



Standardized Digital Data Collection Provides Better Data to Advance Child Safety in Vehicles



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Executive Summary

Child passenger safety technicians (CPST) provide a crucial service in local communities, conducting car seat checks where parents and caregivers receive hands-on assistance for proper use of car seats, booster seats and seat belts, ensuring children can travel safely in vehicles. Standardized data collection among these technicians is essential to improving safety for children in motor vehicles. Unfortunately, we lack a national standard for documenting these crucial data. Policies must be established to support technician use of the National Digital Car Seat Check Form (NDCF) to save the lives of children all across the country.

Vehicle crashes are a leading cause of unintentional deaths for people ages birth to 21 years of age. These crash deaths are often the result of vehicle ejection, injuries to internal organs and the spine, and even decapitation resulting from incorrect use of car seats, booster seats and seat belts. Correct use of a child restraint system appropriate for a child's size, age and developmental level saves lives.

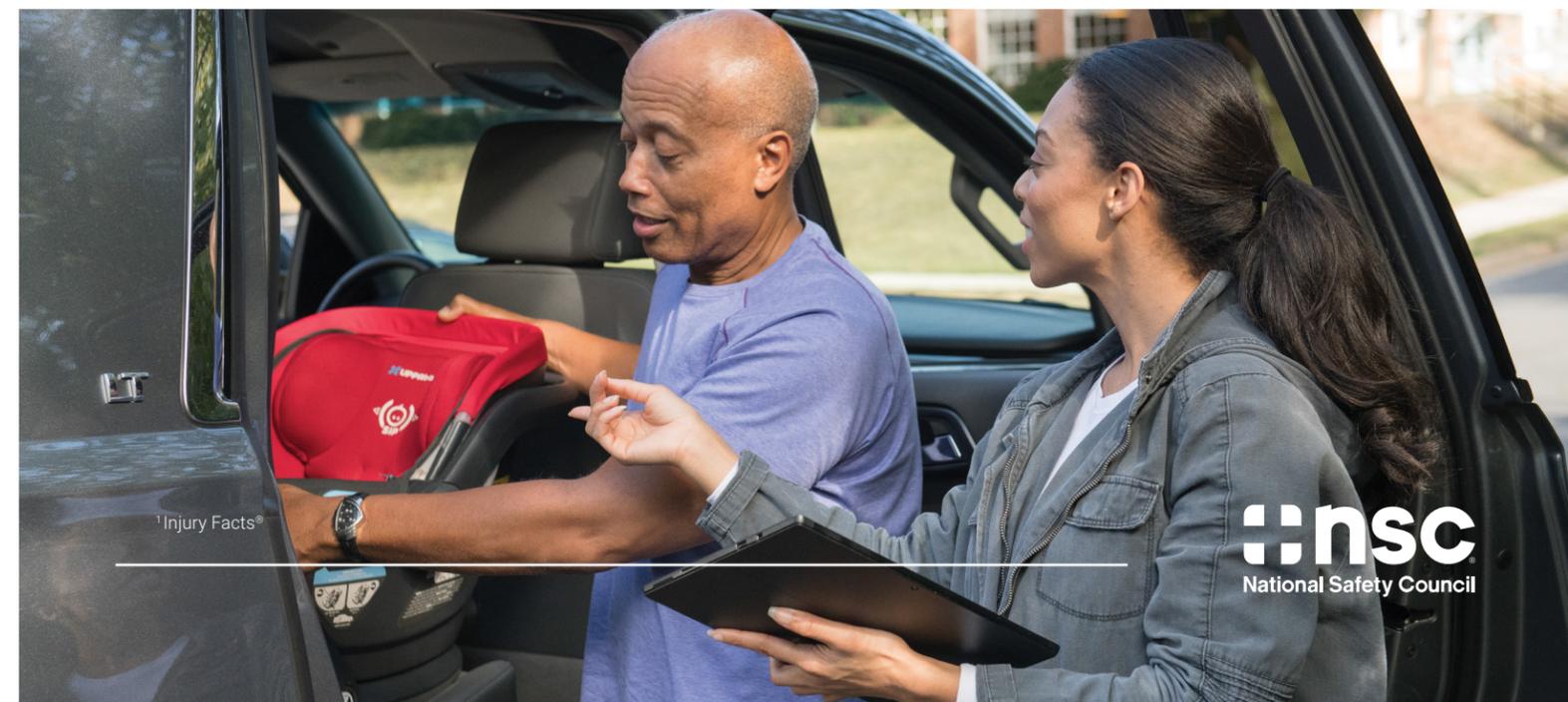
The NDCF, which is available free of charge and is HIPAA compliant, allows technicians to assess the use of car seats within a vehicle, document how car seats are installed and how children are secured, and standardizes this digital data, allowing for identification of patterns that can help reduce child passenger injuries and fatalities.

Without a national standard for documenting car seat check data, use of the NDCF is entirely voluntary and many car seat checks are documented with traditional paper forms or no forms at all. The NDCF is significantly more efficient, comprehensive and accurate than these options, taking only five minutes to query and download data compared to the 100 manual hours required to create the same data with paper forms. Thus, the NDCF maximizes technicians' time, allowing them to serve more community members and more easily share data to improve safety for vehicle passengers.

Wider adoption of the NDCF would allow more families to benefit from the learnings of technicians across the country, identify where safety services are lacking to improve increased health equity for families in a specific state or geographic area, and even help organically address common car seat misuse patterns observed by technicians.

In 2021, 711 child occupants under age 13 died in traffic crashes; 226 were unrestrained and many others were inadequately restrained at the time of the crash.¹ Policies to support NDCF use are needed at the local, state, regional and national levels to maximize impact and save the lives of these most vulnerable passengers.

To find the full report online visit nsc.org/carseats.



¹Injury Facts®

Scope of the Issue

Standardized data collection among child passenger safety technicians (CPST), or technicians, is essential to improving safety for children in motor vehicles, and standard infrastructure is required to generate these data. More than 160,000 technicians have been trained in the U.S. since 1998.² However, until recently, a single national data collection system was not available to all technicians as they assessed the use of car seats, booster seats and seat belts in vehicles. Not collecting these data is a lost opportunity to identify trends and patterns in specific misuses of car seats.

High quality data provides an opportunity to improve health outcomes for children during motor vehicle crashes, a leading cause of unintentional injuries and fatalities throughout childhood.³ These crash deaths are often the result of vehicle ejection, injuries to internal organs and the spine, and even decapitation resulting from incorrect use of car seats, booster seats and seat belts.⁴ According to the National Highway Traffic Safety Administration (NHTSA), correct use of car seats, booster seats and seat belts remains a priority to decrease injuries and fatalities during vehicle crashes.⁵ More accurate and standardized information on car seat misuse is necessary to understand the scope of the problem and create strategies that address data findings.

Some technicians advocate for digital data collection over paper documentation. As a result, an efficacy analysis conducted by Petraglia & Polson (2021) assessed the quality of car seat check (or, inspection) data collected using the National Digital Car Seat Check Form (NDCF) compared to data documented on traditional paper forms. Overall, study findings show NDCF use improves data accuracy and reliability of reported estimates, such as misuse rates, and saves technicians time in creating usable data sets.⁶

Enacting policies to support technician use of the NDCF ensures:

- Data are efficiently available to influence vehicle and car seat design (improving product compatibility and addressing misuse patterns)
- Resources and public messaging can be tailored to address leading challenges and reinforce the safe transportation of children and vehicle occupants of all ages⁷
- Technicians have data readily available to report evidence-based program impact and outcomes to sponsoring organizations, program funders and others as needed
- Efficient use of technicians' time, taking less time to prepare information for reporting purposes and allowing for technicians to help more community members through direct service activities

Introduction

Vehicle crashes are the leading cause of unintentional deaths for people ages 4 to 21 and a leading cause of unintentional deaths for children birth through 3 years of age.⁸ We can save more lives and prevent injuries to children in motor vehicle crashes with improved policies to support technician use of the NDCF. A study conducted by Petraglia & Polson in 2021 found:

- The NDCF is operationally more efficient than traditional paper check forms
- The NDCF provides higher quality data
- The NDCF allows technicians, agencies and safety advocates to create usable data sets in minimal time⁹

The study found at least 62% of one agency's paper forms were never submitted for data processing. In order to analyze data from the paper forms that were submitted, more than 100 hours of labor were needed to manually transcribe the paper forms into a usable data set. Meanwhile, it took less than five minutes to download a comparable NDCF data set.¹⁰ These examples demonstrate the benefits of NDCF use, such as collecting important data that is otherwise lost, saving technicians valuable time and easing reporting burdens.

Why Use the NDCF?

Tens of thousands of technicians give their time and energy to ensure children travel safely in vehicles. Using a digital documentation form or "check form" helps maximize their time, allowing them to serve more community members and consolidate and share data to improve safety for vehicle passengers. Technician use of the NDCF is necessary to improve the safety of children in motor vehicles. The NDCF:

- Standardizes data for child safety seat use
- Is available free of charge
- Assesses use of car seats within a vehicle, while other studies collect these data through roadside observation¹¹
- Documents how car seats are installed and how children are secured, allowing for identification of trends and patterns that contribute to reducing preventable injuries and deaths during vehicle crashes



Policy

Policies to support NDCF use are needed at the local, state, regional and national levels to maximize impact. Adoption of NDCF use by individual child passenger safety programs and their supporting agencies throughout the U.S. is important to identify multi-level trends and patterns in car seat use and installation. These data include common product misuses, as well as which car seats and vehicles are most often seen by technicians in a particular geographic area.

² Safe Kids Worldwide [SKW], 2022

³ National Safety Council [NSC], 2022

⁴ National Highway Traffic Safety Administration [NHTSA], 2020

⁵ NHTSA, 2020

⁶ Petraglia & Polson, 2021

⁷ NHTSA, 2020

⁸ NSC, 2022

⁹ NDCF data quality was measured based on comprehensiveness of forms, accuracy of data and the capture of key data elements.

¹⁰ Petraglia & Polson, 2021

¹¹ Enriquez, 2021

Currently, there is no national standard for documenting car seat check data. Some state child passenger safety programs require use of the NDCF.¹² This is based on voluntary decision-making by state highway safety offices and may influence adoption by child passenger safety programs at the local level, which is also voluntary. The national child passenger safety program supports use of the NDCF to capture important data and contribute to a comprehensive national data set. Specifically, the National Child Passenger Safety Technician Certification Training curriculum encourages use of the NDCF.¹³

State and regional data outcomes help identify where safety services are lacking to improve increased child passenger safety health equity for families throughout a state or geographic area.¹⁴ Geographic-specific information helps support increased familiarity by technicians regarding commonly used products in their local area, so technicians are better informed to educate families on correct use and installation of specific car seats in certain vehicles. Furthermore, identified trends and patterns can inform tailored public messaging conducted through state highway safety office communication efforts.

Nationally, data dashboards are created by the NDCF program and made available to vehicle and car seat manufacturers at no cost to the manufacturers. These dashboards are unique to the products for each manufacturer. As a result, NDCF data is available for use to inform product engineering and design in an effort to organically address common misuse patterns observed by trained technicians. National data are also available to inform public education communication campaigns conducted by NHTSA and others, as well as provide a national picture of where there are geographic gaps in child passenger safety services, again providing an opportunity to improve health equity by mapping the location of services available to all families.¹⁵ Moreover, it is anticipated that the NDCF will be more prominently encouraged and comprehensively incorporated as an industry standard in the 2024 update of the National Child Passenger Safety Technician Certification Training curriculum, the U.S. training program for technicians.¹⁶

A public data dashboard providing an overview of current NDCF national data is provided at carseatcheckform.org/national-dashboard.

A Need for Standardized Practice

As previously stated, there are no national standards for documenting car seat checks. Safety can be improved through standardized documentation practices which allow for compiling of a comprehensive national data set. A review of state practices for child passenger safety program implementation reveals inconsistency from state to state.¹⁷ While the 2020 technician training does encourage use of the NDCF, it isn't required.¹⁸ In addition, per a review of nationally-based child passenger safety policies and procedures, a policy regarding documentation of car seat checks was not identified.

The National Child Passenger Safety Board (NCPSB) attempted to improve consistency and create a standardized way to identify resources for states through a technician Code of Conduct,¹⁹ a resource page linking to state-specific child passenger safety resources (including information for the Indian Health Service),²⁰ and through hosting webinars and a listserv for state, territory and regional child passenger safety coordinators.²¹ These resources were developed to encourage increased consistency among program implementation practices, as well as increase communication among state safety coordinators. Furthermore, while the number of certified technicians is tracked, there is no comprehensive count of the number of car seat checks conducted nationally. Therefore, it is currently impossible to determine how many parents and caregivers utilize this resource and difficult to identify gaps where services are unavailable. While there is a steadily growing trend of NDCF adoption and use among states, the choice of form used to check car seats remains voluntary.²² Variability in documentation among programs and technicians impedes creation of a comprehensive, national data set.

Regardless of format, it is imperative that technicians use a check form to document their work and to ensure that parents and caregivers sign the liability waiver before a technician touches a vehicle or car seat. This practice protects the technician and affiliated program or agency. It is also important for the technician to document findings from a car seat check for a variety of reasons, including documentation of individual check results, demonstration of program impact, and identification of trends and patterns for local and widespread dissemination and benefit.

If the NDCF is used consistently instead of traditional paper forms, more families will benefit from learnings from car seat checks across the country and child passenger safety at the local, state, regional and national levels is improved. The NDCF provides a tiered data access system, meaning data are available for individual technicians, affiliated programs and agencies, states, regions of NHTSA and the Indian Health Service, and car seat and vehicle manufacturers. There is no financial cost to create an account, use the NDCF or to access data at any tier level. Data are available as soon as the information is uploaded to the NDCF. The NDCF provides the solution to standardize the data and improve health outcomes related to correct use of car seats, booster seats and seat belts for vehicle occupants. For these reasons, use of the NDCF is preferred over other paper check forms or no check form at all.

Furthermore, the efficacy study conducted by Petraglia & Polson (2021) demonstrates the quality of data collected in the NDCF is more comprehensive compared to traditional paper check forms, with fewer missing forms and data elements. NDCF data are more accurate with fewer inconsistencies, and misuse is captured more accurately. In addition, use of the NDCF is more operationally efficient.²³

In this study, car seat check forms were analyzed from a single regional program that included seven states. This study compared use of a traditional paper check form with use of the NDCF while aiming to control for other confounding factors including geographic location, technicians, and the parent and caregiver population.



¹² Florida Occupant Protection Resource Center [FOPC], 2022

¹³ NHTSA, 2020 Titus, 2020

¹⁴ Titus, 2020

¹⁵ National Digital Car Seat Check Form [NDCF], 2022.

¹⁶ NHTSA, 2020 National Child Passenger Safety Board [NCPSB], 2022c

¹⁷ National Child Passenger Safety Board [NCPSB], 2022c

¹⁸ NHTSA, 2020 NCPSB, 2022a

¹⁹ NCPSB, 2022a

²⁰ NCPSB, 2022b

²¹ NCPSB, 2022c FOPC, 2022

²² FOPC, 2022

²³ Petraglia & Polson, 2021

The following graphs confirm that the comparability of the types of car seats assessed in the included check forms were similar.

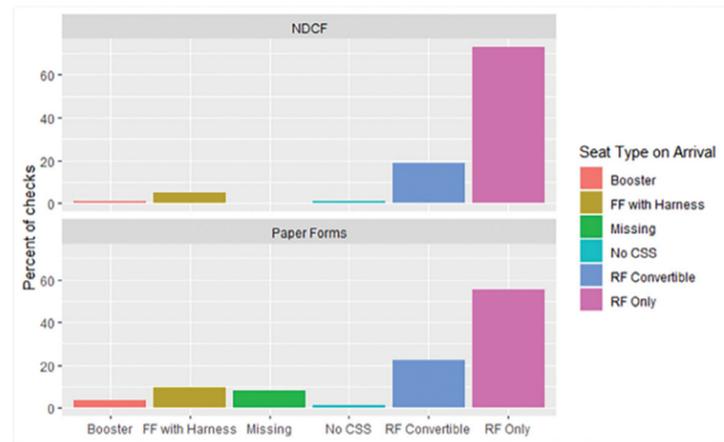


Figure 1. Comparability of the Samples: Car Seat Distribution. Petraglia & Polson, 2021.
 CSS = child safety seat or car seat
 FF = forward-facing car seat
 RF = rear-facing car seat

The distribution of car seat installation types were also similar by source.

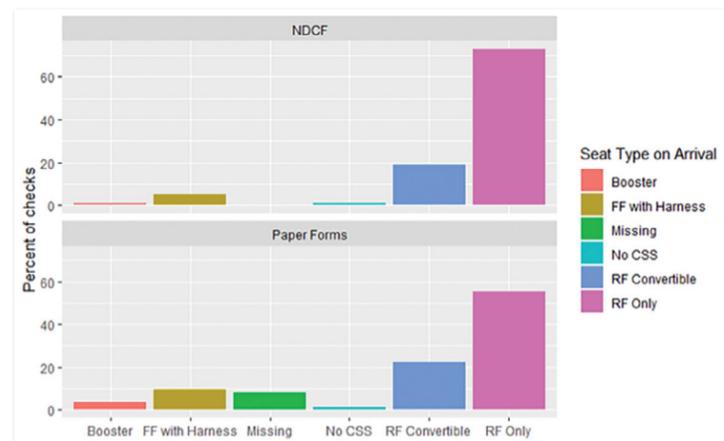


Figure 1. Comparability of the Samples: Car Seat Distribution. Petraglia & Polson, 2021.
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This study revealed:

- Sixty-two percent (62%) of traditional paper check forms were lost between completion of the car seat check and data processing
- It took more than 100 hours to manually create a usable data set with paper forms but only approximately five minutes to create a comparable data set with the NDCF
- Multiple key NDCF data elements had fewer missing data compared to paper forms
- The paper forms contain more inconsistent data compared to NDCF data

Missing and inconsistent data are important not only because they affect the quality of information collected but also because these numbers contribute to incorrect computations in misuse rates – a leading indicator of car seat effectiveness and improvement in the field of child passenger safety. For example, in the Petraglia & Polson (2021) study, there was a 51.4% misuse rate among the traditional paper forms and a 67.8% misuse rate with the NDCF. Accurate misuse rates are a regular topic of debate in the field of child passenger safety and it is important to identify a standard for calculating a misuse rate that is referenced in grants, reporting and research. It is likely that the misuse rate in the NDCF is more accurate for misuse of car seats seen at car seat checks because the NDCF leads technicians through a consistent process for conducting a car seat check and captures a greater level of detail regarding misuse components than traditional paper forms.

While more than 130,000 check forms have been entered into the NDCF since August 2018, it is crucial that a greater number of states and safety programs require use of the NDCF to continue building a comprehensive national data set that contributes to advancements in child passenger safety.²⁴

Conclusions

Lives can be saved and injuries prevented if the NDCF is more widely implemented. Additional benefits of NDCF use include:

- The car seat check process is standardized
- Data are consolidated and standardized
- Critical car seat safety information is instantly available and freely accessible once uploaded
- Data are widely available to car seat manufacturers and automakers, enabling enhanced data-driven design improvements
- Operational efficiency is improved, allowing technicians to conduct more safety checks
- Data is available to inform communication campaigns and address health equity
- The NDCF server is HIPAA compliant

Policies recommending NDCF adoption and use by all technicians are needed, and you can help. Share this information and encourage policies that support technician use of the NDCF. For more information visit cpsboard.org/NDCF. For assistance with the NDCF program, email training@carseatcheckform.org or info@carseatcheckform.org.

For more information about the child passenger safety program managed by the National Safety Council, visit nsc.org/carseats.

References

- Enriquez, J. (2021, September). *Occupant restraint use in 2020: Results from the NOPUS controlled intersection study* Report No. DOT HS 813 186). National Highway Traffic Safety Administration. <https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/813186>
- Florida Occupant Protection Resource Center. (2022, November 9). *Digital Car Seat Check Form*. https://www.floridaoprce.ufl.edu/oprc/Report_on_Car_Seats.asp
- National Child Passenger Safety Board. (2022a, November 14). *Code of conduct*. <https://www.cpsboard.org/technician-resources/code-of-conduct/>
- National Child Passenger Safety Board. (2022b, November 14). *Find CPS resources in your state*. <https://www.cpsboard.org/car-seat-safety/find-cps-resources-in-your-state/>
- National Child Passenger Safety Board. (2022c, November 14). *State Coordinator: Your touchpoint to child passenger safety*. <https://www.cpsboard.org/state-coordinators/>
- National Digital Car Seat Check Form. (2022, November 9). *National Dashboard: Map*. <https://carseatcheckform.org/national-dashboard>
- National Highway Traffic Safety Administration. (2020, January). *National Child Passenger Safety Technician Certification Training Technician Guide*. National Child Passenger Safety Board. <https://www.cpsboard.org/technician-resources/>
- National Safety Council. (2022, November 9). *Injury Facts: Deaths by Demographics, age and cause*. <https://injuryfacts.nsc.org/all-injuries/deaths-by-demographics/deaths-by-age/data-details/>
- Petraglia, E., & Polson, A. (2021). *National Digital Car Seat Check Form (NDCF) efficacy analysis*. Unpublished manuscript.
- Safe Kids Worldwide. (2022, October 4). *National Child Passenger Safety Certification*. <https://cert.safekids.org>
- Titus, D. (2020, September). Congressional Record: National Child Passenger Safety Week. <https://www.congress.gov/congressional-record/volume-166/issue-166/extensions-of-remarks-section/article/E883-2>

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The opinions, findings and conclusions expressed in this publication are those of NSC and Westat, and not necessarily those of the Department of Transportation, the National Highway Traffic Safety Administration or the National Child Passenger Safety Board.





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