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## Promoting Correct Car Seat Use in Parents of Young Children: Challenges, Recommendations, and Implications for Health Communication

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### Abstract

Injuries involving motor vehicles continue to be the biggest threat to the safety of children. Although child safety seats (CSS) have been established as a central countermeasure in decreasing injury risk, the majority of parents do not use the correct car seat correctly. There are many challenges in promoting correct car seat use, which itself is a complex behavior. To advance this critical protective behavior, the public health community would benefit from clarifying CSS messaging, communicating clearly, and addressing the conflicting recommendations of product use. In this article, we present current challenges in promoting CSS use and draw on health communication and other fields to offer recommendations for future work in this area.

### Keywords

health promotion; injury prevention; safety; maternal and infant health

## INTRODUCTION

With significant advances in injury control, half as many children now die in traffic crashes than were killed in 1975. The fatality rate has consistently declined and has now reached a low of 12 deaths from car crashes per million children in 2010 (Insurance Institute for Highway Safety, 2010). Correct use of a child safety seat is known to decrease the morbidity and mortality of child passenger occupants involved in a crash (Centers for Disease Control and Prevention [CDC], National Center for Injury Prevention and Control [NCIPC], 2011; Durbin, Chen, Smith, Elliott, & Winston, 2005). The National Highway Traffic Safety Administration (NHTSA) estimates that from 1975 through 2010, a total of 9,611 children younger than 5 years were saved because of child restraint use and that safety belts saved the lives of 280,486 children aged 5 years and older (U.S. Department of Transportation, NHTSA, 2012a). In 2010 alone, it is estimated that 285 and 12,546 children were saved by

child restraints and safety belts, respectively (U.S. Department of Transportation, NHTSA, 2012a).

Even with these enormous improvements, traffic crashes are currently responsible for 24% of all deaths of children aged 5 to 19 years (CDC, NCIPC, 2012). According to the most recently released data from NHTSA, in 2010 a total of 1,210 children aged 14 years or younger were killed in car crashes (U.S. Department of Transportation, NHTSA, 2012b); additionally there were 189,525 nonfatal injuries to children who were motor vehicles occupants (CDC, 2012).

An appropriate child safety seat or belt-positioning booster seat provides the best protection in a crash until a child is large enough for an adult safety belt to fit properly, usually when a child is 57 inches tall and weighs 80 pounds. It is estimated that children between the ages of 2 and 6 who are riding in a child safety seat or booster seat are 28% less likely to be killed in a crash than those who are using a seat belt (Elliott, Kallan, Durbin, & Winston, 2006). Likewise, belt-positioning booster seats reduce nonfatal injury by 45% in 4- to 8-year-olds compared with use of safety belts alone (Arbogast, Jermakian, Kallan, & Durbin, 2009).

Rates of caregiver use of *any* type of child safety seat have improved yet remain suboptimal (NHTSA, 2011) as does use of the *correct* child restraint system (Greenspan, Dellinger, & Chen, 2010; Macy, Reed, & Freed, 2011), which has been cited as a significant risk factor for MVC injury (Hummel, Langwieder, Finkbeiner, & Hell, 1997). In a recent comprehensive report summarizing 82,000 child restraint checks in 1 year, Safe Kids reports that 44% of parents left the fitting appointment with a different car seat than the one they used on arrival (Safe Kids USA, 2011). Thus, one of the primary aims of injury control efforts is to increase the rates of correct, age-appropriate child safety seat use for children (Hummel et al., 1997). The CDC National Action Plan for child injury prevention highlights the need for more interdisciplinary research to further determine why caregivers do not always appropriately restrain their children and encourages researchers to identify effective strategies for targeting audiences using relevant channels (CDC, NCIPC, 2012).

There are many challenges in promoting the use of correct child safety seats—particularly given the numerous child safety seat products available, each marketed for children of different age, height, and weight limits from various manufacturers. For caregivers to make informed decisions about child safety seats and for public health professionals to advance these critical protective behaviors, we must address these challenges so that effective health communication messages can be provided (Neuhauser, 2003). In this article, we discuss the complexities of choosing the correct car seats and the challenges of public health messaging in the context of promoting best practice child passenger restraint use with tailored communications to caregivers. Although correct installation of car seats is an important consideration, in this article we focus on caregivers' choice of child passenger restraint as the critical first step in increasing child passenger safety. We conclude with recommendation for future work.

## LITERATURE REVIEW

### Child Passenger Safety

**Current recommendations**—Current child safety seat recommendations from the American Academy of Pediatrics (AAP) are based on data from crashes both in the lab and on the road. Child safety seats aim to prevent the ejection of a child from the vehicle while spreading the forces of the crash across the strongest parts of the child's body (NHTSA, 2010). The most recent AAP child passenger safety report provides updated

recommendations to help caregivers optimize the safety of their child given the dramatic evolution of child passenger safety in the past decade (Durbin, 2011).

1. All infants/toddlers should remain in a rear-facing child safety seat until they are 2 years of age OR until they reach the highest weight or height allowed by the manufacturer of their child safety seat.
2. All children 2 years or older, or younger than 2 years who have outgrown the rear-facing weight or height limit for their child safety seat, should use a forward-facing child safety seat with a harness for as long as possible, up to the highest weight or height allowed by the manufacturer of their child safety seat.
3. All children whose weight or height is above the forward-facing limit for their child safety seat should use a belt-positioning booster seat until the vehicle lap and shoulder seat belt fit properly, typically when they have reached 4 feet 9 inches in height and are between 8 and 12 years of age.

**Child restraint decision making**—A wealth of child passenger safety literature has been distributed and marketed through the NHTSA, Safe Kids, the AAP, and others to inform consumers about correct child safety seat choice and use. However, point-of-purchase decisions are often based on other factors, such as accessories, aesthetics, convenience features, price, availability, maximizing time of use, and use for multiple children. This often results in seats that may not fit correctly in the vehicle or optimally fit the height and weight of the child for the duration of use (Rader, 2011).

Misuse rates continue to be documented for both forward-facing car seats and belt-positioning booster seats (Brixey, Guse, & Meurer, 2008; Vesentini & Willems, 2007). Studies in which researchers observed child safety seat use in more than 5,000 children estimated misuse rates greater than 72% (Decina & Lococo, 2005). Reasons for misuse are multifactorial and continue to be explored (Bilston, Finch, Hatfield, & Brown, 2008; Brixey, Corden, Guse, & Layde, 2011; Winston, Chen, Smith, & Elliott, 2006). Racial and ethnic disparities persist and may be widening, thought to be related to lower child safety seat use by racial minorities (Durbin, 2011; Brixey et al., 2011). Proper installation, one aspect of misuse, requires the child safety seat to be secured appropriately to the vehicle. Common errors in installation specifically include the safety seat being too loosely secured in the vehicle (Decina & Lococo, 2005), failure to tether the seat (Safe Kids USA, 2011), and improper placement of the car safety seat in the vehicle. Factors related to proper installation include the characteristics of the Lower Anchors and Tethers for Children (LATCH) system, such as the accessibility and ease of use (Klinich et al., in press). Further research is needed to target and inform consistently proper installation.

### Communicating About Child Safety Seats

The science of health communication offers strategies for promoting health behaviors using many channels, including the use of print materials that are developed by considering theories of persuasion and behavior change. Tailored health communication, in particular, allows developers to customize information to an individual in order to deliver highly relevant content and thus increase the likelihood that users will respond favorably to the materials and make behavioral decisions to promote their health (Kreuter & Wray, 2003). By increasing the relevance of information, it is more likely that the reader will consider and more carefully process the information being presented, leading to more sustained behavior change.

Tailored communication involves delivering content—usually in the form of text—that incorporates aspects of a user's individualism (Hawkins, Kreuter, Resnicow, Fishbein, &

Dijkstra, 2008). Such approaches can be thought of as personalizing some element of the communication, such as personalizing risks, beliefs, attitudes, values, or preferences. Tailored health communication approaches rely on (a) a clear communication objective and (b) knowledge of the audience of interest. Thus, tailored approaches offer an optimal strategy for promoting correct car seat use, since generic communication is likely inadequate given the complexities of the behavior. However, these complexities make it problematic to design effective health communication messages—tailored or otherwise.

These complexities arise from multiple sources. In some cases, the communication objective may be clear (e.g., “always use a rear-facing car seat for your child”), but our knowledge of the audience may be incomplete, limiting our ability to provide relevant messages. In many cases, the communication objective may be less clear because of “grey areas” or discrepancy between the most ideal behavior and a less ideal option that may be more feasible for families. Additionally, as described below, the correct car seat depends on many factors; few experts are trained to assess the full constellation of family characteristics that would be relevant in selecting the appropriate child safety seat.

Although parents often rely on their pediatricians for child safety advice, physicians have knowledge gaps about child safety seat use and sources of accurate information (Bilston et al., 2008; Brixey & Guse, 2009). Tailored health communications provided within a health provider's office or linked to an electronic medical record platform offer a mechanism to address these gaps. Tailored communications offer a strategy for customizing car seat recommendations for each child. An example of such an approach is *Safe N' Sound*, an evidence-based program that generates personalized injury prevention materials for parents of children 0 to 4 years (Nansel et al., 2002; Nansel, Weaver, Jacobsen, Glasheen, & Kreuter, 2008; Weaver et al., 2008). Based on a parental self-assessment of attitudes and behaviors related to child passenger restraints and other injury topics, *Safe N' Sound* prints a tailored report for the parents in real time. Initially developed and evaluated nearly 8 years ago, it is now used in pediatric clinics as an evidence-based approach to increase the adoption and use of injury prevention behaviors in parents of young children. Over time, the protective behaviors that are suggested by the program have been updated to reflect evolving recommendations by national organizations and new evidence of injury risks and countermeasure effectiveness. In the process of such an update, ambiguity arose over the classification of car safety seat risk responses for specific age and weight combinations given the previously described complexities and potential contradictions in determining the most appropriate recommendation. Although such systems are nimble enough to respond quickly to changing recommendations, their implementation nonetheless depends on the ability to select a single health message based on parent responses to a limited set of questions. As such, it is difficult to take into account factors such as potential contradictory manufacturer's information or family feasibility issues that may necessitate selection of a “second best” option.

It may be fairly straightforward to identify the positioning in the car (rear facing or forward facing) and the type of restraint (a harness system or an infant seat) that is consistent with best practices. So when a family is purchasing a new child safety seat, retail buying guides and packaging information can be used to direct this purchase. Existing marketing materials, however, may not always align with nationally recognized evidence-based recommendations. For example, best practice recommendations encourage families to keep children in a child safety seat with harness system until they outgrow the harness, so that a young child can be optimally protected in a harness for as long as possible prior to transitioning to a belt-positioning booster seat (Durbin, 2011). Yet many belt-positioning booster seats are marketed to children as young as 3 years, when the average weight is approximately 31 pounds (CDC, 2010), far below the recommended weight for this seat

transition. Thus, product promotion may encourage families to purchase a less safe seat for their child by highlighting ease of use or convenience.

Even when recommendations do not conflict with the manufacturer's information or family realities, there are many factors that complicate the recommendations. First, car seats vary in their ability to accommodate children of a particular weight. For example, some seats will easily accommodate a rear-facing child until 35 pounds; others do not. Therefore, the task for caregivers is that they must not only consider the rear-facing recommendations but consult their car seat owners' manual to ensure that their specific seat will accommodate their child. Second, there are characteristics of the vehicle such as the angle of the vehicle seat, the footprint (width and depth) of the car seat, and the location and length of the seat belt stalks that determine what car seat could be used appropriately in a particular vehicle.

Last, the capacity of the child care provider to follow specific child safety seat specifications, the temperament of the child, and use limitations of multiple children in a vehicle complicate the decision-making process. In addition, there are times when best practice collides with the realities a given family faces. For example, if the family of a 13-month-old has a forward-facing-only car seat, health professionals may be hard pressed to encourage them to purchase and use a convertible seat that would allow the child to stay rear facing for a longer period of time. The current role of the car seat technician is to inform the caregiver of best practice recommendations and the manufacturer's instructions and then allow the caregiver to make the decision if the recommendations and instructions are at odds. In fact, Safe Kids USA (2011) notes that if a parent is using a car seat according to the manufacturer's instructions, it is considered "correct use" even if their use does not conform to current best practices. They further note that there is not a "one-size-fits-all" car seat option and that only the caregiver can make the decision about what seat fits their child in their vehicle, their price point, and their circumstances.

**Getting the Message Out: Child Passenger Safety Programs**—Using the correct car seat requires caregivers to reevaluate their child's child safety seat needs as he or she grows. Therefore, multiple communication contact points with differing content are necessary during the first decade of a child's life. Research continues to expand on how to best communicate with families who may not fully understand how to use child safety seat properly (Bilston et al., 2008). Because the science of child passenger safety evolves quickly, informational materials that have not been updated yearly are most likely out of date. In the study *Seated for Safety* (Ross, Gallagher, Hudson, & Miara, 2002), it was found that 15% of child passenger safety materials reviewed were inaccurate, and most required a high reading level. These findings highlight the need for greater standardization and simplification to create effective messages. Greater emphasis needs to be placed on maintaining updated materials that keep pace with evidence-based practice while maintaining appropriate readability standards for the targeted community.

Child safety agencies have taken great steps to clarify information for families, lead by NHTSA's 4 Steps for Kids program and consumer ease of use compilations, the AAP's yearly recommendations to families, and the many nationwide and local efforts by Safe Kids organizations (NHTSA, 2002). The 2000 TREAD (Transportation Recall Enhancement, Accountability, and Documentation) Act requires a consumer rating system that is easy to understand, practical, and timely so that caregivers can make more informed purchasing decisions (NHTSA, 2008). Manufacturing changes have been helpful in this regard by more clearly indicating height and weight limits with visual cues (Smith, Collins, Rockwell, Park, & Kim, 2009).

## DISCUSSION AND RECOMMENDATIONS

We offer the following recommendations to promote correct the use of the correct product within an evolving health communication landscape.

### Conduct Meaningful Formative Research

When child safety seat instructions conflict with the vehicle owner's manual, when product information conflicts with evidence-based recommendations, as families and friends share child safety seats, we need to understand how caregivers perceive the associated risks of keeping their children as safe as possible. Behavioral science theories (Gielen & Sleet, 2003) can be used to explore the perspectives of parents. Further research is needed to address questions such as how caregivers decide between the added safety benefit of rear-facing seats and the convenience of forward-facing seats. It will also be important to examine how parents understand legal requirements and manufacturers' information in relation to advice from their physician or national best practices and how, if at all, parents plan ahead for future passenger safety needs of their children. Because caregivers are best positioned to make these decisions for their child, educational efforts should be responsive to the needs and perspectives of caregivers.

Research should also be conducted to identify the barriers to proper seat choice specifically in light of the updated AAP recommendations. Caregivers and health care practitioners may not realize the additional safety benefit of children riding rear facing until the age of 2 years or that “scrunched” legs are a relatively insignificant risk when compared to spinal cord injuries. We should strive for consensus around these message concepts and marketing approaches so that they can be used consistently.

### Develop and Evaluate Injury Prevention Message Strategies

It is important to create and disseminate clear and consistent messaging on child passenger safety that reflects the decision-making process that parents use. Message testing, market analysis, health literacy application, and social marketing approaches should be considered to promote best practices. The field should strive for simplified messages that resonate with caregivers and are easy to understand and act on.

### Evaluate Existing Programs and Recommendations

Although it is important to evaluate the process of program implementation (e.g., the number of car seats inspected or delivered), the field cannot evolve without rigorous evaluation of program impact. Once message strategies are developed and implemented, it is imperative to understand the effects of their use—both on long-term outcomes of car seat use and injury events and on the beliefs, attitudes, and skills of caregivers. Evaluation efforts have led to the repackaging of seats to be fully assembled, the revision of instruction labels to be more clear, and colored indicators to designate seat positioning (NHTSA, 2008). With the adoption of new guidelines and new approaches comes the need to carefully anticipate, monitor, and investigate potential unintended consequences. For example, it is not unreasonable to anticipate that encouraging parents to keep their children rear facing until at least the age of 2 years may result in premature graduation to *booster* seats if parents skip the transition to a forward-facing harness. Clearly, this would not be desired and should be carefully anticipated, monitored and investigated. Practitioners will rightfully demand data from epidemiological studies and outcome evaluations to justify their efforts to promote these recommendations with parents, and the field should be prepared to offer such evidence.

## Conduct Transdisciplinary Work

If public health can shape and advance a consistent and simplified message of best practice car seat use, then we might expect the prevalence of correct seat use to increase and the normative behaviors around child safety seat use to shift. Given that most parents report having car seats, we need to “move the needle” on the prevalence of *correct* use. Clear messages would also allow public health professionals and pediatricians to partner more effectively with law enforcement, policy makers, manufacturers and retailers, and consumer health information systems. Public health could then develop a coordinated approach to maintaining and updating this information such that best practices are encouraged but other factors (e.g., laws and product availability) are also considered.

## Support Partnerships Between Manufacturers, Retailers, and Injury Prevention Specialists

It is critical to have an effective partnership between caregivers, industry, child safety experts, and physicians to ensure child safety. The effectiveness of partnerships was evidenced when manufacturers began to offer products that accommodate children weighing more than 40 pounds in keeping with the advocacy efforts aimed at enforcing car seat use in children aged 4 to 9 years (Winston, Chen, Elliott, Arbogast, & Durbin, 2004). Partnering will allow product design to be advanced in ways that meet the market need and address the barriers identified by parents.

Given the potential conflicts between evidence-based best practice recommendations and manufacturers’ instructions, it would be ideal for manufacturers to describe how their child safety seat products align with best practice recommendations for the age and weight of the child they are targeting. This partnership would also allow the field to more directly address misuse rates associated with installation errors. With more rigorous evaluation of products, the public health community can drive consumer demand for specific products that align with best practices. It should also be noted that nationally recognized best practices should continue to be examined and that objective data regarding the relative safety of various products and practices should be shared.

## CONCLUSION

Consumers are bombarded with marketing campaigns promoting various parenting devices for young children. Even when caregivers hear the public health message of the importance of harnessing a child for as long as possible, for example, it is challenging to reconcile that message with the packaging materials that claim a certain booster seat can be used for a 3-year-old. This is particularly true when a product is available that allows parents to circumvent a personal barrier—such as turning a young child front facing to ease interactions while traveling. Already these mixed messages are adopted and promoted through social media outlets and have far outpaced the reach of traditional channels of content delivery.

It is incumbent on public health professionals to critically examine the evidence and to advocate for the safest environment for children. Because gray areas in recommendations only result in increased confusion and children at greater risk, we should take steps to clarify the child safety seat message and promote safe traveling for children. As electronic communication channels increasingly provide a way to provide customized relevant content, the injury control field risks losing its place to other public health issues with more clarity of consensus, risk identification, and focus. Although we have made great strides in decreasing the morbidity and mortality from car crashes, the complexity of the prevention message must be addressed so that the injury and death rates do not plateau at unacceptably high levels. Simplified language, consistency in messaging, objective and precise formative and

impact evaluation, and collaboration between private and public sectors will help injury control keep pace in today's evolving health communication field.

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