Trends and Correlates of Child Passenger Restraint Use in 6 Northwest Tribes: The Native Children Always Ride Safe (Native CARS) Project

Jodi A. Lapidus, PhD, Nicole Holdaway Smith, MPH, Tam Lutz, MPH, MHA, and Beth E. Ebel, MD, MSc, MPH, for the Native CARS Study Group

Objectives. We compared proportions of children properly restrained in vehicles in 6 Northwest American Indian tribes in 2003 and 2009, and evaluated risks for improper restraint.

Methods. During spring 2009 we conducted a vehicle observation survey in Oregon, Washington, and Idaho tribal communities. We estimated the proportions of children riding properly restrained and evaluated correlates of improper restraint via log-binomial regression models for clustered data.

Results. We observed 1853 children aged 12 years and younger in 1207 vehicles; 49% rode properly restrained. More children aged 8 years and younger rode properly restrained in 2009 than 2003 (51% vs 29%; $P < .001$). Older booster seat–eligible children were least likely to ride properly restrained in 2009 (25%). American Indian children were more likely to ride improperly restrained than nonnative children in the same communities. Other risk factors included riding with an unrestrained or nonparent driver, riding where child passenger restraint laws were weaker than national guidelines, and taking a short trip.

Conclusions. Although proper restraint has increased, it remains low. Tribe-initiated interventions to improve child passenger restraint use are under way. (*Am J Public Health.* 2013;103:355–361. doi:10.2105/AJPH.2012.300834)

Despite advances in restraint technology and improved laws, motor vehicle injury still remains the leading cause of death for children aged between 3 and 14 years.[1] American Indian and Alaska Native (AI/AN) children experience higher mortality rates from motor vehicle crashes than other races, nearly twice the national average.[2,3] This is, in part, a result of riding unrestrained or improperly restrained in vehicles. According to 2002 Fatal Accident Reporting System data, fewer fatally injured occupants were restrained in crashes that occurred in tribal jurisdictions (16%) than in crashes that occurred in other areas of the nation (38%).[4]

In a 2003 vehicle observation survey, the majority of AI/AN children were observed riding unrestrained (41%) or improperly restrained (30%) in 6 Northwest tribal communities (Idaho, Oregon, and Washington).[5] In that study, only 11% of booster seat–eligible children were properly restrained. These figures were much lower than those reported for other populations during the same time frame.[6,7] Less frequent use of proper restraints among AI/AN children may be a result of a combination of factors,[7–11] and AI/AN parents and other caregivers who travel with unrestrained or improperly restrained children face barriers to consistent use that may differ from those in other US communities. These would likely include legal and law enforcement differences,[12,13] but could also include cultural beliefs, family and community structure, geographic location, and economic factors.[5]

In response to data from the 2003 study,[5] the 6 participating Northwest tribes collaborated to form Native Children Always Ride Safe (Native CARS), a community-initiated intervention study designed to improve child passenger restraint use in tribal communities. We present data from a vehicle observation study conducted in 2009 in these tribes. We contrasted data from the 2003 and 2009 surveys to determine change in proper restraint over time, and examined correlates of improper restraint from the 2009 data to help inform intervention planning in the tribes.

METHODS

The 6 participating tribes were located in Oregon, Washington, and Idaho (2 in each state), and had enrolled populations ranging from approximately 2200 to 8900 individuals. Site coordinators employed at each tribe (who were tribal members themselves) oversaw all work at the local level, including the vehicle observations.

Data Collection

We conducted a vehicle observation survey in all 6 tribes to estimate proportion of children who ride properly restrained and determine factors associated with improper restraint. The survey consisted of observational interviews: observing seating position and restraint use of all vehicle occupants, followed by a short driver interview. The methods employed in 2009 were similar to, but improved upon, those from our 2003 survey.[5] Observational interviews were conducted during daylight hours in April through June 2009. We contracted and trained tribal members to collect the data. Site coordinators determined appropriate locations to observe vehicles riding with children aged 8 years and younger. These included parking lots of gas stations, mini-marts, day care facilities, schools, tribal health clinics, and community centers that were in tribal communities or nearby towns. Observers approached vehicles with children as passengers as they were entering or leaving sites (while occupants would most likely be restrained). They confirmed that at least 1 passenger was aged 8 years or younger, and obtained verbal consent to conduct a 5-minute interview and observation. Unlike the 2003 survey, in 2009 we

collected information on both AI/AN and non-AI/AN children and drivers, which was appropriate because non-AI/AN persons would still be subject to tribal traffic laws, and may be exposed to community interventions when implemented.

The driver reported each child's age, estimated each child's weight, and reported distance from home (in minutes). Observers then recorded the seating location and restraint use of all passengers and driver. Because of time constraints, observers did not enter the vehicle to check the fit of straps in infant seats or forward-facing harness seats. Although we only surveyed vehicles with at least 1 passenger aged 8 years or younger, if there were children aged 9 to 12 years in the vehicle, we collected detailed restraint use information on those children as well. In the driver interview portion of the survey, drivers were asked to share their opinions about child passenger restraint use, their reasons for use or nonuse, and about community resources related to child passenger safety and awareness of local passenger restraint laws. A $5 gift card was provided at the completion of the interview. We attempted to collect 200 complete interviews from each tribe in 2009. This number was selected so that there would be ample statistical power to detect effects attributable to interventions that would be implemented in the tribes.

Restraint Definitions and Statistical Analysis

We defined proper restraint status according to the American Academy of Pediatrics and National Highway Transportation Safety Administration (NHTSA) guidelines in effect during the time that the observations were conducted.[14] If children were using some type of restraint, but not the one recommended by these guidelines, they were designated as improperly restrained. Children using an appropriate restraint with the belt positioned inappropriately (e.g., shoulder belt behind their back) were classified as improperly restrained. Children weighing up to 65 pounds in forward-facing harness seats were classified as properly restrained because some seats have an upper weight limit higher than 40 pounds. We also classified 3-year-old children weighing greater than 40 pounds in booster seats as properly restrained because they likely had outgrown the forward-facing harness seat. Children seated in a front seat when a rear seat was available were classified as improperly restrained as guidelines state that children in this age group should ride in the back seat when possible to do so.[14] However, because restraint choice and seat positioning may be separate decisions for drivers, we also ran analyses designating those using correct restraint in the front seat as properly restrained. Finally, children who were not using any type of restraint were classified as unrestrained. We compared child, driver, and vehicle characteristics among the 3 restraint-use categories (properly, improperly, and unrestrained).

For multivariable models, we created a dichotomous child restraint variable (properly restrained or not) by collapsing the improperly restrained and unrestrained groups together. We modeled this dichotomous variable by using 2009 data for all children (AI/AN and non-AI/AN, aged 12 years and younger), to ascertain vehicle, driver, and child factors associated with riding improperly or unrestrained, and to suggest possible subgroups to focus intervention efforts. Note that for these models, the event of interest was *not* being properly restrained. We used log-binomial regression models, which yielded a direct measure of relative risk,[15–17] but found that some log-binomial models, which may be less numerically stable than logistic regression models, did not converge. We opted to use the log-Poisson regression model with robust variance estimate,[17] which approximates the log-binomial maximum likelihood estimates and standard errors. Because children riding in the same car are not independent, we used a generalized estimating equations method to account for the clustering of children in a car.[18] To further refine possible intervention strategies, we fit the same multivariable models restricted to vehicles with AI/AN children only to evaluate the difference in the magnitude of associations versus the model containing all children. We always entered indicator variables for tribe into the models to adjust for observed and unobserved differences in communities participating in the study (data not shown).

In addition, we compared the proportion of American Indian children aged 8 years and younger who were properly restrained in 2009 to the proportion observed in 2003 by child's age. The age and AI/AN restriction on 2009 data was necessary to facilitate direct comparison with 2003 study data. We evaluated change in proper restraint over time by fitting a year indicator variable in a log-Poisson generalized estimating equation regression model. For this model the event of interest was being properly restrained as defined by NHTSA guidelines.[14]

We used Stata version 11 (StataCorp LP, College Station, TX) for all descriptive and inferential analyses.

RESULTS

We approached 1378 vehicles with children as occupants during our 2009 vehicle survey. Most drivers (88%) agreed to participate, and of those that participated, 79% of vehicles contained an AI/AN driver, AI/AN children passengers, or both. Drivers who refused to participate were far less likely to be wearing their seat belt (32%) than were those who agreed to participate (61%; $P<.001$).

Child, driver, and vehicle characteristics for both the 2003 and 2009 vehicle surveys are presented in Table 1. In 2009, there were 1604 passengers aged 8 years and younger, and another 249 between the ages of 9 and 12 years. Forty percent of vehicles only had 1 other passenger besides the driver (2 occupants), 34% had 3 occupants, 17% had 4, and 9% had 5 or more total occupants. Only 1.7% of vehicles had more occupants than available seats. By contrast, in 2003 we only collected data from 574 vehicles, which had at least 1 AI/AN occupant. Other characteristics were similarly distributed in 2003 and 2009.

In 2009, 71% of children aged 12 years and younger were using some type of restraint, but only 49% of all children aged 12 years and younger were observed riding properly restrained in a device appropriate for their age and size. Proper restraint varied by tribe (24% to 70%). When we restricted to AI/AN children younger than 8 years, 51% rode properly restrained in 2009, which was a statistically significant increase from the 29% properly restrained in 2003 (Figure 1; $P<.001$). In fact, in 2009, AI/AN children were 1.6 times more likely to be properly restrained than in 2003 (relative risk [RR] = 1.63; 95% confidence interval [CI] = 1.43, 1.85). Increases were seen at

TABLE 1—Characteristics of Child Passengers and Drivers: 6 Northwest US American Indian Tribes, April–June 2009 and June–July 2003

Characteristic	2009, No. (%) or Mean ±SD (No.)	2003,[a] No. (%) or Mean ±SD (No.)
Child age, y		
< 1	171 (9)	88 (11)
1 to < 4	538 (29)	280 (36)
4 to 8	895 (58)	407 (53)
9 to 12	220 (12)	0[b] (0[b])
Child weight, lbs		
< 20	118 (7)	67 (9)
20–39	604 (34)	330 (43)
40–79	829 (47)	364 (47)
≥ 80	212 (12)	7[c] (1[c])
Mean	48 ±25 (1763[d])	40 ±16 (768[d])
Male child passenger	903 (51)	366 (47)
Seating location of child passengers		
Front seat	381 (21)	244 (32)
Rear seat	1444 (79)	526 (68)
Driver relationship to child		
Parent	1377 (75)	527 (68)
Other	466 (26)	248 (32)
Driver seat belt use		
Belted	715 (61)	291 (51)
Unbelted	466 (39)	280 (49)
Female driver	381 (68)	417 (73)
Driver age, y	34 ±12 (1194)	34 ±15 (594)
Driving time from home, min	12 ±13 (1190)	12 ±17 (573)

Note. April–June 2009 survey: n = 1853 children and n = 1207 drivers; June–July 2003 survey: n = 775 children and n = 574 drivers.
[a]2003 table originally published by Lapidus et al.[5]
[b]Data not collected on children older than 8 years in 2003.
[c]Data not collected on children weighing > 80 pounds in 2003.
[d]Some drivers were unable to estimate weight of child.

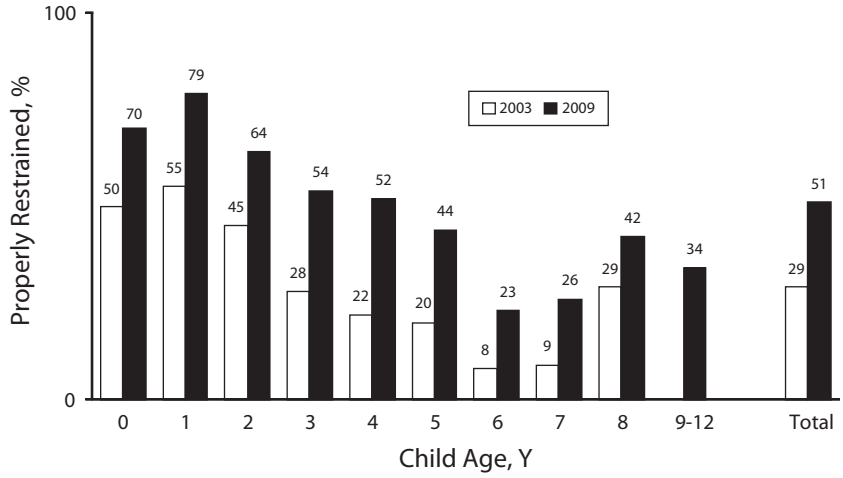
all ages, but larger relative improvement was observed for AI/AN children aged 4 to 7 years, more than doubling since 2003 (RR = 2.24; 95% CI = 1.73, 2.92). Trends in proper restraint by child age were similar in 2003 and 2009. Infants and 1-year-old children were most likely to be properly restrained in rear-facing infant seats (70%–79%), whereas 6- and 7-year-old children (older children who still required a booster seat) still had the lowest proportion properly restrained (23%–26%).

In 2009, 29% of children still rode unrestrained and another 22% rode improperly restrained. Of the 358 unrestrained children younger than 8 years, 71 (19%) had an unused child safety seat in the vehicle at the time of observation. Among improperly restrained children, 68% were prematurely using restraints designed for older or larger children, 10% were using a booster seat or lap shoulder belt but had the shoulder belt positioned behind the back or arm, and 2% clearly exceeded the size capacity for their child safety seat. Another 81 (21%) children were using an appropriate restraint but were seated in the front when a rear position was available. These children were usually seat-belt–eligible 8- to 12-year-old children (61 of 81 in the front seat). Individual correlates of restraint status (proper, improper, or unrestrained) are presented in Table 2.

Results of the multivariable model evaluating risk factors for improper child restraint are found in Table 3. Children riding in areas with child passenger safety laws weaker than the NHTSA recommendations had 1.66 times the risk of improper restraint as children riding in areas with strong laws. AI/AN children and children riding with an AI/AN driver had 26% higher risk of improper restraint than nonnative children and drivers in the same areas. In addition, children being driven by someone other than their own parents were at 29% increased risk of improper restraint and children riding with an unrestrained driver had 46% increased risk of improper restraint. Children riding in a car had slightly higher risk of improper restraint than children riding in a van or sport utility vehicle (RR = 1.13), and children riding in trucks had 27% higher risk of improper restraint. A short trip—5 minutes from home or less—was a significant risk factor for improper restraint (RR = 1.16) as well. Vehicle model year and driver age were associated with proper child restraint initially (with adjustment only for tribe), but were not in the final multivariable model. Gender of the child or driver was not associated with child restraint status (data not shown).

Multivariable models containing American Indians/Alaska Natives only had similar sized associations for virtually all risk factors, with the exception of riding in an area where child passenger restraint laws are weaker than NHTSA guidelines—AI/AN children were at 2.32 (95% CI = 1.10, 4.90) times the risk of riding improperly restrained in this model (vs 1.66 for all children).

In 2009, common reasons drivers cited for not using a child safety seat included "seat is in another vehicle," "short trip," and "do not have a child safety seat." Most drivers (59%) said that people in their community did not wear seat belts. Drivers who were wearing a seat belt were more likely to perceive that seat belt use was common (48%) in their community than unrestrained drivers (29%). Most drivers (64%) said they did not know anyone who had received a ticket for not using a child safety seat. The most commonly cited sources of information on child safety seats were tribally operated programs such as Tribal Health; The Special Supplemental Nutrition Program for Women, Infants, and Children; or other community health or education programs.



Note. Significant increase over time for children aged 8 years and younger (29%–51%; $P < .001$). Observations were only conducted for children age 8 years and younger in 2003. Total column represents age 8 years and under.

FIGURE 1—Percentage of American Indian children properly restrained, by age: 6 Northwest US tribes, 2003 and 2009.

DISCUSSION

The Native CARS project is a collaborative effort between 6 Northwest tribes to develop and implement community-based interventions to improve child passenger safety. The 2009 vehicle observation survey served as baseline data to inform intervention planning and gauge improvements. Repeated vehicle surveys were conducted in 2011 and will be conducted in 2013. However, we note that even without formal interventions in place, we did observe an encouraging increase in the percentage of AI/AN children riding with some type of age- and size-appropriate restraint between 2003 and 2009. Despite the increase, child passenger restraint use in 2009 in these tribes was still lower than national, regional, and state estimates. Nationwide, restraint use of any type for children in this age range was 87% in 2008 as measured by NHTSA's National Occupant Protection Use Survey, which is a slight improvement from 82% reported nationally in 2004.[19] However, the 2008 survey's percentage was higher in Western states (93%),[19] suggesting that the use in Native CARS tribes (71% in 2009) was still lower than that of the general population of the region. Native CARS children younger than 8 years were also more likely to ride in the front seat (16%) compared with children nationally (6%). However, our data demonstrate that the gap in child passenger restraint use between American Indians/Alaska Natives and other populations in the region is closing.

The 2009 vehicle observation survey identified several correlates of improper child passenger restraint in and near Native CARS tribal communities, including characteristics of the child and driver, as well as characteristics of the surrounding environment (i.e., state and tribal child passenger laws). The Native CARS tribes are using the data to inform intervention planning. Between our 2 vehicle surveys, stronger child passenger laws were enacted in all 3 states particularly focused on children in the age or size range eligible for booster seats. Washington's and Oregon's laws are very similar to the NHTSA guidelines that were in effect when the laws were adopted, but Idaho only covers children through age 6 and does not specify specific seat types by age or size. We did observe a greater than 2-fold increase in proper restraint among 4- to 7-year-old AI/AN children between 2003 and 2009. This finding suggests that booster seats have gained wider acceptance in these tribal communities and that tribes have disseminated information regarding use of child passenger restraints in this age group. Changes in child passenger safety laws in Idaho, Oregon, and Washington to include booster-eligible children may explain some of the increase in proper restraint in the tribal communities as well.

In the 2009 data, we noted that tribes in areas subject to state legislation that meets NHTSA guidelines (e.g., off-reservation in Oregon and Washington where drivers are subject to state laws) reflected higher rates of child restraint use. Children observed in areas where the child passenger laws were weaker than the NHTSA guidelines were much more likely to ride improperly restrained. This was not a native-only phenomenon—the trend persisted for nonnative children we observed as well, but the association was stronger when restricted to AI/AN children only. This finding suggests the continued need for special efforts to increase booster seat use for school-aged AI/AN children in the Northwest.

American Indian tribes are sovereign nations with the inherent authority to determine their own form of government and establish tribal laws. Tribal traffic safety laws (e.g., seat belt and child passenger restraint laws) are limited to violations within reservation boundaries.[20] Many tribal governments choose to adopt state traffic safety laws, but some have enacted different laws, and others have chosen not to have any law governing seat belt or child passenger restraint use. In addition, when tribal laws are enacted, they may have different fines associated with infractions than the surrounding states. Land-based tribes participating in this survey (4 of the 6 tribes with federally recognized reservation boundaries), for the most part, had weaker laws than did the state in which they are located. Some had adopted an older version of a state law which was not updated, or, in 1 case, the tribe had no law governing child passenger restraint at all. Tribes also tended to have less strict seat belt laws for adult passengers (e.g., secondary rather than primary enforcement or lower fines). In addition, certain US tribes are subject to Public Law 83–280, and have transferred civil jurisdiction to their state of residence (California, Minnesota, Nebraska, Oregon [6 of 9 tribes], Wisconsin, Alaska).[21] The 2 Native CARS tribes in Oregon are subject to state seat belt and child passenger restraint laws that are enforced by state police.

There still remains a disparity between AI/AN children and children of other races in the same communities. American Indian

TABLE 2—Percentage of Children Observed Riding Properly Restrained, Improperly Restrained, and Unrestrained on or Near 6 Northwest Tribal Communities, Stratified by Driver, Vehicle, and Child Characteristics: 2009

Variable	Properly Restrained, %	Improperly Restrained, %	Unrestrained, %	*P*
Overall	49	22	29	. . .
Driver seat belt use				<.001
Belted	63	27	10	
Not belted	25	14	60	
Driver gender				.017
Male	44	22	34	
Female	50	23	27	
Driver relationship to child				<.001
Parent	53	21	26	
Nonparent	33	27	40	
Vehicle type				<.001
Van or sport utility vehicle	56	20	24	
Car	46	24	31	
Truck	36	25	39	
Minutes from home				<.001
> 5	55	22	23	
≤ 5	40	23	37	
Law status				<.001
Similar to guidelines	69	23	8	
Weaker than guidelines	36	22	42	
Native driver or child				<.001
All nonnative	70	23	9	
≥ 1 native person	43	23	35	

Note. *P* values determined by the χ^2 test.

children were still at higher risk for riding improperly restrained even after adjustment for many other risk factors, including law status, in a multivariable model. Some tribes have attempted to address this disparity by utilizing resources specifically designated for American Indians, such as the Indian Health Service Ride Safe Program,[22] which provides limited funding for some child passenger safety activities (e.g., purchase or distribution of safety seats) in tribal communities. There is still a clear need for community-based interventions designed by American Indians for American Indians.

Interventions designed and implemented by tribes should be evidence-driven, based on data generated from their own communities. We noted that many of the risk factors in our model were similar for AI/AN and nonnative children, and were consistent with those identified in other nonnative populations.[7,10,11,19,23] Children who rode with a nonparent driver were at increased risk for riding improperly restrained, possibly because the nonparent driver may not have an appropriate restraint. Many parents in these tribes receive child safety seats through tribal programs, but usually nonparent caregivers must purchase seats. In addition, many of the nonparent drivers we observed were grandparents who may not be aware of newer child passenger restraint technology. Furthermore, 48% of AI/AN children riding with nonparent driver were completely unrestrained, compared with only 7% of nonnative children riding with nonparent driver (meaning they are using some type of restraint, such as a seat belt). Thus, it appears that AI/AN children traveling with nonparent drivers are at even greater risk of crash-related injury and fatality than nonnative children in the same areas. Tribes also may benefit from strengthened seat belt laws, as driver seat belt nonuse was highly correlated with improper child passenger restraint.

The 6 Native CARS tribes have collaborated to design, implement, and evaluate interventions to improve child passenger safety. Interventions, which are all community-initiated, emphasize law development or change, enhanced enforcement, caregiver and professional education, and increasing tribal capacity to provide passenger safety programs. In addition, media campaigns have been undertaken, focused on risk factors identified by the data (e.g., nonparent drivers, children of booster seat age), to increase awareness in tribes and surrounding communities.

Limitations

This study has some limitations. We relied on reported age and weight of the children and did not independently validate driver report, which may have led us to misclassify some children as properly or improperly restrained (because of under- or overestimating either age or weight). The unrestrained category is not subject to this type of misclassification. Trained observers did not enter the vehicles to assess whether safety seats were correctly installed and belt placement and fit were not assessed for infant seats or harness seats; thus, proper restraint percentage is likely overestimated. However, because observation procedures in 2003 and 2009 were nearly identical, improvements over time are likely not over- or understated because of these limitations.

The 2009 study was conducted in the spring (April–June) when schools were in session, whereas the 2003 study was conducted during the summer (July). Thus, it is possible that comparisons over time may be slightly biased by seasonal differences associated with weather or school schedules. However, tribal site coordinators selected many of the same vehicle observation sites in 2003 and 2009, including schools and Head Start programs that run programs in summer that attract the same population as during the school year.

Finally, proper restraint was based on the NHTSA guidelines in effect at the time the observations were conducted in 2009. In March 2011, these guidelines changed slightly,[24] extending to age 2 years the recommendation that children ride in rear-facing infant seats. Future assessments in tribal

TABLE 3—Risk Factors for Inadequate Child Passenger Restraint Use: 6 Northwest US American Indian Tribes, 2009

Variable	No.	Multivariable Model, RR (95% CI)
Law status		
Similar to guidelines	705	1.00 (Ref)
Weaker than guidelines	1148	1.66 (1.05, 2.64)
Native driver or child		
All nonnative	388	1.00 (Ref)
≥ 1 native person	1449	1.26 (1.02, 1.53)
Driver seat belt use		
Belted	1115	1.00 (Ref)
Not belted	701	1.46 (1.32, 1.62)
Relationship to driver		
Parent	1377	1.00 (Ref)
Nonparent	466	1.29 (1.19, 1.41)
Minutes from home		
> 5	984	1.00 (Ref)
≤ 5	837	1.16 (1.06, 1.27)
Vehicle type		
Van or sport utility vehicle	754	1.00 (Ref)
Car	786	1.13 (1.02, 1.24)
Truck	269	1.27 (1.13, 1.43)
Child age, y		
0	171	1.00 (Ref)
1	143	0.74 (0.52, 1.06)
2	191	1.18 (0.9, 1.56)
3	204	1.38 (1.05, 1.81)
4	232	1.47 (1.14, 1.89)
5	230	1.74 (1.35, 2.24)
6	150	2.13 (1.67, 2.7)
7	125	2.14 (1.67, 2.73)
8	158	1.70 (1.33, 2.19)
9–12	220	1.88 (1.47, 2.39)

Note. CI = confidence interval; RR = relative risk. Inadequate child passenger restraint use = observed riding unrestrained or improperly restrained as compared with National Highway Traffic Safety Administration and American Academy of Pediatrics guidelines. In addition to these variables, the relative risks in the final multivariable model were also adjusted by tribe to account for observed and unobserved differences between the 6 participating tribal communities.

communities will need to consider these new guidelines.

Conclusions

More AI/AN children were riding properly restrained in 6 tribes in the Northwest United States in 2009 than in 2003; however, almost half of all children aged 8 years and younger were riding improperly or unrestrained suggesting that additional interventions to improve restraint use in tribes are warranted. We identified several correlates of improper restraint, including older booster-seat–eligible children (aged 6–7 years), nonparent drivers, drivers riding unrestrained, and riding in areas subject to legislation weaker than NHTSA guidelines. On the basis of this information, community-initiated interventions have been planned and are under way in these communities to further increase child passenger restraint use and eliminate disparities. ■

About the Authors

Jodi A. Lapidus, Nicole Holdaway Smith, and Tam Lutz are with the Northwest Tribal Epidemiology Center, Northwest Portland Area Indian Health Board, Portland, OR. Jodi A. Lapidus is also with the Department of Public Health and Preventive Medicine, Oregon Health & Science University, Portland. Beth E. Ebel is with Harborview Injury Prevention and Research Center, University of Washington, Seattle.

Correspondence should be sent to Jodi Lapidus, PhD, Northwest Portland Area Indian Health Board, 2121 SW Broadway, Portland, OR 97201 (e-mail: jlapidus@npaihb.org or lapidusj@ohsu.edu). Reprints can be ordered at http://www.ajph.org by clicking the "Reprints" link.

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Contributors

J. A. Lapidus is principal investigator of the Native CARS project, providing overall guidance for the project, including observation methodology, study design, data analytic strategies, and interpretation of results. She led the preparation of this article. T. Lutz is project director of the Native CARS study. She provided input into the 2009 data collection methodology, trained community-based observers, and participated in data collection. She provided expertise regarding tribal laws and law enforcement, and contributed to article preparation and revision. N. H. Smith supervised data entry and management of both the 2003 and 2009 vehicle surveys. She conducted all data analyses for this article and participated in article preparation and revision. B. E. Ebel has been an external consultant to the Native CARS study since 2003. She originated the original vehicle observation methodology, which was adapted for tribal communities. She provided extensive expertise in child passenger safety and injury prevention, and participated in writing and critical review of the current article.

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Human Participant Protection

Vehicle observation survey methods in 2003 and 2009 were reviewed and approved by the Portland Area Indian Health Service institutional review board. Tribal

councils and health commissions received and reviewed reports based on their own tribe-specific data, as well as the aggregate information presented in this article.

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