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Inadequate Supervision as a Cause of Injury Deaths Among Young Children in Alaska and Louisiana

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ABSTRACT. *Objective.* Inadequate supervision of children has contributed to injuries. However, the association of inadequate supervision with injury events in children has not been quantified. The purpose of this study was to describe and quantify the role of inadequate supervision of children in injury deaths.

Methods. Injury deaths among children aged 0 to 6 years in Alaska during 1993 to 1995 and Louisiana during 1994 were classified using 10 child safety standards to assess the role of parent/caregiver supervision in the circumstances of injury death.

Results. The leading categories of injury death for both states combined were motor vehicle injury and fire-related injury. Of the classifiable injury deaths in both states (157 [77%] of 203 deaths), the most commonly violated safety standard was "children should be supervised by a responsible care provider" (64 deaths [41%]). Of these deaths, the caregiver was absent in 38%, and the caregiver increased the danger to the child in 17%. Male injury deaths more typically involved a supervision standard violation. Drowning and pedestrian deaths typically involved a supervision standard violation, whereas asphyxiation, homicide, and occupant motor vehicle injury deaths did not.

Conclusion. Alaska and Louisiana child injury deaths were mostly attributed to preventable violations of 10 child safety standards, most commonly the supervision standard. The methods in this report were useful in identifying target populations and causes of death, which can be used to plan and implement interventions to improve supervision of children. *Pediatrics* 2003;111:328–331; *injury, supervision, safety.*

ABBREVIATIONS. E-code, external cause of injury code; PR, prevalence ratio.

Providing appropriate supervision of children is an important responsibility of parents. Maternal decision making,^{1–3} family processes,⁴ and past parental response to injury events⁵ all have been found to be associated with injury. Lapses of supervision, even when brief, can lead to a child's being

injured or killed. Inadequate supervision by parents or caregivers played a role in pedestrian injuries^{6–8} and dog bite injuries.⁹ Some pediatricians have suggested that neglect of safety should be reported as child abuse if the child is younger than 2 years and a gross lack of supervision occurred.¹⁰ However, the contribution of inadequate or absent supervision to childhood injury events has not been quantified.¹¹

This study of injury deaths among 0- to 6-year-olds describes and quantifies the role of parent/caregiver supervision in injury deaths among children in this age group. Because the standard of adequate supervision might differ by cultural setting, we compared data from 2 different locations for this study. During 1993 to 1995, Alaska (30.2/100 000) and Louisiana (20.9/100 000) had some of the highest rates of injury death in the United States among children under age 10, and both rates were higher than the US rate (15.7/100 000 in 1994).

METHODS

All children who were aged ≤6 years and died from injuries during 1994 in Louisiana and during 1993 to 1995 in Alaska were identified on the basis of having an *International Classification of Diseases, Ninth Revision* external cause of injury code (E-code) as the underlying cause of death on their death certificates. Demographic data and E-codes were obtained from the death certificates. Rates of injury death by age group and race were determined using population estimates for Louisiana from the US Census Bureau from 1994 and for Alaska from 1993 to 1995 Alaska Department of Labor estimates.

Information regarding the circumstances of injury was obtained from Alaska police, medical examiner, fire department, Fire Marshal records, and the Louisiana Child Death Review Panel. Data from different sources were linked by the name of the decedent. In this study, 2 authors classified injury deaths on the basis of which, if any, of 10 child safety standards had been violated (Table 1). The authors classified each death jointly by discussing and reaching agreement on cases in which the initial classification differed between authors. When available information was inadequate for classification, the death was not classified. When >1 standard was violated in a death, the violated standard that, in the judgment of the authors, was most closely associated with the injury was chosen.

The supervision provided by the parent or caregiver in deaths in which the supervision standard (standard 3) had been violated was further classified as to whether the supervision was present but inadequate, absent, or dangerous. Present but inadequate supervision was defined as a situation in which the parent could see or hear the child but had not taken reasonable measures to protect the child. Absent supervision was defined as a situation in which the caregiver was unable to see or hear the child but apart from his or her absence did not actively endanger the child. Dangerous supervision was defined as a situation in which an action by the caregiver placed the child in a more hazardous environment, such as leaving a child at home alone with the oven on. Deaths in which standard 3 was violated were also compared

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TABLE 1. Injury Deaths With Violations of Child Safety Standards Among Children Aged 0 to 6 Years: Alaska, 1993 to 1995, and Louisiana, 1994

Child Safety Standards	Examples of Violations	Number of Deaths With Violations (%*)		
		Alaska	Louisiana	Both
Children should be provided with appropriate food, shelter, and medical care	Discarding a newborn in the garbage; 1-year-old choking on 1-inch piece of hot dog	3 (3.5)	4 (5.6)	7 (4.5)
Children should be free from physical abuse	Death caused by shaking or blunt trauma to head or abdomen	3 (3.5)	9 (12.7)	12 (7.6)
Children should be supervised by a responsible care provider	Leaving a child unattended near a pool (≤ 6 y) or street (≤ 4 y), or alone at home	33 (38.4)	31 (43.7)	64 (40.8)
Children should be supervised by persons unimpaired by alcohol or drugs	Bathing a child while under the influence of drugs or alcohol	3 (3.5)	1 (1.4)	4 (2.5)
Children should not be subjected to unlawful behavior	Riding in a motor vehicle driven by an unlicensed person; a drive-by shooting	3 (3.5)	6 (8.5)	9 (5.8)
Children should be appropriately restrained or protected when riding in or on a vehicle	Riding on a bicycle without a helmet or in a boat without a flotation device	5 (5.8)	10 (14.1)	15 (9.6)
Firearms, poisons, and other hazardous materials should be kept away from children	Unintentionally shooting oneself or being shot by another child using an accessible firearm	3 (3.5)	1 (1.4)	4 (2.5)
Children should be protected by a working smoke detector	Death as a result of smoke inhalation from a fire in a home that lacks a working smoke detector	14 (16.3)	2 (2.8)	16 (10.2)
Toys, play equipment, home appliances, and municipal sites should meet accepted safety standards	Death involving a bike without brakes; carbon monoxide poisoning as a result of faulty heater	3 (3.5)	2 (2.8)	5 (3.2)
Children should have a safe sleeping environment	Suffocation by overlying of an adult or as a result of being caught between mattress and wall	7 (8.1)	3 (4.2)	10 (6.4)
No standard violated		9 (10.5)	2 (2.8)	11 (7.0)
Insufficient information		2	44	45
Total		88	115	203

* Percentage of deaths classified (AK, $n = 86$; LA, $n = 71$; both, $n = 157$).

with deaths in which other standards or no standards were violated using prevalence ratios.

RESULTS

In Alaska during 1993 to 1995 and in Louisiana during 1994, 88 (27.4%) of 321 deaths and 115 (12.4%) of 930 deaths, respectively, among children aged 0 to 6 years were caused by injury. In both states, the injury death rate was highest among children who were younger than 1 year but was $>40/100\ 000$ in Alaska in all groups except for the 5- to 6-year-old age group (Table 2). Alaska Natives had the highest injury death rate (74.1/100 000) among racial groups in Alaska, whereas blacks had the highest injury death rate (35.1/100 000) in Louisiana.

The highest rates of injury death among children aged 0 to 6 years for both states were for motor vehicle injury and fire-related injury (Table 2). Alaska had substantially higher rates of drowning, asphyxia, and fire-related deaths, whereas Louisiana had substantially higher rates of homicide and deaths caused by falls.

A total of 115 deaths occurred in Louisiana, and 88 occurred in Alaska. Of these deaths in Louisiana and Alaska, adequate information was available for classifying child safety standard violations for 71 (62%) deaths and 86 (90%) deaths, respectively. Of the classifiable injury deaths in both states, the most commonly violated standard was "children should be supervised by a responsible care provider" (Table 1). The second most frequently violated standard in

Alaska was "children should be protected by a working smoke detector" and in Louisiana was "children should be appropriately restrained or protected when riding in or on a vehicle."

Combining deaths from both states for those injury deaths in which the supervision standard was violated, supervision was present but inadequate in 45.3% of injury episodes, caregivers were absent in 37.5% of instances, and a caregiver increased the danger to the child in 17.2% of these situations. In addition, the 4 violations of standard 4, "children should be supervised by persons unimpaired by alcohol or drugs," could be added to the dangerous supervision category.

Comparing characteristics of injury deaths that involved a violation of the supervision standard (standard 3) with those with a violation of other or no standards, supervision was more typically a factor (prevalence ratio [PR] = 1.6) among male injury deaths in Alaska but not in Louisiana (Table 3). In Alaska, deaths among Alaska Natives were almost twice as likely (PR = 1.9) to have involved a supervision standard violation; in Louisiana, injury deaths among whites were almost twice (PR = 1.9) as likely to involve a supervision standard violation than injury deaths among blacks. Drowning, pedestrian, and fire deaths typically involved a supervision standard violation, whereas deaths from other causes were much less likely to involve a violation of the supervision standard.

TABLE 2. Annual Rates of Injury Death by Age, Race, and Injury Category: Alaska, 1993 to 1995, and Louisiana, 1994

	Alaska		Louisiana	
	Number of Deaths	Rate*	Number of Deaths	Rate*
Age (y)				
<1	15	46.7	26	45.5
1-2	28	41.2	33	23.7
3-4	28	40.0	31	22.5
5-6	17	25.0	25	17.6
Race				
White	41	25.4	51	17.8
Black	5	40.6	64	35.1
Alaska Native	41	74.1	—	—
Asian	1	9.4	—	—
Injury category				
Motor vehicle	21	8.8	42†	8.8
Occupant	9	3.8	20	4.2
Pedestrian	9	3.8	15	3.1
Bicyclist	3	1.3	5	1.0
Fire	23	9.6	21	4.4
Drowning	13	5.4	13	2.7
Asphyxia	17	7.1	9	1.9
Homicide	4	1.7	16	3.4
Fall	—	—	7	1.5
Unintentional poisoning	3	1.3	1	0.2
Unintentional firearm	2	0.8	2	0.4
Other	5	2.1	4	0.8
Total	88	36.7	115	24.1

* Deaths per 100 000 population/year.

† Includes 2 deaths classified as other motor vehicle injury.

TABLE 3. Characteristics of Injury Deaths Among Children Aged 0 to 6 Years by Involvement of a Violation of the Supervision Standard (3): Alaska, 1993 to 1995, and Louisiana, 1994

Characteristic	Supervision Standard Violated					
	Alaska			Louisiana		
	Yes (n [%])	No (n)	Prevalence Ratio (95% CI)	Yes (n [%])	No (n)	Prevalence Ratio (95% CI)
Gender of child						
Male	23 (45%)	28	1.6 (0.9-2.9)	18 (43%)	24	1.0 (0.6-1.6)
Female	10 (29%)	25	Ref.	13 (45%)	16	Ref.
Race						
White	11 (28%)	29	Ref.	21 (57%)	16	1.9 (1.1-3.5)
Black	1 (25%)	3	0.9 (0.2-5.3)	10 (29%)	24	Ref.
Alaska Native	21 (51%)	20	1.9 (1.0-3.3)	N/A	N/A	N/A
Intent/cause						
Unintentional						
Fire/burn	9 (39%)	14		5 (62%)	3	
Drowning	9 (82%)	2		14 (100%)	0	
Pedestrian	8 (89%)	1		6 (86%)	1	
Asphyxia	4 (24%)	13		0 (0%)	6	
Poisoning	1 (33%)	2		0 (0%)	1	
Other	2 (40%)	3		0 (0%)	0	
Other MVC	0 (0%)	9		1 (9%)	10	
Bicycle	0 (0%)	3		1 (33%)	2	
Firearm	0 (0%)	2		0 (0%)	1	
Fall	0 (0%)	0		3 (75%)	1	
Homicide						
All causes	0 (0%)	4		1 (6%)	15	

CI indicates confidence interval.

DISCUSSION

The results of this analysis illustrate both some commonalities and some differences in the relationship between violations of accepted safety standards and child death from injuries in 2 different cultural settings. Alaska has the largest percentage of American Indians and Alaska Natives in the nation and a sub-Arctic climate, whereas Louisiana has a large

black population and a semitropical climate. Despite these differences, in both states, child injury deaths could be largely attributed to specific preventable factors, and inadequate child supervision was the most common factor that led to death, accounting for 43% of deaths. The spectrum of inadequate supervision contributing to these deaths was broad. When the supervision standard was violated, supervision

was present but inadequate in 45.3% of instances, absent in 37.5%, and dangerous in 17.2%. The next most common safety standard violations (for Alaska, "children should be protected by a working smoke detector" [16%], and for Louisiana, "children should be appropriately restrained or protected when riding in or on a vehicle" [14%]), however, suggest different risk factor profiles in the 2 states.

Several demographic factors and causes of death were specifically associated with a lack of appropriate supervision. Deaths among boys were more likely to have involved a violation of the supervision standard, which might have been caused by greater risk-taking among boys or different parental standards for supervision by gender.¹² Deaths among Alaska Natives and whites in Louisiana were more likely than deaths among other racial groups to have been caused by violation of the supervision standard. Drowning and pedestrian deaths nearly always involved a supervision standard violation, and fire deaths often did. These descriptors have been useful in suggesting target populations and causes of death, which can be used to plan and implement interventions to improve supervision of children.

This study has several limitations. Adequate information for classification was lacking in many of the cases, particularly from Louisiana, and sufficient information regarding these deaths might have changed the relative sizes of the categories. As safety standard violations were determined jointly by 2 of the authors, interrater reliability could not be calculated. Also, the child safety standards had variable specificity such that some (eg, supervision standard) were more likely to include a broad range of injuries, whereas others (eg, fire detector standard) included a narrow range of injuries. In addition, the true risk of injury caused by the violation of these safety standards cannot be measured because no data are available on the frequency of violation of these standards among those who are not injured.

The judgments involved in making a determination that supervision was "inadequate" also introduced subjectivity into this analysis. We attempted to minimize this subjectivity by making these determinations through discussions involving more than 1 investigator. An alternative to the approach used here might be to use the legal concept of "neglect" rather than our concept of "inadequate supervision." The legal operationalization of "neglect" in some states relies on specific but arbitrary criteria, such as age cutoffs, which are necessary for prosecution,

whereas the concept of "inadequate supervision" used in this analysis relies on judgments about the "reasonableness" of supervision provided. Although reliance on judgments about "reasonableness" might introduce less precision into the classification process, it allows for the inclusion of cases that would not meet the arbitrary criteria incorporated in a legal definition of "neglect." This broader concept, although not acceptable for the courtroom, can be useful as a guide for prevention of these injuries and deaths.

The large proportion of deaths attributed to a lack of appropriate supervision provides support for prevention programs that focus on improving supervision of children, especially in settings where pedestrian or drowning injuries can occur. Such prevention programs might include home visiting programs that model appropriate supervision, general education of the public about the preventability of child injury¹³ and importance of appropriate supervision, and specific reminders to parents about the need for especially attentive supervision around known hazards, such as bodies of water or street locations that are particularly frequent sites of injury.

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