

Knowledge of Accident Prevention Among Parents of Young Children in Nine Massachusetts Towns

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The project described in the paper was supported by the Statewide Childhood Injury Prevention Program, Massachusetts Department of Public Health, through funds from the Office of Maternal and Child Health Title V Grant No. MCH 022001-03.

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SYNOPSIS

Knowledge concerning childhood accident prevention was assessed by means of developmentally oriented safety surveys that parents completed during their child's health maintenance visits at primary care sites. A total of 1,493 parents in urban, suburban, and rural Massachusetts communities participated. The questionnaires were administered between September 1980 and June 1982 to 512 parents of infants under 9 months and 981 parents of children aged 9 months through 5 years.

Parents in all nine localities needed to learn how to prevent their children from getting burns. A variety of community-specific needs for other types of preventive behavior were also identified. Recognition of these educational needs is important because individual counseling or community education programs may be the only feasible preventive measures for certain injuries, particularly those that require parents to make substantial behavioral changes.

IN 1981 ACCIDENTAL INJURY WAS THE FOURTH most common cause of death for persons of all ages, exceeded only by heart disease, cancer, and stroke. In fact, accidents are the leading cause of death in the age groups 1 to 44 years (1a, 2). Their impact is particularly striking in the pediatric age groups. A recent Massachusetts study documented approximately 485 injury-related deaths of children per year from 1969 to 1978, representing 58 percent of all deaths of those between the ages of 1 and 20 years (3). Researchers found that for every childhood injury resulting in death, there were about 770 nonfatal injuries necessitating an emergency room visit.

The causes of fatal injuries in children and young adults and the sites of occurrence are summarized in table 1. Clearly, motor vehicle injuries are important to all age groups. This toll is especially evident in the 15-24-year age group in which motor vehicle injuries represented 79.2 percent of accidental deaths. For children ages 0-4 years, however, 53.7 percent of accidental deaths occurred in the home. These included 650 deaths from fires and burns, 550 suffocations (ingestions and mechanical means), 350 drownings, 150 poisonings, 150 falls, and 50 deaths from firearms as well as an additional

300 deaths attributed to a variety of other household accidents (1b).

In an attempt to educate parents about childhood accident prevention, the Pediatric Accident Prevention Project (4) has instituted a counseling package for use in pediatric primary care settings. The project, based in the Department of Pediatrics at Framingham Union Hospital, is part of the Statewide Childhood Injury Prevention Program (3). The program's primary counseling tool, the Framingham Safety Surveys (FSS), are a series of developmentally oriented safety surveys that parents complete during their children's health maintenance visits to primary care settings. Each survey is a self-administered, multichoice questionnaire consisting of about 20 items. The questionnaires are available in Spanish language versions. The surveys are designed to allow providers to identify and counsel individual parents about areas of risk where needs for education are apparent (4).

In addition, parental responses were tabulated and analyzed to assay community-wide education needs. Data from questionnaires administered to Spanish-speaking, English-speaking, and private patients have been described elsewhere (4). The purpose of this paper is to analyze the data obtained from the recent

Table 1. Fatal accidental injuries of children and young adults, by cause and site of occurrence, 1981

Cause and site	0-4 years	5-14 years	15-24 years	Total
Cause				
Motor vehicles	1,300	2,500	17,500	21,300
Falls	170	80	450	700
Drownings	650	750	1,700	3,100
Fires, burns	650	300	500	1,450
Suffocation, ingestions	350	100	200	650
Poisons, solid, vapor	180	90	850	1,120
Firearms	50	180	600	830
Other	550	500	1,900	2,950
Total	3,900	4,500	23,700	32,100
Site				
Motor vehicle, including pedestrians	1,300	2,500	17,500	21,300
Home (falls, fires, burns, poisonings, firearms, suffocation, drowning) ..	2,200	800	1,900	4,900
Public places (drowning, falls, firearms, fires, burns, transports)	600	1,100	2,700	4,400

SOURCE: cases, reference 1c; sites, reference 1b, 1d, 1e.

administration of the FSS to parents of preschool children in urban, suburban, and rural communities of Massachusetts.

Methodology

The Framingham Safety Surveys (available upon request) were used in 10 primary care offices located in 9 Massachusetts communities; they included urban, suburban, and rural sites. In addition, two boards of health and one visiting nurse association administered the surveys during clinics and home visits. The communities—Malden and Everett (urban); Southborough, Westborough, and Hopkinton (suburban); and Harvard, Shirley, Groton, and Littleton (rural)—represent 5 percent of the State's population. Demographic data (5, 6) on these towns are outlined in table 2.

Data were collected and analyzed for a 22-month period, September 1980 to June 1982. They consisted of the responses of 1,493 parents who completed questionnaires. The surveys were administered to parents of children in two age groups—less than 9 months and 9 months through 5 years (given in two parts)—at the child's regularly scheduled health maintenance visits. The surveys covered general household and environmental safety, poisoning, burns, vehicular safety, drowning, and toy safety. The parents completed the surveys in the pediatrician's waiting room. The followup discussion between parent and provider took place after the child had been examined.

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Table 2. Median income and education, 1970 census, and home ownership, 1980, for communities in the Pediatric Accident Prevention Project

Type of community	1970 median income (5)	1970 median education (5)	Home ownership percent in 1980 (6)
Urban			
Everett	\$10,068	11.8	40.9
Malden	\$10,204	12.1	42.5
Suburban			
Hopkinton	\$11,446	12.4	82.2
Southboro	\$13,311	12.6	80.7
Westboro	\$12,837	12.5	55.2
Rural			
Shirley	\$ 9,495	12.1	59.2
Harvard	\$ 9,335	12.7	85.0
Littleton	\$12,243	12.6	81.5
Groton	\$11,441	12.5	75.6

The physician's copy, by use of a noncarbon transfer process, records only those survey responses which are considered "at risk." The term "at risk" denotes answers indicating a need for further counseling (4). These responses were analyzed from a variety of perspectives including a breakdown by frequency: many at-risk responses (more than 40 percent of the group), few responses (less than 5 percent) as well as a moderate number (5-40 percent) which demonstrated statistically significant differences among the groups. These differences were tested by chi-square analysis of raw data.

Results

A total of 512 parents completed the infant (less than 9 months) survey in the three types of communities. Two questions in this survey received at risk responses from more than 40 percent of the parents. Fifty-two percent of the parents reported that they placed their infant in the front seat of the

car. Fifty-eight percent stated that they did not have a fire extinguisher in the home. The proportion was 65.1 percent ($P < .05$) for the urban group.

There were two surveys of parents of the children 9 months through 5 years—257 parents in the first survey and 724 in the second. Questions with at-risk answers by 40 percent or more of the preschoolers' parents are summarized in table 3. Table 4 presents those questions that evoked at-risk answers from 40 percent or more of the respondents only at certain sites. In table 5 are listed the questions with 5 percent or fewer at-risk responses.

Finally, other questions with statistically significant differences between certain respondent groups ($P < .05$) are outlined in table 6.

Discussion

A general review of the responses of parents to the questions demonstrates that educational needs differed significantly among parents in the different communities surveyed. Although the surveys were designed and used in individual counseling, an overview of the responses provides some interesting in-

Table 3. Questions with "at risk" answers from 40 percent or more of parents of children 9 months to 5 years, by type of community, September 1980–June 1982

Questions	Not at-risk response	At-risk response	Number of parents	Percent giving at-risk answers				P value ¹
				Total	Urban	Suburban	Rural	
Do you have working fire extinguishers in the house?	Yes	Don't know, no	257	53.3	61.5	41.1	40.0	<.01
Do you use electrical appliances in the bathroom?	No	Don't know	257	52.5	50.0	66.1	44.4	NS
Do you have safety plugs on unused electrical outlets?	All outlets	Some outlets, none	257	47.5	48.1	41.1	53.3	NS
Do you check for safety hazards in homes of friends or relatives where your child may play?	Always	Sometimes, never	724	47.2	41.2	51.6	50.5	<.05
Have you checked your yard and house for poisonous plants and wild mushrooms?	Yes	No	724	43.8	43.3	43.9	44.4	NS
Do you keep your child in an enclosed area when alone and not being watched by an adult?	Always	Sometimes, never	724	43.5	43.0	45.5	41.8	NS
Do you have Ipecac in the house?	Yes	Don't know, no	724	44.1	56.7	29.5	43.9	<.001

¹ Determined by Chi square of raw data. Chi squares available from the author on request. NS = not significant.

Table 4. Questions with "at risk" answers from 40 percent or more of parents of children 9 months to 5 years, only from certain sites, September 1980–June 1982

Questions	Not at-risk response	At-risk response	Number of parents	Percent giving at-risk answers				P value ¹
				Total	Urban	Suburban	Rural	
Do you leave your child alone in the car?	Never	Frequently, occasionally	257	17.1	8.3	23.2	40.0	<.001
Do you take your child on a boat?	Never	Frequently, occasionally	257	26.5	22.4	21.4	46.7	NS
Where do you seat your children in the car?	Rear	Front, front or rear	257	35.0	29.5	41.4	46.7	<.05
Is your child in the yard while the lawn mower is in use?	Never, have no mower	Sometimes	724	32.5	10.2	47.1	46.4	<.001
Do you know how to use Ipecac?	Yes	No	724	38.1	50.7	27.0	33.7	<.001

¹ Determined by Chi square of raw data. Chi squares available from the author on request. NS = not significant.

sights. It is evident that parents in all communities shared significant educational needs concerning the hazards of household fires and electrical burns. On the other hand, parents in all the communities showed good knowledge of the hazards of asphyxiation, by both aspiration and strangulation, for young children. Further, parents seemed to understand the

importance of supervising both infants and older children to protect them from drowning.

In addition to these general trends, regional differences were also evident. The urban parents were particularly at risk for failing to have a fire extinguisher in the house. The fact that more than half of the urban sample lived in rental units (table 2)

Table 5. Questions with "at risk" answers by 5 percent or fewer parents of 1,493 surveyed, September 1980-June 1982

Questions	Not at-risk response	At-risk response	Parents giving at-risk answers	
			Number	Percent
<i>Child is under 9 months</i>				
Does your child play with small objects such as beads or nuts?	Never	Always, sometimes	512	3.9
Are any of your babysitters less than 13 years old?	No	Yes, don't know	512	3.5
Do you leave the baby alone in a tub of water?	Never	Frequently, occasionally	512	1.4
<i>Child is 9 months through 5 years</i>				
Does your child wear a pacifier attached to a string around the neck?	No	Yes, don't know	724	.8
Do you have a screen for the fireplace?	Yes, no fireplace	No	257	3.1
Do you allow your child to swim unsupervised?	Never	Frequently, occasionally	257	1.6
Does your child ever play with darts or bows and arrows?	Never	Frequently, occasionally	257	1.2

Table 6. Questions with "at risk" answers from 5 to 40 percent of parents of children 9 months through 5 years, with significant differences by site, September 1980-June 1982

Questions	Not at-risk response	At-risk response	Number of parents	Percent giving at-risk answers				P value ¹
				Total	Urban	Suburban	Rural	
Does your child ride on your bicycle with you?	Never	Always, sometimes	257	19.5	11.5	28.6	35.6	<.001
Do you keep firearms in your house? ..	No	Yes, don't know	724	21.8	15.5	23.8	28.6	<.01
Do you place gates at the entrance to stairways? (for children under 3 years)	Always	Sometimes, never	724	30.0	22.9	34.0	35.2	<.005
Do you keep household products, medicines, and sharp objects out of reach and in locked cabinets?	Always	Sometimes, never	724	14.2	8.1	18.9	17.3	<.001
Do you dispose of old medicines?	Always	Sometimes, never	724	24.4	18.7	28.3	28.1	<.01
Do you leave your child alone in the house?	Never	Frequently, occasionally	724	9.1	3.2	13.1	12.8	<.001
Are any of your babysitters less than 13 years old?	No	Yes, don't know	724	7.3	2.8	9.4	11.2	<.001

¹ Determined by Chi square of raw data. Chi squares available from the author on request.

'In summary, the results of this analysis demonstrated clearly that parents in all communities needed a wide range of educational counseling about how to prevent accidents that injure children. This fact reemphasizes the necessity of continuing to devote public attention to this problem. Preventive efforts can encompass both legislative and educational approaches.'

perhaps is related to this finding. This possibility is supported by a recent Massachusetts survey (7) which demonstrated absence of smoke detectors in rental units. The urban group also exhibited some interesting strengths. Although many were at risk for not having syrup of Ipecac in the house, they seemed to know the importance of storing household products out of a child's reach and of disposing of old and unused medicines. In addition, the urban dwellers were not likely to leave a child alone in the car or in the care of a very young babysitter.

Among the suburban parents, a particular hazard was the lack of awareness of the possibility of lawnmower injury. The strengths of the suburban group included keeping Ipecac in the house and knowing how to use it. They also reported having well repaired screens on windows, an important factor in preventing falls, and demonstrated knowledge about the proper use of an effective car seat. The particular risk behavior that parents in rural areas exhibited included leaving the child alone in the car or in the house, lack of awareness of lawnmower hazards, use of young babysitters, and riding a bicycle with an infant.

In summary, the results of this analysis demonstrated clearly that parents in all communities needed a wide range of educational counseling about how to prevent accidents that injure children. This fact reemphasizes the necessity of continuing to devote public attention to this problem. Preventive efforts can encompass both legislative and educational approaches. For example, to address motor vehicle accident fatalities, Massachusetts has recently passed legislation making it mandatory to put children in carseats (8). This is, of course, an important safety measure, but it must be remembered that of the 1,300 motor vehicle-related deaths of children 0-4

years old reported in 1981, only 440 resulted from collisions between motor vehicles or with fixed objects. There were also 270 noncollision accidents, 570 pedestrian accidents, and 10 bicycle-related accidents (1c). In this study, parent supervision of young children was shown to be an important factor, with 43.5 percent scoring at risk (table 3). Leaving children alone, which contributes to pedestrian accidents in this age group, is not readily amenable to legislative action. Education of parents is essentially the only feasible approach.

Legislative efforts have been introduced to ensure the presence of smoke detectors in homes (6). A similar requirement might be effective for fire extinguishers, an identified problem among more than half of the parents. But the prevention of electrical burns requires the parent to modify the home environment and calls for educational intervention.

In conclusion, it is clear from this study that legislative efforts, although effective in preventing some kinds of accidents, can never prevent many of the accidental deaths for which young children are at risk. If the effective measure requires establishment of a new behavioral pattern for the parent (for example, supervising toddlers to prevent pedestrian accidents), the educational approach may be the only option. A concerted effort that enlists primary care providers and community health educators is necessary in order to fill those gaps that cannot be effectively regulated.

References

1. National Safety Council: Accident facts. 1982 edition. Chicago, 1982; (a) pp. 8-9; (b) 80-81; (c) 6-7; (d) 42-43; (e) 72-73.
2. National Center for Health Statistics: Monthly Vital Statistics Report, vol. 3, No. 13, Dec. 20, 1982.
3. Gallagher, S. S., et al.: A strategy for the reduction of childhood injuries in Massachusetts: SCIPP. *N Engl J Med* 307: 1015-1019 (1982).
4. Bass, J. L., and Mehta, K. A.: Developmentally oriented safety surveys: reported parental and adolescent practices. *Clin Pediatr* 19: 350-356 (1980).
5. U.S. Bureau of the Census: 1970 census of the population: general, social and economic characteristics, Massachusetts. U.S. Government Printing Office, Washington, D.C., 1972.
6. U.S. Bureau of the Census: 1980 census of the population: general population characteristics, Massachusetts. U.S. Government Printing Office, Washington, D.C., 1982.
7. Miellette, M.: 1983 legislative efforts. SCIPP Reports 4: 9-10 (1983).
8. The child passenger safety law. Massachusetts General Laws, Ch. 90, Sec. 7AA (Ch. 680 of the acts of 1981).