Nova Scotia Child Restraint Use: An Observational Roadside Survey

Research Team

Dr. Mark Asbridge, Department of Community Health and Epidemiology, Dalhousie University

Katherine Hutka, Child Safety Link, IWK Health

Research Assistants: Tanner Van Every (Dalhousie University), Alexa Davis (Dalhousie University), Grace Rheault (Dalhousie University), Taylor Truong (Dalhousie University), and Lauren Duggan (Dalhousie University).

With Support From:

DALHOUSIE UNIVERSITY

CHILDSAFETYLINK Here for you.

cybex for all tomorrow's people

CPSAC

Table of Contents

Introduction

Background

Motor vehicle collisions (MVCs) remain the primary cause of death for children aged 9 years and younger.[1] Between 2008 and 2012, there were 398 motor vehicle deaths among Canadian children aged 0–14 years, with 119 of those deaths in children aged 5–9 years.[2] In the United States, MVCs are the leading cause of death for children under 13 years of age, resulting in 938 fatalities in 2015.[3] Importantly, most injuries and deaths involve unrestrained or incorrectly restrained child passengers.[4]

A key mechanism to reduce motor vehicle occupant deaths among children is the proper use of child vehicle restraint systems.[5] A vehicle restraint includes rear facing and forward-facing seats, booster seats, and seat belts. Child restraints are part of a suite of regulated safety products that include rear- and forward-facing child seats and booster seats.[6,7] A rear-facing car seat is designed for infants and young children that faces the back of the vehicle to provide added protection for a child's head, neck and spine in the event of a collision.[8] A forward-facing car seat is designed for older children (typically between the ages of 2 and 6) that faces the front of the vehicle and is typically used after outgrowing a rear-facing seat, providing additional safety with a harness system. A booster seat is a child restraint device for children and youth (typically between the ages of 4 and 12) to improve seat belt fit.[7] Three main configurations of booster seats are on the market: backless booster seats, high-backed booster seats,; and combination/all-in-one seats that can be used in booster mode with the internal harness removed.

Appropriate child restraint use reduces a child's risk of death up to 75% and the risk of serious injury by nearly 70%.[9,10] Unfortunately, national, and regional surveillance data indicate that the rate of child restraint systems use in Canada is around 90% and, among those that use them, there is a significant rate of incorrect or inappropriate use.[11,12] A survey of child restraint use in Nova Scotia, completed over 10 years ago, found that while the rate of child restraint use was high, the proportion of children in the correct restraint system was 90%, and less than 50% of restraint systems overall were incorrectly used or installed.[12] There has been a request from both child safety advocacy groups and CYBEX Canada for an evidence update on the state of child restraint use in Nova Scotia. The purpose of this study was to complete a roadside observational study of child passenger restraint use in Nova Scotia, replicating, updating, and expanding on the previous study carried out in 2012.[12]

Methodology

The Nova Scotia Child Restraint Use Study is an observational roadside survey of Nova Scotia drivers of passenger vehicles carrying child passengers under the age of 14 years. The methodology for the study is modified from the previous study carried out in Nova Scotia in 2012.[12] Between May and November 2024, we conducted 41 roadside child restraint checks across 33 different sites across Nova Scotia (see Appendix A for locations) over 31 days. Data were collected in 10 of 18 counties, covering six of the seven regions in Nova Scotia (Halifax Metro, Eastern Shore, Cape Breton Shore, Northumberland Shore, Bay of Fundy & Annapolis Valley, and South Shore, excluding only Yarmouth & Acadian Shores). A roadside checkpoint is most appropriate to reach drivers (parents and caregivers) with children of all ages to assess correct restraint use and provide education on the proper use of child restraints). Ethics approval was obtained from Dalhousie Research Ethics Board in April 2024 to complete this research.

Data Collection

Data collections were scheduled in conjunction with regional police departments and the RCMP dependent on whether collection was in an urban or rural community. All drivers who entered the roadside checkpoint inspection area where a child aged 14 years and under was present in the vehicle were offered a vehicle restraint check for their children. Drivers were given a short overview of the study and consent was sought to complete the vehicle restraint check; drivers were also asked to complete a short questionnaire (Appendix B). The Driver survey was designed to capture how drivers learned to install their child restraint, where they had received information around transporting children, and where they would look for more information. The survey also included key sociodemographic questions such as age, postal code, education and language spoken at home.

A certified Child Passenger Safety Technicians (CPST) then completed the child restraint inspection using our Child Restraint Checklist (Appendix C) The child's age, height, and weight were recorded. Technicians examined how the child was restrained in the vehicle, the type of restraint: rear or forward facing car seat, booster, seat belt, whether the child was in the right restraint for their stage (age, weight, height), whether the seat was safe and legal to use (expired, broken, missing parts etc.), installation issues (UAS/seat belt not tight, seat belt not locked, tether use where applicable), and harnessing/bucking issues (straps tight, chest clip placement, seat belt placement where applicable, etc.).

If a child was unrestrained, the driver was required to appropriately restrain the child either with their own restraint system or with one provided by the research team. Similarly, if the child restraint was

broken or had expired, a new one was provided. Following the child restraint inspection, the CPST would discuss their findings with the driver, provide education, and answer any questions. The CPST would then assist the driver in correcting any issues or recommend a new child restraint. If the driver was unable to obtain a new child restraint, our study team would provide them with the recommended seat and ensure correct usage and installation before departure.

At the end of the inspection, drivers were given a $10 gas card, provided by CYBEX Canada, to thank them for participating in the study and provided relevant child restraint information/education materials to take home with them detailing child restraint safety tools and tips and contact information if they needed further assistance. During these roadside checks, we completed 682 driver questionnaires and 1005 child restraint inspections. Data collection for an inspection took roughly 15-25 minutes to complete, on average, from start to finish.

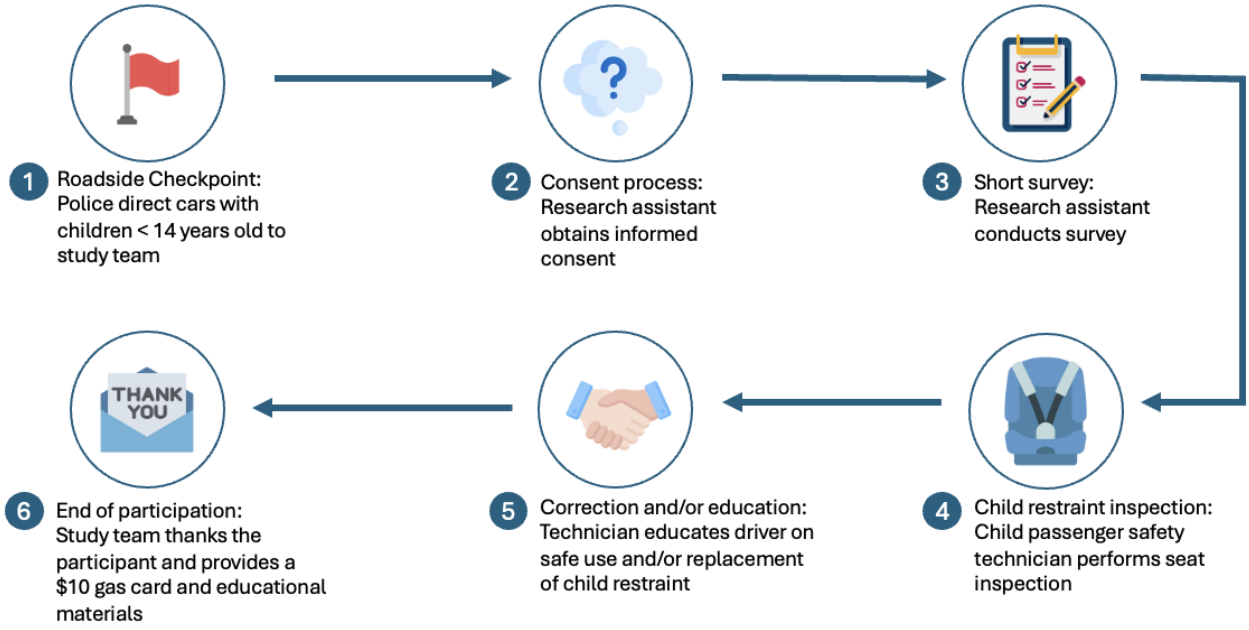

Figure 1. Data collection process

If a driver declined to participate, a CPST would ensure children were legally and safely restrained before leaving the designated area (similar to a regular roadside check). If the driver declined to participate, we did not collect any information for the study. See the flowchart below for included participants. As shown in Figure 2, 114 drivers refused to participate or had incomplete data, for a total of 1005 child restraint

inspections included in the study. A common reason why drivers were unable to participate included not having enough time (i.e., on the way to an appointment).

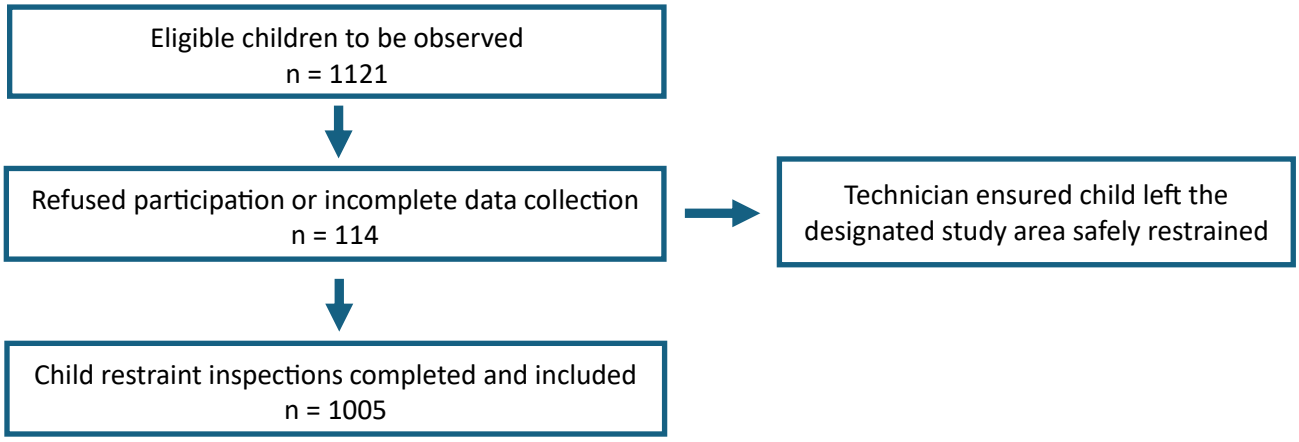

Figure 2. Participants included in the study

Community partners were instrumental in conducting this study. We partnered with RCMP and police officers across the province to manage traffic at the roadside. At many rural sites, fire stations and firefighters were instrumental in providing a safe space for our roadside checks, managing traffic in our designated areas, and enhancing trust. Other community partners, such as family resource and community centres, were also important to build community trust. Finally, our roadside events would not have happened without the support of CPST volunteers.

Work was carried out by a research team from the Department of Community Health and Epidemiology at Dalhousie University, led by Principal Investigator (PI) Mark Asbridge, and working in conjunction with Child Safety Link at the IWK Health Centre, the Child Passenger Safety Association of Canada (CPSAC), and industry partner, CYBEX Canada. Data collection was led by Katherine Hutka, a Health Promotion Specialist focusing on child passenger safety, working at the Child Safety Link at the IWK, Tanner Van Every and Alexa Davis, MSc students in the Department of Community Health and Epidemiology, Dalhousie University, who were also trained as CPSTs in April 2024 to conduct child restraint inspections.

Results

Driver Overview

Driver sociodemographic information is included in Table 1. We included the driver's age, relationship to the child(ren), how many children they were parent or guardian of under the age of 16, their primary language spoken in the home, country of birth, their home ownership status, and highest level of educational attainment.

Table 1. Driver sociodemographic characteristics

Driver Characteristics	n= 682 [1]	Percent (%)
Age, years (categories)		
16-19	6	0.9 %
20-29	87	12.8 %
30-39	310	45.5 %
40-49	151	22.1 %
50-59	37	5.4 %
60-69	48	7 %
70+	21	3.1 %
Missing	22	3.2 %
Relationship to child(ren)		
Mother	348	51 %
Father	178	26.1 %
Grandmother	63	9.2 %
Grandfather	33	4.8 %
Parent (gender unspecified)	29	4.3 %
Sibling	6	0.9 %
Grandparent (gender unspecified)	3	0.4 %
Other relative	4	0.6 %
Other	11	1.6%
Missing	7	1 %
Number of children (< 16 years)		
0	80	11.7 %
1	207	30.4 %
2	243	35.6 %
3	92	13.5 %
4	25	3.7 %
5 +	19	2.8 %
Missing	16	2.4 %

[1] We completed 684 driver questionnaires; however, we excluded two driver questionnaires from the analysis because no children were present.

Primary language		
English	596	87.4 %
French	7	1 %
Other	71	10.4 %
Missing	8	1.2 %
Country of origin		
Canada	573	84 %
Outside of Canada	96	14.1 %
Missing	13	1.9 %
Rental status		
Owns home	466	68.3 %
Rents home	159	23.3 %
Lives with parents/family	34	5 %
Other	3	0.4 %
Missing	20	2.9 %
Education		
< Highschool	34	5 %
Highschool	123	18 %
Some college, trade, or university	108	15.8 %
Completed college, trade, or university	396	58.1 %
Missing	21	3.1 %

The mean age of drivers across Nova Scotia was 39.7 years old, ranging from 17 to 79 years old. Most drivers were the mother of the child passenger, followed by fathers, grandmothers, and grandfathers. The "other relative" category included aunts, uncles, and cousins. The "other" category included family friends, service workers (uber drivers, teachers, day care workers, etc.), babysitters, and foster parents. We consolidated these groups to ensure confidentiality due to the low group numbers. Most drivers were the guardian for one to two children under the age of 16. Most drivers also spoke English in the home and were born in Canada. Most participants owned their home, and completed a college, trade, or university level education. If drivers had limited time to participate in our study, we chose to focus on the child restraint checklist. Therefore, there may be missing data in the driver questionnaire responses.

Child Restraint Knowledge

In the questionnaire, we asked drivers how they learned to install their child restraints, if they have ever received information on how to transport children, and where they would go to seek out this information. Information on where drivers are learning to install car seats and transport children is important to inform policies, programs, and education surrounding child restraints. As shown in Figure 3, the most common way to learn how to install a child restraint was through the instruction manual (n=197), a health centre (n=143), online (n=130), or from family and friends (n=126). The least common way to learn how to install a child restraint was from the brand (n=22), emergency services (n=25), a car seat technician (n=27), or retailer (n=29).

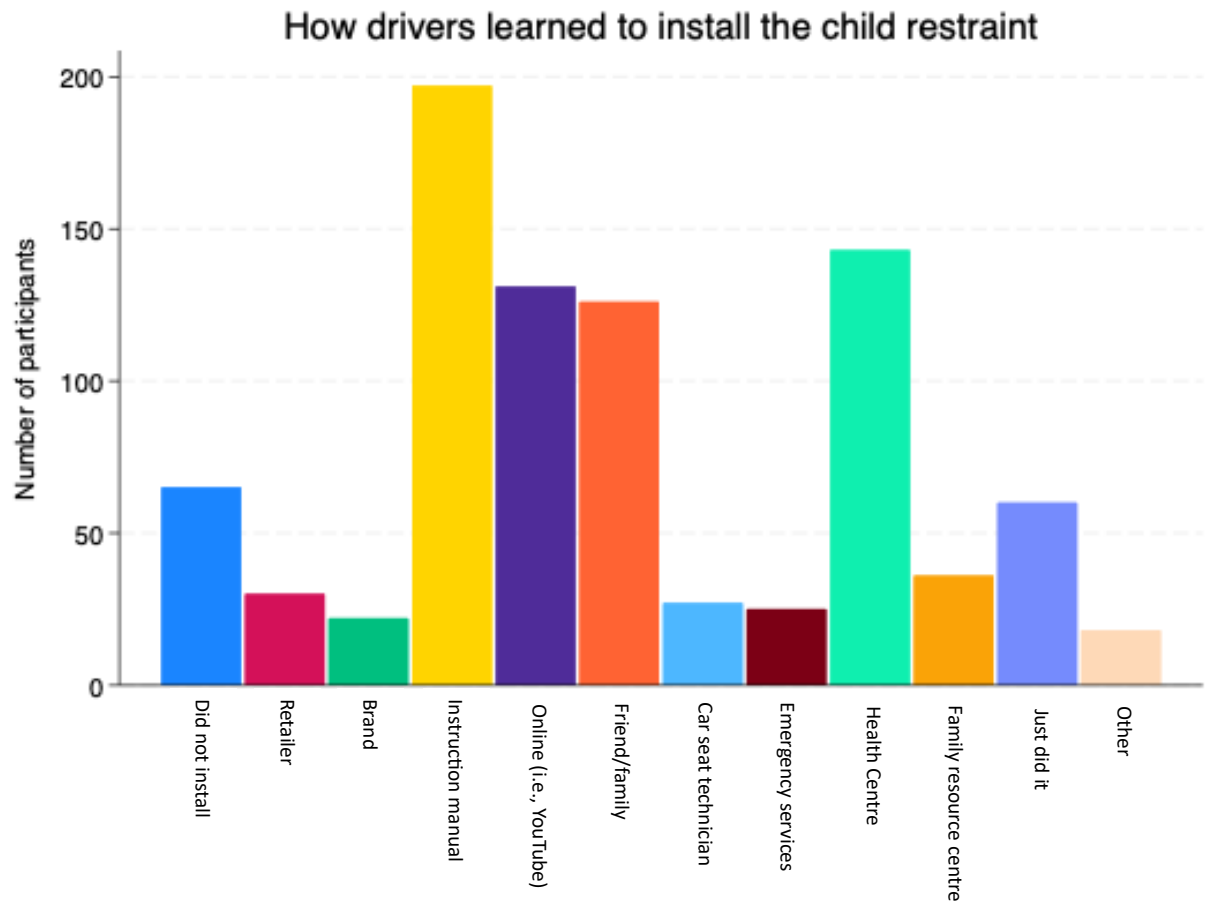

Figure 2. How drivers learned to install their child restraint

In addition to learning about how to install a child restraint, we were interested in where drivers had received information on how to transport children. We learned that 421 drivers (62.6%) had received information on how to transport children, and 252 (37.4%) drivers had not received any information. As shown in Figure 4, out of the drivers who received information, the most common source was from a hospital or health care centre, online web search, or a friend or family member. The least used source was from a retailer, car seat technician, or prenatal/parenting education class.

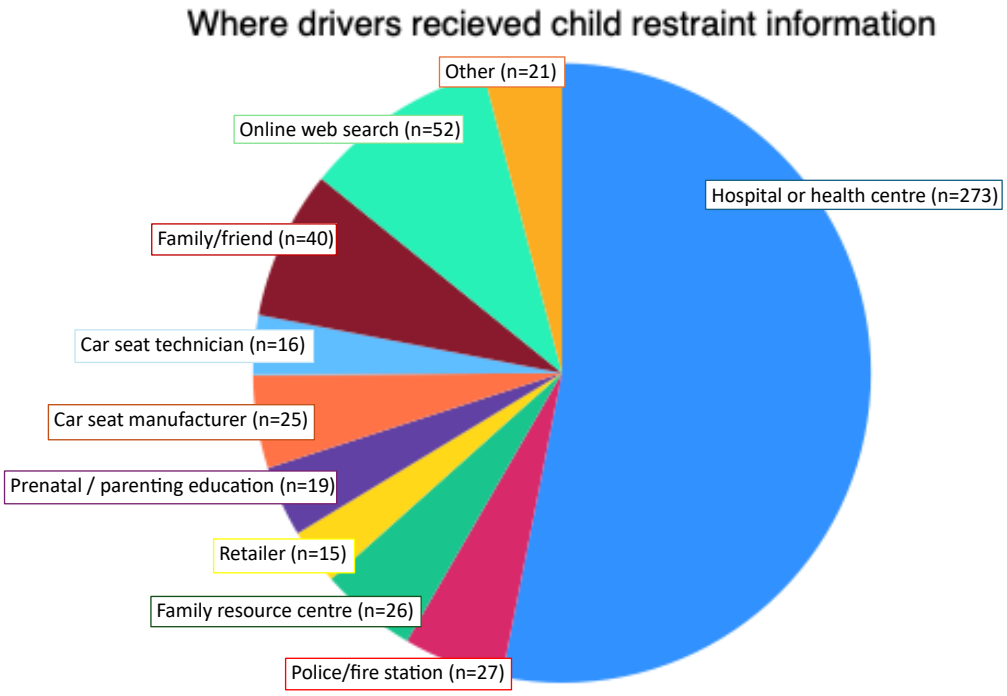

Figure 3. Where drivers received information on how to transport children

For the drivers who had never received information on how to transport a child or drivers who would seek out additional information, we asked where they would look for this information. As shown in Figure 5, most drivers would look for more information online, followed by a hospital or health centre and the car seat manufacturer. The lowest number of drivers would go to a retail store, prenatal or parenting education group, or car seat technician for more information.

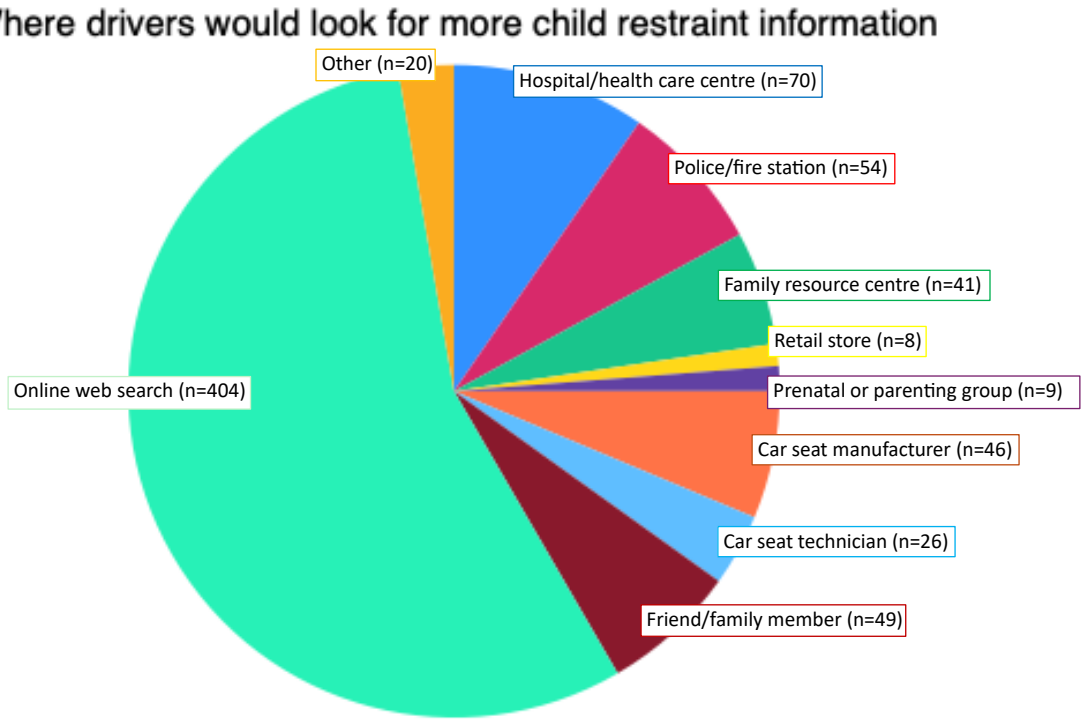

Figure 5. Where drivers would look for additional child restraint information

Child Restraints

In our study, we assessed child restraints in those under the age of 14 years old. In total, we included 1005 children with child restraints in our study. The most common child restraint observed was a booster seat, followed by a seat belt, forward facing, and then a rear facing seat. Table 2 below details the distribution by type of child restraint.

Table 2. Type of child restraint upon arrival

Child Restraint Upon Arrival	n	Percent (%)
Rear-facing	180	17.9%
Forward-facing	256	25.5%
Booster	297	29.6%
Seat belt	260	25.9%
None	12	1.2%
Total	**1005** [2]	**100%**

Within each type of restraint, we have highlighted the most common errors. These errors can be categorized as stage-based errors, restraint issues, usage errors, or installation errors. Stage-based errors would include the incorrect child restraint by age, weight, height, fit, or development. Restraint issues would include issues related to the seat itself (i.e., expired, missing parts). Usage errors would include issues related to how the child is in the seat (i.e., loose harness, twisted straps), and installation errors would include issues related to how the seat is attached to the vehicle (i.e., UAS misuse, no tether strap). In some instances, children arrived at the checkpoint without any type of restraint (none category in Table 2). Of the 12 children who arrived in no child restraint, one child should have been in a rear-facing seat, two should have been in a forward-facing seat, and seven should have been in a booster seat. Two children should have been in a seat belt, but there were no available seat belts in the car (vehicle issues). In these cases, we have included the children in their *ideal* child restraint stage below based on their age, weight, and/or height.

[2] We conducted 1006 child restraint inspections; however, we excluded one child restraint from the analysis because no children were present.

Rear-Facing Child Restraint Stage

The rear-facing child restraint stage group had a mean age of 11.8 months old. The youngest child was 3 days old, and the oldest child was 4 years old. This group included children who arrived in rear-facing only seats without a base (n=15), rear-facing only seats with a base (n=88), convertible seats (n=26), and all-in-one seats (n=51). One child who arrived with no child restraint (no seat present n=1) should have been in a rear-facing restraint. We have separated errors in the rear facing group by stage, restraint, usage, and installation issues, and then combined the total of all three errors in the following Table 3.

Out of the 181 children in a rear-facing seat stage, 140 (77.4%) were improperly restrained. The overall stage, restraint, usage, and installation errors includes restraints with at least one of the errors previously listed. The overall error then includes restraints with stage-based, restraint, usage, and/or installation errors. CPSTs were able to correct 97 issues at the roadside, nine new seats were required, and 34 seat or vehicle issues remained.

Table 3. Rear-facing child restraint errors

Rear-Facing Child Restraint Errors	Total n = 181	Percent (%)
Stage-based Error	**2**	**1.1%**
Height	2	1.1%
Restraint Issues	**17**	**9.4%**
Damaged	1	0.6%
Expired	4	2.2%
Parts missing	7	3.9%
Not Canadian	4	2.2%
No seat present	1	0.6%
Usage Errors	**93**	**51.4%**
Child unrestrained	5	2.8%
Harness too loose	59	32.6%
Chest clip above/below armpit level	32	17.7%
Straps at incorrect shoulder height	37	20.4%
No top of head 1” clearance	3	1.7%
Straps twisted/not flat	15	8.3%
Installation Errors	**104**	**57.5%**
Seat uninstalled	2	1.1%
Not secured tightly	48	26.5%
Incorrect belt path	6	3.3%
Twisted	11	6.1%
Misrouted	5	2.8%
Lock off misused	4	2.2%
UAS lower anchor misuse	12	6.6%
Seat belt not locked	14	7.7%
Loose install	22	12.2%
Both UAS and seat belt used	15	8.3%
Handle position incorrect	20	11.1%
Recline angle incorrect	46	25.4%
Overall Error	**140**	**77.4%**

Forward-Facing Child Restraint Stage

Children in a forward-facing restraint stage had a mean age of 3.3 years old (39.7 months), ranging from 7 months to 8 years old. This group included children who arrived in forward-facing convertible seats (n=89), all-in-one seats (n=108), combination seats (n=55), rear facing only seats with base (n=3) and without base (n=1), and no restraint (n=2). Two children who arrived with no child restraint (no seat present n=2) should have been in a forward-facing restraint. The rear-facing only seats were installed in forward-facing positions. We have separated errors in forward -facing group by stage, usage, and installation errors, and then combined the total of all three errors in the following Table 4.

Out of the 258 children in the forward-facing seat stage, 230 (89.2%) had either a stage-based, restraint, usage, or installation error. CPSTs were able to correct 160 issues at the roadside, 34 new seats were required, and 36 seat or vehicle errors remained.

Table 4. Forward-facing child restraint errors

Forward-Facing Child Restraint Errors	Total n = 258	Percent (%)
Stage-Based Errors	**24**	**9.3%**
Age	14	5.4%
Weight	10	3.9%
Height	5	2%
Fit	5	2%
Restraint Issues	**53**	**20.5%**
Damaged	9	3.5%
Expired	14	5.4%
Parts missing	26	10.1%
Not Canadian	12	4.7%
No seat present	2	0.8%
Usage Errors	**171**	**66.3%**
Child unrestrained	6	2.3%
Incompletely buckled	6	2.3%
Harness too loose	113	43.8%
Chest clip above/below armpit level	82	31.8%
Straps at incorrect shoulder height	72	27.9%
Top of ears within shells	9	3.5%
Straps twisted/not flat	84	32.6%
Installation Errors	**190**	**73.6%**
Seat uninstalled	4	1.6%
Incorrect belt path	40	15.5%
Twisted	29	11.2%
Misrouted	23	8.9%
Lock off misused	4	1.6%
UAS lower anchor misuse	23	8.9%
UAS exceeds weight limit	18	7%
Seat belt not locked	45	17.4%
Loose installation	34	13.2%
Both UAS and seat belt used	22	8.5%
Tether not used at all	88	34.1%
Loose tether strap	23	8.9%
Incorrect tether anchor	22	8.5%
Overall Error	**230**	**89.2%**

Booster Seat Child Restraint Stage

The mean age of children in the booster seat stage was 6.3 years old, ranging from 2.5 to 11 years old. This group included children who arrived in high backed boosters (n=80), backless boosters (n=193), all-in-one seats (n=10), and combination seats (n=14). Seven child who arrived with no child restraint (no seat present n=7) should have been in a booster restraint.

Table 5. Booster seat child restraint errors

Booster Seat Errors	Total n = 304	Percent (%)
Stage-based Errors	**23**	**7.6%**
Age	10	3.3%
Weight	19	6.3%
Height	2	0.7%
Fit	1	0.3%
Development	2	0.7%
Restraint Issues	**80**	**26.3%**
Damaged	4	1.3%
Expired	37	12.2%
Recalled	1	0.3%
Parts missing	34	11.2%
Not Canadian	10	3.3%
No seat present	7	2.3%
Usage Errors	**162**	**53.3%**
Child unrestrained	14	4.6%
Not good lap belt fit	58	19.1%
Not good shoulder belt fit	81	26.6%
No adequate head support	19	6.3%
Belt not flat/twisted	71	23.4%
Other buckling misuse	21	6.9%
Installation Errors	**170**	**55.9%**
Lap belt not routed correctly	92	30.3%
Shoulder belt not routed correctly	120	39.5%
Twisted seat belt	46	15.1%
Misrouted seat belt	133	43.8%
Other seat belt misuse	13	4.3%
Overall Error	**235**	**77.3%**

Out of the 304 children in the booster seat stage, 235 (77.3%) had either a stage-based, restraint, usage, or installation error. CPSTs were able to correct 136 issues at the roadside, 69 children required a new seat, and 30 left with car or seat issues remaining.

Seat Belt Child Restraint Stage

The mean age of children who arrived in a seat belt restraint stage were 9.8 years old, ranging from 3 to 13.9 years old. The current Nova Scotia law is that children can be 4'9" (145cm) tall or 9 years old to transition into a seat belt. Out of the 262 children who arrived in the seat belt restraint stage, 69 (26.3%) were illegally restrained (neither 4'9" tall or 9 years old). There were 128 children under 4'9" tall, and 70 children under 9 years old. Two children arrived with no seat belt present in the vehicle. There were 94 instances where a new seat was required, which included children needed to return to using a booster seat.

While there is no law requiring a minimum age in the front seat, it is usually recommended that children are at least 13 years old.[13] There were 63 children under the age of 13 who were in the front passenger or front middle seat; CPSTs recommended these children move to the back seat. CPSTs were able to correct 44 issues at the roadside, such as switching seats in the vehicle or tightening the belt for a better fit. There were 5 instances where seat or vehicle errors remained.

Summary of Findings

Our study results show that in Nova Scotia between May and November 2024, 77.4% of rear-facing, 89.2% of forward-facing, and 77.3% of booster seats had either a stage-based error, restraint issue, usage error, and/or installation error. In total, there were **605 (81.4%)** rear-facing, forward-facing, and booster restraints (n=743) with one of these errors. In total, we gave away 93 new seats. Nearly all of these seats were provided by CYBEX Canada, with a few seats provided by child safety link and local fire stations.

Since the previous Nova Scotia study[12] was published in 2015, errors in child restraints have increased across the province. These results are important to inform local policy makers in Nova Scotia about the extent to which Nova Scotian child passengers are being correctly restrained in motor vehicles, while providing child safety advocacy groups and CYBEX Canada with updated evidence on possible barriers and avenues for intervention.

References

1. Canadian Paediatric Society. Transportation of infants and children in motor vehicles. *Paediatr Child Health*. 2008;13(4):313-318.

2. Statistics Canada. *Deaths and Mortality Rate, by Selected Grouped Causes, Age Group and Sex, Canada*.; 2014. http://www5.statcan.gc.ca/cansim/a26?id=1020551&

3. Centers for Disease Control and Prevention. WISQARS (Web-Based Injury Statistics Query and Reporting System). 2016. https://www.cdc.gov/injury/wisqars/index.html

4. Durbin DR, Jermakian JS, Kallan MJ, et al. Rear seat safety: Variation in protection by occupant, crash and vehicle characteristics. *Accid Anal Prev*. 2015;80:185-192. doi:10.1016/j.aap.2015.04.006

5. Asbridge M, Ogilvie R, Wilson M, Hayden J. The impact of booster seat use on child injury and mortality: Systematic review and meta-analysis of observational studies of booster seat effectiveness. *Accid Anal Prev*. 2018;119:50-57. doi:10.1016/j.aap.2018.07.004

6. National Highway Traffic Safety AdministratCion - Parents Central. Car seat by child's age and size. 2016. https://www.safercar. gov/parents/carseats/Right-Car-Seat-Age-Size.htm

7. Government of Canada. Motor vehicle restraint systems and booster seats safety regulations. 2010. https://www.tc.gc.ca/eng/actsregulations/ regulations-sor2010-90.htm

8. National Highway Traffic Safety Administration. *Car Seat Recommendations for Children*. https://www.nhtsa.gov/sites/nhtsa.gov/files/documents/carseat-recommendations-for-children-by-age-size.pdf

9. Weber K. Crash protection for child passengers: a review of best practices. *UMTRI Research Review*. 2000;31(3):1-28.

10. Ontario Ministry of Transportation. *Child Car Seat Restraint Enhancements – Summary of Proposal*. https://www.ontariocanada.com/registry/showAttachment.do?postingId=1702&attachmentId=2131

11. Snowdon AW, Hussein A, Purc-Stevenson R, et al. Are we there yet? Canada's progress towards achieving road safety vision 2010 for children travelling in vehicles. *International Journal of Injury Control and Safety Promotion*. 2009;16(4):231-237. doi:10.1080/17457300903308308

12. Bruce B, Cramm C, Mundle K, Williams DP, Conrad A. Roadside observation of child passenger restraint use. *Adv Ped Res*. 2015;2(24). doi:10.12715/apr.2015.2.24

13. IWK Child Safety Link. Front Seat Safety. Accessed February 4, 2025. https://childsafetylink.ca/front-seat-safety

Appendices

Appendix A. Dates and Locations of Roadside Events

Event #	Day	Date (2024)	County	Location	Check Point Time
1	Monday	May 13	Colchester	Springhill	9 - 11 am
2	Monday	June 17	Colchester	Stewiacke	11 - 1 pm
3	Monday	June 17	Colchester	Brookfield	2 - 4 pm
4	Wednesday	June 19	Pictou	Stellarton	11 - 1 pm
5	Thursday	June 20	Cumberland	Pugwash	10 - 12 pm
6	Saturday	July 6	Hants	Enfield	10 - 12 pm
7	Monday	July 8	Colchester	Truro	3:30 - 5:30 pm
8	Tuesday	July 16	Pictou	Abercrombie	11 - 1 pm
9	Tuesday	July 16	Colchester	Hilden	2 - 4 pm
10	Wednesday	July 17	Cumberland	Springhill	9 - 11 am
11	Tuesday	July 23	Halifax Regional Municipality	Tantallon	9 - 11 am
12	Tuesday	July 23	Halifax Regional Municipality	Tantallon	12 – 2 pm
13	Wednesday	July 24	Halifax Regional Municipality	Timberlea	11 - 1 pm
14	Tuesday	July 30	Halifax Regional Municipality	Lower Sackville	10 - 12 pm
15	Tuesday	July 30	Halifax Regional Municipality	Lower Sackville	1 - 3 pm
16	Wednesday	July 31	Halifax Regional Municipality	Fall River	10 - 12 pm
17	Wednesday	July 31	Halifax Regional Municipality	Windsor Junction	1 - 3 pm
18	Tuesday	August 6	Halifax Regional Municipality	Chezzetcook	10 - 1 pm
19	Tuesday	September 17	Halifax Regional Municipality	Lower Sackville	1:30 - 4 pm
20	Wednesday	October 2	Halifax Regional Municipality	Beechville	1 - 3:30 pm
21	Thursday	October 3	Halifax Regional Municipality	Spryfield	1:30 - 3:30 pm
22	Wednesday	October 9	Halifax Regional Municipality	Spryfield	11 - 1 pm

23	Wednesday	October 9	Halifax Regional Municipality	Spryfield	2 - 4 pm
24	Thursday	October 10	Halifax Regional Municipality	Halifax	2 - 4 pm
25	Tuesday	October 15	Halifax Regional Municipality	Clayton Park	2 - 4 pm
26	Wednesday	October 16	Halifax Regional Municipality	Dartmouth	10 - 12 pm
27	Monday	October 21	Cape Breton	Glace Bay	2 - 4 pm
28	Monday	October 21	Cape Breton	Membertou	5:30 - 7:30 pm
29	Tuesday	October 22	Cape Breton	Sydney	1 - 3 pm
30	Tuesday	October 22	Cape Breton	North Sydney	4:30 - 6:30 pm
31	Wednesday	October 23	Antigonish	Antigonish	10 - 12 pm
32	Friday	October 25	Halifax Regional Municipality	Eastern Shore	9:30 - 12 pm
33	Friday	October 25	Halifax Regional Municipality	Cole Harbour	1:30 - 4 pm
34	Thursday	November 7	Halifax Regional Municipality	Halifax	1 - 4 pm
35	Thursday	November 14	Halifax Regional Municipality	Lower Sackville	1 - 4 pm
36	Monday	November 18	Lunenberg	Bridgewater	10:30 - 12:30 pm
37	Monday	November 18	Queens	Liverpool	2 - 4 pm
38	Tuesday	November 19	Halifax Regional Municipality	Dartmouth	1 - 4 pm
39	Wednesday	November 20	Halifax	Halifax	10 - 1 pm
40	Friday	November 22	Valley	Kentville	10:30 - 12:30pm
41	Friday	November 22	Valley	Port Williams	2 - 4 pm

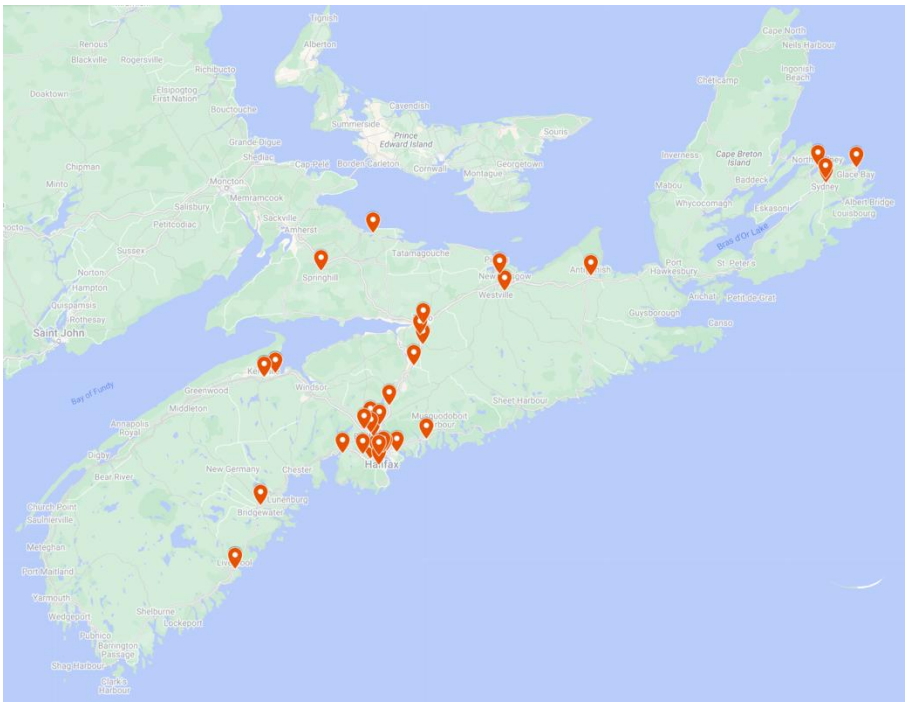

Figure 4. Roadside event sites across Nova Scotia

Appendix B. Driver Questionnaire

STUDY ID: _____ **Interviewer initials:** _____

1. What is your relationship to the child or children in the vehicle today? _____

2. How many children under the age of 16 are you **currently** the parent or guardian for? _____

3. How did you learn to install the car seats/booster seats? (can choose more than one option)
   - ☐ Did not install car seat
   - ☐ Retailer (website, in-person customer Service) (i.e., Walmart)
   - ☐ Brand (website, customer service) (i.e., Evenflo)
   - ☐ Instruction manual and/or labels
   - ☐ YouTube video
   - ☐ Friend or family member
   - ☐ Car seat technician
   - ☐ Emergency services (e.g., fire or police services)
   - ☐ Health Centre (e.g., hospital, doctor's office)
   - ☐ Family Resource Centre (e.g., community services, other family support services)
   - ☐ Other: _____

4. Have you ever received information on how to transport your child safely? ○ YES ○ NO

   a. **If YES**, where did you get that information? (can choose more than one option)
      - ☐ Hospital or Health Care Centre
      - ☐ Police or Fire station
      - ☐ Family resource centre or community services
      - ☐ Retail store
      - ☐ Prenatal or parenting education support person
      - ☐ Car seat manufacturer or customer service
      - ☐ Car seat technician
      - ☐ Friend or family member
      - ☐ Online web search, YouTube, etc...
      - ☐ Other: _____

   b. **If you** wanted more information on how to transport a child safely, where would you go?
      - ☐ Hospital or Health Care Centre
      - ☐ Police or Fire station
      - ☐ Family resource centre or community services
      - ☐ Retail store
      - ☐ Prenatal or parenting education support person
      - ☐ Car seat manufacturer or customer service
      - ☐ Car seat technician
      - ☐ Friend or family member
      - ☐ Online web search, YouTube, etc...
      - ☐ Other: _____

5. What is the primary language spoken at home?

   ○ English ○ French ○ Other: _____

6. What is your year of birth? _____

7. Were you born in Canada? ○ YES ○ NO

   a. **If NO**, what country were you born/raised in? _____

   b. **If NO**, how long have you lived in Canada (years)? _____

8. What is your postal code? _____

9. Do you own or rent your current place of residence?

   ○ Own ○ Rent ○ Live with parents/family ○ Other: _____

10. What is the highest level of education you have ever completed?

    ○ Less than High School
    ○ Completed High School
    ○ Some College, Trade or University
    ○ Completed College, Trade, or University

Additional observations: (e.g., driver behaviours, other adult passengers, receptiveness/attitude):

Appendix C. Child Restraint Roadside Observation Tool

Study ID: _____ **Technician Name(s):** _____

Child Information:	**Child age** years:	**Weight** pounds:	**Height** inches:	Child unrestrained ☐
	+ months:	Measured ☐ Reported ☐	Measured ☐ Reported ☐	Driver unrestrained ☐

Vehicle Information	**Restraint Information:**			
Vehicle info Make: _____ Model: _____ Year: _____	**Seating position in vehicle** Driver M1 P1 D2 M2 P2 D3 M3 P3 Other: _____	**Child Restraint** Brand: _____ Model: _____ DOM: _____	**Canadian:** Y N N/A ? **Restraint issues:** ☐ None ☐ Damaged ☐ Expired ☐ Recalled ☐ Parts missing ☐ Not Cdn. ☐ Other:	**Child meets seat limits for mode:** Y N If No, by which? ☐ Age ☐ Weight ☐ Height ☐ Fit require ☐ Other:	**Child Restraint Type Present** ☐ RF-only without base ☐ RF-only with base ☐ Convertible (RF/FF) ☐ All-in-one (RF/FF/B) ☐ Combination (FF/B) ☐ High Back Booster ☐ Backless booster ☐ Vest/Adaptive ☐ Seat Belt ☐ None
Type: ☐ Car ☐ SUV ☐ Truck ☐ Van ☐ Other:					

Upon arrival what was the stage or direction of the restraint?

Rear Facing ☐	**Forward Facing** ☐	**Booster** ☐	**Seat Belt** ☐

Seat present was the right stage for child? (Law / Safety Recommendations)

Child over 22 lbs? Y N	Child over 40 lbs? Y N	Child over 57"/ 4'9"? Y N
Child over age 1? Y N	Child aged 4 or over? Y N	Child aged 9 or over? Y N
Child over age 2? Y N		

Was the child restraint correctly used? (Is the child correctly buckled?)

Rear Facing		**Forward Facing**		**Booster**		**Seat Belt**	
Child buckled?	Y N	Child buckled?	Y N	Child buckled?	Y N	Child buckled?	Y N
Harness snug	Y N	Harness snug	Y N	Lap and shoulder belt present and used	Y N	Lap and shoulder belt present and used	Y N
Chest clip armpit level	Y N	Chest clip armpit level	Y N	Lap belt correct fit	Y N	Lap belt correct fit	Y N
Straps through slots at or below shoulder	Y N	Straps through slots at or above shoulder	Y N	Shoulder belt correct fit between neck and shoulder	Y N	Shoulder belt correct fit between neck and shoulder	Y N
Top of head 1" clearance	Y N	Tops of ears within shell	Y N	Adequate head support	Y N	Adequate head support	Y N
Straps flat / untwisted	Y N	Straps flat untwisted	Y N	Belt flat / untwisted	Y N	Back flat/knees bend?	Y N
Other harness misuse?	*Y N*	*Other harness misuse?*	*Y N*	*Other buckling misuse?*	*Y N*	*Other buckling misuse?*	*Y N*

How was the child restraint installed in the vehicle? (rear-facing/forward-facing only)

☐ Uninstalled ☐ Lower anchors ☐ Seat belt ☐ Other

Seat tightly secured	Y N	Seat tightly secured	Y N	Lap belt routed correct	Y N	Lap belt routed correct	Y N
Correct belt path	Y N	Correct belt path	Y N	Shoulder belt routed correct	Y N	Shoulder belt routed correct	Y N

Installation issues/misuse
☐ None - no installation misuse
☐ Twisted ☐ Misrouted
☐ Both UAS + seat belt misuse
☐ Lock off misused
☐ Seat belt not locked
☐ Lower anchor misuse
☐ Exceeds UAS weight limit
☐ Other installation misuse (in notes) ☐ Loose

Seat belt issues:
☐ Twisted ☐ Misrouted ☐ Other misuse (in notes)

Handle position correct	Y N N/A	Tether used	Y N
		Tether strap tight	Y N
		Correct anchor used	Y N
Recline angle correct	Y N	Recline angle correct	Y N

Features used correctly if present/required?
Anti-rebound bar / Req. rear-facing tether / Load leg Y N N/A

Document if present:
☐ Unregulated products ☐ Projectiles

Notes about any misuse:

DEPARTURE choose ONE best answer	☐ **No misuse** no changes needed	☐ **All issues corrected** noted on form	☐ **Seat issues remain** to be fixed at home	☐ **Vehicle issues** to be fixed by driver	☐ **New seat required / recommended** ☐ driver provided / researchers provided ☐ new seat recommended – unsafe/legal ☐ new seat recommended – unsafe/not legal ☐ new seat recommended – safe/not legal ☐ Stated: has a safe seat at home

Version date Jan 7, 2024