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Tweens at risk: Examining car safety practices in four economically disadvantaged urban elementary schools in Virginia

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ABSTRACT

Introduction: Children aged 8- to 12-years-old ("tweens") are at high risk for crash injury, and motor vehicle crashes are their leading cause of death. *Method:* Data are presented from behavioral observations ($N = 243$), surveys ($N = 677$), and focus groups ($N = 26$) conducted with tweens attending four urban elementary schools in Virginia. The populations assessed were predominantly Black (77.9%) and economically disadvantaged (61.9%). *Results:* Focus groups revealed a number of inconsistencies in and misconceptions about safety practices. Among the 677 tweens who completed anonymous surveys, the majority (58.1%) reported wearing their seat belts "not very much at all" or "never." Many students (47.8%) reported usually sitting in the front seat or sitting in the front and back seats equally. This is despite the fact that most (92.0%) knew that the back seat was the safest place to sit. Of the 243 tweens observed in vehicles, 65.0% were unrestrained and 60.1% were seated in the front passenger seat. *Impact on Industry:* Findings of this study shed light on the great disparity between the national rates for child safety practices and those of children living in an economically disadvantaged urban school district. Additional intervention programs that are culturally appropriate and specifically target this age group are needed.

1. Introduction

Children are especially susceptible to road traffic injury, and morbidity and mortality rates across the world reflect this vulnerability (Toroyan & Peden, 2007). In the United States in 2010, motor vehicle crashes were the leading cause of death for ages 5 to 24 years (Centers for Disease Control and Prevention [CDC], 2012). "Tweens" (8-12 year olds) are at high risk for crash injury given a propensity toward inconsistent restraint use and increased front seat positioning compared to their younger peers (Partners for Child Passenger Safety, 2006). Of those aged 8-12 years with known restraint status who were killed in a passenger motor vehicle crash in 2010, 44% were unrestrained (National Highway Traffic Safety Administration [NHTSA], 2012b).

Crash forces are quite powerful given the abrupt changes in momentum and velocity that occur in mere fractions of a second (NHTSA, 2007). Using a safety restraint dramatically reduces injury in a collision. Failing to wear a safety restraint increases one's odds of injury or death in a crash by 45% to 74%, depending on the type of restraint and seating position (Arbogast, Jermakian, Kallan, & Durbin, 2009; Durbin, Chen, Smith, Elliott, & Winston, 2005; NHTSA, 2012a; Rice & Anderson, 2009). Properly fitted safety restraints prevent injury by: (a) keeping occupants in the vehicle; (b) contacting the strongest parts of the body; (c) spreading forces over a wide area of the body; (d) helping the body slow down; and (e) protecting the brain and spinal cord (NHTSA, 2007). Compared to appropriately restrained children (age 0-15 years), unrestrained children are greater than three times more likely to sustain injury in a crash, and children traveling in inappropriate restraints for their size are at 2 times the risk of injury (Durbin et al., 2005).

Depending on the size of the child, children older than age 8 may still need a booster seat. Graduation from a booster to a belt is best determined by proper fit of the belt. Tweens should travel in a lap and shoulder seat belt system in the back seat once they outgrow a booster seat, which is usually after they grow to 4 feet 9 inches tall and are between 8 and 12 years old.

Overall, restraint use among children aged 8-15 years old is 84%, but studies demonstrate great variability in this estimate by region, race/ethnicity, and age of child, and many children are improperly restrained for their age (Greenspan, Dellinger, & Chen, 2010; NHTSA, 2010, 2012a). Tween restraint use rates are also frequently below rates observed for adults and younger children (Agran, Anderson, & Winn, 1998; Greenspan et al., 2010; Yang et al., 2011). Tweens are often part-time (or situational) belt users, leading to variability in use percentages reported in observational studies. For instance, children are less likely

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to be restrained when arriving at school versus when observed at intersections (Emery & Faries, 2008). Emery and Faries postulate several reasons for this, including children only riding a short time in the vehicle, children wearing backpacks, and families running late for school. At schools with lower socio-economic status, children are even less likely to be restrained (Emery & Faries, 2008).

Among 8-12 year olds observed in a national observation study in 2008, tween belt use percentages were 91% for Asians, 90% for Whites, 72% for Blacks, and 77% for other races/ethnicities. The percentages were 87% for non-Hispanic and 79% for Hispanic (Pickrell & Ye, 2009). When considering all age groups, differential belt use is well documented for certain demographic subgroups (Lee, Shults, Greenspan, Haileyesus, & Dellinger, 2008; Macy & Freed, 2012). Key groups that use seat belts less often than their counterparts include: males, older children, young drivers, black motorists/occupants, pick-up truck drivers, those living in rural areas, those with low incomes, and those with less education (Agran et al., 1998; Braver, 2003; Briggs et al., 2006; Brown, 2010; Colgan et al., 2004; Eby, Bingham, Vivoda, & Ragunathan, 2005; Greenspan et al., 2010; Gunn, Phillippi, & Cooper, 2005; Lee et al., 2008; Pickrell & Ye, 2009; Rangel, Martin, Brown, Garcia, & Falcone, 2008; Romano, Tippetts, Blackman, & Voas, 2005; Vivoda & Eby, 2011; Vivoda, Eby, & Kostyniuk, 2004; Winston, Kallan, Senserrick, & Elliott, 2008). However, separating the presence of any one risk factor from additional injury risk factors is anything but simple. Race, poverty, urban settings, knowledge, religiosity, parental supervisions, and access to educational resources are often so confounded with one another in injury risk research that no one factor can be determined as causal (Lavranos, Kalampoki, & Petridou, 2008; Yang et al., 2011). Demographic differences in safety restraint use may be attributable to barriers in access to care and/or lack of culturally appropriate programming (Brown, 2010; Rangel et al., 2008). Driver restraint has been shown to be the strongest predictor of children's use of appropriate restraints (Agran et al., 1998; Eby et al., 2005).

In addition to restraint use, the back seat is recommended for all children under age 13, which includes tweens. Because frontal collisions are the most common type of crash, rear seating offers independent and additive safety protections in a crash because the occupants are farther from the point of impact (Berg, Cook, Corneli, Vernon, & Dean, 2000; Braver, Whitfield, & Ferguson, 1998; Durbin et al., 2005; Lennon, Siskind, & Haworth, 2008). Further, frontal airbags pose great risk to small children seated directly in front of them due to the speed and force with which they deploy (Williams & Croce, 2009). Children (age 0-12 years) in the front seat are at 40% greater risk of injury compared to those seated in the back (Durbin et al., 2005; Lennon et al., 2008). Both restrained and unrestrained children are at a lower risk of dying in rear seats (Braver et al., 1998; Durbin et al., 2005; Lennon et al., 2008). Incidence of riding in the front seat increases with age, with most (73%) children over age 8 being seated in the front row (Durbin, Chen, Elliott, & Winston, 2004). Many tweens only sit in the back if told to do so by their parents, and most tweens in the United States sit in the front passenger seat when they are the sole passenger (Durbin et al., 2004). Being in the front seat more than doubles the risk of fatality for children under age 13 and being unrestrained increases fatality risk four-fold (Lennon et al., 2008). Tweens are also at greater risk when traveling with teen drivers, as they are less likely to wear their seat belt or sit in the back seat (Winston et al., 2008).

Noncompliance with safety recommendations stems not only from a lack of knowledge, but also from low perceptions of risk, poor recognition of restraint system effectiveness, flawed understanding of crash forces, and a number of other competing factors such as child protest, personal beliefs, and legal loopholes (Bingham, Eby, Hockanson, & Greenspan, 2006; Simpson, Moll, Kassan-Adams, Miller, & Winston, 2002; Will, 2005; Winston, Erkoboni, & Xie, 2007). Tweens are at an ideal age for intervention because they are highly impressionable and very susceptible to both peer and parent influences (Jennings, Merzer, & Mitchell, 2006). Further, they are at a time of transition and are just starting to make their own decisions and develop safety habits. Unfortunately, the traffic safety field has few evidence-based programs specifically targeting this age group. Indeed, the national *Occupant Protection for Children Assessment* surveys conducted with eight state Highway Safety Offices (including Virginia) in 2007 identified "programs for tweens" as the top need for child passenger safety (Governor's Highway Safety Association, 2008). Little is known about perceptions of car safety among various demographic risk groups within the tween population. The present study used a multiple methods approach to examine car safety attitudes and practices among mostly minority tweens living in an economically disadvantaged urban school district in Virginia.

2. Method

2.1. Setting and participants

A needs assessment regarding tween transportation safety was conducted with 8- to 12-year-old students attending attending 3rd through 6th grades at four public elementary schools in a multi-ethnic urban community in southeastern Virginia. Data are presented from behavioral observations ($N = 243$), surveys ($N = 677$), and focus groups ($N = 26$) conducted with 8-12 year-old students at the four schools. All measures and procedures were reviewed and approved by Eastern Virginia Medical School's Institutional Review Board for Protections of Human Subjects.

The school populations assessed were economically disadvantaged, as indicated by Title I status and 61.9% of the schools' enrollment in the free and reduced lunch program. Title I is a federal aid program that provides supplemental services for high-poverty schools with at least 40% of the enrollment meeting low-income criteria. School demographics were 77.9% Black, 18.1% White, and 4.0% other races. Gender was approximately equal in the schools, with 49.6% male and 50.4% female. The study schools had 300, 341, 269, and 274 total students enrolled in 3rd, 4th, 5th, and 6th grades, respectively. Demographics of the four study schools are presented in Table 1.

2.2. Materials and procedure

In order to gain a more complete understanding of tween transportation safety attitudes and practices, this research used a multi-methods

Table 1
Demographics of 4 study schools in Virginia, 2008-2009 School Year.

Descriptor	*N*	%
Gender		
Male	1257	49.6%
Female	1279	50.4%
Grade		
PreK	294	11.6%
K	385	15.1%
1st	349	13.7%
2nd	330	13.0%
3rd	300	11.8%
4th	341	13.4%
5th	269	10.6%
6th	274	10.8%
Race		
Black	1975	77.9%
White	458	18.1%
Other	103	4.0%
Free & Reduced Lunch		
Eligible	1574	61.9%
Non-eligible	968	38.1%

Note. Demographic data are presented for the entire school population ($N = 2542$). Race and gender information was not available for 6 students.