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Countermeasures That Work – Child Passenger Safety

The National Highway Traffic Safety Administration has published its 10th edition of *Countermeasures That Work*. The guide is a basic reference to assist State Highway Safety Offices and other highway safety professionals in selecting effective, evidence-based countermeasures for traffic safety problem areas. This Traffic Tech highlights the effective countermeasures from Chapter 2, "Seat Belts and Child Restraints."

Background

Unfortunately, motor vehicle traffic crashes are a leading cause of death of children, defined by NHTSA as people 14 and younger. Of the 36,560 motor vehicle traffic fatalities in the United States in 2018, there were 1,038 (3%) who were children. On average, three children were killed and 520 were injured every day in traffic crashes in 2018 (NCSA, 2021). Table 1 shows the change in traffic fatalities by age group over the past 10 years.

Table 1. Child Traffic Fatalities by Age Group

Age Group	2009	2018	Change
Under 1 Year Old	75	67	-11%
1–3 Years Old	260	219	-16%
4–7 Years Old	329	255	-22%
8–12 Years Old	402	339	-16%
13–14 Years Old	254	158	-38%
All	**1,320**	**1,038**	**-21%**

Source: FARS 2009 Final File, 2018 ARF

Of the 1,038 children killed in 2018 in fatal crashes, 797 (77%) were vehicle occupants, and 736 (71%) were passenger vehicle occupants. Of the 736 child passenger vehicle occupants killed in fatal crashes, restraint use was known for 669, of whom 236 (35%) were unrestrained (NCSA, 2021). Child restraint systems (CRSs) including car seats and booster seats remain the best way to protect children in motor vehicle crashes. CRSs reduce fatalities by 71% for infants (under 1 year old) and by 54% for toddlers (children 1 to 4 years old) in passenger cars. CRSs reduce fatalities 58% for infants and 59% for toddlers in light trucks, such as pickups and SUVs (Hertz, 1996).

CRS use by children under 13, as observed in the 2017 National Survey of the Use of Booster Seats (NSUBS), was 90.1% in 2017. However, it ranged from 97.9% for children under 1 year old to 86.5% for children 8 to 12 years old (Li & Pickrell, 2018). Correct CRS use is important for efficacy in a crash, and based upon NHTSA's National Child Restraint Use Special Study (NCRUSS), CRS misuse is estimated to be at least 46% (Greenwell, 2015).

Effective CPS Countermeasures

The following sections discuss the six behavioral countermeasures for child passenger safety (CPS) that are supported by research as consistently effective across situations (★★★★★), effective in certain situations (★★★★), or promising/likely effective (★★★). For more information on these countermeasures, their effectiveness, cost, use, and time to implement, see the full *Countermeasures That Work* report.

Countermeasure	Effectiveness
4.1 Strengthening Child/Youth Occupant Restraint Laws	★★★★★

All 50 States have laws requiring children 4 and younger to be properly restrained. However, State laws vary in coverage of children 4 to 8, with most States requiring children to be properly restrained in seat belts once they have aged out of a CRS. Laws that require the use of booster seats improve safety through reduced fatalities and injuries despite booster seat use still being low. States that have laws that follow best practices for CRS use had children who were more likely to ride in the recommended type of restraint, but the strongest predictor of whether a child was restrained was whether the driver was restrained.

Countermeasure	Effectiveness
5.1 Short-Term High-Visibility Law Enforcement	★★★★★

Short-term high-visibility enforcement campaigns are one of the most effective occupant protection countermeasures, and most often include CRS enforcement. Enforcement is more effective when coupled with media announcements about enforcement efforts and outreach campaigns designed to increase knowledge and awareness of effective CRS usage. Enforcement campaigns can be costly, with expenses that include compensation for enforcement activities, coordination of the events, and media outreach. The most effective campaigns maximize these contributions and are further promoted through the activation of child restraint inspection stations that operate concurrent to the enforcement and media events.

Countermeasure	Effectiveness
6.1 Strategies for Older Children	★★★

Communication and outreach aimed at increasing occupant protection for children older than 8 have been shown to be effective at increasing seat belt use. Programs focusing on

both child and parent proved more effective than those that limit focus to just the child or the parent. These programs vary in operational length and costs, as they can be implemented in a variety of ways (e.g., in schools, through media, through community events).

Countermeasure	Effectiveness
6.2 Strategies for Child Restraint and Booster Seat Use	★★★

Most children do not reach the appropriate size, based on height and weight, to use the seat belt without a car seat or booster seat until they are more than 8 years old. However, inappropriate graduation is common, with 21% of children 4 to 7 years old restrained only with the seat belt (Li & Pickrell, 2018). Communication and outreach programs to improve occupant protection among children 7 or younger have been shown to be effective when they improve parents' knowledge of the benefits of the appropriate CRS, including booster seats, and when they build community norms around appropriate CRS use. These programs vary in their costs, but low-resource settings can use community events and traditions to improve safety without significant costs.

Countermeasure	Effectiveness
7.1 School-Based Programs	★★★

Schools offer settings for child occupant protection programs, and programs offered through schools and day care centers have been shown to be effective at increasing seat belt use and CRS use. The effects have even been shown to last beyond the immediate end of the program. However, it is unclear how many communities are making use of this countermeasure. More reports about school-based programs would improve understanding of effects and inform best practices. These programs can vary in cost and time to implement, and they can be tailored to the community and its challenges.

Countermeasure	Effectiveness
7.2 Inspection Stations	★★★

Efforts to reduce CRS misuse started because observational studies found significant numbers of CRSs improperly installed or inappropriate CRSs being used. Inspection stations provide a place for CRS users to receive hands-on help with installing or adjusting CRSs. These stations have been shown to improve the rates of children riding in appropriate CRSs for their size, these CRSs being appropriately installed, and children being appropriately secured in the CRSs. These stations work best when they have at least one certified child passenger safety technician. These stations are also frequently used to distribute car seats for low-income families or as part of car seat loan programs, which have been shown to improve CRS use. The cost of establishing inspection stations depends on the size of the program, and permanent stations require maintenance of personnel qualifications and the facility.

Conclusion

Several effective countermeasures exist to improve CPS. The most effective include strong laws and high-visibility enforcement. Communications and outreach, school-based programs, and inspection stations can be effective when targeted to community needs. Pairing CPS countermeasures with adult seat belt efforts can be effective because of the link between children being properly restrained and the vehicle's driver being properly restrained.

One theme throughout effective CPS countermeasures is the importance of understanding each community's needs and choosing the appropriate format, timing, and scope of each program. Leveraging existing community resources (such as community events, schools, hospitals, law enforcement agencies, and fire departments) can reduce costs and improve the effect of these countermeasures in preventing child passenger deaths and injuries.

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