7-3	0 - No 1 – Yes	N	
Race: White (imputed)	7-4	0 - No 1 – Yes	N	
Race: Black of African American (imputed)	7-4	0 - No 1 – Yes	N	
Race: Asian (imputed)	7-4	0 - No 1 – Yes	N	
Race: American Indian or Alaska Native/Native Hawaiian or Other Pacific Islander (imputed)	7-4	0 - No 1 – Yes	N	
Education Level (imputed)	7-5	Less than 12th grade, high school diploma or GED, some college or associate's degree, bachelor's degree, graduate degree or professional degree	N	
Respondent Age (imputed)	7-6	0 – 110	N	
Respondent Gender (imputed)	7-7	0 - Female 1 – Male	N	

Variable Label	Question Number	Response Categories*	Var Type	Drop
Household Income (imputed)	7-8	Less than $25,000, greater than $25,000 but less than $35,000, greater than $35,000 but less than $50,000, greater than $50,000 but less than $75,000, $75,000 or more	N	
Proper CRS Selection	NA	0 - No 1 – Yes	N	
Acceptability of CRS Non-Use	NA	0 - Zero to 8 - Eight	N	
Number of Steps Taken in First Installation	NA	0 - Zero to 10 - Ten	N	Yes
Number of CRS Topics Reviewed	NA	0 - Zero to 11 - Eleven	N	
Number of CRS Information Sources	NA	0 - Zero to 11 - Eleven	N	
Number of CRS Types Received Help With	NA	1 - One to 5 - Five	N	Yes
Number of Issues Preventing Inspection Station Use	NA	0 - Zero to 8 - Eight	N	
State CRS Law Ranking	NA	1 - Lower Ranking 2 - Medium Ranking 3 - Higher Ranking	N	
Correct Knowledge of State CRS Law	NA	0 - Incorrect 1 – Correct	N	
Correct Knowledge of Fine for Violating State CRS Law	NA	0 - Incorrect 1 – Correct	N	Yes
Census Region	NA	NA	C	
Urban Indicator (based on Census Bureau urbanicity code)	NA	0 - No 1 – Yes	N	

Note: For the purposes of the Linked Analysis, response categories were recoded and may differ from those presented elsewhere in this report.

Some variables in Table 8.20 were modified as follows:

- **Collapsed Car Seat Type** is a modified version of **Car Seat Type** by collapsing categories infant seat and rear facing seat into one category and categories high back booster and low back booster into another category
- **Race: American Indian or Alaska Native/Native Hawaiian or Other Pacific Islander** is a collapsed version of **Race: American Indian or Alaska Native** and **Race: Native Hawaiian or other Pacific Islander**. Note that multiracial people have a value of 1 for applicable race variables.
- **Urban Indicator** has a value of 1 for **Urbanicity: Urban Cluster and Urbanicity: Urban Area**, and 0 for **Urbanicity: Rural**.

One of the objectives of this analysis was to see whether there was any advantage to using NSUBS data. To answer this question, Analysis 1 was first performed using only AACPSIR data and Analysis 2 was performed using the combined data of AACPSIR and NSUBS. The Analysis 1 model, with the AACPSIR data alone, will be referred to as the AACPSIR model. The Analysis 2 model, with the combined data of AACPSIR and NSUBS, will be referred to as the combined model. Note that the combined dataset has 985 records, which is 63 percent of the PERSON data with 1,565 records. Therefore, the AACPSIR model and the combined model use different databases. To make the models comparable, they had to be built using the same database. Therefore, another analysis, Analysis 3, was conducted with a model that used only AACPSIR variables with the combined dataset. This model will be referred to as the combined data AACPSIR model.

Since all outcome variables were dichotomous, logistic regression analysis was used, and the main tool for the analysis was the SAS procedure SURVEYLOGISTIC with the final weight and replicate weights for variance estimation. To obtain the final model, it was first necessary to select important main effect variables and interaction terms. It was found that interaction terms were very important. Two-way interaction terms were used because including higher order interaction terms with so many explanatory variables would have increased interpretation difficulty and difficulty in model selection. Variable selection (including interaction terms) was performed using a SAS macro developed for logistic regression analysis with complex survey data (Wang & Shin, 2011). Main effects and interaction terms were treated equally, and they were entered into or removed from the model based on their ability to improve model fit. Therefore, non-significant main effects were excluded from this report.

The SURVEYLOGISTIC procedure cannot select variables like the LOGISTICS procedure. The macro was built around the core engine of the SURVEYLOGISTIC procedure to perform three types of variable selection: forward, backward, and stepwise. However, it could not handle interaction terms or use replicate weights. A modified macro was required to accommodate interaction terms and replicate weights. Furthermore, the procedure often failed to produce a solution when there was a quasi-complete separation problem in the data. This problem occurs when an explanatory variable almost completely determines the values of the outcome (independent) variable linearly. The problem occurs more often with backward selection. Therefore, only the forward and stepwise selection methods were used.

With selected variables including interaction terms, the SURVEYLOGISTIC procedure was run to refine the model manually. Hereafter, the term "variable" includes interaction terms unless otherwise specified because they were actually newly defined variables in the model as the cross-product of two variables.

The analysis was conducted in a step-by-step process as follows:

S1. Identify main effect variables by running the SURVEYLOGISTIC procedure for each explanatory variable and select variables that have a p-value for testing a zero regression coefficient less than 10 percent (to include more variables);
S2. Run the variable selection macro with the main effects identified in S1 and the two-way interaction terms using the variable selection macro with a 5 percent significance level for entry and exit;
S3. Run the SURVEYLOGISTIC procedure with selected variables in S2;
S4. Delete the variable (or an interaction term) with the largest p-value for testing a zero regression coefficient that exceeds 5 percent;
S5. Repeat S4 until there are no more such terms in the model.

The following sections provide details for the outcome of each of these steps.

8.7.1 Analysis of Awareness of Inspection Stations

The main effect variables identified in S1 provided information about which explanatory variables were significant predictors of the outcome variable. Those variables from the AACPSIR data are presented in Table 8.21. The table is ordered by p-value for testing against a regression coefficient of zero for that single explanatory variable. The sign of the coefficient is provided in the table for each variable (except pure categorical variables with more than two categories, e.g., **Census Region** and **Collapsed Car Seat Type**) and indicates whether the relationship is positive or negative.

Table 8.21: Main effect variables for the AACPSIR Model for Awareness of Inspection Stations

Order	Main Effect	Wald Chi-Square	P-Value	Sign of Coefficient
1	Number of CRS Topics Reviewed	67.0188	< 0.0001	+
2	Attached by Person Formally Trained in CPS	29.5401	< 0.0001	+
3	Household Income	23.6252	< 0.0001	+
4	Number of CRS Information Resources	23.3480	< 0.0001	+
5	Confidence in Seat Installation	21.6585	< 0.0001	-
6	Race: White	19.9968	< 0.0001	+
7	Respondent Gender	16.5166	< 0.0001	-
8	Race: Black or African American	14.9501	< 0.0001	-
9	Education Level	13.0840	< 0.0001	+
10	CRS Usefulness in Preventing Injury in Low-Speed Crash	11.2135	< 0.0001	-
11	Proper CRS Selection	10.7206	0.0011	+
12	Number of Steps Taken in First Installation	9.8333	0.0017	+
13	Attached by Another Relative	8.8533	0.0029	-
14	Hispanic or Latino Origin	7.1693	0.0074	-
15	Acceptability of CRS Non-Use	6.6709	0.0090	-
16	Urban Indicator	5.6551	0.0174	-
17	Collapsed Car Seat Type	10.8139	0.0287	NA
18	Attached by Spouse/Partner	2.9337	0.0868	+
19	Race: Asian	2.8722	0.0901	-

Note that the **Confidence in Seat Installation** variable had a negative coefficient. The negative coefficient indicates that increased confidence in the seat installation predicted a greater likelihood of being aware of installation stations. Among other relationships, it was interesting to note that female respondents were more likely (than males) to be aware of inspection stations and that respondents in urban areas were less likely to be aware of inspection stations (than those in rural areas).

Both forward and stepwise selections produced the same results in S2, and all selected variables were significant explanatory variables as shown in Table 8.22. The table is ordered by p-value except for the intercept term.

Table 8.22: Significance of explanatory variables for the AACPSIR Model for Awareness of Inspection Stations

Analysis of Maximum Likelihood Estimates					
No	**Parameter (Explanatory Variable)**	**Estimate**	**Standard Error**	**t-Value**	**P-Value**
0	Intercept	-0.2884	0.2025	-1.42	0.1596
1	Attached by Person Formally Trained in CPS * Education Level	0.5253	0.0945	5.56	<0.0001
2	Number of CRS Topics Reviewed * Education Level	0.0355	0.0074	4.79	<0.0001
3	Respondent Gender	-0.6708	0.1586	-4.23	<0.0001
4	Household Income * Race: White	0.1689	0.0415	4.07	0.0001
5	Confidence in Seat Installation * Urban Indicator	-0.2737	0.0728	-3.76	0.0004
6	Attached by Another Relative * Acceptability of CRS Non-Use	-0.5674	0.1815	-3.13	0.0027
7	Number of CRS Information Resources	0.0883	0.0319	2.77	0.0075

Note: Two-way interaction terms are shown as two variables joined by "*".

There were seven terms in the model, two of which were main effects, **Respondent Gender** and **Number of CRS Information Resources**. **Education Level** entered the model via an interaction with **Attached by Person Formally Trained in CPS** and **Number of CRS Topics Reviewed**, as they were the two significant explanatory variables with the largest coefficients. Highly educated people who had the CRS attached by a formally trained person or sought more information about the CRS were more likely to be aware of inspection stations.

For other variables tested as single explanatory variables, male respondents were less likely to be aware of inspection station than female respondents. The interaction between **Household Income** and **Race: White** indicated that respondents who indicated they were White and had a high income were more likely to be aware of inspection stations. The interaction between **Confidence in Seat Installation** and **Urban Indicator** showed that respondents in urban areas who were confident about CRS installation were less likely to be aware of inspection stations. Respondents who had the CRS attached by a relative tended to believe it was acceptable not to use the CRS under some circumstances and were less likely to be aware of inspection stations. Finally, respondents seeking more information sources about the CRS were more likely to be aware of inspection stations. The model rejected the intercept model with a p-value < 0.0001 for the Rao-Scott likelihood ratio test.

For the combined model, the main effect variables were identified in the same manner as the AACPSIR model, as shown in Table 8.23. Out of 27 variables, 8 were selected from the NSUBS data.

Table 8.23: Main effect variables for the combined model for Awareness of inspection stations

Order	Main Effect	Wald Chi-Square	P-Value	Sign of Coefficient
1	Number of CRS Topics Reviewed	30.8984	<0.0001	+
2	Child White	26.3055	<0.0001	+
3	White Drivers	25.3609	<0.0001	+
4	Household Income	17.5249	<0.0001	+
5	Education Level	16.5622	<0.0001	+
6	Race: White	15.8950	<0.0001	+
7	Confidence in Seat Installation	14.0867	0.0002	-
8	Hispanic or Latino Origin	13.3747	0.0003	-
9	Number of CRS Information Resources	13.1106	0.0003	+
10	Respondent Gender	11.4754	0.0007	-
11	Attached by Person Formally Trained in CPS	11.3662	0.0008	+
12	Proper CRS Selection	9.4097	0.0022	+
13	Improper Car Seat Use %	7.1021	0.0077	+
14	CRS Usefulness in Preventing Injury in Low-Speed Crash	7.0924	0.0077	-
15	Collapsed Car Seat Type	13.2106	0.0103	NA
16	Number of Steps Taken in First Installation	6.1008	0.0135	+
17	Child Other Race	5.4528	0.0195	-
18	Urban Indicator	5.2078	0.0225	-
19	Child 4 to 7 Years	4.3263	0.0375	-
20	Race: Asian	3.9425	0.0471	-
21	Other Race Drivers	3.9332	0.0473	-
22	Hispanic Drivers	3.5478	0.0596	-
23	Confidence in First Seat Installation	3.4694	0.0625	-
24	Race: Black or African American	3.3177	0.0685	-
25	Child Hispanic	3.1121	0.0777	-
26	Acceptability of CRS Non-Use	3.0502	0.0807	-
27	Census Region	6.7306	0.0810	NA

Note: NSUBS and ACS variables use the variable name (see tables 8.19 and 7.2, respectively) to distinguish them from AACPSIR variables.

All AACPSIR variables from the first model are included in the combined model. Among the selected NSUBS variables, those with a negative correlation with **Awareness of Inspection Stations** indicated that the respondents from NSUBS PSUs with a higher percentage of booster seat age children were less likely to be aware of inspection stations.

The forward and stepwise selections produced different results in S2, and the stepwise selection results were ultimately chosen. The forward selection method tended to select more terms but resulted in a weaker model. The final model is shown in Table 8.24. The table is ordered by p-value except for the intercept term.

Table 8.24: Significance of explanatory variables for the combined model for Awareness of Inspection Stations

Analysis of Maximum Likelihood Estimates					
No	**Parameter (Explanatory Variable)**	**Estimate**	**Standard Error**	**t-Value**	**P-Value**
0	Intercept	-0.5391	0.2477	-2.18	0.0335
1	Household Income * Number of CRS Information Resources	0.0697	0.0148	4.72	<.0001
2	Education Level * Attached by Person Formally Trained in CPS	0.5662	0.1545	3.67	0.0005
3	Number of CRS Information Resources * Respondent Gender	-0.2026	0.0639	-3.17	0.0024
4	Education Level * Number of CRS Topics Reviewed	0.0361	0.0114	3.16	0.0025
5	Household Income * CRS Usefulness in Preventing Injury in Low-Speed Crash	-0.0504	0.0178	-2.84	0.0062
6	Number of CRS Topics Reviewed * Hispanic or Latino Origin	-0.0804	0.0274	-2.93	0.0048
7	Number of CRS Topics Reviewed * Child White	0.0130	0.0050	2.57	0.0126
8	Collapsed Car Seat Type * Race: Asian [1]				0.0179
9	Number of CRS Topics Reviewed * White Drivers	-0.0109	0.0050	-2.19	0.0322

Note: **Collapsed Car Seat Type** is a categorical variable. There is no t-value and the p-value is based on the chi-square.

The model rejected the intercept model with a p-value < 0.0001 for the Rao-Scott likelihood ratio test. Model fit statistics such as the max-rescaled R-square, associations of predicted probabilities and observed responses and the Akaike Information Criterion (AIC) are shown below in Table 8.26.

Although the interpretation of the combined model was more challenging because of the many interaction terms, it was a better model than the AACPSIR model based on all model fit statistics. AIC provides a measure of the relative quality of statistical models for a given dataset. However, the AIC could not be used to compare the AACPSIR and combined models because the sample bases were very different (1,343 versus 849) as the combined model used only those cases selected from the NSUBS PSUs.

Based on the model fit statistics (except AIC), it was concluded that it was beneficial to use the NSUBS data to understand the dynamics between awareness of the inspection station and the respondent's individual and community-level (PSU) characteristics.

The strongest predictor was the interaction term of **Household Income** and **Number of CRS Information Resources**. Higher income earners who also seek more sources of information about their car seat were much more likely to be aware of inspection stations. **Education Level** interacted significantly with two other variables, **Attached by Person Formally Trained in CPS** and **Number of CRS Topics Reviewed**. Highly educated people who had the car seat attached by a formally trained person were more likely to be aware of inspection stations. Also, those who sought more information (measured by **Number of CRS Topics Reviewed**) and had a higher level of education were more likely to be aware of inspection stations. The interaction of **Number of CRS Information Resources** and **Respondent Gender** was the predictor with the third largest coefficient. Female respondents who sought more information sources were more likely to be aware of inspection stations. **Number of CRS Topics Revie**wed interacted with several variables: **Education Level** (already mentioned), **Hispanic or Latino Origin**, Child White, and White Drivers. Respondents who sought more information sources about the car seat and resided in a PSU with a high percentage of White children were more likely to be aware of inspection stations. Among those who sought more information on the car seat, Hispanic respondents residing in a PSU with a high percentage of Non-Hispanic White drivers were less likely to be aware of inspection stations. The interaction term **Household Income** and **CRS Usefulness in Preventing Injury in Low-Speed Crash** was negatively correlated with the outcome variable. **CRS Usefulness in Preventing Injury in Low-Speed Crash** was defined as a Likert scale variable with a low score associated with high perceived usefulness of the car seat in a car crash. Therefore, people with a high income who perceived low-speed car crashes to be risky were more likely to be aware of inspection stations.

Next, the combined data AACSPIR Model was explored. This model allowed only AACPSIR variables to be used with the combined data (smaller than the full AACPSIR data). Then, because the sample base was the same, it was fair to compare the AACSPIR and combined model and use the AIC statistic to compare the models along with other model fit statistics. The combined data AACSPIR model obtained from this analysis is given in Table 8.25, and its model fit statistics are shown in Table 8.26.

Table 8.25: Explanatory variables for the Combined Data AACSPIR Model for Awareness of Inspection Stations

Analysis of Maximum Likelihood Estimates					
No	**Parameter (Explanatory Variable)**	**Estimate**	**Standard Error**	**t-Value**	**P-Value**
0	Intercept	-0.3459	0.1822	-1.90	0.0625
1	Education Level * Number of CRS Information Resources	0.0404	0.0073	5.55	<.0001
2	Number of CRS Topics Reviewed * Household Income	0.0579	0.0101	5.73	<.0001
3	Attached by Person Formally Trained in CPS * Urban Indicator	2.3623	0.6862	3.44	0.0011
4	Household Income * CRS Usefulness in Preventing Injury in Low-Speed Crash	-0.0679	0.0218	-3.11	0.0029
5	Collapsed Car Seat Type * Race: Asian[1]				0.0063
6	Number of CRS Topics Reviewed * Respondent Gender	-0.0931	0.0331	-2.82	0.0066
7	Urban Indicator * Census Region[1]				0.0109

Note: **Collapsed Car Seat Type** and **Census Region** are categorical variables. There are no t-values for them and their p-values are based on the chi-square.

There are other tests, such as the Score and Wald tests, that examine the intercept model as the null hypothesis, but the Rao-Scott likelihood ratio test (Rao-Scott test) was selected because it uses a second-order design correction for complex survey data. The SURVEYLOGISTIC procedure produces R-square as one of the model fit statistics, which allowed measurement of the strength of the model and comparison among competing models. The maximum achievable value did not reach 1 as a typical R-square statistic does, and Nagelkerke (1991) proposed a max-rescaled R-square whose maximum reaches 1. This statistic is also produced by SURVEYLOGISTIC, along with the associations among predicted probabilities and observed responses. These statistics are presented in Table 8.26 for all models examined. These model fit statistics are useful when comparing the AACPSIR model and the combined model.

Table 8.26: Model fit statistics: association measures of predicted probabilities and observed responses, max-rescaled R-Square, and the sample size

AACPSIR Model for Awareness of Inspection Stations			
Percent Concordant	71.8	**Somers' D**	0.440
Percent Discordant	27.8	**Gamma**	0.441
Percent Tied	0.3	**Tau-a**	0.188
Pairs	385,632	**C**	0.720
Max-rescaled R-Square	0.1900	**Sample Size**	1,343
Combined Model for Awareness of Inspection Stations			
Percent Concordant	74.7	**Somers' D**	0.496
Percent Discordant	25.1	**Gamma**	0.497
Percent Tied	0.3	**Tau-a**	0.212
Pairs	153,794	**C**	0.748
Max-rescaled R-Square	0.2432	**Sample Size**	849
AIC	9,771,935.4		
Combined Data AACSPIR Model			
Percent Concordant	73.1	**Somers' D**	0.465
Percent Discordant	26.6	**Gamma**	0.467
Percent Tied	0.3	**Tau-a**	0.199
Pairs	153,794	**C**	0.733
Max-rescaled R-Square	0.2370	**Sample Size**	849
AIC	9,821,017.1		

Comparing the statistics in Table 8.26, the combined model was better than the combined data AACPSIR model using the same combined dataset. In this case, the AICs were compared. The relative likelihood that the AACPSIR model minimized the information loss over the combined model was given by

$$\exp\{(AIC_{COM}\text{-}AIC_{CPS})/2\}$$

where AIC_{COM} is the AIC for the combined model and AIC_{CPS} is the AIC for the AACPSIR model. It is virtually 0. This finding means that it is improbable that the combined data AACPSIR model improved the combined model based on the information loss measured by AIC. In other words, the combined model was almost surely better than the combined data AACPSIR model. This finding is not surprising as the AACPSIR model did not fit as well as the combined model (which included NSUBS variables). Using only the AACPSIR variables would be unlikely to fit the data better once the dataset was restricted to include only the combined data.

8.7.2 Analysis of Inspection Station Use

Individually selected main effect variables in S1 for **Inspection Station Use** are presented in Table 8.27.

Table 8.27: Main effect variables for inspection station use for the AACPSIR model

Order	Main Effect	Wald Chi-Square	P-Value	Sign of Coefficient
1	Attached by Person Formally Trained in CPS	118.656	< 0.0001	+
2	Number of CRS Information Resources	58.843	< 0.0001	+
3	Number of Steps Taken in First Installation	26.275	< 0.0001	+
4	Number of CRS Topics Reviewed	14.478	0.0001	+
5	Attached by Self	9.108	0.0026	-
6	Confidence in Seat Installation	6.129	0.0133	-

The negatively correlated variables were **Attached by Self** and **Confidence in Seat Installation**.

Both forward and stepwise selections produced the same result in S2, and only two main effects selected in the final model as shown in Table 8.28. The table is ordered by p-value except for the intercept term.

Table 8.28: Significance of explanatory variables for the AACPSIR model

Analysis of Maximum Likelihood Estimates				
Parameter (Explanatory Variable)	**Estimate**	**Standard Error**	**t-Value**	**P-Value**
Intercept	-1.7703	0.1887	-9.38	<0.0001
Attached by Person Formally Trained in CPS	2.4731	0.2731	9.06	<0.0001
Number of CRS Information Resources	0.3739	0.0538	6.95	<.00001

The model rejected the intercept model with a p-value < 0.0001 for the Rao-Scott likelihood ratio test. The max-rescaled R-square and associations of predicted probabilities and observed responses are shown in Table 8.32.

For the combined model, the main effect variables were identified in the same manner as the AACPSIR model, and the results are shown in Table 8.29. Out of seven selected variables, only one variable came from the NSUBS data.

Table 8.29: Main effect variables for inspection station use for the combined model

Order	Main Effect	Wald Chi-Square	P-Value	Sign of Coefficient
1	Attached by Person Formally Trained in CPS	61.2713	<0.0001	+
2	Number of CRS Information Resources	55.3016	<0.0001	+
3	Number of Steps Taken in First Installation	15.8871	<0.0001	+
4	Number of CRS Topics Reviewed	9.2265	0.0024	+
5	Drivers Under 25 years old	8.2494	0.0041	-
6	Attached by Self	5.0786	0.0242	-
7	Number of Household Children	3.9012	0.0482	+
8	Acceptability of CRS Non-Use	3.3297	0.0680	+
9	Attached by Spouse/Partner	2.7770	0.0956	-

All AACPSIR variables in Table 8.27 are included in Table 8.29. The only NSUBS variable, Drivers Under 25, was negatively correlated with **Inspection Station Use**.

Both forward and stepwise selections produced different results in S2. Stepwise selection produced a better model, which is shown in Table 8.30. The table is ordered by p-value except for the intercept term.

Table 8.30: Explanatory variables for the combined model for inspection station Use

Analysis of Maximum Likelihood Estimates					
No	**Parameter (Explanatory Variable)**	**Estimate**	**Standard Error**	**t-Value**	**P-Value**
0	Intercept	-1.9267	0.3081	-6.25	<.0001
1	Number of CRS Information Resources	0.5642	0.1021	5.53	<.0001
2	Attached by Person Formally Trained in CPS	4.0356	0.7975	5.06	<.0001
3	Attached by Person Formally Trained in CPS * Number of CRS Information Resources	-0.5469	0.1675	-3.27	0.0018
4	Number of CRS Information Resources * Attached by Spouse/Partner	-0.2945	0.1099	-2.68	0.0095
5	Drivers Under 25	-0.0883	0.0334	-2.64	0.0105
6	Number of CRS Information Resources * Drivers Under 25	1.1684	0.4786	2.44	0.0176
7	Number of CRS Topics Reviewed * Attached by Spouse/Partner	0.1064	0.0466	2.28	0.0260

The model rejected the intercept model with a p-value < 0.0001 for the Rao-Scott likelihood ratio test. The max-rescaled R-square, associations of predicted probabilities and observed responses, and the AIC value are shown in Table 8.32.

The combined model was considerably better than the AACPSIR model in all model fit statistics. Therefore, it was beneficial to use the NSUBS data to understand the dynamics between the outcome (**Inspection Station Use**) and the respondent's individual and community-level (PSU) characteristics.

Attached by Person Formally Trained in CPS was a main effect and in interaction terms. **Number of CRS Information Resources** was the best predictor as a main effect, and it also interacted with **Attached by Person Formally Trained in CPS**. Both **Attached by Person Formally Trained in CPS** and **Number of CRS Information Resources** were individually positively correlated with the outcome variable, but their interaction was a negative term. In other words, those who had the car seat attached by a formally trained person and had used fewer information sources overall were more likely to get help from a trained person at an inspection station. On the other hand, **Number of CRS Information Resources** negatively interacted with drivers under 25. This finding means that those who had used fewer information sources overall and resided in PSUs with a higher percentage of young drivers (under age 25) were more likely to get help from a trained person at an inspection station

Again, the combined data AACPSIR model was also developed and investigated. Significant explanatory variables are shown in Table 8.31, and its model fit statistics are presented in Table 8.32.

Table 8.31: Significance of explanatory variables for the Combined Data AACPSIR Model for Inspection Station Use

Analysis of Maximum Likelihood Estimates					
No	**Parameter (Explanatory Variable)**	**Estimate**	**Standard Error**	**t-Value**	**P-Value**
0	Intercept	-2.0718	0.3017	-6.87	<.0001
1	Number of CRS Information Resources	0.5526	0.0982	5.63	<.0001
2	Attached by Person Formally Trained in CPS	4.7660	0.9048	5.27	<.0001
3	Number of CRS Information Resources * Attached by Spouse/Partner	-0.2794	0.1059	-2.64	0.0106
4	Attached by Person Formally Trained in CPS * Number of CRS Information Resources	-0.4755	0.1872	-2.54	0.0137
5	Number of CRS Topics Reviewed * Attached by Spouse/Partner	0.1016	0.0450	2.25	0.0278

Table 8.32: Model fit statistics: association measures of predicted probabilities and observed responses, max-rescaled R-Square, and the sample size for inspection station use

AACPSIR Model for Inspection Station Use			
Percent Concordant	70.4	**Somers' D**	0.519
Percent Discordant	18.5	**Gamma**	0.584
Percent Tied	11.1	**Tau-a**	0.258
Pairs	253,425	**c**	0.760
Max-rescaled R-Square	0.2900	**Sample Size**	1,010
Combined Model for Inspection Station Use			
Percent Concordant	78.5	**Somers' D**	0.576
Percent Discordant	20.9	**Gamma**	0.58
Percent Tied	0.6	**Tau-a**	0.288
Pairs	100,899	**c**	0.788
Max-rescaled R-Square	0.3368	**Sample Size**	636
AIC	7,617,175.6		
Combined Data AACPSIR Model for Inspection Station Use			
Percent Concordant	76.0	**Somers' D**	0.555
Percent Discordant	20.5	**Gamma**	0.576
Percent Tied	3.5	**Tau-a**	0.277
Pairs	100,899	**c**	0.778
Max-rescaled R-Square	0.3206	**Sample Size**	636
AIC	7,729,861		

All model fit statistics indicated that the combined model was better than the combined data AACPSIR model with the same combined dataset. Moreover, based on AICs shown in Table 8.32, the relative likelihood given by the AACPSIR model

$$\exp\{(\mathrm{AIC}_{\mathrm{COM}}\text{-}\mathrm{AIC}_{\mathrm{CPS}})/2\}$$

was virtually 0. $\mathrm{AIC}_{\mathrm{COM}}$ is the combined model AIC and $\mathrm{AIC}_{\mathrm{CPS}}$ is the combined data AACPSIR model AIC. This finding means that it is improbable that the combined data AACPSIR model improved the combined model in terms of information loss when analyzing **Inspection Station Use** using the combined dataset. The combined model with NSUBS variables was almost surely better than the combined data AACPSIR model.

8.7.3 Analysis of Proper CRS Selection

The dataset used for the analysis of **Proper CRS Selection** was the fused PERSON data and CHILD data. The CHILD data were in a separate dataset of the children reported by the AACPSIR respondents. There were 1,565 respondents who reported for 2,613 children. If a respondent reported that they drove with more than five children on a regular basis, they were asked to report for the five children with whom they drove most frequently. The distribution of the number of children per respondent is presented below. A slight majority reported just one child.

Table 8.33: Distribution of number of children per AACPSIR respondent

Number of Household Children	Frequency	Percent (%)	Cumulative Frequency	Cumulative Percent
1	804	51.37	804	51.37
2	563	35.97	1,367	87.35
3	135	8.63	1,502	95.97
4	37	2.36	1,539	98.34
5	26	1.66	1,565	100

Individually selected main effect variables in S1 for **Proper CRS Selection** for the AACPSIR model are presented in Table 8.34.

Table 8.34: Main effect variables for proper CRS selection for the AACPSIR model

Order	Main Effect	Wald Chi-Square	P-Value	Sign of Coefficient
1	Collapsed Car Seat Type	149.066	<0.0001	NA
2	Child Age in Months	88.698	<0.0001	-
3	Attached by Spouse/Partner	86.707	<0.0001	+
4	Attached by Self	59.830	<0.0001	+
5	Household Income	48.427	<0.0001	+
6	Number of CRS Topics Reviewed	34.546	<0.0001	+
7	Race: Black or African American	26.524	<0.0001	-
8	Race: White	25.249	<0.0001	+
9	Education Level	19.677	<0.0001	+
10	Acceptability of CRS Non-Use	18.764	<0.0001	-
11	Awareness of Inspection Stations	14.073	0.0002	+
12	Number of Issues Preventing Inspection Station Use	13.332	0.0003	+
13	Respondent Age	8.562	0.0034	-
14	State CRS Law Ranking	8.229	0.0041	+
15	Attached by Another Relative	7.580	0.0059	+
16	Number of Steps Taken in First Installation	4.396	0.0360	+
17	Number of Household Children	3.381	0.0660	-
18	Attached by Person Formally Trained in CPS	2.739	0.0979	+
19	CRS Usefulness in Preventing Injury in Low-Speed Crash	2.735	0.0982	-

The negatively correlated variables were **Child Age in Months**, **Race: Black or African American**, **Acceptability of CRS Non-Use**, **Respondent Age**, **Number of Household Children**, and **CRS Usefulness in Preventing Injury in Low-Speed Crash**. This finding by itself provided interesting information on the relationship between the AACPSIR variables and **Proper CRS Selection**. For example, for **Child Age in Months**, as the child's age increased, the child was less likely to be properly restrained.

The forward and stepwise selections produced different results in S2; the forward selection picked many more variables (including many interaction terms). However, many variables had to be dropped because they turned out to be insignificant terms. The final model was worse than the model selected by the stepwise approach, and thus, the stepwise selection model was used, as shown in Table 8.35. The table is ordered by p-value except for the intercept term.

Table 8.35: Explanatory variables for the AACPSIR model for proper CRS selection

Analysis of Maximum Likelihood Estimates					
No	**Parameter (Explanatory Variable)**	**Estimate**	**Standard Error**	**t-Value**	**P-Value**
0	Intercept	-0.3768	0.3503	-1.08	0.2864
1	Collapsed Car Seat Type				<.0001
2	Collapsed Car Seat Type * Child Age in Months[1]				<.0001
3	Child Age in Months * Number of Household Children	-0.0140	0.0029	-4.89	<.0001
4	Number of Household Children	0.8013	0.2010	3.99	0.0002
5	Household Income * Race: White	0.1715	0.0494	3.47	0.0010
6	Number of Issues Preventing Inspection Station Use * State CRS Law Ranking	0.0310	0.0116	2.67	0.0097
7	Attached by Friend * Number of Household Children	0.4900	0.2006	2.44	0.0175
8	Race: Black or African American * Number of Household Children	-0.2642	0.1112	-2.38	0.0208
9	Child Age in Months * Education Level	0.0025	0.0011	2.34	0.0227

Note: **Collapsed Car Seat Type** is a categorical variable. There is no t-value for it and its p-value is based on the chi-square.

A small number of terms remained in the model when compared to the 19 main effect variables given in Table 8.34.

Collapsed Car Seat Type was the most important explanatory variable singly and interactively with **Attached by Spouse/Partner**.

The number of children was very important in the model singly and interactively with **Child Age in Months**, **Attached by Friend**, and **Race: Black or African American**. Respondents with more children that were older were less likely to use child car seats properly, and black respondents who drove with more children regularly were less likely to use child car seats properly. However, respondents who drove with more children with the car seat attached by a friend were more likely to use the car seat properly.

Household Income interacted with **Race: White** as a significant explanatory variable, meaning that White respondents with a higher income were more likely to use the car seat properly. Respondents who reported having more reasons for not using an inspection station and living in States with a strong car seat law were more likely to use the car seat properly.

The last significant term in the model was the interaction of **Child Age in Months** and **Education Level**. Highly educated respondents who drove with older children were more likely to use the car seat properly, but **Child Age in Months** was negatively correlated with **Proper CRS Selection**, which means that as the child aged, they were less likely to be in a properly used car seat.

The model rejected the intercept model with a p-value < 0.0001 for the Rao-Scott likelihood ratio test. Several other model fit statistics are presented in Table 8.39 This model had the best model fit statistics compared to all other models discussed above.

For the combined model, the main effect variables were identified in the same manner as the AACPSIR model and are shown in Table 8.36.

Table 8.36: Main effect variables for the proper CRS selection outcome for the combined model

Order	Main Effect	Wald Chi-Square	P-Value	Sign of Coefficient
1	Collapsed Car Seat Type	66.858	<.0001	NA
2	Attached by Spouse/Partner	49.6881	<.0001	+
3	Child Age in Months	42.5011	<.0001	-
4	Household Income	41.2114	<.0001	+
5	Attached by Self	39.7829	<.0001	+
6	Race: Black or African American	26.2839	<.0001	-
7	Number of CRS Topics Reviewed	20.6207	<.0001	+
8	Education Level	16.2542	<.0001	+
9	Race: White	11.7904	0.0006	+
10	Acceptability of CRS Non-Use	10.1976	0.0014	-
11	State CRS Law Ranking	10.1829	0.0014	+
12	Awareness of Inspection Stations	10.0818	0.0015	+
13	Number of Household Children	9.8743	0.0017	-
14	Number of CRS Information Resources	7.2099	0.0073	-
15	Child Belted	7.0632	0.0079	+
16	Improper Car Seat Use %	5.5241	0.0188	+
17	Census Region	9.9149	0.0193	NA
18	Child Black	5.2387	0.0221	-
19	Number of Issues Preventing Inspection Station Use	5.1352	0.0235	+
20	Hispanic or Latino Origin	4.4201	0.0355	-
21	Black Drivers	3.9879	0.0458	-

Only 4 of the 21 selected variables were from the NSUBS data, and they appeared after the 14th variable in order of coefficient magnitude. Therefore, they were not strong predictors. Child Belted, Improper Car Seat Use, and Child Black were positively correlated, whereas Black Drivers was negatively correlated with **Proper CRS Selection**.

Attached by Self was an important predictor as an individual variable, but together with other variables, it created quasi-complete separation in the model, which caused convergence failure in the interaction model fitting procedure. Therefore, the variable was not included in model selection.

Forward selection produced additional variables, but more than half of them were dropped from the final model. Its results were worse than the model based on stepwise selection. The stepwise-selected terms were all significant explanatory variables as shown in Table 8.37. The table is ordered by p-value except for the intercept term.

Table 8.37: Explanatory variables for the combined model for proper CRS selection

Analysis of Maximum Likelihood Estimates					
No	**Parameter (Explanatory Variable)**	**Estimate**	**Standard Error**	**t-Value**	**P-Value**
0	Intercept	-2.2839	0.874	-2.61	0.0113
1	Collapsed Car Seat Type				<.0001
2	Child Age in Months * Number of Household Children	-0.0106	0.00229	-4.60	<.0001
3	Race: Black or African American * Acceptability of CRS Non-Use	-0.3940	0.098	-4.02	0.0002
4	Child Age in Months * Improper Car Seat Use %	0.0004	0.000115	3.87	0.0003
5	Collapsed Car Seat Type * Child Age in Months				0.0006
6	State CRS Law Ranking * Number of Household Children	0.1566	0.0507	3.09	0.0030
7	Number of CRS Topics Reviewed * Hispanic or Latino Origin	-0.1174	0.0391	-3.00	0.0039
8	Household Income * Number of CRS Topics Reviewed	0.0297	0.0101	2.94	0.0047
9	Child Age in Months * Acceptability of CRS Non-Use	0.0030	0.00105	2.81	0.0067
10	Household Income * Race: Black or African American	-0.2645	0.1007	-2.63	0.0109
11	Collapsed Car Seat Type * Number of CRS Information Resources				0.0303

Note: **Collapsed Car Seat Type** is a categorical variable. The interaction terms combined with it have no t-value and their p-values are based on the chi-square.

Collapsed Car Seat Type was the variable with the largest coefficient and was included in two other significant interaction terms with **Child Age in Months** and **Number of CRS Information Resources**. **Collapsed Car Seat Type** had these categories.

1. Infant car seat or rear facing car seat
2. Forward facing car seat
3. Booster seat
4. Seat belt
5. No use of CRS or seat belt

Twenty records (0.77% of the person and child combined data) with **Collapsed Car Seat Type** where the child did not use a car seat or seat belt caused convergence problems in modeling, and they were dropped from analysis.

Child Age in Months significantly interacted with **Number of Household Children**, Improper Car Seat Use, and **Acceptability of CRS Non-Use**. As seen before, respondents who drove more children of an older age were less likely to use the car seat properly, and respondents with older children living in PSUs with a higher level of proper use in the NSUBS survey tended to use the car seat properly. Also, respondents who drove with older children that accepted not using the car seat under some circumstances were more likely to use the car seat properly.

Other findings included that Black respondents who were more accepting of children riding without car seats in some circumstances were less likely to use the car seat properly. The interaction of **State CRS Law Ranking** and **Number of Household Children** indicated that people who drove with more children living in States with strong car seat laws were more likely to use the car seat properly. Respondents who indicated they were Hispanic and who sought more information about the car seat were less likely to use the car seat properly, whereas people with higher income who also sought more car seat information were more likely to use the car seat properly. Additionally, respondents who indicated they were Black and had a higher income were less likely to use the car seat properly.

The model rejected the intercept model with a p-value < 0.0001 for the Rao-Scott likelihood ratio test. The max-scaled R-square, associations of predicted probabilities and observed responses, and the AIC value are shown in Table 8.39.

The combined model was slightly worse than the AACPSIR model using all model fit statistics. When it was compared with the AACPSIR model with the full dataset (n = 2,558 versus 1,554), it was not beneficial to use the NSUBS data to understand the dynamics between **Proper CRS Selection** and the respondent's individual and community-level (PSU) characteristics.

To compare the AACPSIR and combined models based on the same sample base, a combined data AACPSIR model was developed using the cases from the NSUBS PSUs (n = 1,554 instead of 2,558). Significant explanatory variables are shown in Table 8.38, and model fit statistics are shown in Table 8.39.

Table 8.38: Explanatory variables for the combined data AACPSIR model for proper CRS selection

Analysis of Maximum Likelihood Estimates					
No	**Parameter (Explanatory Variable)**	**Estimate**	**Standard Error**	**t-Value**	**P-Value**
0	Intercept	0.4084	0.4062	1.01	0.3186
1	Collapsed Car Seat Type				<.0001
2	Child Age in Months * Number of Household Children	-0.0173	0.0044	-3.92	0.0002
3	Child Age in Months * Acceptability of CRS Non-Use	0.0037	0.0010	3.59	0.0007
4	Collapsed Car Seat Type * Child Age in Months				0.0012
5	Household Income * Education Level	0.0550	0.0179	3.06	0.0033
6	Number of CRS Information Resources	-0.5638	0.1724	-3.27	0.0018
7	Household Income * Race: Black or African American	-0.3345	0.0933	-3.58	0.0007
8	Child Age in Months	0.0070	0.0023	3.12	0.0028
9	Collapsed Car Seat Type				0.0121
10	Number of Household Children	0.8868	0.3564	2.49	0.0156
11	State CRS Law Ranking * Number of Issues Preventing Inspection Station Use	0.0287	0.0135	2.13	0.0376
12	Number of Household Children * Acceptability of CRS Non-Use	-0.4220	0.1719	-2.46	0.0170

Table 8.39: Model fit statistics: association measures of predicted probabilities and observed responses, max-rescaled R-Square, and the sample size for proper CRS selection

AACPSIR Model for Proper CRS Selection			
Percent Concordant	88.9	**Somers' D**	0.781
Percent Discordant	10.8	**Gamma**	0.783
Percent Tied	0.20	**Tau-a**	0.228
Pairs	955,216	**C**	0.890
Max-rescaled R-Square	0.5395	**Sample Size**	2,558
Combined Model for Proper CRS Selection			
Percent Concordant	87.8	**Somers' D**	0.759
Percent Discordant	11.9	**Gamma**	0.761
Percent Tied	0.3	**Tau-a**	0.212
Pairs	336,440	**C**	0.879
Max-rescaled R-Square	0.5173	**Sample Size**	1,554
AIC	9,694,496.6		
Combined Data AACPSIR Model for Proper CRS Selection			
Percent Concordant	87.8	**Somers' D**	0.758
Percent Discordant	12.0	**Gamma**	0.760
Percent Tied	0.3	**Tau-a**	0.212
Pairs	335,920	**C**	0.879
Max-rescaled R-Square	0.5313	**Sample Size**	1,552
AIC	9,476,121.3		

The combined model and the combined data AACPSIR model based on the smaller dataset were very similar in terms of the associations among the predicted probabilities and observed responses. However, the max-scaled R-square of the combined data AACPSIR model was larger than that of the combined model. Moreover, and the relative likelihood given by

$$\exp\{(AIC_{CPS}\text{-}AIC_{COM})/2\}$$

was virtually 1. AIC_{COM} is the combined model AIC and AIC_{CPS} is the combined data AACPSIR model's AIC. This finding means that it is improbable that the combined model improved the combined data AACPSIR model in terms of information loss when analyzing **Proper CRS Selection** using the combined dataset. The combined data AACPSIR model was almost surely better than the combined model. The NSUBS data did not add any value in analyzing **Proper CRS Selection**.

Using the NSUBS variables through linking the AACPSIR and NSUBS was beneficial for analyzing **Awareness of Inspections Stations** and **Inspection Station Use** but not **Proper CRS Selection**.

9. Findings

This section describes the key findings of the AACPSIR survey in relation to the study objectives. As listed in Section 2, the study objectives were the following.

1. Estimate the degree of awareness parents and caregivers have of CPST inspection stations.
2. Determine the relationships among parent and caregiver confidence, risk perception, and intent to visit an inspection station.
3. Identify the barriers that result in underutilization of hands-on instruction provided at inspection stations.

The survey question numbers are presented for key findings. While multiple statistical tests were run, only those with an adequate sample size are reported. Weighted percentages of the response categories for each question are provided, both in the text and all figures. All statistical test results are presented at the 5 percent significance level unless otherwise specified.

9.1 Sample Characteristics

Data were collected from 1,565 households. The respondent sample primarily consisted of female respondents, urban households, and households with a higher than average household income. The median respondent age was 37.5 years. Weighted percentages of the response categories for each of the respondent demographics are provided in Table 9.1.

Table 9.1: Household characteristics, unweighted sample size and weighted percent

Characteristic	Unweighted N	Weighted Percent
Gender		
Male	422	27.9%
Female	1,143	72.1%
Race-Ethnicity*		
Hispanic or Latino	191	21.5%
Non-Hispanic White	1,095	57.4%
Non-Hispanic Black or African American	177	12.4%
Non-Hispanic others	169	8.8%
Education		
Less than 12th grade	52	3.2%
High school diploma or GED	238	14.8%
Some college or associate's degree	513	32.9%
Bachelor's degree	418	26.4%

Characteristic	Unweighted N	Weighted Percent
Graduate degree	344	22.6%
Respondent Age		
Under 30	310	20.0%
Age 30-50	881	55.6%
Age 50+	374	24.4%
Income		
Less than $25,000	265	14.6%
Greater than $25,000 but less than $35,000	178	10.5%
Greater than $35,000 but less than $50,000	200	10.5%
Greater than $50,000 but less than $75,000	290	18.3%
$75,000 or more	632	46.0%
Urbanicity		
Urban	1,169	75.9%
Urban Cluster	159	9.1%
Rural	237	15.1%
Number of Children Driven		
1 Child	831	52.3%
2 Children	555	35.4%
3 Children	126	8.5%
4 Children	34	2.3%
5+ Children	19	1.6%

Note: Race-Ethnicity is a combination of Question 7-3 on Hispanic or Latino Origin and Question 7-4 on Race; respondents may select multiple responses; therefore, the total unweighted sample size is more than N= 1,565.

Each respondent was asked to list up to five children that they drove at least twice per month, referred to as the reported or rostered children. Therefore, in addition to information gathered on the respondent, several characteristics were collected for the 2,613 rostered children driven by the respondent. These characteristics included gender, age, CRS type used, relationship to respondent, and frequency driven (see Table 9.2). Then, based on CRS use and driving frequency, the survey selected one child to be used for the remainder of the survey. This child is referred to as the selected child.

Most respondents were parents. However, a significant number were grandparents or other relatives. Nearly three quarters of the respondents drove the selected child more than 11 times a month, and the median number was 19.7 times a month.

Table 9.2: Child-related characteristics, unweighted sample size and weighted percent

Characteristic	Unweighted N	Weighted Percent
Gender		
Male	1,317	49.4%
Female	1,296	50.6%
Age		
0-12 months	209	7.9%
12-24 months	241	9.5%
2-3 years	521	20.7%
4-5 years	604	23.1%
6-7 years	586	21.2%
8-9 years	452	17.4%
Child Restraint System Type		
Infant seat	191	7.4%
Rear-facing seat	215	8.4%
Forward-facing seat	727	27.9%
High-back booster	523	20.4%
Low-back booster	550	19.9%
Seat belt	385	15.1%
Does not use CRS or seat belt	22	0.7%
Relationship to All Reported Children		
Parent/stepparent	1,628	63.6%
Grandparent	583	21.6%
Other relative	253	9.7%
Childcare provider	68	2.3%
Carpool driver	54	1.9%
Other	26	0.9%
Relationship to Selected Child		
Parent/stepparent	1,030	67.0%
Grandparent	352	21.5%

Characteristic	Unweighted N	Weighted Percent
Other relative	128	8.3%
Childcare provider	27	1.4%
Carpool driver	15	0.9%
Other	12	0.8%
Frequency Driving the Selected Child		
Up to 10 times a month	453	27.5%
11-20 times a month	417	27.1%
21-31 times a month	695	45.4%

Note: Child relationship was not reported for one respondent who refused.

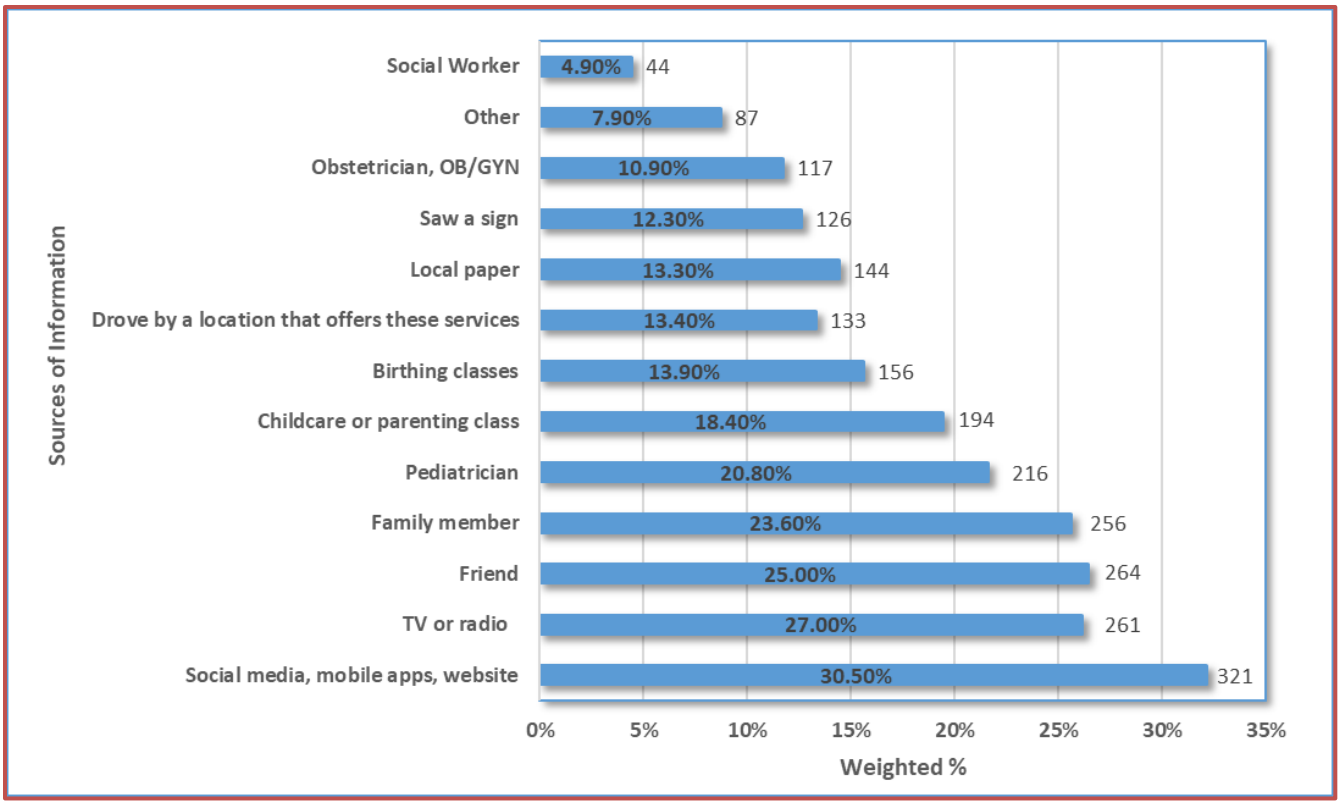
9.2 Awareness of Inspection Stations

Respondents read a short description of inspection stations and asked if they had ever heard of these services (Question 4-1). Two-thirds of the respondents indicated they had heard of these services (66.9%), while a third indicated they had not heard of these services (33.1%).

Respondents who indicated they were aware of inspection stations (66.9% of sample) were then asked if they were aware of car seat inspections in their area (Question 4-3).

- 70.6 percent indicated there were inspection stations in their areas
- 2.5 percent indicated there weren't inspection stations in their areas
- 26.9 percent indicated they didn't know whether there were inspection stations in their areas

Respondents who were aware of inspection stations (66.9% of sample) were asked how they found out about these car seat inspections. Respondents were asked to indicate all sources of information on inspection stations. Therefore, the total is more than 100 percent. Social media, mobile apps, and websites were the most common sources of information overall. Pediatricians were the leading professionals indicated as a source of information. Figure 9.1 presents all the sources of information indicated by respondents.



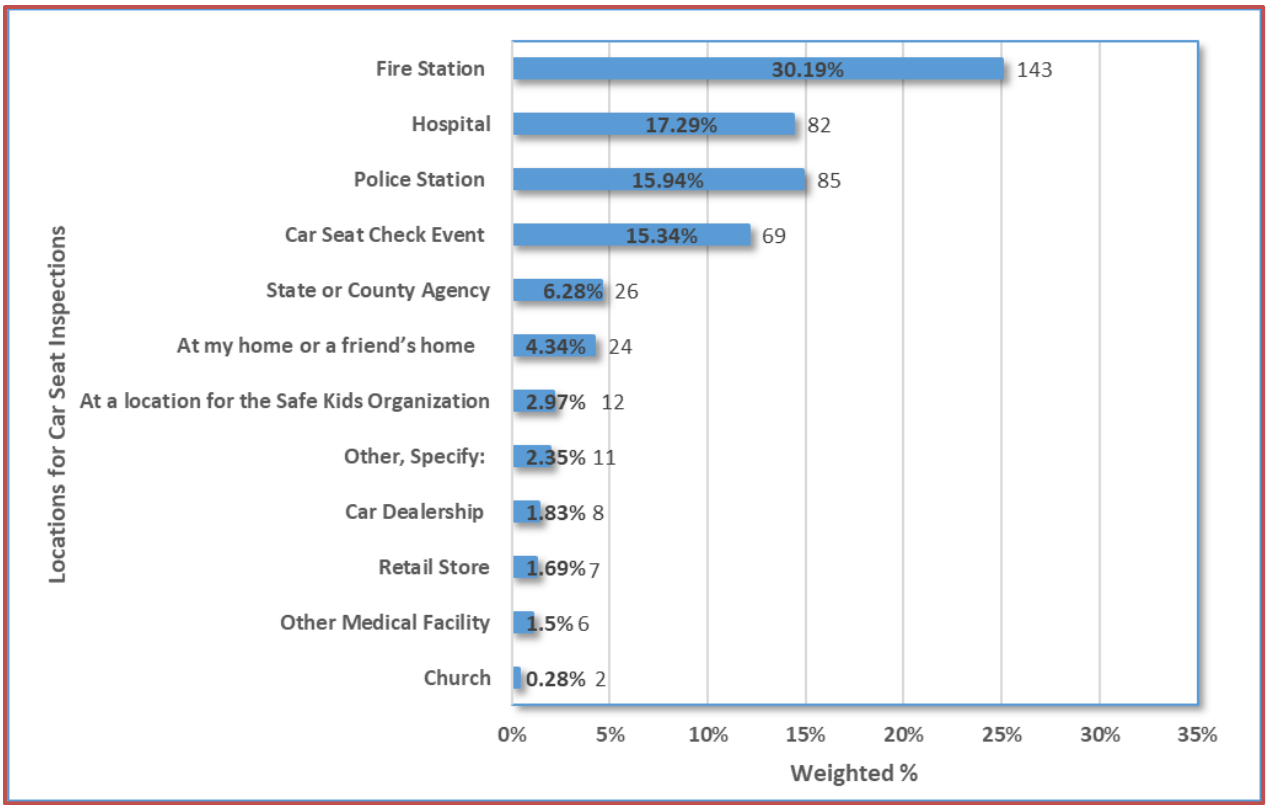
Question 4-2: How did you find out about these car seat inspections? (Check all that apply.)
Unweighted Data: Base sample =1048, Question sample =1047, numbers at the end of each bar are unweighted responses.

Figure 9.1: Sources of information on inspection stations

Among those respondents who were aware of inspection stations (66.9% of sample), only 44.2 percent reported previously receiving help at an inspection station, whereas 55.8 percent had never used an inspection station (Question 4-4). Most inspection station users had visited a station more than a year ago (70.5%); whereas, only a few users had visited recently (less than 30 days ago) (3.72%) (Question 5-2).

Inspection station users reported that there were inspection stations in their community at a higher rate (87.2%) compared to the rate (57.5%) reported by non-users, and they were also far less likely to report they didn't know if there was a station in their community (11.6%) compared to the non-user group (39%) (p-value <0.0001). This points to the validity of the study findings.

Inspection stations users identified the location of the services. Figure 9.2 presents the different locations where respondents received a car seat inspection.



Question 4-5: Where did you get the car seat inspection?
Unweighted Data: Base sample = 475, Question sample = 466, numbers at the end of each bar are unweighted responses.

Figure 9.2: Reported locations for car seat inspections

Respondents were asked if they knew anyone who had gotten assistance at an inspection station (Question 4-8). Inspection station users were far more likely to know someone who also visited an inspection station (53.1%) compared to the non-users (29.9%) (p-value <0.0001).

Similarly, in a validity check of the study results, inspection station users also knew more people from the different categories (Question 4-9), friends, family, and caregivers, who went to an inspection station (1.4) compared to the non-users (1.2) (p = 0.0007).

Among inspection station users, most respondents (62.1%) indicated they attended only one time; 36.7 percent reported that they visited a station more than one time; and 1.2 percent responded that they didn't know (Question 5-1).

Respondents were asked which type of car seat was inspected at the station (Question 5-3). Respondents indicated that they most frequently received assistance with infant seats (63.1%), followed by forward-facing seats (39.7%), rear-facing seats (35.2%), high back boosters (21.2%), and low back boosters (12.4%). Overall, respondents received assistance with a weighted mean of 1.7 seats.

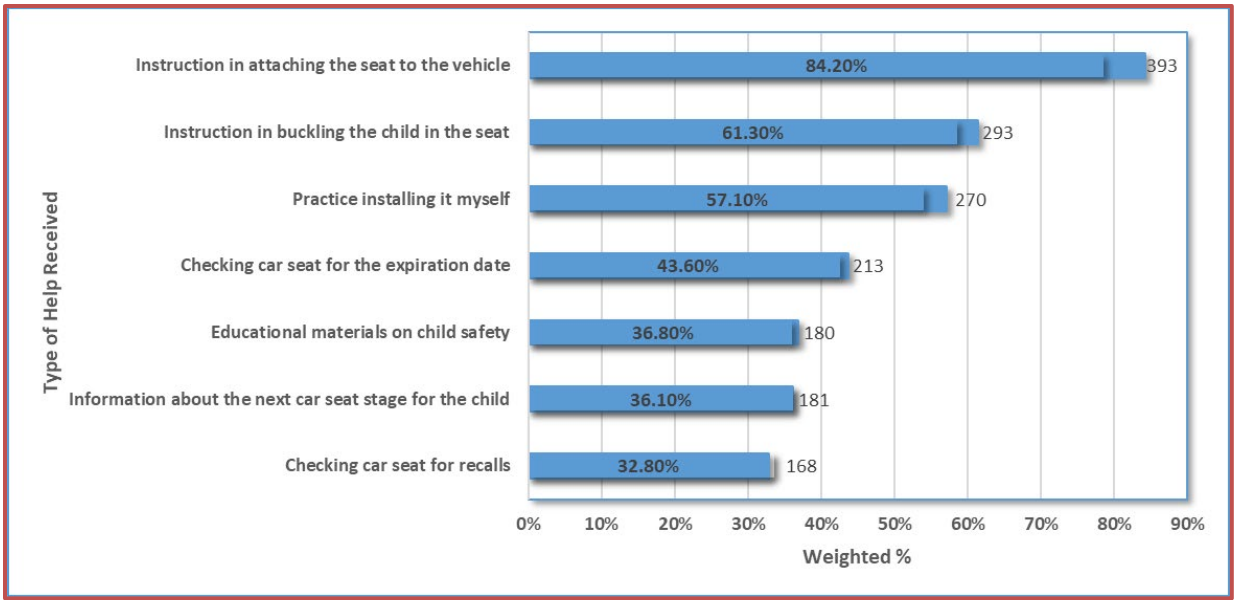
Respondents identified the occasion that led to their visit at an inspection station (Question 4-6). Respondents were asked to indicate all that applied so the total is more than 100 percent. Most respondents (67.5%) indicated they "Wanted to be sure the car seat was attached correctly". Other occasions reported by respondents in descending order include these.

- Expected birth of a child - 37.8 percent
- Got a different car seat - 20.4 percent
- Expected driving with a child passenger - 16.8 percent
- Needed to move a child to a new seat - 14.9 percent
- Got a different vehicle - 9.1 percent
- Expected someone else would drive with my child - 4.8 percent

Respondents also identified the reason they chose to go to an inspection station (Question 4-7). The most common reason was "I felt it was important to get this service" (73.5%). Other reasons in descending order include the following.

- Someone recommended the service - 27. 6 percent
- I wasn't sure I attached it right - 24.0 percent
- I saw an advertisement for this service - 13.2 percent
- The instructions for the car seat were confusing - 7.1 percent
- Other - 4.4 percent

Inspection station users were asked about the services they received during their inspection station visit. Figure 9.3 details the different types of services respondents received during visits to inspection stations. Respondents were asked to indicate all that applied so the total is more than 100 percent.



Question 5-9: What type of help did you receive? (Check all that apply.)
Unweighted Data: Base sample =475 Questions sample = 474, numbers at the end of each bar are unweighted responses.

Figure 9.3: Services received at the inspection station

Respondents who intended to visit an inspection station were identified (derived based on Questions 4-1, 5-12, 5-13, 5-14). These were all respondents who were aware of inspection stations and included inspection station users who intended to get additional help and non-users who considered it or called but did not go. In total, 39.5 percent of the respondents intended to visit an inspection station. Among respondents who did not intend to visit an inspection station (60.5%), more than half were unaware of inspection stations (54.7%).

Respondents who intended to visit an inspection station had reviewed a higher average number of sources for CPS information overall (3.52) compared to those who did not intend to visit (2.91) (p-value <0.0001). Female respondents were more likely to intend to visit than male respondents (79.7% versus 67.1%) (p-value <0.0001).

For a more detailed analysis, awareness of inspection stations was predicted by a series of demographic variables (income, race/ethnicity, gender, education, relationship to the child, and urbanicity) using logistic regression. The results indicated the following.

- Awareness of inspection stations among respondents with higher income, greater than $50,000 or more, was significantly greater than that among respondents with lower income, less than $25,000. Respondents with a household income greater than $50,000 but less than $75,000 were more likely to be aware of inspection stations than respondents with a household income less than $25,000. Similarly, respondents in the highest income group were more likely to be aware of inspection stations than those in the lowest income group (odds ratio = 2.247, p-value = 0.0002).
- For race/ethnicity, Non-Hispanic White respondents were more likely to be aware of inspection stations than Hispanic respondents (odds ratio = 2.014, p-value = 0.0002).
- Females were more likely to be aware of inspection stations than males (odds ratio = 1.747, p-value = 0.0001).
- Compared to respondents with less than a 12th grade education or high school GED, all other respondents were more likely to be aware of inspection stations (Graduate/professional degree: odds ratio = 2.268, p-value = 0.0003; Bachelor's degree: odds ratio = 1.581, p-value = 0.0081; Some college/associate's degree: odds ratio = 1.624, p-value = 0.0161).
- Compared to respondents who were the parent/stepparent of the child, other relatives or carpool drivers were less likely to be aware of inspection stations (Other relatives: odds ratio = 0.384, p-value <0.0001; Carpool drivers: odds ratio = 0.238, p-value = 0.0275).

In a weighted logistic model with awareness of inspection stations as the outcome and multiple predictors (**Income, Race/Ethnicity, Gender, Education, and Relationship to the Child**), several variables were significant. The results revealed that, after controlling for other demographic variables, Non-Hispanic White, female respondents with the highest income who were parents/stepparents were more likely to be aware of inspection stations than Hispanic, male respondents with the lowest income who were other relatives.[16]

[16] The two variables, income and education, were ordinal instead of purely nominal. Therefore, they were treated as continuous predictors in the logistic regression. The additional logistic regressions were conducted treating these two variables as continuous, and the results were similar to treating them as categorical where income was significant and education was not.

9.3 Confidence in CRS Installation Ability

This section presents the results of reported confidence related to CRS installation. Experience installing the CRS, frequency of CRS installation, use of instructions, and comparisons of CRS installation to other tasks were also examined.

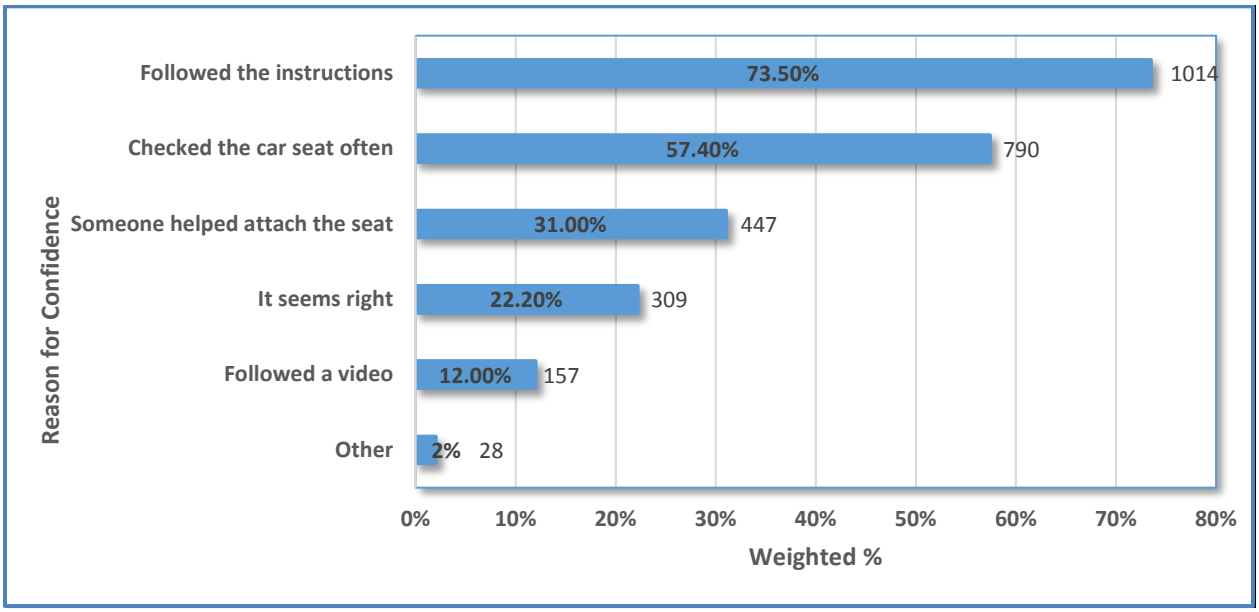
Respondents indicated how they obtained the selected car seat (Question 1-1). Results are presented in descending order.

- Purchase - 76.3 percent
- Provided by parents - 13.2 percent
- As a gift – 9.3 percent
- As a loan – 1.2 percent

Respondents were asked how confident they were that the car seat was installed correctly (Question 1-3). Reported confidence levels were high.

- Extremely confident - 61.8 percent
- Very confident - 29.9 percent
- Moderately confident, slightly confident, or not at all confident - 8.4 percent

Those respondents who indicated that they were extremely, very, or moderately confident the car seat was attached correctly were asked to provide the reasons why they were confident (See Figure 9.4). Respondents were asked to indicate all that applied. Therefore, the total is more than 100 percent.



Question 1-4: Why are you [fill in response from 1-3 extremely, very, moderately] confident that this [fill in car seat type] is attached correctly? (Check all that apply.) Unweighted Data: Base sample=1388, Question sample = 1388, numbers at the end of each bar are unweighted responses.

Figure 9.4: Reasons respondents were confident the CRS was attached correctly

Respondents who indicated they were confident the car seat was installed correctly because they used the instructions were more likely to indicate they were extremely confident (64.3%) compared to the group that did not use the instructions (57.3%) (p-value = 0.0004).

Respondents who indicated that they were confident the car seat was installed correctly because they checked the car seat often were more likely to indicate that they were extremely confident (67.0%) compared to the group that did not check the car seat often (56.4%) (p-value <0.0001).

Respondents who purchased the seat indicated that they were extremely confident the seat was installed correctly (63.2%) compared to those who received the seat as a loan (52.2%), as a gift (54.6%), or were provided a seat by the parents (59.2%) (p-value <0.0001).

Respondents were also asked how frequently they install the car seat (Question 1-6). Despite reported confidence in installation, most respondents moved the seat infrequently.

- Every day - 3.3 percent
- Almost every day - 2.3 percent
- A few days a week - 6.7 percent
- A few days a month - 26.6 percent
- A few days a year - 30.2 percent
- Never - 30.8 percent

Although the survey collected data on why respondents were not confident, the number of respondents who indicated they were not confident was too small for any meaningful analysis.

Among inspection station non-users, a higher percent indicated that they were confident because they followed instructions (76.3%) compared to inspection station users (70.3%) (p-value = 0.0482).

Among inspection station non-users, a higher percent indicated that they were confident because "it seemed right" (26.5%) compared to inspection station users (16.5%) (p-value <0.0001).

In addition, a higher percentage of inspection station users indicated that they were confident because someone helped them install the seat (44.2%) compared to those who did not get help at an inspection station (23.0%) (p-value <0.0001).

To further explore the characteristics of respondents who were aware of inspection stations, respondent confidence in the car seat installation, use of resources, and the person installing the car seat were examined. Question 2-1 collected information on who attached the car seat to the vehicle for all respondents who drove a child riding in a car seat. Respondents could select more than one response. While most respondents indicated that they installed the car seat themselves (75.6%), a quarter of the respondents never attached the car seat. Additional responses about who attached the car seat were the following.

- Spouse/Partner - 46.3 percent
- Another relative - 13.3 percent
- Daughter/Son - 13.2 percent
- Person formally trained in car seats - 12.9 percent
- Friend - 3.5 percent

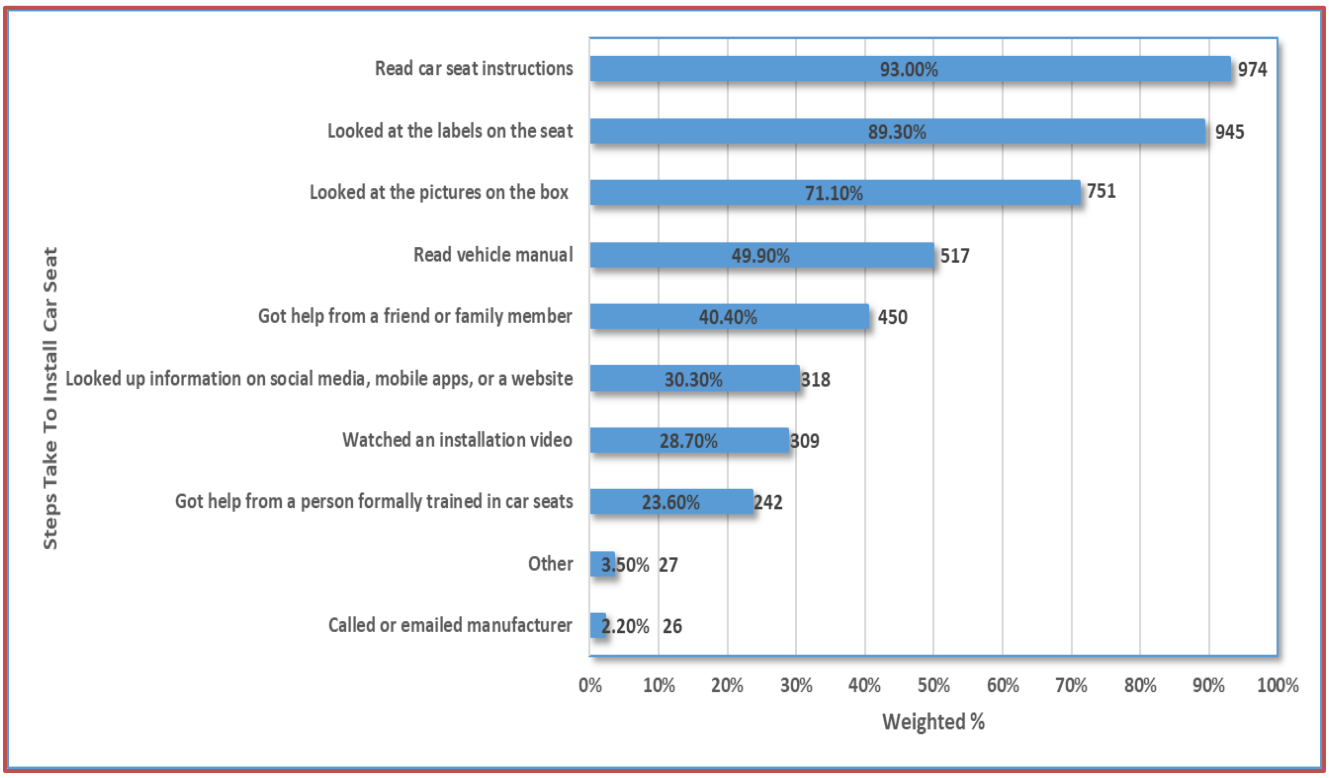
Not surprisingly, inspection station users reported getting help by someone trained to install their seat (34.4%) at a higher rate than non-users (3.5%) (p-value <0.0001). Inspection station non-users were more likely to indicate that they installed the seat on their own (80.7%) compared to inspection station users (70.0%) (p-value = 0.0005).

A higher percentage of respondents who indicated the seat was attached by someone who was formally trained, indicated that they were extremely confident the car seat was attached correctly (74.7%) compared to respondents who did not indicate the seat was installed by someone formally trained (59.9%) (p-value <0.0001).

Respondents who indicated the seat was attached by a daughter or son indicated more often that they were extremely confident the car seat was attached correctly (70.1%), compared to respondents who did not indicate that their son or daughter installed the seat (60.5%) (p-value = 0.0368).

Compared to those that did not install their own CRS (57.8%), a higher percentage of respondents who did install their own car seats indicated that they did not get help at an inspection station because they already knew how to install a CRS (74.3%) (p-value = 0.0002).

Respondents who indicated they attached the CRS themselves were asked about the steps they took the first time. Nearly all respondents indicated that they read the car seat instructions the first time they installed the car seat (93%). Figure 4.5 presents all the steps respondents indicated they used when installing the car seat for the first time. Respondents were asked to indicate all that applied so the total is more than 100 percent.



Question 2-2: Which of the following did you do the first time you attached this [car seat type] in your vehicle? (Mark one response for each row)
Unweighted Data: Base sample =1,057, Question sample = 1,056-1,057, across the different categories except for other, which had a question sample of N= 850 due to the web survey design. Numbers at the end of each bar are unweighted responses.

Figure 9.5: Steps taken the first time the car seat was installed

Respondents who indicated they used the car seat instructions the first time they installed the seat were more likely to indicate they were extremely confident (64.6%) compared to those who did not use the instructions (41.3%) (p-value <0.0001). In addition, respondents who indicated they used the vehicle manual the first time they installed the seat were more likely to indicate they were extremely confident (69.6%) compared to those who did not use the manual (56.5%) (p-value = 0.0001). Inspection station users were more likely to have used the manual the first time they installed their car seat (57.1%) compared to non-users (47.6%) (p-value = 0.0254).

In a validity check, inspection station users were more likely to report the seat was attached the first time by someone who was formally trained in car seats (52.2%) compared to the non-user group (12.6%) (p-value <0.0001).

Looking at the overall score of the number of actions taken the first time the car seat was installed, inspection station users indicated that they conducted a higher number of actions the first time they installed the car seat (4.9) compared to the non-users (4.1) (p-value <0.0001).

Respondents who indicated that they installed the car seat themselves were also asked about their confidence in having correctly installed the CRS the first time (Question 2-3).

- 53.9 percent indicated they were extremely confident
- 36.9 percent were very confident
- 8.3 percent were moderately confident.

Respondents using any type of car seat were asked to compare installation of the CRS to other tasks common for caregivers of young children or drivers. Specifically, they were asked to assess the difficulty of assembling a crib, adjusting a stroller, and changing a tire.

Most respondents thought it was easier to install a car seat than to assemble a crib (Question 2-4).

- Easier - 74.5 percent
- About the same - 19.1 percent
- Harder - 6.3 percent

However, inspection station non-users were more likely to indicate assembling a crib was easier than installing a car seat (78.4%) compared to inspection station users (68.4%) (p-value = 0.0098).

Almost a quarter of the respondents thought it was more difficult to install a car seat than to adjust a stroller (Question 2-5).

- Easier - 39.5 percent
- About the same - 36.5 percent
- Harder - 23.9 percent

Respondents who indicated they did not use an inspection station because they already knew how to install the seat were more likely to indicate adjusting a stroller was easier than installing a car seat (43%), compared to respondents who indicated they did not go to a car seat inspection because they already knew how to install the seat (33.5%) (p-value = 0.0131).

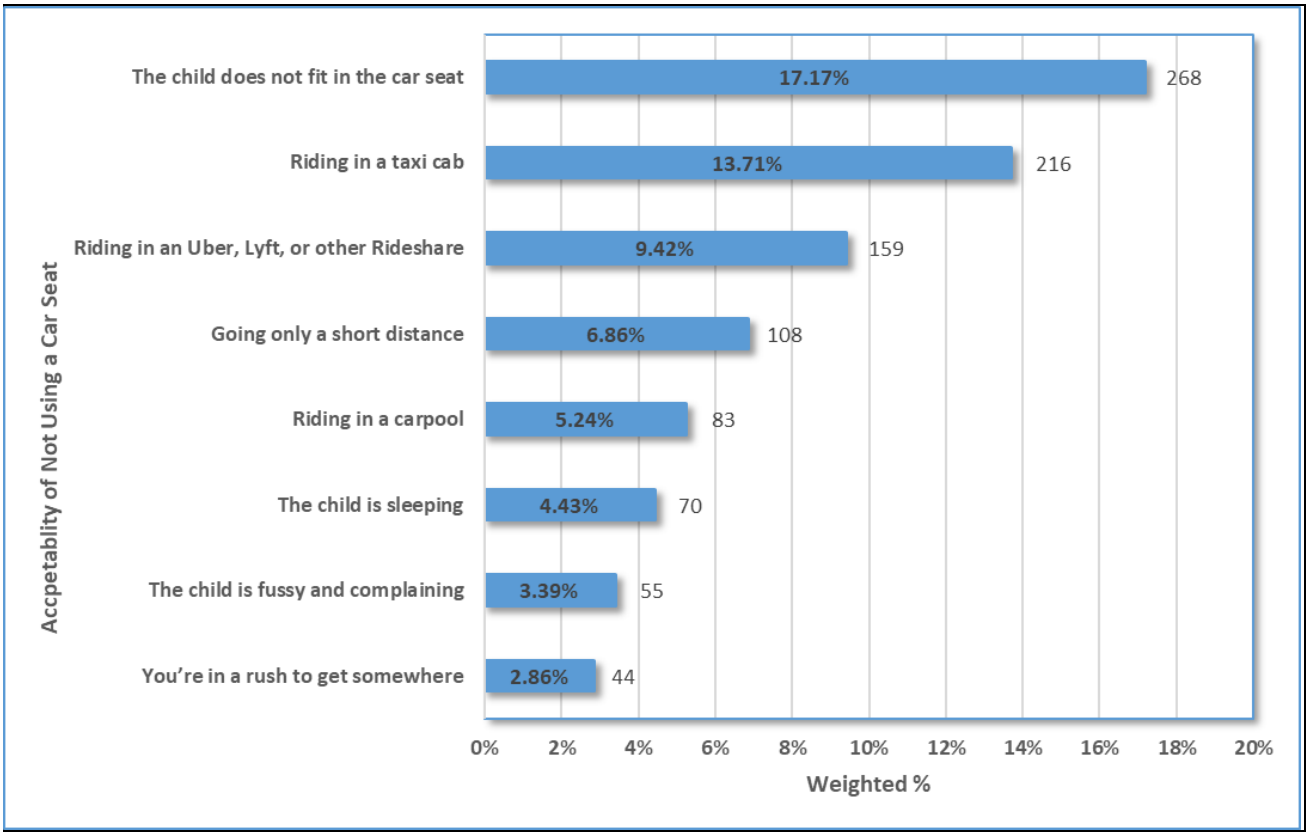
Most respondents reported it was easier to install a car seat than to change a tire (Question 2-6).

- Easier – 84.2 percent
- About the same – 10.7 percent
- Harder - 4.9 percent

Inspection stations non-users were more likely to indicate installing a car seat was easier than changing a tire (88.2%) compared to inspection station users (80.6%) (p-value = 0.0066).

9.4 Risk Perceptions Associated With Improper CRS Selection

The following section includes findings regarding the perception of the risk of improper CRS selection and potential for injury in a motor vehicle crash. The survey posed many different scenarios and respondents were asked whether it was acceptable for the child to ride in the vehicle without a car seat for the given scenarios. Figure 9.6 presents the percent of respondents who indicated it was acceptable for a child not to ride in a CRS for each given scenario.



Question 1-7: To you, is it acceptable or not acceptable for a child to ride in a vehicle not in a car seat when…(Mark one response for each row)
Unweighted Data: Base sample = 1,565, Question sample = 1,562-1,565, across the different categories, numbers at the end of each bar are unweighted responses.

Figure 9.6: Acceptability of a child riding without a CRS for each scenario

An overall score was created for the acceptability of the different scenarios with the following distribution.

- 72.2 percent of respondents indicated there was never an acceptable situation for a child to ride in a vehicle when not in a car seat
- 13.9 percent indicated 1 situation was acceptable
- 5.7 percent indicated 2 situations were acceptable
- 3.9 percent indicated 3 situations were acceptable
- 1.2 percent indicated 4 situations were acceptable
- Less than 1 percent indicated 5-7 situations were acceptable

Respondents who were aware of inspection stations believed that all the situations for riding without a car seat were unacceptable (overall score of 0) at a higher rate (75.3%) than respondents who were not aware of inspection stations (65.8%) (p-value <0.0001).

In a series of weighted linear regression analyses where the overall score for acceptability was treated as the continuous outcome and each of the reasons why they didn't access an inspection station was treated as a predictor, the following findings were of interest.

- The average overall score was higher for the group that indicated they did not access an inspection station because they had no time (0.96) compared to the groups that indicated other reasons (0.59) (p=0.0170).
- Similarly, the average overall score was higher for the group that indicated they did not access an inspection station because they had to set up an appointment (1.21) compared to the groups that indicated other reasons (0.60) (p=0.0152).
- The group that was aware of inspection stations had a lower overall score (0.56) compared to the group that was not aware of inspection stations and indicated there were more situations they deemed acceptable for a child to ride without a car seat (0.77) (p=0.0106).

Respondents were asked if they believed the selected car seat would be useful in preventing injury in the event of a low-speed crash (Question 1-8). Overall, most respondents believed the car seat would be useful.

- Extremely useful – 51.6 percent
- Very useful – 31.3 percent
- Moderately useful, slightly useful, not at all useful – 11.5 percent

Respondents who were aware of inspection stations reported the car seat would be very useful in a low-speed crash more often than the unaware respondents (54.9% and 44.4% respectively) (p-value = 0.0012).

Similarly, respondents who were aware of inspections stations but did not use them tended to indicate that a car seat was very useful in a low-speed crash compared to respondents who were not aware of these services (54.6% and 44.4% respectively) (p-value = 0.0288).

Respondents were also asked if car seat misuse increased the likelihood of child injury in a crash (Question 1-9). Most respondents indicated that injury was likely.

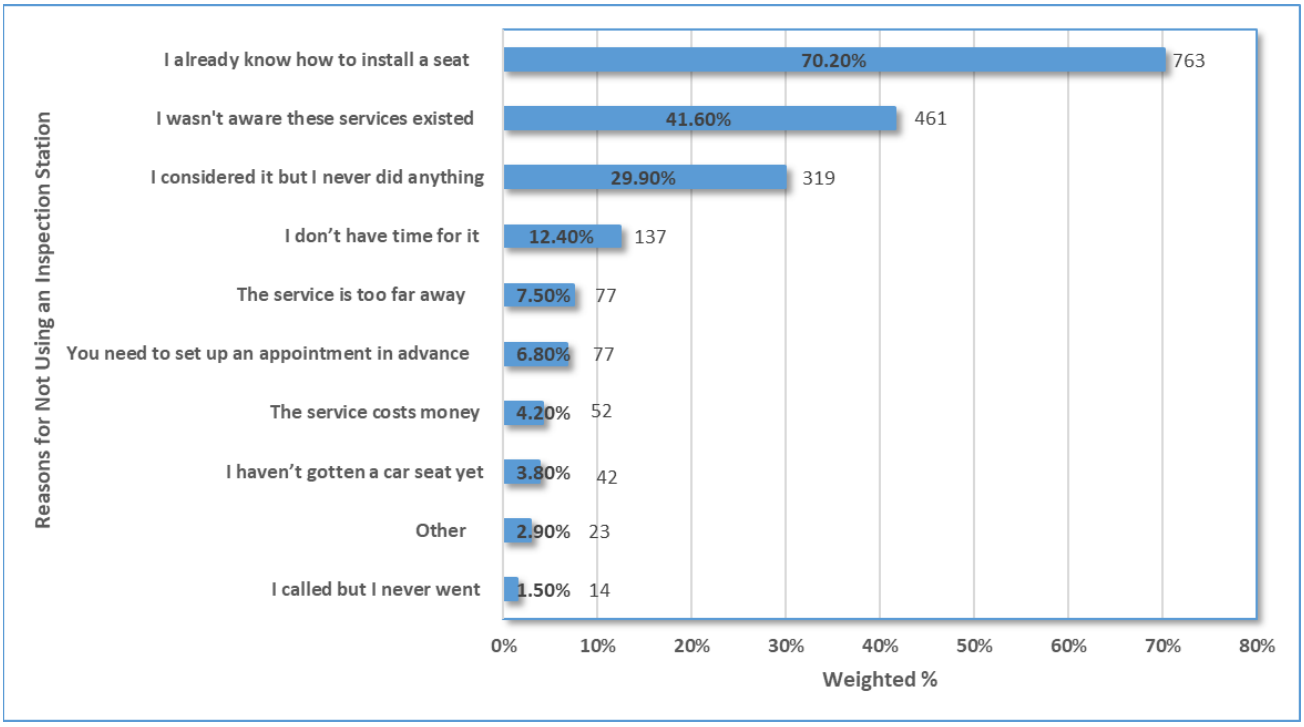
- Very likely – 55.7 percent
- Somewhat likely – 32.5 percent
- Neither likely nor unlikely, unlikely, and very unlikely – 11.8 percent

Respondents who did not use an inspection station for reasons other than time indicated that the likelihood of the child being injured in an improperly installed car seat was very likely compared to the group that did not visit an inspection station because they didn't have time (56.2% and 49.8% respectively) (p-value = 0.0142).

9.5 Barriers to Use of Inspection Stations

This section details findings on the barriers to use of inspection stations and CPST services. Cost, availability, and proximity were examined. Availability or cost of services were not found to be barriers. Among inspection station users, 73.0 percent did not need to make an appointment, 22.3 percent made their own appointment, and 4.7 percent had someone else schedule the appointment (Question 5-4). Among those who made an appointment, 53.6 percent didn't know how many days they needed to wait, 14.1 percent had same-day appointments, 20 percent had to wait 1-6 days, and 12 percent had to wait 7 days or more (Question 5-5). Most inspection station users (91%) indicated that there was no charge, and 4.7 percent indicated there was a request for a donation (Question 5-6).

Respondents who did not previously access an inspection station were asked to report all their different reasons. Figure 9.7 presents the reasons cited. Respondents were asked to indicate all reasons relevant to them so the total is more than 100 percent.



Question 4-10: Why didn't you ever get help at a car seat inspection? (Mark one response for each row)
Unweighted Data: Base sample =1,090, Question sample = 1,082-1,089, across the different categories except for other, which had a question sample of N= 806 due to the web survey design. Numbers at the end of each bar are unweighted responses.

Figure 9.7: Reasons for not previously using an inspection station

Respondents who considered but did not go to a car seat inspection were less likely to indicate that they were extremely confident their car seat was installed correctly (46.1%), compared to respondents who did not consider or go to a car seat inspection (63.9%) (p-value <0.0001).

Respondents who were non-users because they already knew how to install the seat were more likely to indicate that they were extremely confident their car seat was installed correctly (64.3%) compared to other non-users (44.3%) (p-value <0.0001).

Respondents who were inspection station non-users because of distance were less likely to indicate that they were extremely confident their car seat was installed correctly (31.3%), compared to non-users who did not indicate that an inspection station was "too far" (60.3%) (p-value = 0.0003).

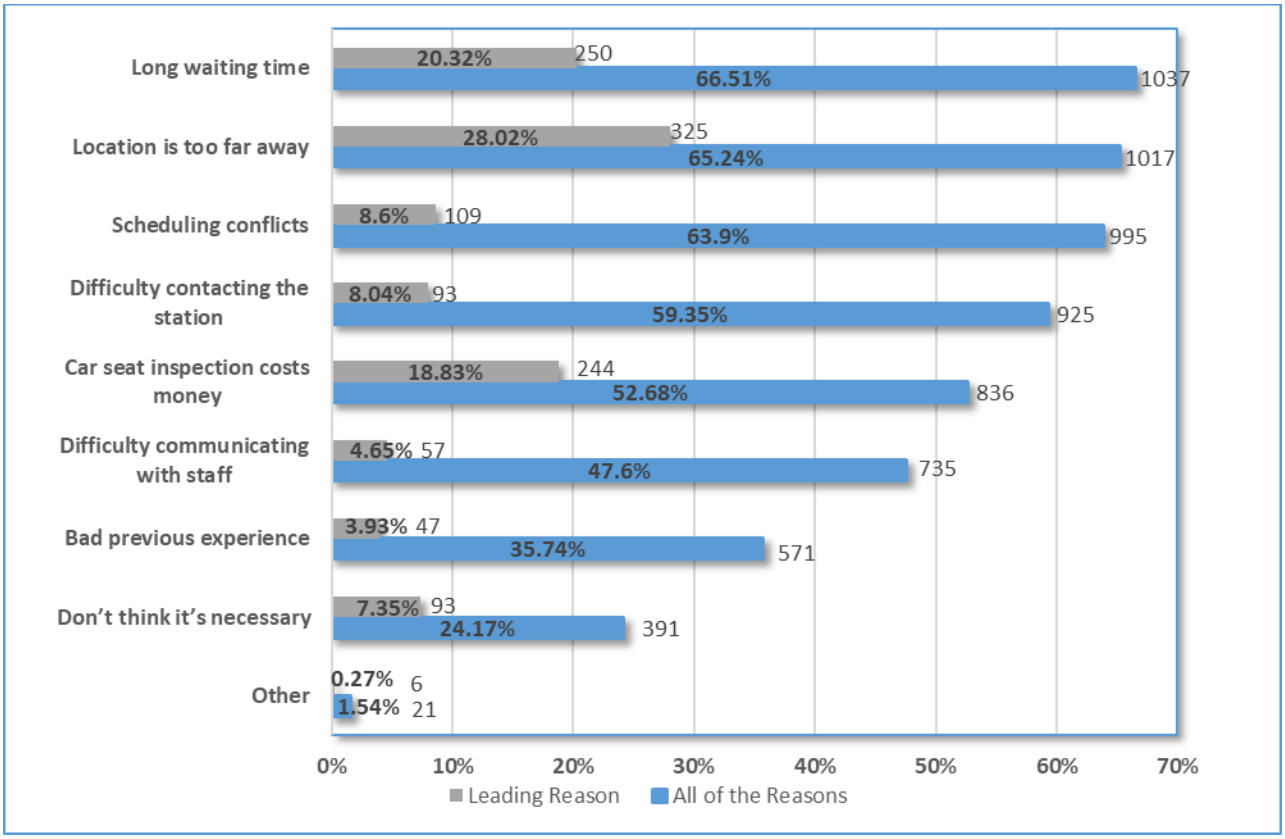
Respondents who considered but did not go to a car seat inspection were less likely to indicate that they were extremely confident their car seat was installed correctly the first time (35%) compared to other non-users (58.5%) (p-value <0.0001).

Inspection station users who indicated they would not visit an inspection station again were asked to provide an explanation (Question 5-14). Respondents were asked to indicate all reasons, making the total more than 100 percent. The responses are provided below in descending order.

- I already know how to install a seat - 60.3 percent
- I learned all I needed to know in my previous experience - 50.7 percent
- The children are too old now - 38.2 percent
- I wasn't satisfied with my previous experience - 6.3 percent
- The service takes too long - 5.5 percent
- It is too far away - 4.1 percent

Respondents were also asked about the types of issues that might prevent them from using an inspection station without any connection to previous experiences. A long wait time, distance, and schedule conflicts were most frequently indicated as potential issues. Respondents were asked to indicate all the issues. Therefore, the total is more than 100 percent.

In a follow-up question, respondents who indicated more than one issue were asked to select the reason that would most likely prevent them from using an inspection station. The leading issues indicated by respondents were distance, a long wait time, and car seat inspection cost. Figure 9.8 presents all issues that might prevent accessing an inspection station and the leading issue. When offered multiple potential issues and when asked to select the most significant deterrent, distance was the most common reason.



Question 6-4: Which of the following might prevent you from using a car seat inspection? (Mark one response for each row)
Unweighted Data: Base sample = 1,565, Question sample = 1,557-1,565, across the different categories
Question 6-5: Which one of the following is most likely to keep you from using a car seat inspection?
Unweighted Data: Question sample = 1,224, numbers at the end of each bar are unweighted responses.

Figure 9.8: Issues that might prevent accessing an inspection station

Table 9.3 summarizes the reasons why respondents would not consider revisiting an inspection station.

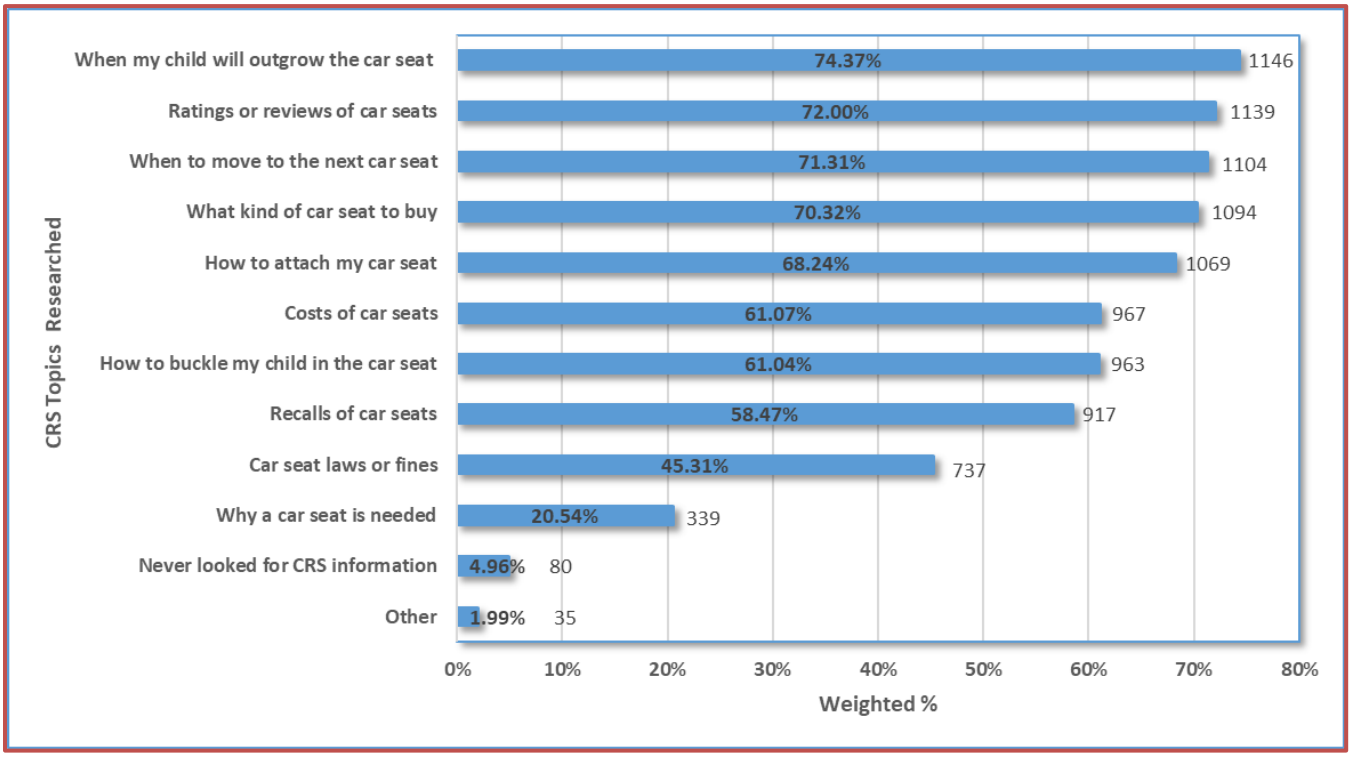
Table 9.3: Differences in reasons for not using inspections stations in weighted percentages

Issues	Inspection Station Users	Inspection Station Non-Users	P-values
Bad Experiences	41.5%	31.8%	0.0003
Difficulty Communicating With Staff	55.9%	41.7%	< 0.0001
Not Necessary to Visit One	16.1%	29.4%	< 0.0001
Already Know How to Install a CRS	14.5%	33.1%	< 0.0001

9.6 Facilitators to Using Inspection Stations

The following section considers the facilitators to promote the use of inspection stations. These facilitators include searching for information on child passenger safety, previous experience, and preferred features for a station.

Respondents were asked about the different types of information they accessed on child passenger safety. Only 4.9 percent of the respondents indicated they had never looked for information on CRSs. Respondents were asked to indicate all topics they reviewed on CRSs so the total is more than 100 percent (Figure 9.9).



Question 3-1: What information have you looked for about car seats for children? By car seats please consider all types, including booster seats. (Check all that apply.)
Unweighted Data: Base sample=1,565, Question sample = 1,561, numbers at the end of each bar are unweighted responses.

Figure 9.9: Topics respondents reviewed related to CRSs

Inspection station users indicated they accessed information on how to buckle their child in the car seat more often (70%) than non-users (60.7%) (p-value = 0.0014). Users also indicated they accessed information on ratings or reviews of car seats more often (81.1%) than non-users (72.1%) (p-value = 0.0188), and they also accessed information on car seat recalls more often (70.7%) than non-users (59.8%) (p-value = 0.0017). Finally, inspection station users indicated that they never looked for information on car seats less often than non-users (1.5% versus 4.3%) (p-value = 0.0070).

In reviewing the overall score for car seat safety information using weighted linear regression, inspection station users accessed a significantly higher average of car seat safety topics (6.84) compared to non-users (6.18) (p-value = 0.0002).

Inspection station users obtained CRS information from the doctor more frequently (26.2%) than non-users (14.8%) (p-value <0.0001). Inspection station users also indicated that they obtained information on CRSs from the police or fire department more often (52.2%) than non-users (14.2%) (p-value <0.0001). Additionally, inspection station users obtained information on CRSs from a person formally trained in car seats more often (59.7%) than non-users (13.1%) (p-value <0.0001).

The weighted linear regression analysis of the total overall score for sources of information indicated that inspection station users obtained information from a significantly larger average number of sources (3.64) compared to non-users (2.55) (p-value <0.0001).

In Question 3-2, respondents were asked about the type of information they looked for on car seats, including the following.

- Weight and height restrictions – 86.3 percent
- Steps for attaching the car seat – 77.7 percent
- Using LATCH – lower anchors and/or the top tether – 72.8 percent
- Which direction the seat should face – 59.9 percent
- Which seat in the car to attach it to – 51.4 percent
- Which vehicles are suitable for the car seat – 28.7 percent

Inspection station users accessed information about which vehicle seat to attach the CRS more often (57.6%) than non-users (47.5%) (p-value = 0.0523). Inspection station users also accessed information on using lower anchors and tethers for children (LATCH) more often (83.1%) than non-users (73%) (p-value = 0.0125). Inspection station users accessed information about which vehicles were suitable for the car seat more often (34.2%) than non-users (24.2%) (p-value = 0.0276), and accessed information on steps for attaching the car seat more often (84.3%) than non-users (75.3%) (p-value = 0.0199). Finally, inspection station users accessed information on weight and height restrictions more often (92.2%) than non-users (83.7%) (p-value = 0.0042).

Inspection station users were asked about how comfortable they were installing the car seat following their visit to the inspection station (Question 5-10). Respondents cited a high level of comfort.

- Extremely comfortable - 64.1 percent
- Very comfortable - 28.3 percent
- Moderately comfortable - 5.6 percent

Similarly, respondents were asked to indicate their level of satisfaction with the services at the inspection station (Question 5-11). Respondents cited a high level of satisfaction.

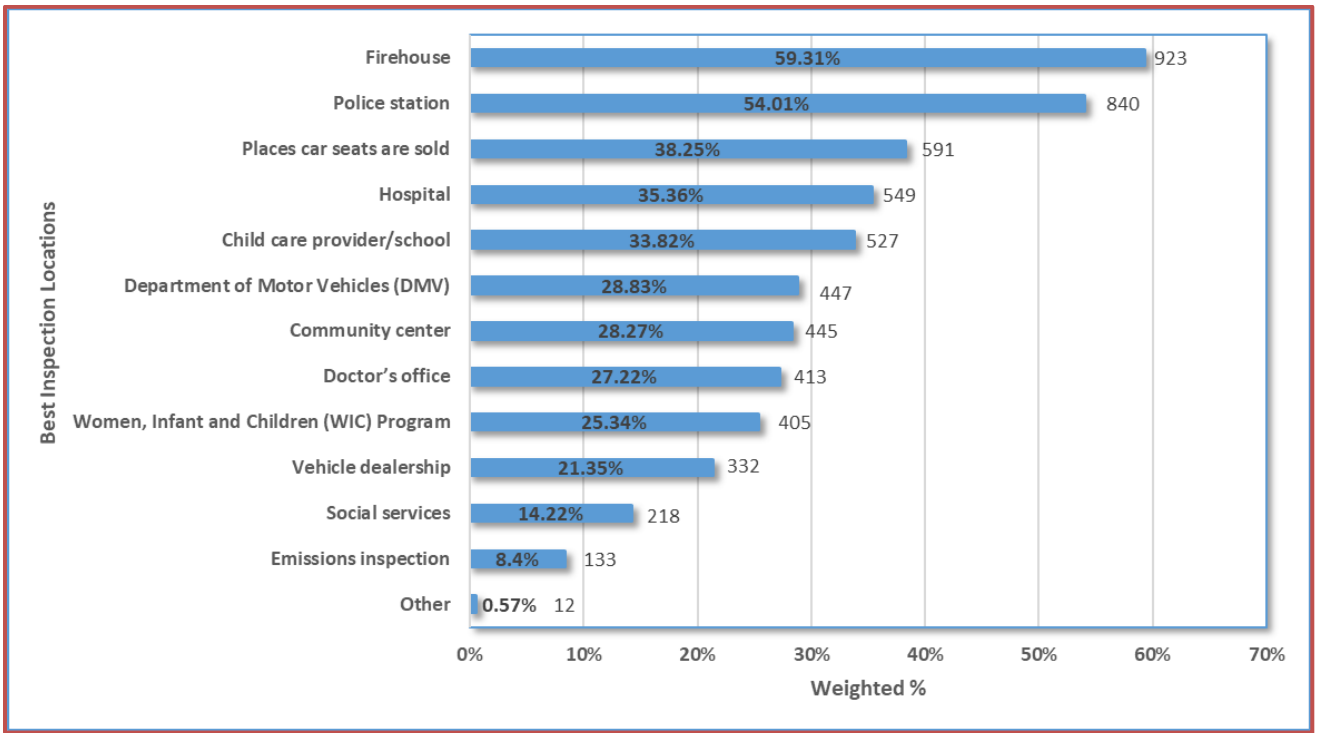
- Very satisfied - 80.2 percent
- Satisfied - 16.8 percent

In a validity check of the findings on satisfaction with services, inspection station users who intended to revisit a station in the future were significantly more likely to report that they were very satisfied with their service (83.9%) compared to respondents who did not intend to revisit a station (66.6%) (p-value = 0.0001).

Inspection station users were asked about the scenarios that would motivate them to seek additional help at a station (Question 5-13). The most common reason was changing to a different car seat 83.5 percent. Other reasons included the following.

- Driving a different vehicle - 52.5 percent
- Driving a different child - 22.1 percent
- Having a substitute or temporary driver for a child - 17.2 percent

Respondents also provided the preferred locations for an inspection station. Figure 9.10 presents the best locations as indicated by the respondents. Respondents were asked to indicate all relevant locations so the total is more than 100 percent.



Question 6-1: Which of the following would be the best locations for you to get car seat inspections? (Check all that apply)
Unweighted Data: Base sample = 1,565, Questions sample = 1,563, numbers at the end of each bar are unweighted responses.

Figure 9.10: Best locations for an inspection station

In comparing inspection station users and non-users, there were no significant differences for preferred locations except for emissions stations. Inspection station users identified emissions stations at a higher rate (8.1%) than non-users (4.7%) (p-value = 0.0357).

Respondents were asked about the most important services to have at an inspection station (Question 6-2). Respondents indicated that a playground/play area (36.6%), followed by car seat sales (35.5%), were preferred services.

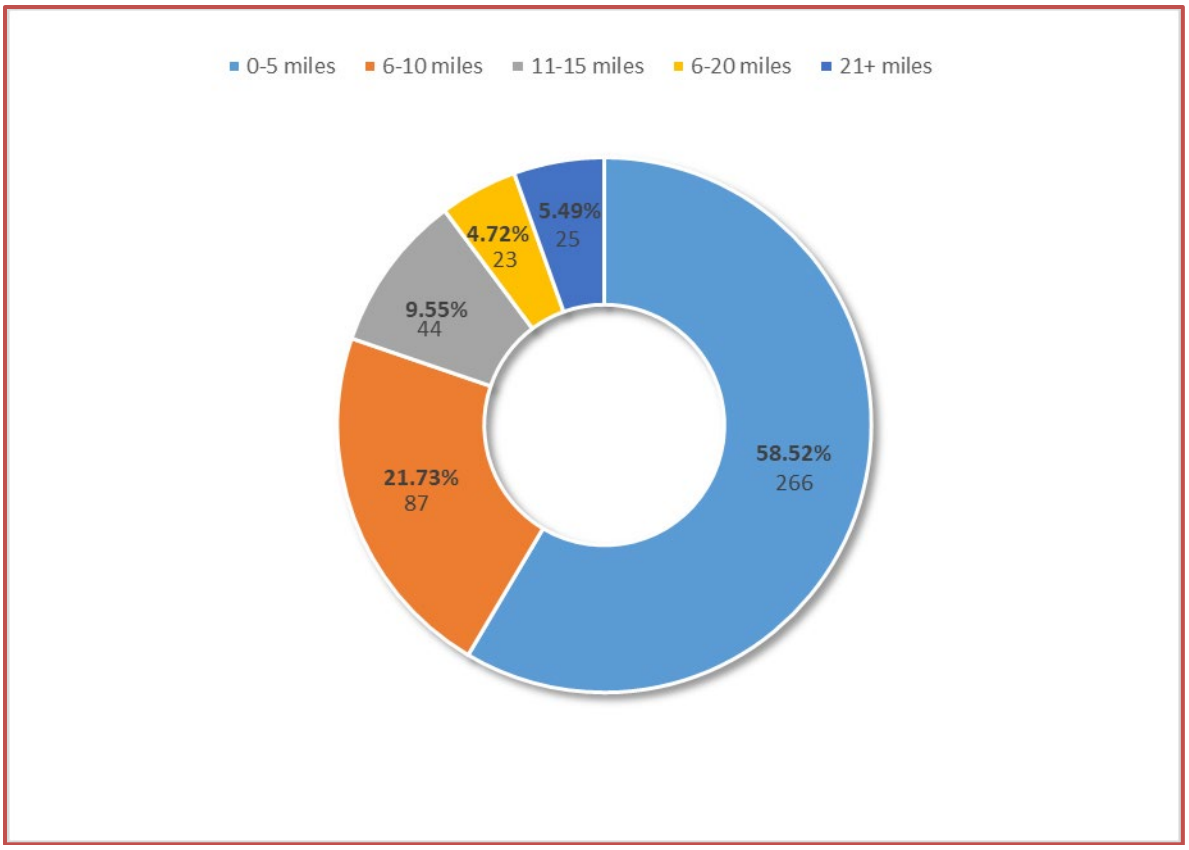
Respondents were also asked about important features/support offered at an inspection station (Question 6-3). The most important feature was no need for appointments. The important services in descending order were the following.

- No appointments necessary - 57.9 percent
- Help with other child safety topics - 19.4 percent
- Parent education services - 17.6 percent
- Different language options - 3.6 percent

Among both users and non-users of inspection stations, the feature "No Appointments Necessary" was most important and more frequently endorsed by non-users (66.7%) than users (55.5%). Among inspection station users, parent education services were indicated as important at a higher rate (21.1%) than non-users (12.1%) (p-value = 0.0034).

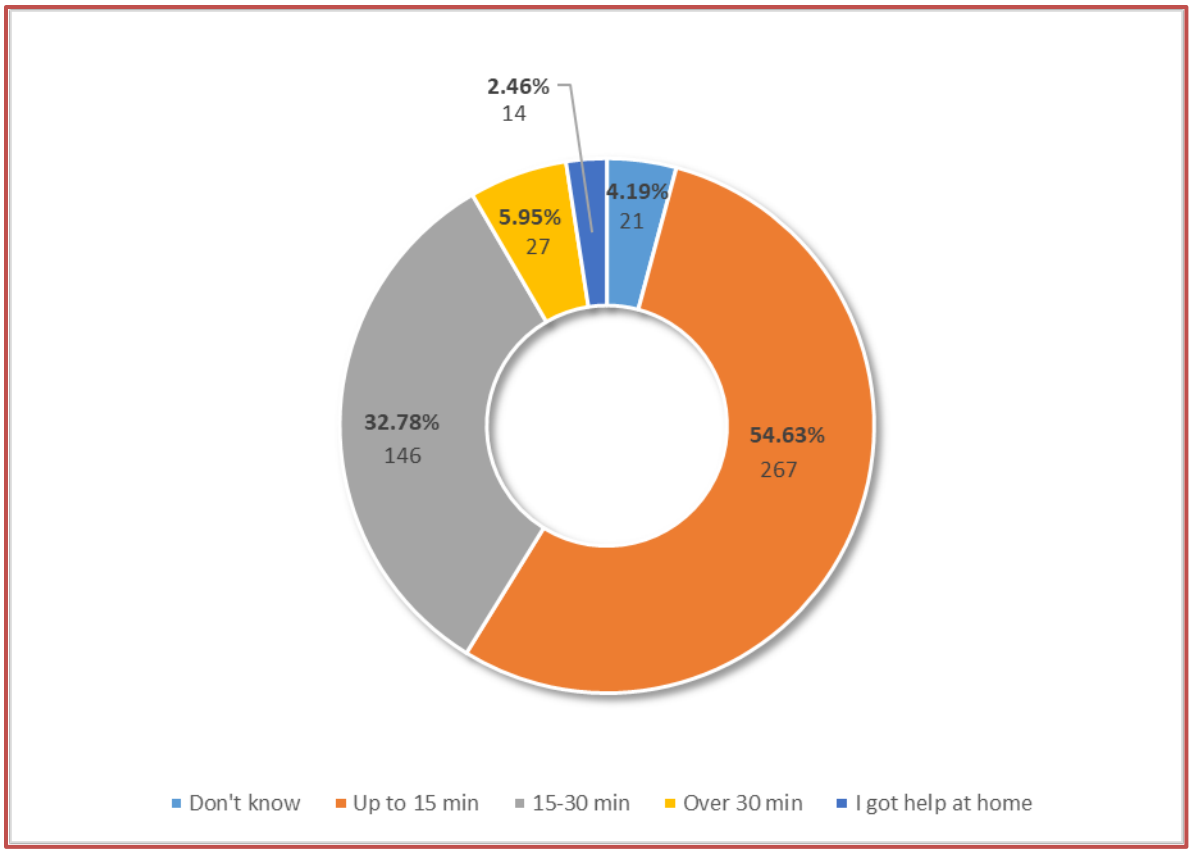
9.7 Proximity of Inspection Stations

One of the potential barriers to the use of an inspection station was the distance from the caregiver's home. As indicated in Section 9.2, inspection station users reported that there was an inspection station in their community at a higher rate compared to non-users (87.2% and 57.5% respectively) (p-value <0.0001). Inspections station users were asked about the distance to the service in miles and about the amount of time necessary to reach the station. More than half of the respondents indicated that the station was five miles or less from their home and up to a 15-minute drive (see Figure 9.11 and Figure 9.12).



Question 5-7: How many miles away is the nearest location offering car seat inspection?
Unweighted Data: Base sample=475, Question sample = 445

Figure 9.11: Reported distance to inspection station



Question 5-8: How many minutes did it take to drive to the location where you received a car seat inspection?
Unweighted Data: Base sample =475, Question sample = 475

Figure 9.12: Reported time to inspection station

It is conceivable that the distance to the inspection station would be a barrier to using the CPS services. If this premise was true, there would be a strong relationship between the distance and the use of an inspection station. To further explore this idea, a weighted logistic regression analysis was conducted with use of inspection station as the response variable and the distance as the single independent variable. The distance was measured using two methods: (1) in miles as the straight-line distance from a respondent's house to the nearest inspection station, and (2) the network path distance between the respondent's house and the nearest inspection station. This analysis targeted respondents who were aware of the existence of the inspection station and also those who previously visited an inspection station. The average distance was compared between those who did and did not access services. A comparison was also conducted by urbanicity.

In the logistic regression analysis, distance in miles was not found to be a strong predictor of use of CPS inspection stations. While the average distance reported by non-users was slightly larger than that for the users of CPS inspection stations, the difference of 0.23 miles was not significantly different from 0 with a large p-value (0.5939). In rural areas, the distance was more widely dispersed. However, the different distance distributions did not influence the use rate. The CPS inspection station use rate for the urban clusters was much higher than the rates for the urban and rural areas, but the standard errors were large, and the differences were not significant.

The contingency table analysis indicated that the two variables were not significantly associated with a p-value of 0.2603.

Further analysis was conducted to examine if there was a causal relationship between the distance and non-use of the inspection station among those who were aware of the existence of the station. As indicated in Section 9.2, 66.9 percent of respondents were aware of the existence of inspection stations, and 44.2 percent of those 1,048 visited a station. The causal analysis focused on those 1,048 respondents who were aware of the station. Several proximity groups[17] of households were defined according to the distance to the nearest inspection station. None of the five proximity groups showed any significant results. Relying on straight line distance instead of actual driving distance could potentially lead to some weakness in analysis. To remedy this weakness, the distances were also calculated using the shortest Google map distance and run through the same analysis. The correlation between these two distances was very strong at 0.975. The use rate of inspection stations was compared for the middle three proximity groups similarly defined as before but using the Google distance. Again, there was no significant difference between the use rates. Based on the analysis, it is quite clear that the distance (straight-line or Google map distance) from the respondent's house to the nearest inspection station was not a factor that hindered people from using the inspection stations.

9.8 Proper CRS Selection and Knowledge of State Laws and Fines

A key outcome variable in the AACPSIR was proper CRS selection. Classifications of proper restraint use, misuse, and no restraint use for children of various ages were based on the current NHTSA recommendations for CRS use. To operationalize analyses based on NHTSA recommendations, the data on the age, height, and weight of the child were used. CDC growth charts were used to assist with classification of proper selection groups. This classification of proper selection did not include misuse related to mistakes in installation of the CRS into the vehicle or seating the child in a CRS. Proper CRS selection for a child was defined as shown in the Methods section. Otherwise, restraint selection was coded as misuse.

Proper CRS Selection was determined for all 2,613 children who were rostered in the screener. These were all the child passengers driven by respondents at least twice a month. Overall, proper CRS selection was reported for 80.8 percent of the children, and 19.2 percent were reported as riding improperly.

There were significant differences in proper CRS selection across respondent groups. Rates of proper selection for children riding with parents (67.6%) were significantly higher than for those

[17] The proximity groups are defined depending on the distance in miles and the urbanicity of the household address as follows:

Group	1	2	3	4	5
Urbanicity	**10th Percentile**	**25th Percentile**	**50th Percentile**	**75th Percentile**	**90th Percentile**
Rural	3.24	4.90	8.44	13.56	24.56
Urban Cluster	0.53	0.95	1.98	5.07	14.66
Urban Area	0.73	1.29	2.21	3.71	6.00

riding with other drivers including grandparents, other relatives, and child care providers (p-value <0.0001).

There were also differences in proper CRS selection across different race and ethnicity groups. A higher percent of Non-Hispanic Black and African American respondents were driving with children who were not restrained properly (35.4%), compared to the other groups (Hispanic or Latino - 21.8%; Non-Hispanic White- 14.6%; Non-Hispanic Others- 19.1%) (p-value <0.0001).

Education was significantly correlated with proper selection. Except for the group with the lowest level of education (less than 12th grade), higher education was related to a higher percentage of children riding in a correct CRS (p-value = 0.0005).

Similarly, proper selection was significantly different across different income groups. Generally, proper selection of the CRS was higher among higher income groups (except for the lowest income group) (p-value <0.0001).

Respondents who reported that they drove five children or more were more likely to report improper restraint use (36.2%), compared to those driving fewer children (One child - 19.9%; two children - 16.1%; three children - 21.5%; four children- 19.2%) (p-value = 0.0057).

Respondents in the oldest age group reported children riding in an improper restraint (24.3%) at a higher rate as compared to other age groups (youngest age group – 18%; middle age group – 17.6%) (p-value = 0.0309).

When examining child age and proper CRS selection, the age groups that had a higher share of improper selection included 2-3 years (21.5%) and 8 or over (54.6%), compared to the other age groups of children less than 1 (4.8%), children 1-2 (3.3%), children 4-5 (3.9%) and children 6-7 (17.4%) (p-value <0.0001).

Children who were correctly restrained, were driven more frequently (on average 18.5 trips per month) than those who were not correctly restrained (on average 15.8 trips per month) (p-value <0.0001).

Respondents who drove with children improperly restrained identified a higher number of situations where riding without a CRS was acceptable (1.01), compared to respondents who drove with children who were properly restrained (0.53) (p-value <0.0001).

There was an association between proper selection of a CRS and awareness of inspection stations. Among respondents who used proper restraints, a higher proportion were aware of inspection stations (69.4%) compared to those who did not use proper restraints (57.8%) (p-value = 0.0002). However, proper CRS selection was not found to be significantly associated with the use of inspection stations.

Respondents were asked about the type of CRS law in their state (Question 7-1). Respondents indicated whether their state had a car seat law, booster seat law, both car and booster seat law,

neither, or don't know. The responses to this question were scored in accordance with the type of CRS law in the PSU and each respondent was categorized.

- 30 percent were correct
- 52 percent were incorrect
- 18 percent didn't know

Similarly, respondents were asked about the level of fine for not properly restraining a child in a CRS in their state (Question 7-2). Respondents indicated a fine of up to $25, $26 to $50, $51 to $100, over $100 or don't know. The responses to this question were scored in accordance with the fine in the PSU and each respondent was categorized.

- 7 percent were correct
- 16 percent were incorrect
- 78 percent didn't know

There were no significant associations between a correct response regarding the fine and either awareness of inspection stations or visits to inspection stations.

The strength of the CRS law in each PSU was also scored based on a combination of the age and size requirements, details of different seats required, and the fine. The relationship between the strength of the CRS law and use of inspection stations was investigated. However, they were not found to be related.

9.9 Linked Analysis to the NSUBS Data

The AACPSIR Study used the NSUBS sample frame to select a sample of 60 PSUs. This approach allowed for linked analysis of the two surveys, and it was expected that this linkage would enhance the analysis capacity. To maximize the power of the linked analysis, all 30 NSUBS PSUs were included in the AACPSIR PSU sample plus an additional 30 PSUs from the NSUBS sample frame.

The analysis was exploratory, and the main goal was to examine the relationship between selected AACPSIR outcome variables and selected explanatory variables from the AACPSIR and NSUBS data through regression. A summary of the key findings of the linked analysis are presented here. A detailed description of the method and analysis is described in the Methods Section. **Awareness of Inspection Stations**, **Inspection Station Use**, and **Proper CRS Selection** were used as the outcome variables.

One of the objectives of this analysis was to determine if there was any advantage to using NSUBS data. To answer this question, an AACPSIR model using only AACPSIR data (Analysis 1, 60 PSUs), a combined model using the combined data of AACPSIR and NSUBS (Analysis 2, 30 NSUBS PSUs), and a combined data AACPSIR model using only AACPSIR variables with the combined dataset (Analysis 3, 30 NSUBS PSUs) were tested.

Logistic regression analysis was used, and main effects and interaction terms were treated equally. They were entered into or removed from the model based on their ability to improve model fit.

Based on the model fit statistics, it was concluded that it was beneficial to use the NSUBS data to understand the dynamics between the awareness of the inspection station and the respondent individual and community-level (PSU) characteristics. Similar benefits were found for analysis of the use of inspection stations. However, the NSUBS data were not found to add any value in analyzing proper CRS selection.

Some of the additional insights provided by the linked analysis include the following that female respondents were more likely to be aware of inspection stations than male respondents, urban respondents were less likely to be aware of inspection stations than rural respondents, and higher income earners were more likely to be aware of inspection stations than lower income earners. The likelihood of visiting an inspection station decreased as the child aged. Higher improper selection rates were found for households with more older children, but states with strong laws had higher proper selection rates.

10. Discussion and Conclusions

The AACPSIR study is the first in-depth national survey studying the awareness and use of inspection stations and the different barriers and facilitators for accessing CPST services. Overall, about two-third of respondents (66.9%) were aware of inspection stations. The results suggest that a segment of parents and caregivers share a positive safety culture. These caregivers are parents who were actively engaged in searching for information on CPS issues, gathering information on multiple safety topics, and using CRS instructions and other safety material. This group was also likely to know of the services in their community, use or intend to use CPST services, and know someone else who had used an inspection station. These engaged caregivers were more likely to perceive the benefits of CRSs in a crash and the need to use a CRS on every ride. These findings are in line with the efforts that have been made nationwide to improve CPS legislation, enforcement, and public education that contributed to the increase in CRS use over the last decade (Li & Pickrell, 2018).

Drivers who transport children frequently indicated they were confident their CRS was installed correctly. They reported that use of CRS instructions and other material contributed to their confidence in a correct installation. The AACPSIR survey found that 19.2 percent of children were not riding in a proper CRS based upon self-reported CRS type, child age, weight and height. There were higher rates of improper selection in the 2- to 3-year old and the 8- and 9year-old age groups, which are common stages for early graduation. Therefore, whereas using this material raises the level of engagement with CPS, this same behavior may contribute to a degree of over confidence. In addition, this rate is likely an underestimation as the study did not include measurements of misuse issues related to installation in the vehicle and appropriate restraint of the child in the CRS. Previous research has found that rates of CRS misuse were higher (Koppel & Charlton, 2009; Greenwell, 2015; Bachman et al., 2016).

Of additional concern are parents and other caregivers who did not access an inspection station and did not intend to get assistance from a CPST because they didn't think it was necessary, indicated that they already knew how to install the CRS, and pointed to other inconveniences such as time needed for a visit or having to book an appointment. These people were also more likely to indicate that in certain scenarios it was acceptable for a child to ride without a CRS, such as riding in a taxi or rideshare vehicle, going a short distance, or riding in a carpool. This group also exhibited high rates of self-confidence in their CRS installation. These findings on confidence in CRS installation are in line with research indicating that parents and caregivers may overestimate their own abilities to select and securely install a CRS and secure the child in the CRS (Mirman et al., 2013).

The AACPSIR survey indicates that rates of proper selection of a CRS are lower for populations with lower income and lower education and among Non-Hispanic Black or African American people. These findings are similar to other studies that found that rates of misuse and non-use are higher among minority groups and parents or caregivers with lower education and lower income (Macy, Cunningham, Resnicow, & Freed, 2014; Hoffman et al., 2016; Li & Pickrell, 2018). More interestingly, the study points to similar demographic characteristics among people who are unaware of inspection stations and do not intend to use the services. Therefore, the population that is at a higher risk for nonuse or misuse of restraints is also the population that is less aware of these services that have the potential to improve restraint use.

The results of the study should consider its limitations. First, although the rate of survey completion among eligible households that participated in the survey was high, the overall response rates for the AACPSIR survey were lower than anticipated. In addition, the AACPSIR sample primarily consisted of female respondents, urban households, and households with a higher than average household income. The respondent population was also unique and carefully defined as adults who drive children up to age 9 on a regular basis. While weighting procedures were used, these unique characteristics point to potential participation bias that should be considered in examining the research findings.

Unlike other studies on the effects of CPST services, Proper CRS Selection was not found to be significantly associated with the use of inspection stations. This result should be considered in context with the classification of proper restraint use, misuse, and no restraint use for children of various ages in the AACPSIR study. Proper selection was defined based on the current NHTSA recommendations for CRS use as well as based on the age, height, and weight of children and CDC growth charts in association with self-report of restraint use for child passengers by survey respondents. This classification was limited primarily to age-appropriate selection of the correct type of CRS. Common CRS misuse scenarios, such as those related to the method of attaching the restraint to the vehicle, appropriate use of harness straps or loose installation of CRSs, were not identified in this study.

The results suggest that awareness of inspection stations is higher than the actual use of the services. Based on the findings, there are several recommendations that may encourage use of CPST services. Reported experiences with inspection stations were positive. Users reported high rates of satisfaction with the services and high levels of comfort installing their CRS following an inspection station visit. Considering the findings that users of inspection stations were more

familiar with other users, it is recommended that child safety stakeholders promote shared positive experiences regarding visits to inspection stations via social networks, family, and friends.

A significant percentage of those who used CPST services did so at fire stations, which was also the most recommended location for services by the entire population. It seems that locating CPST services at fire stations is effective way to reach drivers of children. In addition, it is likely that further improvements to alerting the public about additional existing locations would be conducive to increasing use of services. For example, very few respondents recognized inspection stations because of roadside signs. However, many stations are situated at a permanent location, and more prominent signs and advertising may be helpful. An important source for CPS information is pediatricians, which is in line with research that found that offering CPST services or CRS instruction in coordination with physicians and medical facilities has positive potential for reducing misuse (Burstein et al., 2017; Mirman et al., 2017; Durbin & Hoffman, 2018). Additional facilitators may include allowing for visits without an appointment, providing inspection services at locations that sell CRSs, or adding play areas. A common barrier indicated by caregivers is distance to the inspection station and cost. However, the AACPSIR survey did not find that distance to an inspection station hinders actual use of services, and very few users had to pay any fee. Considering these findings, it may be important to publicize these findings or advertise the locations and free services, as there may be common misperceptions by the public.

The AACPSIR survey findings point to higher rates of inspection station use for drivers of newborns and those engaged in early stages of car seat use and a lower rate of repeat visits even though users reported positive experiences. Currently, one of the goals of the inspection station visit is to provide caregivers with a strong basis for independent installation of their CRS. However, surveys have shown that proper restraint use diminishes as children age, and premature graduation is common (Li & Pickrell, 2018). It may be an important consideration to target use of CPST services for older children and encourage return visits to inspection stations. Additional targets are caregivers and drivers of children other than parents, such as grandparents and other drivers who are less likely to be aware of or intend to use inspection stations.

Intervention programs that target those caregivers less familiar with inspection stations and simultaneously more likely to drive with children who are not properly restrained have the potential to improve CPS for children. In addition, there may be benefits of programs to increase overall awareness and knowledge regarding inspection services via pediatricians, social networks, and other common information sources. Public information about inspection stations should emphasize positive experiences, easy access, low/no cost, and the importance of the services in preventing common CRS misuse. Future studies could allow for evaluation of changes in awareness and behavior related to use of inspection stations, both in the general public and among target populations.

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Appendix A: AACPSIR Survey Questionnaire

Web Survey Address:

The web survey was hosted on www.childsafetysurvey.com.

General Notes:

- Each survey question is followed by the relevant research question listed in green. This explains how each question in the survey relates to study objectives and research questions.
- For the purposes of this survey, "car seat" refers to all types of child restraint systems, including infant seats, rear-facing car seats, forward-facing car seats, high-back booster seats, and no back booster seats.
- For questions with a long list of response options the order was randomized.
- Don't know and refusals:
  1. If the respondent did not provide a response they were presented with a box stating: "You left a question blank".
  2. The box included response options: "I meant to answer"; I don't know the answer"; and "I prefer not to answer".
  3. This was used in lieu of presentation of do not know and refuse options within the questionnaire, with the exception of questions identified as likely to need a don't know option in advance based on testing.

Introductory Screens:

- The public site had an introductory screen with similar information to the introduction letter.
- The introductory screen presents a box to input the household PIN and the OMB statement. The screen scrolls to introductory text, Help Desk information and a FAQs section.
- Following input of the PIN, the initial screen includes confirmation that the respondent is a household member over age 18.

Final Screens:

- Following completion of the survey, the respondents are connected directly to a screen with child passenger safety information and links.

Screener

S1. In a typical month, how often do you drive a vehicle with a child passenger **under the age of 9**? [TYP_MONTH]

A. Daily
B. At least 2 times a week
C. At least 2 times a month
D. Less than 2 times a month
E. Never

S2. Are you the person living in your household who drives most often with a child passenger **under age 9**? [MOST_DRIVER]

A. Yes, I am the household member who drives most often with a child passenger (If answer to S1 is D or E and S2 is A, proceed to select demographic questions and thank you; otherwise go to S4)
B. No, someone else drives most often with a child passenger (Go to S3)
C. No one in our household drives with children under the age of 9 (Proceed to select demographic questions and thank you)

S3. Is the individual who drives **most often** with a child passenger available to participate in this survey at this time? [HOUSE_DRIVER]

A. Yes (Provide text asking for alternative respondent and back to introduction)
B. No (If answer to S1 is D or E and S2 is B, proceed to select demographic questions and thank you; otherwise go to S4)

S4. How many children **under age 9** do you drive in a vehicle **at least 2 times a month**? [CHILD_MONTH]

Number (2 Digits)

[Based on the number of children reported, a screen will be opened for each child with an introduction and a series of questions S5-S16.
If respondent records, 0 verify response from S1.]

Introduction:
[Based on number of children reported, a different introduction will appear prior to the roster.]

[**For respondents that drive one child:]**
Please continue to provide information about the child **under age 9** that you drive in a vehicle **at least 2 times a month**.

[For respondents that drive 2-5 children:]
For each child **under age 9** you drive in a vehicle **at least 2 times a month**, please provide the following information. Start with the **oldest child**.
[For respondents that drive more than 5 children:]

You have indicated that you drive more than 5 children under the age of 9 on a regular basis. Please provide the following information for the 5 children you drive, in a vehicle, **most frequently**. Start with the **oldest child.**

S5. What is the child's name? [CHILD_NAME]
NOTE: We only ask for names to help refer to the child later. You can use initials, nicknames, etc. if you prefer. We just ask that no two names are the same and that what you use is meaningful to you.

A. _____ (Text)

S6. Is [child name] a ……? [CHILD_GENDER]

A. Boy
B. Girl

S7. How old is [child name]? [CHILD_AGE]

A. Less than 2 years old (Go to S8)
B. Two years old or older(Go to S9)

S8. What is [child name]'s age in years? (Go to S10) [CHILD_AGE_YEAR]

____ (enter number)

S9. What is [child name]'s age in months? Please round to the nearest month. (Go to S10) [CHILD_AGE_MONTH]

_____ (enter number)

S10. What is [child name]'s height? Please try to provide your best guess. [CHILD_HEIGHT_FEET]

A. ___ (Text)feet
B. I don't know

S11. [CHILD_HEIGHT_INCHES]

A. ____ (Text) inches
B. I don't know

S12. What is [child name]'s weight in **pounds**? Please try to provide your best guess. [CHILD_WEIGHT]

A. _____ pounds
B. I don't know

S13. What is your relationship to [child name]? [CHILD_RELATION]

A. Parent/Stepparent
B. Grandparent
C. Other Relative
D. Child Care Provider
E. Carpool Driver
F. Other, Specify:

S14. How many days per week or per month do you usually drive [child name]? [CHILD_FREQ]

_____ (Number Field) days

S15. Is that per week or per month? [CHILD_FREQ_UNT]

A. Per week
B. Per month

S16. How does [child name] **usually ride with you in a vehicle**? (NOTE – will use images below) [CHILD_SEAT_IM]

A. Infant Seat
B. Rear-Facing Seat
C. Forward-Facing Seat
D. High back Booster
E. Low Back Booster
F. Seat Belt
G. Does not use CRS or seat belt

[If the response to S16 for all of the children is seat belt (F) or none (G), go to Question 1-7 followed by Section 3.]

[Questions S5-S16 repeated for number of children reported in S4]

[Asked only if response to S4 is equal to or less than 4]
S17. Are there any additional children **under age 9** that you drive in a vehicle **at least 2 times a month**? [CHILD_ADD]

A. Yes (provide additional screen for the child)
B. No (continue to survey)

Screener Questions about children relate to Research Questions:
11 a. How many / to what extent do parents / caregivers know the correct stages for graduation to the next stage in CPS? (proportion in the population)
11 b. How many / To what extent do parents/ caregivers know the basic rules on how to select and install a CRS? (proportion in the population)

Section 1. Current Use of Car Seats

[In this section for questions 1-1 – 1-5 a specific selection will be made from the screener – it will be of the child riding most frequently (S14) who is still riding in a car seat (S16, Responses A, B, C, D, E). NOTE in cases with more than one child riding in car seats at the same frequency the selection will be random using a pre-generated random number]

1-1. How did you get the [**fill in car seat type**] that [**child name**] rides in? [SEAT_OBTAIN]

A. Purchase
B. As a loan
C. As a gift
D. Provided by parents
E. Other, Specify: _____

Research Question 13c. Are the CRS purchased by parent/ caregiver (relevant in particular to grandparents)?

1-2. Was the [**fill in car seat type**] new or used when you got it? [SEAT_STATUS]

A. New
B. Used
C. I don't know

1-3. How confident are you that this [**fill in car seat type**] is attached correctly? [SEAT_CONF]

A. Extremely confident (Go to 1-4)
B. Very confident (Go to 1-4)
C. Moderately confident (Go to 1-4)
D. Slightly confident (Go to 1-5)
E. Not at all confident (Go to 1-5)

Research Question 2c. To what extent do they believe their CRS installation is correct?
Research Question 13d. Is the parent/ caregiver responsible for CRS installation?

1-4. Why are you [fill in response from 1-3 extremely, very, moderately] confident that this [**fill in car seat type**] is attached correctly? [CONF_WHY]

(Check all that apply.)

A. I followed the instructions (Go to 1-6)
B. It seems right (Go to 1-6)
C. I followed a video (Go to 1-6)
D. Someone helped me attach the seat (Go to 1-6)
E. I check the car seat often (Go to 1-6)
F. Other, Specify: _____ (Go to 1-6)

Relates to Research Question 2c. To what extent do they believe their CRS installation is correct? And **2b.** To what extent do they use instructions or other material to assist them.

1-5. Why aren't you confident that this [**fill in car seat type**] is attached correctly? [NOT_CONF_WHY]

(*Check all that apply.)*

A. The instructions were very complicated.
B. It seems wrong.
C. It seems too loose.
D. Someone told me the seat was not attached correctly.
E. Other, Specify: _____

1-6. How frequently do you move this [**fill in car seat type/ including the base**] in and out of the vehicle? [SEAT_FREQ]

A. Every day
B. Almost every day
C. A few days a week
D. A few days a month
E. A few days a year
F. Never

Research Question 13b. How frequently do they move the same seat between multiple vehicles?

1-7. To you, is it acceptable or not acceptable for a child to ride in a vehicle **not in a car seat** when… [SEAT_ACCEPT]

	Acceptable	Not Acceptable
A. Going only a short distance?	☐	☐
B. Riding in a taxi cab?	☐	☐
C. The child is sleeping?	☐	☐
D. Riding in an Uber, Lyft, or other Rideshare?	☐	☐
E. The child is fussy and complaining?	☐	☐
F. You're in a rush to get somewhere?	☐	☐
G. Riding in a carpool?	☐	☐
H. The child does not fit in the car seat?	☐	☐

Research Question 11e. To what extent do parents/ caregivers believe that CRS are necessary on every trip?

Relates to Research Question 3a. To what extent are parents/ caregivers aware of the risk of child injury in crashes?

1-8. In the event of a **low speed crash** (30 mph or less), how useful will your [**fill in car seat type**] be in preventing [fill with child's name] from being injured? [LOW_CRASH]

A. Extremely useful
B. Very useful
C. Moderately useful
D. Slightly useful
E. Not at all useful

1-9. If your **[fill in car seat type]** is **not used correctly**, how likely is it that [fill in child's name] would be injured in a crash? [CRASH_MISUSE]

A. Very likely
B. Somewhat likely
C. Neither likely nor unlikely
D. Unlikely
E. Very unlikely

Relates to Research Question 3a. To what extent are parents/ caregivers aware of the risk of child injury in crashes?
Relates to Research Question 3b. To what extent do they perceive CPS misuse as a cause for child injury?

Section 2: Experience Attaching a Car Seat

[In this section a specific selection will be made from the screener. It will be of the child riding most frequently who is still riding in a car seat (responses to S14 and S16)]

2-1. Who has attached the [**fill in car seat type**] used by [**child name**] to your vehicle? [ATTACHED_BY]

(Check all that apply.)

A. I have (Go to 2-2)
B. Spouse/Partner (Go to 2-4)
C. Daughter/Son (Go to 2-4)
D. Another relative (Go to 2-4)
E. Friend (Go to 2-4)
F. Person formally trained in car seats (Go to 2-4)
G. Other, Specify: _____ (Go to 2-4)

Research Question 2a. How many parents/ caregivers install CRS on their own? (proportion in the population)
Research Question 13d. Is the parent/ caregiver responsible for CRS installation?
Relates to Research Question 8a. How many parents/ caregivers have accessed a trained individual to assist them with car seat installation? (proportion in the population)

2-2. Which of the following did you do the **first time** you attached this [**car seat type**] in your vehicle? [ATTACH_FIRST]

(Mark one response for each row)

	Yes	No
1. Read car seat instructions	☐	☐
2. Looked up information on social media, mobile apps, or a website	☐	☐
3. Read vehicle manual	☐	☐
4. Watched an installation video	☐	☐
5. Called or emailed manufacturer	☐	☐
6. Got help from a friend or family member	☐	☐
7. Got help from a person formally trained in car seats	☐	☐
8. Looked at the pictures on the box	☐	☐
9. Looked at the labels on the seat	☐	☐
10. Other, Specify: _____	☐	☐

Research Question 2b. To what extent do they use instructions or other material to assist them?
Relates to Research Question 11c. To what extent do parents/ caregivers review CRS and / or vehicle manual to assist them in installation of the CRS?

2-3. The **first time** you attached this [**car seat type**] and buckled [**child name**] in, how confident were you that you did it right? [CONF_FIRST]

A. Extremely confident
B. Very confident
C. Moderately confident
D. Slightly confident
E. Not at all confident

Research Question 2c. To what extent do they believe their CRS installation is correct?

For the next three questions, please think about your [car seat type].

2-4. Compared to **assembling a crib**, attaching the [car seat type] to a vehicle is... [ASSB_CRIB]

A. Easier
B. About the same
C. Harder

2-5. Compared to **adjusting a stroller**, attaching the [car seat type] to a vehicle is... [ADJ_STROLL]

A. Easier
B. About the same
C. Harder

2-6. Compared to **changing a tire**, attaching the [car seat type] to a vehicle is... [CHG_TIRE]

A. Easier
B. About the same
C. Harder

Research Question 2d. How does installation of a car seat compare to other analogous tasks? (i.e. try to understand confidence in ability as compared to other tasks)

Section 3. Experience Searching for Car Seat Information

Please consider **all your experiences** when searching for information about **any car seats, for any child.**

3-1. What information have you looked for about car seats for children? By car seats please consider all types, including booster seats. [SEAT_INFO]

(Check all that apply.)

A. How to attach my car seat (Go to 3-2)
B. When my child will outgrow the car seat (Go to 3-3)
C. When to move to the next car seat (Go to 3-3)
D. How to buckle my child in the car seat (Go to 3-3)
E. What kind of car seat to buy (Go to 3-3)
F. Costs of car seats (Go to 3-3)
G. Why a car seat is needed(Go to 3-3)
H. Ratings or reviews of car seats (Go to 3-3)
I. Recalls of car seats (Go to 3-3)
J. Car seat laws or fines(Go to 3-3)
K. I have never looked for any information on car seats for children (Go to Section 4)
L. Other, Specify:_____ (Go to 3-3)

Research Question 10b. What are the types of information are they looking for?

3-2. What information about **attaching** a car seat were you looking for? [INFO_ATTACH]

(Check all that apply.)

A. Which direction the seat should face
B. Which seat in the car to attach it to
C. Using LATCH – lower anchors and/or the top tether
D. Which vehicles are suitable for the car seat
E. Steps for attaching the car seat
F. Weight and height restrictions
G. Other, Specify: _____

Research Question 10c. To what extent do they specifically look for information on CRS installation?

3-3. Did you get the information you were looking for about child car seats from… [INFO_SOURCE]

(Mark one response for each row)

	Yes	No
A. A doctor or medical professional?	☐	☐
B. A child care provider?	☐	☐
C. A family member or friend?	☐	☐
D. A Police or Fire Department?	☐	☐
E. A car seat company (hotline, website, product QR codes)?	☐	☐
F. Social media, a mobile app, or a website?	☐	☐
G. A book or magazine?	☐	☐
H. TV or radio?	☐	☐
I. A safety hotline?	☐	☐
J. Someone formally trained in car seats?	☐	☐
K. A car seat instruction manual?	☐	☐
L. Other, Specify: _____		

Research Question 10d. Who are the POC parents/ caregivers approach for information about CPS?

Research Question 10e. What are the methods and channels used to search for this information?

Section 4. Awareness and Use of Car Seat Inspections

Many counties or communities have **car seat inspections**: People who have been **formally trained** on car seats and child passenger safety, check whether the seats are attached to the vehicle and children are buckled up correctly.

4-1. Before today, had you ever heard of these car seat inspections that provide help on how to attach a car seat? [AWARE_INSP]

A. Yes
B. No **(**Go to 4-10**)**

Research Question 1a. How many parents and caregivers know what a fitting station is? (proportion in the population)

4-2. How did you find out about these car seat inspections? [FIND_SERV]
(Check all that apply.)

A. Obstetrician, OB/GYN
B. Pediatrician
C. TV or Radio
D. Local paper
E. Friend
F. Family member
G. Social Worker
H. Birthing Class
I. Social media, mobile apps, website
J. Drove by a location that offers these services
K. Childcare or parenting class
L. Saw a sign
M. Other, Specify: _____

Research Question 1d. What is the source by which parents/ caregivers hear about inspection stations/ CPST services?

4-3. Are car seat inspections available in your area? [COMM_SERV]

A. Yes
B. No
C. I don't know

Relates to Research Question 1c. How many know where there is a station in their community? (proportion in the population)
Research Question 7a. What is the parent/ caregivers knowledge about availability of services?

4-4. Have you ever gotten any help at a car seat inspection from someone who has **formal training**? Please consider help you received for seats for any child you drive with now or in the past. [FORM_HELP]

A. Yes (Go to 4-5)
B. No (Go to 4-8)

Research Question 8a. How many parents/ caregivers have accessed a trained individual to assist them with car seat installation? (proportion in the population)

[If respondent selects "Yes" show instruction]: Please answer the following questions about **the most recent time** you got help at a car seat inspection from someone who has **formal training**.

4-5. Where did you get the car seat inspection? [WHERE_HELP]

A. State or County Agency
B. Hospital
C. Other Medical Facility
D. Fire Station
E. Police Station
F. Car Seat Check Event
G. Car Dealership
H. Retail Store
I. Church
J. At a location for the Safe Kids Organization
K. At my home or a friend's home
L. Other, Specify: _____

Research Question 8b. What are the locations/ venues at which parents/ caregivers received assistance?

4-6. Which of the following led you to get help at a car seat inspection? [EVENT_HELP] *(Check all that apply.)*

A. Expected birth of a child
B. Got a different car seat
C. Got a different vehicle
D. Needed to move a child to a new seat
E. Expected someone else would drive with my child
F. Expected driving with a child passenger
G. Wanted to be sure the car seat was attached correctly
H. Other, Specify: _____

Research Question 8d. What are the occasions that parents/ caregivers use fitting stations?

4-7. Why did you decide to get help at a car seat inspection? [WHY_HELP]

(Check all that apply.)

A. Someone recommended the service
B. The instructions for the car seat were confusing
C. I wasn't sure I attached it right
D. I felt it was important to get this service
E. I saw an advertisement for this service
F. Other, Specify: _____

Relates to Research Question 8d. What are the occasions that parents/ caregivers use fitting stations?

4-8. Do you know anyone else who has gotten help at a car seat inspection? [KNOW_REC]

A. Yes
B. No

Research Question 8g. To what extent are parents/ caregivers familiar with other people who have used these services?

[If respondent answered A to 4-4 and A to 4-8, go to 4-9.
If respondent answered A to 4-4 and B to 4-8, go to Section 5.
If respondent answered B to 4-4 and A to 4-8, go to 4-9.
If respondent answered B to 4-4 and B to 4-8, go to 4-10.]

4-9. Who else do you know got help at a car seat inspection? [ELSE_REC]

(Check all that apply)

A. A friend
B. A family member
C. A child care provider
D. Other, Specify: _____

Research Question 8g. To what extent are parents/ caregivers familiar with other people who have used these services?

[If respondent answered A to 4-4 and A to 4-8, go to Section 5.
If respondent answered B to 4-5 and A to 4-8, go to 4-10.]

4-10. Why didn't you ever get help at a car seat inspection? [WHY_NO_HELP]

(Mark one response for each row)

	Yes	No
A. I wasn't aware these services existed	☐	☐
B. I considered it but I never did anything	☐	☐
C. I called but I never went	☐	☐
D. I already know how to install a seat	☐	☐
E. I don't have time for it	☐	☐
F. The service is too far away	☐	☐
G. You need to set up an appointment in advance	☐	☐
H. The service costs money	☐	☐
I. I haven't gotten a car seat yet	☐	☐
J. Other, Specify	☐	☐

Research Question 5a. What are the kinds of barriers parent/ caregivers point to as regards access/ use of services?
Research Question 4a. How many parents/ caregivers ever consider visiting a station? (proportion in the population)

[All options for 4-10, go to Section 6.]

Section 5. Experience with Car Seat Inspections

[This section is only if respondent answered A to 4-4.]

5-1. How many times did you get help at a car seat inspection from someone who had **formal car seat training**? Please consider **all seats** and **all children** you have driven. [MANY_HELP]

A. Only one time
B. More than one time
C. I don't know

Research Question 8c. How frequently do parents/ caregivers get assistance?

[If respondent selects B - "More than one time" to 5-1, show instruction]: Please answer the following questions about **the most recent time**.

5-2. How long ago did you get help at a car seat inspection? [LONG_HELP]

A. Less than 30 days ago
B. 30 days to less than 6 months ago
C. 6 to 12 months ago
D. More than 12 months ago
E. I don't know

Relates to Research Question 8d. What are the occasions that parents/ caregivers use fitting stations?

5-3. What type of car seat(s) did you get help with? [TYP_SEAT_HELP]

(Check all that apply.)

A. Infant Seat
B. Rear-Facing Seat
C. Forward-Facing Seat
D. High Back Booster
E. Low Back Booster

[Will include images -- along with names of seats]

Relates to Research Question 8d. What are the occasions that parents/ caregivers use fitting stations?

5-4. Did you call to set up an appointment for the car seat inspection? [APPOINT_HELP]

A. Yes
B. Someone else set up the appointment
C. No appointment was necessary (Go to 5-6)

Research Question 7b. What is the experience of parent / caregivers in availability of services?

5-5. How many days were you told you needed to wait for an appointment? [APPOINT_LONG]

A. ____ days (up to 3 digits)
B. I don't know

Research Question 7b. What is the experience of parent / caregivers in availability of services?

5-6. What was the charge for the car seat inspection? [APPOINT_CHARGE]

A. $__.00 (up to 3 digits)
B. No charge
C. Request for donation
D. I don't know

Research Question 5a. What are the kinds of barriers parent/ caregivers point to as regards access/ use of services?

5-7. How many miles away is the nearest location offering car seat inspection? [HELP_MILES]

A. __ miles

5-8. How many minutes did it take to drive to the location where you received a car seat inspection? [HELP_MIN]

B. Under 15 minutes
C. 15-30 minutes
D. Over 30 minutes
E. I got help at home
F. I don't know

Research Question 6b. What is the perceived distance of fitting station to parents/ caregivers?

5-9. What type of **help** did you receive? [HELP_TYPE]

(Check all that apply.)

A. Instruction in attaching the seat to the vehicle
B. Instruction in buckling the child in the seat
C. Checking car seat for recalls
D. Checking car seat for the expiration date
E. Educational material on child safety
F. Information about the next car seat stage for the child
G. Practice installing it myself
H. Other, Specify: _____

Research Question 1b. To what extent do they know what information/ actions are provided at this type of setting?

5-10. After receiving a car seat inspection, how comfortable were you with attaching the seat and securing your child in it on your own? [HELP_COMF]

A. Extremely comfortable
B. Very comfortable
C. Moderately comfortable
D. Slightly comfortable
E. Not at all comfortable

Research Question 8e. What proportion of parents/ caregivers had a positive experience at a station/ with a CPST?

5-11. Overall, how satisfied were you with the service you received? [HELP_SAT]

A. Very satisfied
B. Satisfied
C. Neither satisfied nor dissatisfied
D. Dissatisfied
E. Very dissatisfied

Research Question 8e. What proportion of parents/ caregivers had a positive experience at a station/ with a CPST?

5-12. Would you consider getting additional help at a car seat inspection? [HELP_ADD]

A. Yes (go to 5-13)
B. No (go to 5-14)

5-13. Under which of the following conditions would you consider getting additional help at a car seat inspection? [ADD_HELP_CON]

(Check all that apply.)

A. Driving a different vehicle
B. Changing to a different seat
C. Driving a different child
D. Having a substitute or temporary driver for a child
E. Other, Specify: _____

Relates to Research Question 8e. What proportion of parents/ caregivers had a positive experience at a station/ with a CPST?

[Continue to Section 6]

5-14. Why wouldn't you consider getting additional **car seat help**? [NO_ADD_HELP]
(Check all that apply.)

A. The child[ren] [is/are] too old now
B. I already know how to install a seat
C. The service takes too long
D. You need to set up an appointment in advance
E. It is too far away
F. The car seat inspection costs money
G. I wasn't satisfied with my previous experience
H. I learned all I needed to know from my previous experience
I. Other, Specify: _____

Research Question 5a. What are the kinds of barriers parent/ caregivers point to as regards access/ use of services?

[All responses go to Section 6]

Section 6. Preferences for Car Seat Inspections

6-1. Which of the following would be the **best locations** for you to get car seat inspections? [HELP_BEST] (Check all that apply)

A. Child care provider/school
B. Department of Motor Vehicles (DMV)
C. Doctor's office
D. Vehicle dealership
E. Social services
F. Women, Infant and Children (WIC) Program
G. Hospital
H. Emissions inspection
I. Places car seats are sold
J. Community center
K. Police station
L. Firehouse
M. Other, Specify: _____

Research Question 9c. What are their ideal locations for a fitting station?

6-2. Which one of the following services is **most important to you** to have at an inspection location? [HELP_SERV]

A. Playground/play area
B. Food services
C. Carwash
D. Oil Change
E. Car seat sales
F. Other, Specify: _____

6-3. Which one of the following is **most important to you** at a car seat inspection? [SERV_IMPORT]

A. No appointments necessary
B. Parent education services
C. Help with other child safety topics
D. Different language options
E. Other, Specify: _____

Research Question 9a. What are the features that would make a fitting station more attractive?
Research Question 9b. What are the kinds of services that parents / caregivers would be interested in receiving at a fitting station?

6-4. Which of the following might prevent you from using a car seat inspection? [HELP_PREVENT]

(Mark one response for each row)

	Yes	No
A. Location - too far away	☐	☐
B. Long waiting time	☐	☐
C. Difficulty contacting the car seat inspection	☐	☐
D. Car seat inspection costs money	☐	☐
E. Difficulty communicating with staff	☐	☐
F. Bad previous experience	☐	☐
G. Don't think it's necessary	☐	☐
H. Schedule conflicts	☐	☐
I. Other, Specify: ____	☐	☐

Research Question 5a. What are the kinds of barriers parent/ caregivers point to as regards access/ use of services?

6-5. Which one of the following is **most likely** to keep you from using a car seat inspection? [PREVENT_MOST]

Based on selections from questions 6-4, a subset of response options will be provided here. Specifically, any item with a response of "Yes" will be listed as a response option for this question. Note if all response options are "No" or only one response option is "Yes" in 6-4, this question is skipped.

Research Question 5b. To what extent to parents/ caregivers believe that barriers prevent use of services?

Section 7. About You

7-1. In your state, there is**…** [STATE_LAW]

A. A Car Seat law
B. A Booster Seat law
C. Both a Car Seat and a Booster Seat law
D. Neither
E. I don't know

Research Question 12a. How many parents / caregivers are aware of their state law on CRS use? (proportion in the population)

7-2. Where you drive, how much is the fine for driving with a child who is not buckled in a car seat according to the local law? [SEAT_FINE]

A. Up to $25
B. $26 to $50
C. $51 to $100
D. Over $100
E. I don't know

Research Question 12b. How many parents/ caregivers are aware of any fines associated with CRS misuse? (proportion in the population)

7-3. Are you of Hispanic or Latino origin? [HISP]

A. Yes, Hispanic or Latino
B. No, Not Hispanic or Latino

7-4. What is your race? [RACE]

(Check all that apply)

A. White
B. Black or African American
C. Asian
D. American Indian or Alaska Native
E. Native Hawaiian or other Pacific Islander

7-5. What is the highest level of education you have completed? [EDUC]

A. Less than 12^{th} grade
B. High school diploma or GED
C. Some college or associate's degree
D. Bachelor's degree
E. Graduate degree or professional degree

7-6. How old are you? [AGE]

A. Enter Number

7-7. Are you male or female? [SEX]

A. Male
B. Female

7-8. What was your annual household income from all sources in 2016? [INCOME]

F. Less than $25,000
G. Greater than $25,000 but less than $35,000
H. Greater than $35,000 but less than $50,000
I. Greater than $50,000 but less than $75,000
J. $75,000 or more

Thank you

Thank you for agreeing to take part in this important Child Safety Survey sponsored by the National Highway Traffic Safety Administration at the U.S. Department of Transportation.
Submit
Go to Safety Page

Appendix B: AACPSIR Invitation Letter

«SAMPNO»
«GIVENNAME» «SURNAME» «SURNAMESUFFIX» OR Current Resident
«ADDRESS»
«CITY», «STATE» «ZIP»

«DATENOW»

Please help us improve child safety in your community.

I am writing to ask you to take part in an important **Child Safety Survey** that can benefit children and improve transportation safety in your community and around the country. Even if you don't travel with children on a regular basis, your responses are valuable. Enclosed you will find a small token of appreciation. **You will also receive $5 as a thank you for completing the survey.**

This survey will be used to help:

- Make travel safer for children.
- Give caregivers better information about child safety.
- Build better child safety programs.

To help us improve child transportation safety, the National Highway Traffic Safety Administration (NHTSA), at the U.S. Department of Transportation (DOT), is asking you to complete the **Child Safety Survey**. Westat, a nationally recognized research firm, is conducting the survey on behalf of NHTSA.

The PIN you received is unique to your household; we care about your thoughts so please do not share the PIN with others. Participation is voluntary and you can be certain that all information you provide will be used for research purposes only. The survey will take only **15 minutes** of your time.

Here's how *you* can help children in your community:

Go to ChildSafetySurvey.com → **Enter your PIN: to join the survey** → **Receive $5 for completing the Child Safety Survey**

If you prefer to speak with a study team member, or if you have any questions about the survey, please visit our website at www.ChildSafetySurvey.com or call our study team at 1-855-411-0039.

You can also visit www.nhtsa.gov/child-safety-survey for more information.

Thank you in advance for helping to improve child safety!

Sincerely,

Richard P. Compton, Ph.D
Director, Office of Behavioral Safety Research
National Highway Traffic Safety Administration

NHTSA

OMB Control Number: 2127-0726

«GIVENNAME» «SURNAME» «SURNAMESUFFIX»
OR «CITY» Resident

«DATENOW»

Por favor ayúdenos a mejorar la seguridad infantil en su comunidad.

Escribo para exhortarle a que participe en una importante **Encuesta de Seguridad Infantil** que puede beneficiar a los niños y mejorar la seguridad de transporte en su comunidad y en todo el país. Sus respuestas son valiosas para nosotros, incluso en el supuesto de que usted no viaje con niños con frecuencia. Usted puede participar en español o en inglés. Adjunto encontrará un pequeño obsequio de apreciación. **Recibirá también $5 dólares como agradecimiento por completar la encuesta.**

Esta encuesta se usará para ayudar a:

- Hacer que los viajes sean más seguros para los niños.
- Proporcionar a los cuidadores la mejor información sobre seguridad infantil.
- Diseñar mejores programas de seguridad infantil.

Para ayudarnos a mejorar la seguridad infantil en el transporte, the National Highway Traffic Safety Administration (NHTSA), por sus siglas en inglés), y U.S. Department of Transportation (DOT), piden que llene esta **Encuesta de Seguridad Infantil**. Westat, una empresa de investigación con reconocimiento a nivel nacional, llevará a cabo la encuesta en nombre de la NHTSA.

El PIN que recibió es exclusivo de su hogar; nos interesa saber lo que piensa, de modo que por favor no comparta el PIN con otras personas. La participación es voluntaria y usted puede tener certeza de que toda la información que usted nos provea se usará exclusivamente para efectos de investigación. Esta encuesta solo le tomará **15 minutos** de su tiempo.

Aquí le mostramos como puede *usted* ayudar a los niños de su comunidad:

Para la encuesta telefónica en ESPAÑOL Llame al 1-855-411-0039 → **Proporcione su PIN: <<PINNO>> para unirse a la encuesta** → **Reciba $5 dólares por completar la Encuesta de Seguridad Infantil**

Si prefiere hablar con un miembro del equipo del estudio, o si usted tiene alguna pregunta sobre esta encuesta, por favor visite nuestro sitio web en www.ChildSafetySurvey.com o llame a nuestro equipo al número 1-855-411-0039.

También puede visitar el sitio www.nhtsa.gov/child-safety-survey para obtener más información.

¡Agradecemos de antemano su ayuda para mejorar la seguridad infantil!

Atentamente,

Richard P. Compton, Ph.D.
Director, Office of Behavioral Safety Research
National Highway Traffic Safety Administration

NHTSA

OMB Control Number: 2127-0726

Appendix C: AACPSIR Reminder Postcard

Please help the National Highway Traffic Safety Administration (NHTSA) at the U.S. Department of Transportation (DOT) improve **child safety** in your community.

Your participation in the **Child Safety Survey** will help us make travel safer for children and build better child safety programs.

About a week ago, we sent you a letter asking for your help with this important survey. If you have already responded – **thank you!** If not, there's still time.

To begin the survey, please visit the study website at **www.childsafetysurvey.com** and enter your PIN. **Your PIN is located under your address on the other side of this card.**

You will receive $5 as a thank you for completing the survey.

Questions? Please email childsafetysurvey@westat.com or call 1-855-411-0039
Thank you for helping to improve child safety!

Si quiere participar en este estudio sobre la seguridad infantil, o si quiere obtener más información, por favor llame al 1-855-411-0039.

NHTSA

OMB Control Number: 2127-0726

NHTSA

101 Marietta St. Ste 300
Atlanta, GA 30303-2724

OFFICIAL BUSINESS

«CITY» Resident
«ADDRESS»
«CITY», «STATE» «ZIP»
«**PINNO**»

The Child Safety Survey is sponsored by the U.S. Department of Transportation

Appendix D: AACPSIR Selected Sample of PSUs

No.	PSU Name	Str	Area	Distance	MOS	NSUBS Sample
1_122	Bristol County, MA	1	553	46.99720383	49810	No
1_149	Essex County, NJ	1	126	19.00437546	85446	No
1_205	Suffolk County, NY	1	912	96.6136	138521	Yes
1_187	Nassau County, NY	1	285	36.10656738	120891	No
1_190	Oneida County, NY	1	1212	54.56915665	21175	Yes
1_221	Allegheny County, PA	1	730	37.53634262	102171	Yes
1_245	Lancaster County, PA	1	944	44.86564255	56472	Yes
1_281	Providence County, RI	1	410	29.53619003	58969	No
1_103	Middlesex County, CT	2	369	34.76913834	13062	Yes
1_104	New Haven County, CT	2	605	46.93790054	76777	No
2_105	Cook County, IL	3	945	60.21879959	544846	Yes
2_132	Tazewell County, IL	3	649	37.97980881	13639	No
2_171	Clinton & Tipton Counties, IN	3	666	46.74194336	5177	No
2_294	Sedgwick County, KS	3	998	46.97722626	62142	Yes
2_316	Allegan County, MI	3	825	80.76874542	11730	Yes
2_342	Oakland County, MI	3	868	42.65006256	111006	No
2_351	Wayne County, MI	3	612	47.67720032	186719	No
2_434	St. Charles County, MO	3	560	50.47657776	38652	No
2_457	Clay County, MO	3	397	31.72682953	25463	Yes
2_662	Milwaukee County, WI	3	241	55.80363846	111413	Yes
2_689	Crawford, Richland & Vernon Counties, WI	3	1949	66.69572449	6661	Yes
2_234	Scott County, IA	4	458	31.49650383	18324	No
2_501	Douglas County, NE	4	328	31.83229256	65364	Yes
3_255	DeKalb County, GA	5	268	27.82860565	80960	Yes
3_448	Cecil County, MD	5	346	34.43215942	10100	Yes
3_453	Howard County, MD	5	251	27.60486221	29497	No
3_455	Prince George's County, MD	5	483	42.74228668	93151	No
3_527	Cumberland County, NC	5	652	41.2417984	41499	Yes
3_535	Gaston County, NC	5	356	31.28740501	21153	No
3_729	Brazoria County, TX	5	1358	59.03757095	39469	No
3_735	Dallas County, TX	5	871	42.67889786	312523	Yes
3_744	Harris County, TX	5	1703	70.8135376	541904	No
3_794	Glasscock, Midland, Reagan & Upton Counties, TX	5	4216	92.35932159	19732	Yes
3_874	Alexandria City, VA	5	15	6.091506004	15525	No
3_913	Culpeper & Rappahannock Counties, VA	5	645	45.71601868	5855	Yes
3_924	Fairfax City & Fairfax County, VA	5	397	31.69740486	121753	Yes
3_963	Clay, Nicholas & Webster Counties, WV	5	1542	59.67090225	4265	No
3_133	Cherokee & Etowah Counties, AL	6	1089	63.50694275	12093	Yes
3_162	Ashley, Chicot & Drew Counties, AR	6	2397	71.81957245	5333	Yes
3_194	Broward County, FL	6	1210	58.26859665	169279	No
3_200	Duval County, FL	6	762	46.62549973	94924	Yes
3_201	Escambia County, FL	6	656	62.07680512	29755	Yes
3_211	Lee County, FL	6	785	54.07801819	53283	No

No.	PSU Name	Str	Area	Distance	MOS	NSUBS Sample
3_216	Miami-Dade County, FL	6	1898	74.70495606	242895	No
3_239	Leon & Wakulla Counties, FL	6	1273	56.81574631	26522	No
3_627	Muskogee & Okmulgee Counties, OK	6	1507	69.88327026	11946	No
4_132	Maricopa County, AZ	7	9200	150.5191193	447149	No
4_134	Alameda County, CA	7	739	56.67107391	157288	Yes
4_135	Contra Costa County, CA	7	716	50.27664185	109488	No
4_141	Los Angeles County, CA	7	4058	150.066452	1032795	Yes
4_144	Merced County, CA	7	1935	69.01004028	35655	No
4_147	Orange County, CA	7	791	47.14996719	314159	Yes
4_291	Coos & Curry Counties, OR	7	3223	114.2493439	6447	Yes
4_293	Douglas County, OR	7	5036	121.497551	8858	No
4_343	Snohomish County, WA	7	2087	75.91931152	75470	Yes
4_346	Klickitat & Yakima Counties, WA	7	6166	112.591011	36306	Yes
4_350	Spokane County, WA	7	1764	65.41498566	47818	No
4_361	Campbell & Crook Counties, WY	7	7657	142.2481689	7160	No
4_263	Clark County, NV	8	7891	145.6670837	219745	No
4_269	Bernalillo County, NM	8	1161	64.01416016	71578	Yes

Note. MOS = measure of size

Appendix E: AACPSIR Data Dictionary

Tables

NAME	DESCRIPTION	KEY VARIABLES	MERGE RELATIONSHIPS
PERSON	A record in this table represents the person responding to the survey for their sampled address. One person in the household over the age of 18 responded.	SAMPNO	CHILD (SAMPNO) CHILD (SAMPNO, CHILD_ID_SURVEY = CHILD_ID)
CHILD	A record in this table represents person between 0 and 8 that are driven in a vehicle at least two times per month by the responding household person. People were instructed to report up to five eligible children starting with the oldest.	SAMPNO, CHILD_ID	PERSON (SAMPNO) PERSON (SAMPNO, CHILD_ID = CHILD_ID_SURVEY)
JKCOEFFECIENT	A record in this table represents jacknife coefficient value required for weighted analysis		
MULTIPLE_IMPUTATION	A record in this table represents an imputed height and weight record from multiple imputation groups.	SAMPNO, CHILD_ID	CHILD (SAMPNO, CHILD_ID, IMPUTATION)

Variables

NAME	QUESTION #	LABEL	QUESTION TEXT	DATA TYPE	TABLE: PERSON	TABLE: CHILD
ADD_HELP_CON_1	5-13	Reason to get additional help at a car seat inspection: Driving a different vehicle	Under which of the following conditions would you consider getting additional help at a car seat inspection? [CHECK ALL THAT APPLY]	Text	109	
ADD_HELP_CON_2	5-13	Reason to get additional help at a car seat inspection: Changing to a different seat	Under which of the following conditions would you consider getting additional help at a car seat inspection? [CHECK ALL THAT APPLY]	Text	110	
ADD_HELP_CON_3	5-13	Reason to get additional help at a car seat inspection: Driving a different child	Under which of the following conditions would you consider getting additional help at a car seat inspection? [CHECK ALL THAT APPLY]	Text	111	
ADD_HELP_CON_4	5-13	Reason to get additional help at a car seat inspection: Having a substitute or temporary driver for a child	Under which of the following conditions would you consider getting additional help at a car seat inspection? [CHECK ALL THAT APPLY]	Text	112	

NAME	QUESTION #	LABEL	QUESTION TEXT	DATA TYPE	TABLE: PERSON	TABLE: CHILD
ADD_HELP_CON_O	5-13	Reason to get additional help at a car seat inspection (Other)	Under which of the following conditions would you consider getting additional help at a car seat inspection? [CHECK ALL THAT APPLY]	Text	114	
ADD_HELP_CON_SE	5-13	Reason to get additional help at a car seat inspection: Other, Specify	Under which of the following conditions would you consider getting additional help at a car seat inspection? [CHECK ALL THAT APPLY]	Text	113	
ADJ_STROLL	2-5	Attaching the car seat to a vehicle: Compared to adjusting a stroller	Compared to adjusting a stroller, attaching the [$CHILD_SEAT:R[$SEL_CHILD]] to a vehicle is...	Numeric	38	
AGE	NA	Respondent's age (imputed)		Numeric	252	
AGEDONOR	NA	DONOR SAMPNO FOR AGE		Text	262	
AGE_REPORTED	7-6	Respondent's age (as reported)	How old are you?	Numeric	99	

NAME	QUESTION #	LABEL	QUESTION TEXT	DATA TYPE	TABLE: PERSON	TABLE: CHILD
APPOINT_CHARGE	5-6	Amount paid for most recent car seat inspection	What was the charge for the car seat inspection?	Numeric	74	
APPOINT_HELP	5-4	Appointment status for most recent car seat inspection	Did you call to set up an appointment for the car seat inspection?	Text	72	
APPOINT_LONG	5-5	Days waited for most recent car seat inspection	How many days were you told you needed to wait for an appointment?	Numeric	73	
ASSB_CRIB	2-4	Attaching the car seat to a vehicle: Compared to assembling a crib	For the next three questions, please think about your [$CHILD_SEAT:R[$SEL_CHILD]]. Compared to assembling a crib, attaching the [$CHILD_SEAT:R[$SEL_CHILD]] to a vehicle is...	Text	39	
ATTACHED_BY_1	2-1	People that have attached the car seat: I have	Who has attached the [$CHILD_SEAT:R[$SEL_CHILD]] used by [$CHILD_NAME:R[$SEL_CHILD]] to your vehicle? [CHECK ALL THAT APPLY]	Text	115	

NAME	QUESTION #	LABEL	QUESTION TEXT	DATA TYPE	TABLE: PERSON	TABLE: CHILD
ATTACHED_BY_2	2-1	People that have attached the car seat: Spouse/Partner	Who has attached the [$CHILD_SEAT:R[$SEL_CHILD]] used by [$CHILD_NAME:R[$SEL_CHILD]] to your vehicle? [CHECK ALL THAT APPLY]	Text	116	
ATTACHED_BY_3	2-1	People that have attached the car seat: Daughter/Son	Who has attached the [$CHILD_SEAT:R[$SEL_CHILD]] used by [$CHILD_NAME:R[$SEL_CHILD]] to your vehicle? [CHECK ALL THAT APPLY]	Text	117	
ATTACHED_BY_4	2-1	People that have attached the car seat: Another relative	Who has attached the [$CHILD_SEAT:R[$SEL_CHILD]] used by [$CHILD_NAME:R[$SEL_CHILD]] to your vehicle? [CHECK ALL THAT APPLY]	Text	118	
ATTACHED_BY_5	2-1	People that have attached the car seat: Friend	Who has attached the [$CHILD_SEAT:R[$SEL_CHILD]] used by [$CHILD_NAME:R[$SEL_CHILD]] to your vehicle? [CHECK ALL THAT APPLY]	Text	119	

NAME	QUESTION #	LABEL	QUESTION TEXT	DATA TYPE	TABLE: PERSON	TABLE: CHILD
ATTACHED_BY_6	2-1	People that have attached the car seat: Person formally trained in car seats	Who has attached the [$CHILD_SEAT:R[$SEL_CHILD]] used by [$CHILD_NAME:R[$SEL_CHILD]] to your vehicle? [CHECK ALL THAT APPLY]	Text	120	
ATTACHED_BY_O	2-1	People that have attached the car seat (Other)	Who has attached the [$CHILD_SEAT:R[$SEL_CHILD]] used by [$CHILD_NAME:R[$SEL_CHILD]] to your vehicle? [CHECK ALL THAT APPLY]	Text	122	
ATTACHED_BY_SE	2-1	People that have attached the car seat: Other, Specify	Who has attached the [$CHILD_SEAT:R[$SEL_CHILD]] used by [$CHILD_NAME:R[$SEL_CHILD]] to your vehicle? [CHECK ALL THAT APPLY]	Text	121	
ATTACH_FIRST_CALL	2-2	First time attaching car seat: Called or emailed the manufacturer	Called or emailed the manufacturer	Text	32	
ATTACH_FIRST_FAM	2-2	First time attaching car seat: Help from friend or family member	Got help from a friend or family member	Text	31	

NAME	QUESTION #	LABEL	QUESTION TEXT	DATA TYPE	TABLE: PERSON	TABLE: CHILD
ATTACH_FIRST_INSTR	2-2	First time attaching car seat: Read car seat instructions	Read car seat instructions	Text	30	
ATTACH_FIRST_LBLS	2-2	First time attaching car seat: Looked at the labels on the seat	Looked at the labels on the seat	Text	29	
ATTACH_FIRST_MAN	2-2	First time attaching car seat: Read vehicle manual	Read vehicle manual	Text	28	
ATTACH_FIRST_MEDIA	2-2	First time attaching car seat: Looked up information on social media, mobile apps, or a website	Looked up information on social media, mobile apps, or a website	Text	27	
ATTACH_FIRST_O	2-2	First time attaching car seat (Other)	Please specify what else you did the first time you attached the [$CHILD_SEAT:R[$SEL_CHILD]].	Text	35	
ATTACH_FIRST_OVALL	NA	First time attaching car seat: Overall score for all types of assistance and information		Numeric	232	
ATTACH_FIRST_PIC	2-2	First time attaching car seat: Looked at the pictures on the box	Looked at the pictures on the box	Text	26	
ATTACH_FIRST_SE	2-2	First time attaching car seat: Other, Specify	Other, Specify	Text	34	

NAME	QUESTION #	LABEL	QUESTION TEXT	DATA TYPE	TABLE: PERSON	TABLE: CHILD
ATTACH_FIRST_TRAIN	2-2	First time attaching car seat: Got help from a person formally trained in car seats	Got help from a person formally trained in car seats	Text	33	
ATTACH_FIRST_VID	2-2	First time attaching car seat: Watched an installation video	Watched an installation video	Text	25	
AWARE_INSP	4-1	Aware of car seat inspections	Many counties or communities have car seat inspections: People, who have been formally trained on car seats and child passenger safety, check whether the seats are attached to the vehicle and children are buckled up correctly. Before today, had you ever heard of these car seat inspections that provide help on how to attach a car seat?	Text	53	
CAR_SEAT_ELIGIBLE	NA	Household reporting person is eligible for car seat questionnaire		Text	3	
CHG_TIRE	2-6	Attaching the car seat to a vehicle: Compared to changing a tire	Compared to changing a tire, attaching the [$CHILD_SEAT:R[$SEL_CHILD]] to a vehicle is...	Numeric	37	
CHILD_AGE	S7	Child's age over/under 2 years	How old is [$CHILD_NAME]?	Text		3
CHILD_AGE_INMONTH	NA	Child age in month		Numeric		16

NAME	QUESTION #	LABEL	QUESTION TEXT	DATA TYPE	TABLE: PERSON	TABLE: CHILD
CHILD_AGE_INMONTHDONOR	NA	DONOR CHILDID FOR CHILD_AGE_INMONTH		Text		25
CHILD_AGE_MONTH	NA	Child's age: Months (imputed)		Numeric		19
CHILD_AGE_MONTH_REPORTED	S9	Child's age: Months (as reported)	What is [$CHILD_NAME]'s age in months? Please round to the nearest month.	Numeric		6
CHILD_AGE_YEAR	NA	Child's age: Years (imputed)		Numeric		20
CHILD_AGE_YEAR_REPORTED	S8	Child's age: Years (as reported)	What is [$CHILD_NAME]'s age in years?	Numeric		5
CHILD_FREQ	S14	Number of days child is driven	How many days per week or per month do you usually drive [$CHILD_NAME]?	Numeric		12
CHILD_FREQ_MONTH	NA	Number of days child is driven in a month, derived from CHILD_FREQ and CHILD_FREQ_UNT		Numeric		15
CHILD_FREQ_UNT	S15	Number of days child is driven: per week or per month	Is that per week or per month?	Text		13

NAME	QUESTION #	LABEL	QUESTION TEXT	DATA TYPE	TABLE: PERSON	TABLE: CHILD
CHILD_GENDER	NA	Child's gender (imputed)		Text		21
CHILD_GENDERDONOR	NA	DONOR CHILDID FOR CHILD_GENDER		Text		26
CHILD_GENDER_REPORTED	S6	Child's gender (as reported)	Is [$CHILD_NAME] a .....?	Text		4
CHILD_HEIGHT	NA	Child height in inch		Numeric		17
CHILD_HEIGHTDONOR	NA	DONOR CHILDID FOR CHILD_HEIGHT		Text		28
CHILD_HEIGHT_FEET	NA	Child's height: Feet (imputed)		Numeric		22
CHILD_HEIGHT_FEETDONOR	NA	DONOR CHILDID FOR CHILD_HEIGHT_FEET		Text		27
CHILD_HEIGHT_FEET_REPORTED	S10	Child's height: Feet (as reported)	What is [$CHILD_NAME]'s height? Please try to provide your best guess.	Numeric		8

NAME	QUESTION #	LABEL	QUESTION TEXT	DATA TYPE	TABLE: PERSON	TABLE: CHILD
CHILD_HEIGHT_FLAG	NA	Child height imputation flag (0=not imputed;1=imputed)		Numeric		
CHILD_HEIGHT_INCHES	NA	Child's height: Inches (imputed)		Numeric		23
CHILD_HEIGHT_INCHES_REPORTED	S11	Child's height: Inches (as reported)		Numeric		9
CHILD_HEIGHT_PROCMI	NA	Imputed child height		Numeric		
CHILDID	NA	Concatenation of SAMPNO and CHILD_ID		Text		38
CHILD_ID	NA	MULTIPLE_IMPUTATION Table: Child identifier CHILD Table: Child identifier		Text		2
CHILD_ID_SURVEY	NA	Child identifier being reported for by car seat eligible person		Text	4	
CHILD_MONTH	S4	Number of children driven at least 2 times a month	How many children under age 9 do you drive in a vehicle at least 2 times a month?	Numeric	9	

NAME	QUESTION #	LABEL	QUESTION TEXT	DATA TYPE	TABLE: PERSON	TABLE: CHILD
CHILD_RELATION	S13	Relationship to child	What is your relationship to [$CHILD_NAME]?	Text		10
CHILD_RELATION_O	S13	Relationship to child (Other)	Please specify your relationship to [$CHILD_NAME].	Text		11
CHILD_SEAT_IM	S16	Type of seat child usually rides in	How does [$CHILD_NAME] usually ride with you in a vehicle?	Text		14
CHILD_WEIGHT	NA	Child's weight (imputed)		Numeric		24
CHILD_WEIGHTDONOR	NA	DONOR CHILDID FOR CHILD_WEIGHT		Text		29
CHILD_WEIGHT_FLAG	NA	Child weight imputation flag (0=not imputed;1=imputed)		Numeric		
CHILD_WEIGHT_PROCMI	NA	Imputed child weight		Numeric		
CHILD_WEIGHT_REPORTED	S12	Child's weight (as reported)	What is [$CHILD_NAME]'s weight in pounds? Please try to provide your best guess.	Numeric		7

NAME	QUESTION #	LABEL	QUESTION TEXT	DATA TYPE	TABLE: PERSON	TABLE: CHILD
COMM_SERV	4-3	Car seat inspections availability	Are car seat inspections available in your area?	Text	54	
CONF_FIRST	2-3	Confidence attaching car seat and buckling in child the first time	The first time you attached this [$CHILD_SEAT:R[$SEL_CHILD]] and buckled [$CHILD_NAME:R[$SEL_CHILD]] in, how confident were you that you did it right?	Text	36	
CONF_WHY_1	1-4	Reason confident that the CRS is attached correctly: I followed the instructions	Why are you [$SEAT_CONF_TEXT] that this [$CHILD_SEAT:R[$SEL_CHILD]] is attached correctly? [CHECK ALL THAT APPLY]	Text	123	
CONF_WHY_2	1-4	Reason confident that the CRS is attached correctly: It seems right	Why are you [$SEAT_CONF_TEXT] that this [$CHILD_SEAT:R[$SEL_CHILD]] is attached correctly? [CHECK ALL THAT APPLY]	Text	124	
CONF_WHY_3	1-4	Reason confident that the CRS is attached correctly: I followed a video	Why are you [$SEAT_CONF_TEXT] that this [$CHILD_SEAT:R[$SEL_CHILD]] is attached correctly? [CHECK ALL THAT APPLY]	Text	125	

NAME	QUESTION #	LABEL	QUESTION TEXT	DATA TYPE	TABLE: PERSON	TABLE: CHILD
CONF_WHY_4	1-4	Reason confident that the CRS is attached correctly: Someone helped me attach the seat	Why are you [$SEAT_CONF_TEXT] that this [$CHILD_SEAT:R[$SEL_CHILD]] is attached correctly? [CHECK ALL THAT APPLY]	Text	126	
CONF_WHY_5	1-4	Reason confident that the CRS is attached correctly: I check the car seat often	Why are you [$SEAT_CONF_TEXT] that this [$CHILD_SEAT:R[$SEL_CHILD]] is attached correctly? [CHECK ALL THAT APPLY]	Text	127	
CONF_WHY_O	1-4	Reason confident that the CRS is attached correctly (Other)	Why are you [$SEAT_CONF_TEXT] that this [$CHILD_SEAT:R[$SEL_CHILD]] is attached correctly? [CHECK ALL THAT APPLY]	Text	129	
CONF_WHY_SE	1-4	Reason confident that the CRS is attached correctly: Other, Specify	Why are you [$SEAT_CONF_TEXT] that this [$CHILD_SEAT:R[$SEL_CHILD]] is attached correctly? [CHECK ALL THAT APPLY]	Text	128	
CRASH_MISUSE	1-9	Likelihood that child is injured in crash if CRS not used correctly	If your [$CHILD_SEAT:R[$SEL_CHILD]] is not used correctly, how likely is it that [$CHILD_NAME:R[$SEL_CHILD]] would be injured in a crash?	Numeric	24	
DATE_COMPLETED	NA	Date when respondent completed survey		Text	2	

NAME	QUESTION #	LABEL	QUESTION TEXT	DATA TYPE	TABLE: PERSON	TABLE: CHILD
DIST_MILES	NA	Straight line distance in miles between sample household and the nearest inspection station		Numeric	233	
EDUC	NA	Respondent's highest level of education completed (imputed)		Text	253	
EDUCDONOR	NA	DONOR SAMPNO FOR EDUC		Text	263	
EDUC_REPORTED	7-5	Respondent's highest level of education completed (as reported)	What is the highest level of education you have completed?	Text	98	
ELSE_REC_1	4-9	Received help at a car seat inspection: A friend	Who else do you know that got help at a car seat inspection? [CHECK ALL THAT APPLY]	Text	130	
ELSE_REC_2	4-9	Received help at a car seat inspection: A family member	Who else do you know that got help at a car seat inspection? [CHECK ALL THAT APPLY]	Text	131	
ELSE_REC_3	4-9	Received help at a car seat inspection: A child care provider	Who else do you know that got help at a car seat inspection? [CHECK ALL THAT APPLY]	Text	132	

NAME	QUESTION #	LABEL	QUESTION TEXT	DATA TYPE	TABLE: PERSON	TABLE: CHILD
ELSE_REC_O	4-9	Received help at a car seat inspection (Other)	Who else do you know that got help at a car seat inspection? [CHECK ALL THAT APPLY]	Text	134	
ELSE_REC_OVALL	NA	Received help at a car seat inspection: Overall score for all known who received help		Numeric	234	
ELSE_REC_SE	4-9	Received help at a car seat inspection: Other, Specify	Who else do you know that got help at a car seat inspection? [CHECK ALL THAT APPLY]	Text	133	
EVENT_HELP_1	4-6	Led to getting help at a car seat inspection: Expected birth of a child	Which of the following led you to get help at a car seat inspection? [CHECK ALL THAT APPLY]	Text	135	
EVENT_HELP_2	4-6	Led to getting help at a car seat inspection: Got a different car seat	Which of the following led you to get help at a car seat inspection? [CHECK ALL THAT APPLY]	Text	136	
EVENT_HELP_3	4-6	Led to getting help at a car seat inspection: Got a different vehicle	Which of the following led you to get help at a car seat inspection? [CHECK ALL THAT APPLY]	Text	137	

NAME	QUESTION #	LABEL	QUESTION TEXT	DATA TYPE	TABLE: PERSON	TABLE: CHILD
EVENT_HELP_4	4-6	Led to getting help at a car seat inspection: Needed to move a child to a new seat	Which of the following led you to get help at a car seat inspection? [CHECK ALL THAT APPLY]	Text	138	
EVENT_HELP_5	4-6	Led to getting help at a car seat inspection: Expected someone else would drive with my child	Which of the following led you to get help at a car seat inspection? [CHECK ALL THAT APPLY]	Text	139	
EVENT_HELP_6	4-6	Led to getting help at a car seat inspection: Expected driving with a child passenger	Which of the following led you to get help at a car seat inspection? [CHECK ALL THAT APPLY]	Text	140	
EVENT_HELP_7	4-6	Led to getting help at a car seat inspection: Wanted to be sure seat was attached correctly	Which of the following led you to get help at a car seat inspection? [CHECK ALL THAT APPLY]	Text	141	
EVENT_HELP_O	4-6	Led to getting help at a car seat inspection (Other)	Which of the following led you to get help at a car seat inspection? [CHECK ALL THAT APPLY]	Text	143	
EVENT_HELP_SE	4-6	Led to getting help at a car seat inspection: Other, Specify	Which of the following led you to get help at a car seat inspection? [CHECK ALL THAT APPLY]	Text	142	

NAME	QUESTION #	LABEL	QUESTION TEXT	DATA TYPE	TABLE: PERSON	TABLE: CHILD
FIND_SERV_1	4-2	Found out about car seat inspections from: Obstetrician, OB/GYN	How did you find out about these car seat inspections? [CHECK ALL THAT APPLY]	Text	144	
FIND_SERV_10	4-2	Found out about car seat inspections from: Drove by a location that offers these services	How did you find out about these car seat inspections? [CHECK ALL THAT APPLY]	Text	153	
FIND_SERV_11	4-2	Found out about car seat inspections from: Childcare or parenting class	How did you find out about these car seat inspections? [CHECK ALL THAT APPLY]	Text	154	
FIND_SERV_12	4-2	Found out about car seat inspections from: Saw a sign	How did you find out about these car seat inspections? [CHECK ALL THAT APPLY]	Text	155	
FIND_SERV_2	4-2	Found out about car seat inspections from: Pediatrician	How did you find out about these car seat inspections? [CHECK ALL THAT APPLY]	Text	145	
FIND_SERV_3	4-2	Found out about car seat inspections from: TV or Radio	How did you find out about these car seat inspections? [CHECK ALL THAT APPLY]	Text	146	

NAME	QUESTION #	LABEL	QUESTION TEXT	DATA TYPE	TABLE: PERSON	TABLE: CHILD
FIND_SERV_4	4-2	Found out about car seat inspections from: Local paper	How did you find out about these car seat inspections? [CHECK ALL THAT APPLY]	Text	147	
FIND_SERV_5	4-2	Found out about car seat inspections from: Friend	How did you find out about these car seat inspections? [CHECK ALL THAT APPLY]	Text	148	
FIND_SERV_6	4-2	Found out about car seat inspections from: Family member	How did you find out about these car seat inspections? [CHECK ALL THAT APPLY]	Text	149	
FIND_SERV_7	4-2	Found out about car seat inspections from: Social Worker	How did you find out about these car seat inspections? [CHECK ALL THAT APPLY]	Text	150	
FIND_SERV_8	4-2	Found out about car seat inspections from: Birthing Class	How did you find out about these car seat inspections? [CHECK ALL THAT APPLY]	Text	151	
FIND_SERV_9	4-2	Found out about car seat inspections from: Social media, mobile apps, website	How did you find out about these car seat inspections? [CHECK ALL THAT APPLY]	Text	152	

NAME	QUESTION #	LABEL	QUESTION TEXT	DATA TYPE	TABLE: PERSON	TABLE: CHILD
FIND_SERV_O	4-2	Found out about car seat inspections from (Other)	How did you find out about these car seat inspections? [CHECK ALL THAT APPLY]	Text	157	
FIND_SERV_OVALL	NA	Found out about car seat inspections: Overall score for all who provided information on stations		Numeric	235	
FIND_SERV_SE	4-2	Found out about car seat inspections from: Other, Specify	How did you find out about these car seat inspections? [CHECK ALL THAT APPLY]	Text	156	
FIN_WGT	NA	Final Trimmed raked weight		Numeric	284	
FIN_WGT1	NA	Trimmed Raked Replicate Weight 1		Numeric	285	
FIN_WGT10	NA	Trimmed Raked Replicate Weight 10		Numeric	294	
FIN_WGT11	NA	Trimmed Raked Replicate Weight 11		Numeric	295	

NAME	QUESTION #	LABEL	QUESTION TEXT	DATA TYPE	TABLE: PERSON	TABLE: CHILD
FIN_WGT12	NA	Trimmed Raked Replicate Weight 12		Numeric	296	
FIN_WGT13	NA	Trimmed Raked Replicate Weight 13		Numeric	297	
FIN_WGT14	NA	Trimmed Raked Replicate Weight 14		Numeric	298	
FIN_WGT15	NA	Trimmed Raked Replicate Weight 15		Numeric	299	
FIN_WGT16	NA	Trimmed Raked Replicate Weight 16		Numeric	300	
FIN_WGT17	NA	Trimmed Raked Replicate Weight 17		Numeric	301	
FIN_WGT18	NA	Trimmed Raked Replicate Weight 18		Numeric	302	
FIN_WGT19	NA	Trimmed Raked Replicate Weight 19		Numeric	303	

NAME	QUESTION #	LABEL	QUESTION TEXT	DATA TYPE	TABLE: PERSON	TABLE: CHILD
FIN_WGT2	NA	Trimmed Raked Replicate Weight 2		Numeric	286	
FIN_WGT20	NA	Trimmed Raked Replicate Weight 20		Numeric	304	
FIN_WGT21	NA	Trimmed Raked Replicate Weight 21		Numeric	305	
FIN_WGT22	NA	Trimmed Raked Replicate Weight 22		Numeric	306	
FIN_WGT23	NA	Trimmed Raked Replicate Weight 23		Numeric	307	
FIN_WGT24	NA	Trimmed Raked Replicate Weight 24		Numeric	308	
FIN_WGT25	NA	Trimmed Raked Replicate Weight 25		Numeric	309	
FIN_WGT26	NA	Trimmed Raked Replicate Weight 26		Numeric	310	

NAME	QUESTION #	LABEL	QUESTION TEXT	DATA TYPE	TABLE: PERSON	TABLE: CHILD
FIN_WGT27	NA	Trimmed Raked Replicate Weight 27		Numeric	311	
FIN_WGT28	NA	Trimmed Raked Replicate Weight 28		Numeric	312	
FIN_WGT29	NA	Trimmed Raked Replicate Weight 29		Numeric	313	
FIN_WGT3	NA	Trimmed Raked Replicate Weight 3		Numeric	287	
FIN_WGT30	NA	Trimmed Raked Replicate Weight 30		Numeric	314	
FIN_WGT31	NA	Trimmed Raked Replicate Weight 31		Numeric	315	
FIN_WGT32	NA	Trimmed Raked Replicate Weight 32		Numeric	316	
FIN_WGT33	NA	Trimmed Raked Replicate Weight 33		Numeric	317	

NAME	QUESTION #	LABEL	QUESTION TEXT	DATA TYPE	TABLE: PERSON	TABLE: CHILD
FIN_WGT34	NA	Trimmed Raked Replicate Weight 34		Numeric	318	
FIN_WGT35	NA	Trimmed Raked Replicate Weight 35		Numeric	319	
FIN_WGT36	NA	Trimmed Raked Replicate Weight 36		Numeric	320	
FIN_WGT37	NA	Trimmed Raked Replicate Weight 37		Numeric	321	
FIN_WGT38	NA	Trimmed Raked Replicate Weight 38		Numeric	322	
FIN_WGT39	NA	Trimmed Raked Replicate Weight 39		Numeric	323	
FIN_WGT4	NA	Trimmed Raked Replicate Weight 4		Numeric	288	
FIN_WGT40	NA	Trimmed Raked Replicate Weight 40		Numeric	324	

NAME	QUESTION #	LABEL	QUESTION TEXT	DATA TYPE	TABLE: PERSON	TABLE: CHILD
FIN_WGT41	NA	Trimmed Raked Replicate Weight 41		Numeric	325	
FIN_WGT42	NA	Trimmed Raked Replicate Weight 42		Numeric	326	
FIN_WGT43	NA	Trimmed Raked Replicate Weight 43		Numeric	327	
FIN_WGT44	NA	Trimmed Raked Replicate Weight 44		Numeric	328	
FIN_WGT45	NA	Trimmed Raked Replicate Weight 45		Numeric	329	
FIN_WGT46	NA	Trimmed Raked Replicate Weight 46		Numeric	330	
FIN_WGT47	NA	Trimmed Raked Replicate Weight 47		Numeric	331	
FIN_WGT48	NA	Trimmed Raked Replicate Weight 48		Numeric	332	

NAME	QUESTION #	LABEL	QUESTION TEXT	DATA TYPE	TABLE: PERSON	TABLE: CHILD
FIN_WGT49	NA	Trimmed Raked Replicate Weight 49		Numeric	333	
FIN_WGT5	NA	Trimmed Raked Replicate Weight 5		Numeric	289	
FIN_WGT50	NA	Trimmed Raked Replicate Weight 50		Numeric	334	
FIN_WGT51	NA	Trimmed Raked Replicate Weight 51		Numeric	335	
FIN_WGT52	NA	Trimmed Raked Replicate Weight 52		Numeric	336	
FIN_WGT53	NA	Trimmed Raked Replicate Weight 53		Numeric	337	
FIN_WGT54	NA	Trimmed Raked Replicate Weight 54		Numeric	338	
FIN_WGT55	NA	Trimmed Raked Replicate Weight 55		Numeric	339	

NAME	QUESTION #	LABEL	QUESTION TEXT	DATA TYPE	TABLE: PERSON	TABLE: CHILD
FIN_WGT56	NA	Trimmed Raked Replicate Weight 56		Numeric	340	
FIN_WGT57	NA	Trimmed Raked Replicate Weight 57		Numeric	341	
FIN_WGT58	NA	Trimmed Raked Replicate Weight 58		Numeric	342	
FIN_WGT59	NA	Trimmed Raked Replicate Weight 59		Numeric	343	
FIN_WGT6	NA	Trimmed Raked Replicate Weight 6		Numeric	290	
FIN_WGT60	NA	Trimmed Raked Replicate Weight 60		Numeric	344	
FIN_WGT7	NA	Trimmed Raked Replicate Weight 7		Numeric	291	
FIN_WGT8	NA	Trimmed Raked Replicate Weight 8		Numeric	292	

NAME	QUESTION #	LABEL	QUESTION TEXT	DATA TYPE	TABLE: PERSON	TABLE: CHILD
FIN_WGT9	NA	Trimmed Raked Replicate Weight 9		Numeric	293	
FORM_HELP	4-4	Received help at a car seat inspection from someone with formal training	Have you ever gotten any help at a car seat inspection from someone who has formal training? Please consider help you received for seats for any child you drive now or in the past.	Text	55	
HELP_ADD	5-12	Consider getting additional help at a car seat inspection	Would you consider getting additional help at a car seat inspection?	Text	79	
HELP_BEST_1	6-1	Best location to get car seat inspections: Child care provider/school	Which of the following would be the best locations for you to get car seat inspections? [CHECK ALL THAT APPLY]	Text	158	
HELP_BEST_10	6-1	Best location to get car seat inspections: Community center	Which of the following would be the best locations for you to get car seat inspections? [CHECK ALL THAT APPLY]	Text	167	
HELP_BEST_11	6-1	Best location to get car seat inspections: Police station	Which of the following would be the best locations for you to get car seat inspections? [CHECK ALL THAT APPLY]	Text	168	

NAME	QUESTION #	LABEL	QUESTION TEXT	DATA TYPE	TABLE: PERSON	TABLE: CHILD
HELP_BEST_12	6-1	Best location to get car seat inspections: Firehouse	Which of the following would be the best locations for you to get car seat inspections? [CHECK ALL THAT APPLY]	Text	169	
HELP_BEST_2	6-1	Best location to get car seat inspections: Department of Motor Vehicles (DMV)	Which of the following would be the best locations for you to get car seat inspections? [CHECK ALL THAT APPLY]	Text	159	
HELP_BEST_3	6-1	Best location to get car seat inspections: Doctor's office	Which of the following would be the best locations for you to get car seat inspections? [CHECK ALL THAT APPLY]	Text	160	
HELP_BEST_4	6-1	Best location to get car seat inspections: Vehicle dealership	Which of the following would be the best locations for you to get car seat inspections? [CHECK ALL THAT APPLY]	Text	161	
HELP_BEST_5	6-1	Best location to get car seat inspections: Social services	Which of the following would be the best locations for you to get car seat inspections? [CHECK ALL THAT APPLY]	Text	162	

NAME	QUESTION #	LABEL	QUESTION TEXT	DATA TYPE	TABLE: PERSON	TABLE: CHILD
HELP_BEST_6	6-1	Best location to get car seat inspections: Women, Infant, and Children (WIC) Program	Which of the following would be the best locations for you to get car seat inspections? [CHECK ALL THAT APPLY]	Text	163	
HELP_BEST_7	6-1	Best location to get car seat inspections: Hospital	Which of the following would be the best locations for you to get car seat inspections? [CHECK ALL THAT APPLY]	Text	164	
HELP_BEST_8	6-1	Best location to get car seat inspections: Emissions inspection	Which of the following would be the best locations for you to get car seat inspections? [CHECK ALL THAT APPLY]	Text	165	
HELP_BEST_9	6-1	Best location to get car seat inspections: Places car seats are sold	Which of the following would be the best locations for you to get car seat inspections? [CHECK ALL THAT APPLY]	Text	166	
HELP_BEST_DK	6-1	Best location to get car seat inspections: Does not know answer	Which of the following would be the best locations for you to get car seat inspections? [CHECK ALL THAT APPLY]	Text	171	

NAME	QUESTION #	LABEL	QUESTION TEXT	DATA TYPE	TABLE: PERSON	TABLE: CHILD
HELP_BEST_O	6-1	Best location to get car seat inspections (Other)	Which of the following would be the best locations for you to get car seat inspections? [CHECK ALL THAT APPLY]	Text	172	
HELP_BEST_SE	6-1	Best location to get car seat inspections: Other, Specify	Which of the following would be the best locations for you to get car seat inspections? [CHECK ALL THAT APPLY]	Text	170	
HELP_COMF	5-10	Comfortability attaching and securing car seat after receiving a car seat inspection	After receiving a car seat inspection, how comfortable were you with attaching the seat and securing your child in it on your own?	Numeric	76	
HELP_MILES	5-7	Distance to nearest car seat inspection location (miles)	How many miles away is the nearest location offering a car seat inspection?	Numeric	77	
HELP_MIN	5-8	Minutes it took to drive to car seat inspection location	How many minutes did it take to drive to the location where you received a car seat inspection?	Text	75	
HELP_PREVENT_BAD	6-4	Reason preventing respondent from using a car seat inspection: Bad previous experience	Bad previous experience	Text	87	

NAME	QUESTION #	LABEL	QUESTION TEXT	DATA TYPE	TABLE: PERSON	TABLE: CHILD
HELP_PREVENT_COMM	6-4	Reason preventing respondent from using a car seat inspection: Difficulty communicating with staff	Difficulty communicating with staff	Text	86	
HELP_PREVENT_CONTC	6-4	Reason preventing respondent from using a car seat inspection: Difficulty contacting the car seat inspection	Difficulty contacting the car seat inspection	Text	85	
HELP_PREVENT_COST	6-4	Reason preventing respondent from using a car seat inspection: Car seat inspection costs money	Car seat inspection costs money	Text	84	
HELP_PREVENT_FAR	6-4	Reason preventing respondent from using a car seat inspection: Location - too far away	Location - too far away	Text	93	
HELP_PREVENT_NECSRY	6-4	Reason preventing respondent from using a car seat inspection: Don't think it's necessary	Don't think it's necessary	Text	92	
HELP_PREVENT_O	6-4	Reason preventing respondent from using a car seat inspection (Other)	Please specify what else would prevent you from using a car seat inspection.	Text	88	

NAME	QUESTION #	LABEL	QUESTION TEXT	DATA TYPE	TABLE: PERSON	TABLE: CHILD
HELP_PREVENT_OVALL	NA	Reason preventing respondent from using a car seat inspection: Overall score for all reasons mentioned		Numeric	236	
HELP_PREVENT_SCHED	6-4	Reason preventing respondent from using a car seat inspection: Schedule conflicts	Schedule conflicts	Text	91	
HELP_PREVENT_SE	6-4	Reason preventing respondent from using a car seat inspection: Other, Specify	Other, Specify	Text	90	
HELP_PREVENT_WAIT	6-4	Reason preventing respondent from using a car seat inspection: Long waiting time	Long waiting time	Text	89	
HELP_SAT	5-11	Satisfaction with service received at a car seat inspection	Overall, how satisfied were you with the service you received?	Numeric	78	
HELP_SERV	6-2	Most important service at an inspection location	Which one of the following services is most important to you to have at an inspection location?	Text	82	
HELP_SERV_O	6-2	Most important service at an inspection location (Other)	Please specify which other services would be most important to you to have at this location.	Text	81	

NAME	QUESTION #	LABEL	QUESTION TEXT	DATA TYPE	TABLE: PERSON	TABLE: CHILD
HELP_TYPE_1	5-9	Type of help received at a car seat inspection: Instruction in attaching the seat to the vehicle	What type of help did you receive? [CHECK ALL THAT APPLY]	Text	173	
HELP_TYPE_2	5-9	Type of help received at a car seat inspection: Instruction in buckling the child tin the seat	What type of help did you receive? [CHECK ALL THAT APPLY]	Text	174	
HELP_TYPE_3	5-9	Type of help received at a car seat inspection: Checking car seat for recalls	What type of help did you receive? [CHECK ALL THAT APPLY]	Text	175	
HELP_TYPE_4	5-9	Type of help received at a car seat inspection: Checking car seat for the expiration date	What type of help did you receive? [CHECK ALL THAT APPLY]	Text	176	
HELP_TYPE_5	5-9	Type of help received at a car seat inspection: Educational material on child safety	What type of help did you receive? [CHECK ALL THAT APPLY]	Text	177	
HELP_TYPE_6	5-9	Type of help received at a car seat inspection: Information about the next car seat stage for the child	What type of help did you receive? [CHECK ALL THAT APPLY]	Text	178	

NAME	QUESTION #	LABEL	QUESTION TEXT	DATA TYPE	TABLE: PERSON	TABLE: CHILD
HELP_TYPE_7	5-9	Type of help received at a car seat inspection: Practice installing it myself	What type of help did you receive? [CHECK ALL THAT APPLY]	Text	179	
HELP_TYPE_O	5-9	Type of help received at a car seat inspection (Other)	What type of help did you receive? [CHECK ALL THAT APPLY]	Text	181	
HELP_TYPE_OVALL	NA	Type of help received at car seat inspection: Overall score for all types of help		Numeric	237	
HELP_TYPE_SE	5-9	Type of help received at a car seat inspection: Other, Specify	What type of help did you receive? [CHECK ALL THAT APPLY]	Text	180	
HISP	NA	Hispanic or Latino origin (imputed)		Text	254	
HISPDONOR	NA	DONOR SAMPNO FOR HISP		Text	264	
HISP_REPORTED	7-3	Hispanic or Latino origin (as reported)	Are you of Hispanic or Latino origin?	Text	97	
HOUSE_DRIVER	S3	Availability of person who drives with a child passenger most often	Is the individual who drives most often with a child passenger available to participate in this survey at this time?	Text	7	

NAME	QUESTION #	LABEL	QUESTION TEXT	DATA TYPE	TABLE: PERSON	TABLE: CHILD
IMPAGE	NA	IMPUTE FLAG FOR AGE		Text	265	
IMPCHILD_AGE_INMONTH	NA	IMPUTE FLAG FOR CHILD_AGE_INMONTH		Text		30
IMPCHILD_AGE_MONTH	NA	IMPUTE FLAG FOR CHILD_AGE_MONTH		Text		31
IMPCHILD_AGE_YEAR	NA	IMPUTE FLAG FOR CHILD_AGE_YEAR		Text		32
IMPCHILD_GENDER	NA	IMPUTE FLAG FOR CHILD_GENDER		Text		33
IMPCHILD_HEIGHT	NA	IMPUTE FLAG FOR CHILD_HEIGHT		Text		34
IMPCHILD_HEIGHT_FEET	NA	IMPUTE FLAG FOR CHILD_HEIGHT_FEET		Text		35
IMPCHILD_HEIGHT_INCHES	NA	IMPUTE FLAG FOR CHILD_HEIGHT_INCHES		Text		36

NAME	QUESTION #	LABEL	QUESTION TEXT	DATA TYPE	TABLE: PERSON	TABLE: CHILD
IMPCHILD_WEIGHT	NA	IMPUTE FLAG FOR CHILD_WEIGHT		Text		37
IMPEDUC	NA	IMPUTE FLAG FOR EDUC		Text	266	
IMPHISP	NA	IMPUTE FLAG FOR HISP		Text	267	
IMPINCOME	NA	IMPUTE FLAG FOR INCOME		Text	268	
IMPRACE_1	NA	IMPUTE FLAG FOR RACE_1		Text	269	
IMPRACE_2	NA	IMPUTE FLAG FOR RACE_2		Text	270	
IMPRACE_3	NA	IMPUTE FLAG FOR RACE_3		Text	271	
IMPRACE_4	NA	IMPUTE FLAG FOR RACE_4		Text	272	

NAME	QUESTION #	LABEL	QUESTION TEXT	DATA TYPE	TABLE: PERSON	TABLE: CHILD
IMPRACE_5	NA	IMPUTE FLAG FOR RACE_5		Text	273	
IMPSEX	NA	IMPUTE FLAG FOR SEX		Text	274	
IMPUTATION	NA	Imputation set identifier		Numeric		
INCOME	NA	Annual household income from all sources in 2016 (imputed)		Numeric	255	
INCOMEDONOR	NA	DONOR SAMPNO FOR INCOME		Text	275	
INCOME_REPORTED	7-8	Annual household income from all sources in 2016 (as reported)	What was your annual household income from all sources in 2016?	Text	100	
INFO_ATTACH_1	3-2	Information sought about attaching a car seat: Which direction the seat should face	What information about attaching a car seat were you looking for? [CHECK ALL THAT APPLY]	Text	182	

NAME	QUESTION #	LABEL	QUESTION TEXT	DATA TYPE	TABLE: PERSON	TABLE: CHILD
INFO_ATTACH_2	3-2	Information sought about attaching a car seat: Which seat in the car to attach it to	What information about attaching a car seat were you looking for? [CHECK ALL THAT APPLY]	Text	183	
INFO_ATTACH_3	3-2	Information sought about attaching a car seat: Using LATCH - lower anchors and/or the top tether	What information about attaching a car seat were you looking for? [CHECK ALL THAT APPLY]	Text	184	
INFO_ATTACH_4	3-2	Information sought about attaching a car seat: Which vehicles are suitable for the car seat	What information about attaching a car seat were you looking for? [CHECK ALL THAT APPLY]	Text	185	
INFO_ATTACH_5	3-2	Information sought about attaching a car seat: Steps for attaching the car seat	What information about attaching a car seat were you looking for? [CHECK ALL THAT APPLY]	Text	186	
INFO_ATTACH_6	3-2	Information sought about attaching a car seat: Weight and height restrictions	What information about attaching a car seat were you looking for? [CHECK ALL THAT APPLY]	Text	187	
INFO_ATTACH_O	3-2	Information sought about attaching a car seat (Other)	What information about attaching a car seat were you looking for? [CHECK ALL THAT APPLY]	Text	189	

NAME	QUESTION #	LABEL	QUESTION TEXT	DATA TYPE	TABLE: PERSON	TABLE: CHILD
INFO_ATTACH_SE	3-2	Information sought about attaching a car seat: Other, Specify	What information about attaching a car seat were you looking for? [CHECK ALL THAT APPLY]	Text	188	
INFO_SOURCE_CARE	3-3	Information about child car seats received from: A child care provider	A child care provider?	Text	47	
INFO_SOURCE_COMP	3-3	Information about child car seats received from: A car seat company (hotline, website, product QR codes)	A car seat company (hotline, website, product QR codes)?	Text	48	
INFO_SOURCE_DOC	3-3	Information about child car seats received from: A doctor or medical professional	A doctor or medical professional?	Text	49	
INFO_SOURCE_FAM	3-3	Information about child car seats received from: A family member or friend	A family member or friend?	Text	50	
INFO_SOURCE_HOTLN	3-3	Information about child car seats received from: A safety hotline	A safety hotline?	Text	51	
INFO_SOURCE_MAG	3-3	Information about child car seats received from: A book or magazine	A book or magazine?	Text	40	

NAME	QUESTION #	LABEL	QUESTION TEXT	DATA TYPE	TABLE: PERSON	TABLE: CHILD
INFO_SOURCE_MANUAL	3-3	Information about child car seats received from: A car seat instruction manual	A car seat instruction manual?	Text	41	
INFO_SOURCE_MEDIA	3-3	Information about child car seats received from: Social media, a mobile app, or a website	Social media, a mobile app, or a website?	Text	46	
INFO_SOURCE_O	3-3	Information about child car seats received from (Other)	Please specify where else you got information about car seats from.	Text	45	
INFO_SOURCE_OVALL	NA	Information about car seats: Overall score for all sources of information		Numeric	238	
INFO_SOURCE_PLCE	3-3	Information about child car seats received from: A Police or Fire Department	A Police or Fire Department?	Text	43	
INFO_SOURCE_SE	3-3	Information about child car seats received from: Other, Specify	Other, Specify	Text	44	
INFO_SOURCE_TRAIN	3-3	Information about child car seats received from: Someone formally trained in car seats	Someone formally trained in car seats?	Text	42	
INFO_SOURCE_TV	3-3	Information about child car seats received from: TV or radio	TV or radio?	Text	52	

NAME	QUESTION #	LABEL	QUESTION TEXT	DATA TYPE	TABLE: PERSON	TABLE: CHILD
INTENT_VISIT	NA	Has received or intends to receive support from a car seat inspection station		Text	231	
JKCOEFFICIENT	NA	Jackknife coefficient		Numeric		
KNOW_REC	4-8	Others received help at a car seat inspection	Do you know anyone else who has gotten help at a car seat inspection?	Text	58	
LONG_HELP	5-2	Time since receiving help at a car seat inspection	How long ago did you get help at a car seat inspection?	Numeric	71	
LOW_CRASH	1-8	Usefulness of car seat preventing injury during a low-speed crash	In the event of a low-speed crash (30 mph or less), how useful will your [$CHILD_SEAT:R[$SEL_CHILD]] be in preventing [$CHILD_NAME:R[$SEL_CHILD]] from being injured?	Numeric	23	
MANY_HELP	5-1	Number of times respondent received help at a car seat inspection	How many times did you get help at a car seat inspection from someone who had formal car seat training? Please consider all seats and all children you have driven.	Text	70	
MOST_DRIVER	S2	Person who drives with a child passenger most often	Are you the person living in your household who drives most often with a child passenger under age 9?	Text	6	

NAME	QUESTION #	LABEL	QUESTION TEXT	DATA TYPE	TABLE: PERSON	TABLE: CHILD
NEW_INTRO	NA	Frequency of driving a vehicle with a child passenger in a typical month	To help us understand the experience of adults traveling with children in cars, the National Highway Traffic Safety Administration, at the DOT, has asked your household to participate in this Child Safety Survey. We are asking the individual who drives most often with a child passenger to participate in the survey on behalf of the household. In a typical month, how often do you drive a vehicle with a child passenger under the age of 9?	Numeric	8	
NO_ADD_HELP_1	5-14	Reason why additional car seat help was not sought: The child is too old now	Why wouldn't you consider getting additional car seat help? [CHECK ALL THAT APPLY]	Text	190	
NO_ADD_HELP_2	5-14	Reason why additional car seat help was not sought: I already know how to install a seat	Why wouldn't you consider getting additional car seat help? [CHECK ALL THAT APPLY]	Text	191	
NO_ADD_HELP_3	5-14	Reason why additional car seat help was not sought: The service takes too long	Why wouldn't you consider getting additional car seat help? [CHECK ALL THAT APPLY]	Text	192	

NAME	QUESTION #	LABEL	QUESTION TEXT	DATA TYPE	TABLE: PERSON	TABLE: CHILD
NO_ADD_HELP_4	5-14	Reason why additional car seat help was not sought: You need to set up an appointment in advance	Why wouldn't you consider getting additional car seat help? [CHECK ALL THAT APPLY]	Text	193	
NO_ADD_HELP_5	5-14	Reason why additional car seat help was not sought: It is too far away	Why wouldn't you consider getting additional car seat help? [CHECK ALL THAT APPLY]	Text	194	
NO_ADD_HELP_6	5-14	Reason why additional car seat help was not sought: The car seat inspection costs money	Why wouldn't you consider getting additional car seat help? [CHECK ALL THAT APPLY]	Text	195	
NO_ADD_HELP_7	5-14	Reason why additional car seat help was not sought: I wasn't satisfied with my previous experience	Why wouldn't you consider getting additional car seat help? [CHECK ALL THAT APPLY]	Text	196	
NO_ADD_HELP_8	5-14	Reason why additional car seat help was not sought: I learned all I needed to know from my previous experience	Why wouldn't you consider getting additional car seat help? [CHECK ALL THAT APPLY]	Text	197	
NO_ADD_HELP_O	5-14	Reason why additional car seat help was not sought (Other)	Why wouldn't you consider getting additional car seat help? [CHECK ALL THAT APPLY]	Text	199	

NAME	QUESTION #	LABEL	QUESTION TEXT	DATA TYPE	TABLE: PERSON	TABLE: CHILD
NO_ADD_HELP_SE	5-14	Reason why additional car seat help was not sought: Other, Specify	Why wouldn't you consider getting additional car seat help? [CHECK ALL THAT APPLY]	Text	198	
NOT_CONF_WHY_1	1-5	Reason why not confident that the child car seat is not attached correctly: The instructions were very complicated	Why aren't you confident that this [$CHILD_SEAT:R[$SEL_CHILD]] is attached correctly? [CHECK ALL THAT APPLY]	Text	200	
NOT_CONF_WHY_2	1-5	Reason why not confident that the child car seat is not attached correctly: It seems wrong	Why aren't you confident that this [$CHILD_SEAT:R[$SEL_CHILD]] is attached correctly? [CHECK ALL THAT APPLY]	Text	201	
NOT_CONF_WHY_3	1-5	Reason why not confident that the child car seat is not attached correctly: It seems too loose	Why aren't you confident that this [$CHILD_SEAT:R[$SEL_CHILD]] is attached correctly? [CHECK ALL THAT APPLY]	Text	202	
NOT_CONF_WHY_4	1-5	Reason why not confident that the child car seat is not attached correctly: Someone told me the seat was not attached correctly	Why aren't you confident that this [$CHILD_SEAT:R[$SEL_CHILD]] is attached correctly? [CHECK ALL THAT APPLY]	Text	203	

NAME	QUESTION #	LABEL	QUESTION TEXT	DATA TYPE	TABLE: PERSON	TABLE: CHILD
NOT_CONF_WHY_O	1-5	Reason why not confident that the child car seat is not attached correctly (Other)	Why aren't you confident that this [$CHILD_SEAT:R[$SEL_CHILD]] is attached correctly? [CHECK ALL THAT APPLY]	Text	205	
NOT_CONF_WHY_SE	1-5	Reason why not confident that the child car seat is not attached correctly: Other, Specify	Why aren't you confident that this [$CHILD_SEAT:R[$SEL_CHILD]] is attached correctly? [CHECK ALL THAT APPLY]	Text	204	
NSUBS_PSUFLAG	NA	1=NSUBS PSU; 0=non-NSUBS PSU		Text	239	
PHASE	NA	Data collection phase		Text	240	
PREVENT_MOST	6-5	Most likely to keep respondent from using a car seat inspection	Which one of the following is most likely to keep you from using a car seat inspection?	Text	94	
PROPER_USE	NA	Proper selection of the CRS		Text		18
RACE_1	NA	Race: White (imputed)		Text	256	

NAME	QUESTION #	LABEL	QUESTION TEXT	DATA TYPE	TABLE: PERSON	TABLE: CHILD
RACE_1DONOR	NA	DONOR SAMPNO FOR RACE_1		Text	276	
RACE_1_REPORTED	7-4	Race: White (as reported)	What is your race? [Check all that apply]	Text	102	
RACE_2	NA	Race: Black or African American (imputed)		Text	257	
RACE_2DONOR	NA	DONOR SAMPNO FOR RACE_2		Text	277	
RACE_2_REPORTED	7-4	Race: Black or African American (as reported)	What is your race? [Check all that apply]	Text	103	
RACE_3	NA	Race: Asian (imputed)		Text	258	
RACE_3DONOR	NA	DONOR SAMPNO FOR RACE_3		Text	278	
RACE_3_REPORTED	7-4	Race: Asian (as reported)	What is your race? [Check all that apply]	Text	104	

NAME	QUESTION #	LABEL	QUESTION TEXT	DATA TYPE	TABLE: PERSON	TABLE: CHILD
RACE_4	NA	Race: American Indian or Alaska Native (imputed)		Text	259	
RACE_4DONOR	NA	DONOR SAMPNO FOR RACE_4		Text	279	
RACE_4_REPORTED	7-4	Race: American Indian or Alaska Native (as reported)	What is your race? [Check all that apply]	Text	105	
RACE_5	NA	Race: Native Hawaiian or other Pacific Islander (imputed)		Text	260	
RACE_5DONOR	NA	DONOR SAMPNO FOR RACE_5		Text	280	
RACE_5_REPORTED	7-4	Race: Native Hawaiian or other Pacific Islander (as reported)	What is your race? [Check all that apply]	Text	106	
RACE_DK	7-4	Race: Does not know answer	What is your race? [Check all that apply]	Text	107	
RACE_RF	7-4	Race: Refused to answer	What is your race? [Check all that apply]	Text	108	

NAME	QUESTION #	LABEL	QUESTION TEXT	DATA TYPE	TABLE: PERSON	TABLE: CHILD
REGION	NA	Census region		Text	241	
SAMPNO	NA	MULTIPLE_IMPUTATION Table: Sample identifier CHILD Table: Sample identifier PERSON Table: Sample identifier		Text	1	1
SEAT_ACCEPT_COMP	1-7	Acceptable for a child to ride in a vehicle not in a car seat when: The child is fussy and complaining	The child is fussy and complaining?	Text	18	
SEAT_ACCEPT_DIST	1-7	Acceptable for a child to ride in a vehicle not in a car seat when: Going only a short distance	Going only a short distance?	Text	22	
SEAT_ACCEPT_FIT	1-7	Acceptable for a child to ride in a vehicle not in a car seat when: The child does not fit in the car seat	The child does not fit in the car seat?	Text	19	
SEAT_ACCEPT_OVALL	NA	Acceptable for a child to ride in a vehicle not in a car seat: Overall score for child not fitting in car seat		Numeric	242	

NAME	QUESTION #	LABEL	QUESTION TEXT	DATA TYPE	TABLE: PERSON	TABLE: CHILD
SEAT_ACCEPT_POOL	1-7	Acceptable for a child to ride in a vehicle not in a car seat when: Riding in a carpool	Riding in a carpool?	Text	20	
SEAT_ACCEPT_RUSH	1-7	Acceptable for a child to ride in a vehicle not in a car seat when: You're in a rush to get somewhere	You're in a rush to get somewhere?	Text	21	
SEAT_ACCEPT_SLEEP	1-7	Acceptable for a child to ride in a vehicle not in a car seat when: The child is sleeping	The child is sleeping?	Text	15	
SEAT_ACCEPT_TAXI	1-7	Acceptable for a child to ride in a vehicle not in a car seat when: Riding in a taxi cab	Riding in a taxi cab?	Text	16	
SEAT_ACCEPT_UB	1-7	Acceptable for a child to ride in a vehicle not in a car seat when: Riding in an Uber, Lyft, or other Rideshare	Riding in an Uber, Lyft, or other Rideshare?	Text	17	
SEAT_CONF	1-3	Confidence that the child car seat is attached correctly	How confident are you that this [$CHILD_SEAT:R[$SEL_CHILD]] is attached correctly?	Numeric	10	
SEAT_FINE	7-2	Amount of fine for driving with a child who is not buckled in a car seat	Where you drive, how much is the fine for driving with a child who is not buckled in a car seat according to the local law?	Numeric	95	

NAME	QUESTION #	LABEL	QUESTION TEXT	DATA TYPE	TABLE: PERSON	TABLE: CHILD
SEAT_FINE_CORRECT	NA	Whether respondent correctly determined the fine		Numeric	243	
SEAT_FINE_NSUBS	NA	Fines associated with no CRS use		Numeric	244	
SEAT_FREQ	1-6	Frequency of moving the child car seat in/out of the vehicle	How frequently do you move this [$CHILD_SEAT:R[$SEL_CHILD]][$INCL_BASE] in and out of the vehicle?	Numeric	14	
SEAT_INFO_1	3-1	Information sought about child car seats: How to attach my car seat	Please consider all your experiences when searching for information about any car seats, for any child. What information have you looked for about car seats for children? By car seats, please consider all types, including booster seats. [CHECK ALL THAT APPLY]	Text	206	

NAME	QUESTION #	LABEL	QUESTION TEXT	DATA TYPE	TABLE: PERSON	TABLE: CHILD
SEAT_INFO_10	3-1	Information sought about child car seats: Car seat laws or fines	Please consider all your experiences when searching for information about any car seats, for any child. What information have you looked for about car seats for children? By car seats, please consider all types, including booster seats. [CHECK ALL THAT APPLY]	Text	215	
SEAT_INFO_11	3-1	Information sought about child car seats: I have never looked for any information on car seats for children	Please consider all your experiences when searching for information about any car seats, for any child. What information have you looked for about car seats for children? By car seats, please consider all types, including booster seats. [CHECK ALL THAT APPLY]	Text	216	

NAME	QUESTION #	LABEL	QUESTION TEXT	DATA TYPE	TABLE: PERSON	TABLE: CHILD
SEAT_INFO_2	3-1	Information sought about child car seats: When my child will outgrow the car seat	Please consider all your experiences when searching for information about any car seats, for any child. What information have you looked for about car seats for children? By car seats, please consider all types, including booster seats. [CHECK ALL THAT APPLY]	Text	207	
SEAT_INFO_3	3-1	Information sought about child car seats: When to move to the next car seat	Please consider all your experiences when searching for information about any car seats, for any child. What information have you looked for about car seats for children? By car seats, please consider all types, including booster seats. [CHECK ALL THAT APPLY]	Text	208	

NAME	QUESTION #	LABEL	QUESTION TEXT	DATA TYPE	TABLE: PERSON	TABLE: CHILD
SEAT_INFO_4	3-1	Information sought about child car seats: How to buckle my child in the car seat	Please consider all your experiences when searching for information about any car seats, for any child. What information have you looked for about car seats for children? By car seats, please consider all types, including booster seats. [CHECK ALL THAT APPLY]	Text	209	
SEAT_INFO_5	3-1	Information sought about child car seats: What kind of car seat to buy	Please consider all your experiences when searching for information about any car seats, for any child. What information have you looked for about car seats for children? By car seats, please consider all types, including booster seats. [CHECK ALL THAT APPLY]	Text	210	

NAME	QUESTION #	LABEL	QUESTION TEXT	DATA TYPE	TABLE: PERSON	TABLE: CHILD
SEAT_INFO_6	3-1	Information sought about child car seats: Costs of car seats	Please consider all your experiences when searching for information about any car seats, for any child. What information have you looked for about car seats for children? By car seats, please consider all types, including booster seats. [CHECK ALL THAT APPLY]	Text	211	
SEAT_INFO_7	3-1	Information sought about child car seats: Why a car seat is needed	Please consider all your experiences when searching for information about any car seats, for any child. What information have you looked for about car seats for children? By car seats, please consider all types, including booster seats. [CHECK ALL THAT APPLY]	Text	212	

NAME	QUESTION #	LABEL	QUESTION TEXT	DATA TYPE	TABLE: PERSON	TABLE: CHILD
SEAT_INFO_8	3-1	Information sought about child car seats: Ratings or reviews of car seats	Please consider all your experiences when searching for information about any car seats, for any child. What information have you looked for about car seats for children? By car seats, please consider all types, including booster seats. [CHECK ALL THAT APPLY]	Text	213	
SEAT_INFO_9	3-1	Information sought about child car seats: Recalls of car seats	Please consider all your experiences when searching for information about any car seats, for any child. What information have you looked for about car seats for children? By car seats, please consider all types, including booster seats. [CHECK ALL THAT APPLY]	Text	214	

NAME	QUESTION #	LABEL	QUESTION TEXT	DATA TYPE	TABLE: PERSON	TABLE: CHILD
SEAT_INFO_O	3-1	Information sought about child car seats (Other)	Please consider all your experiences when searching for information about any car seats, for any child. What information have you looked for about car seats for children? By car seats, please consider all types, including booster seats. [CHECK ALL THAT APPLY]	Text	218	
SEAT_INFO_OVALL	NA	Information sought about child car seats: Overall score for all information sought		Numeric	245	
SEAT_INFO_SE	3-1	Information sought about child car seats: Other, Specify	Please consider all your experiences when searching for information about any car seats, for any child. What information have you looked for about car seats for children? By car seats, please consider all types, including booster seats. [CHECK ALL THAT APPLY]	Text	217	
SEAT_OBTAIN	1-1	Obtaining the child car seat	How did you get the [$CHILD_SEAT:R[$SEL_CHILD]] that [$CHILD_NAME:R[$SEL_CHILD]] rides in?	Text	13	

NAME	QUESTION #	LABEL	QUESTION TEXT	DATA TYPE	TABLE: PERSON	TABLE: CHILD
SEAT_OBTAIN_O	1-1	Obtaining the child car seat (Other)	Please specify how you got the [$CHILD_SEAT:R[$SEL_CHILD]] that [$CHILD_NAME:R[$SEL_CHILD]] rides in.	Text	12	
SEAT_STATUS	1-2	Condition of child car seat when obtained	Was the [$CHILD_SEAT:R[$SEL_CHILD]] new or used when you got it?	Text	11	
SERV_IMPORT	6-3	Most important at a car seat inspection	Which one of the following is most important to you at a car seat inspection?	Text	80	
SERV_IMPORT_O	6-3	Most important at a car seat inspection (Other)	Please specify what else is important to you at a car seat inspection?	Text	83	
SEX	NA	Respondent's gender (imputed)		Text	261	
SEXDONOR	NA	DONOR SAMPNO FOR SEX		Text	281	
SEX_REPORTED	7-7	Respondent's gender (as reported)	Are you male or female?	Text	101	
STATE	NA	State		Text	246	

NAME	QUESTION #	LABEL	QUESTION TEXT	DATA TYPE	TABLE: PERSON	TABLE: CHILD
STATE_LAW	7-1	Car/booster seat state law	In your state, there is...	Text	96	
STATE_LAW_CORRECT	NA	Indicates whether the respondent correctly identified State CRS Law		Numeric	247	
STATE_LAW_NSUBS	NA	Type of State CRS law		Text	248	
STRONG_LAW_NSUBS	NA	Ranking of CRS law		Numeric	249	
TYP_MONTH	S1	Frequency of driving a vehicle with a child passenger in a typical month	In a typical month, how often do you drive a vehicle with a child passenger under the age of 9?	Numeric	5	
TYP_SEAT_HELP_1	5-3	Type of car seat respondent received help with: Infant car seat	What type of car seat(s) did you get help with? [CHECK ALL THAT APPLY]	Text	219	
TYP_SEAT_HELP_2	5-3	Type of car seat respondent received help with: Rear facing car seat	What type of car seat(s) did you get help with? [CHECK ALL THAT APPLY]	Text	220	

NAME	QUESTION #	LABEL	QUESTION TEXT	DATA TYPE	TABLE: PERSON	TABLE: CHILD
TYP_SEAT_HELP_3	5-3	Type of car seat respondent received help with: Forward facing car seat	What type of car seat(s) did you get help with? [CHECK ALL THAT APPLY]	Text	221	
TYP_SEAT_HELP_4	5-3	Type of car seat respondent received help with: High back booster car seat	What type of car seat(s) did you get help with? [CHECK ALL THAT APPLY]	Text	222	
TYP_SEAT_HELP_5	5-3	Type of car seat respondent received help with: Low back booster car seat	What type of car seat(s) did you get help with? [CHECK ALL THAT APPLY]	Text	223	
TYP_SEAT_HELP_OVALL	NA	Type of car seat respondent received help: Overall score for total number of seats help received		Numeric	250	
URBANICITY	NA	Census Bureau urbanicity code		Text	251	
VARSTRAT	NA	Variance stratum which is equal to STRATUM		Text	282	
VARUNIT	NA	Variance unit which is equal to PSU		Text	283	

NAME	QUESTION #	LABEL	QUESTION TEXT	DATA TYPE	TABLE: PERSON	TABLE: CHILD
WHERE_HELP	4-5	Location of the car seat inspection	Please answer the following questions about the most recent time you got help at a car seat inspection from someone who has formal training. Where did you get the car seat inspection?	Text	57	
WHERE_HELP_O	4-5	Location of the car seat inspection (Other)	Please specify the other location you got the car seat inspection.	Text	56	
WHY_HELP_1	4-7	Received help at a car seat inspection because: Someone recommended the service	Why did you decide to get help at a car seat inspection? [CHECK ALL THAT APPLY]	Text	224	
WHY_HELP_2	4-7	Received help at a car seat inspection because: The instructions for the car seat were confusing	Why did you decide to get help at a car seat inspection? [CHECK ALL THAT APPLY]	Text	225	
WHY_HELP_3	4-7	Received help at a car seat inspection because: I wasn't sure I attached it right	Why did you decide to get help at a car seat inspection? [CHECK ALL THAT APPLY]	Text	226	

NAME	QUESTION #	LABEL	QUESTION TEXT	DATA TYPE	TABLE: PERSON	TABLE: CHILD
WHY_HELP_4	4-7	Received help at a car seat inspection because: I felt it was important to get this service	Why did you decide to get help at a car seat inspection? [CHECK ALL THAT APPLY]	Text	227	
WHY_HELP_5	4-7	Received help at a car seat inspection because: I wasn't sure I attached it right	Why did you decide to get help at a car seat inspection? [CHECK ALL THAT APPLY]	Text	228	
WHY_HELP_O	4-7	Received help at a car seat inspection because (Other)	Why did you decide to get help at a car seat inspection? [CHECK ALL THAT APPLY]	Text	230	
WHY_HELP_SE	4-7	Received help at a car seat inspection because: Other, Specify	Why did you decide to get help at a car seat inspection? [CHECK ALL THAT APPLY]	Text	229	
WHY_NO_HELP_APPOINT	4-10	Did not receive help at a car seat inspection because: You need to set up an appointment in advance	You need to set up an appointment in advance	Text	60	
WHY_NO_HELP_AWARE	4-10	Did not receive help at a car seat inspection because: I wasn't aware these services existed	I wasn't aware these services existed	Text	61	

NAME	QUESTION #	LABEL	QUESTION TEXT	DATA TYPE	TABLE: PERSON	TABLE: CHILD
WHY_NO_HELP_CALL	4-10	Did not receive help at a car seat inspection because: I called but I never went	I called but I never went	Text	62	
WHY_NO_HELP_CONSD	4-10	Did not receive help at a car seat inspection because: I considered it but I never did anything	I considered it but I never did anything	Text	63	
WHY_NO_HELP_FAR	4-10	Did not receive help at a car seat inspection because: The service is too far away	The service is too far away	Text	64	
WHY_NO_HELP_KNEW	4-10	Did not receive help at a car seat inspection because: I already know how to install a seat	I already know how to install a seat	Text	65	
WHY_NO_HELP_MONEY	4-10	Did not receive help at a car seat inspection because: The service costs money	The service costs money	Text	66	
WHY_NO_HELP_O	4-10	Did not receive help at a car seat inspection because (Other)	Please specify the reason why you haven't gotten help at a car seat inspection.	Text	67	
WHY_NO_HELP_SE	4-10	Did not receive help at a car seat inspection because: Other, Specify	Other, Specify	Text	68	

NAME	QUESTION #	LABEL	QUESTION TEXT	DATA TYPE	TABLE: PERSON	TABLE: CHILD
WHY_NO_HELP_SEAT	4-10	Did not receive help at a car seat inspection because: I haven't gotten a car seat yet	I haven't gotten a car seat yet	Text	69	
WHY_NO_HELP_TIME	4-10	Did not receive help at a car seat inspection because: I don't have time for it	I don't have time for it	Text	59	

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