U.S. Department
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Final Report

January 1985

DEVELOPMENT OF A PRESCHOOL CHILD PEDESTRIAN TRAFFIC SAFETY PROGRAM, THE WALKING IN TRAFFIC SAFELY (WITS) PROGRAM FOR PRESCHOOLERS

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16. Abstract

This report presents an overview of the process followed in developing the 22 WITS booklets for preschoolers, parents, and teachers. The steps involved in completing this project are described: (1) conduct of an in-depth review of the literature, (2) analysis of accident data involving preschool pedestrians, (3) identification of countermeasure ideas, (4) designation of an approach to curriculum design, and (5) development and testing of the curricular materials. The concluding section of this report focuses on suggestions for further work.

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INTRODUCTION

Motor vehicle accidents are the leading cause of death to children under 6 (National Safety Council, 1978). In approximately half of these accidents, the child accident victim is a pedestrian (National Safety Council, 1978).

In traffic-related accidents--both fatal and nonfatal--preschool youngsters are overrepresented proportionally to their numbers in the population. Accidents involving youngsters ages 1 to 6 represent 21% of all pedestrian accidents; yet this age group represents but 8% of the population (Reiss, 1978).

Analyses of thousands of accident reports have been conducted by researchers at the National Highway Traffic Safety Administration (NHTSA) over the past 15 years in an effort to ascertain the behavioral, environmental, and situational factors that lead to child pedestrian accidents. From these efforts, it has been found that over 80% of all children's accidents fall into commonly occurring accident categories or types.

(1) The Dart-Out Accident

From the middle of the block, a child suddenly runs into the street (usually from in front of or behind a parked vehicle) and is struck by or runs into a moving vehicle. In most cases the child was not attempting to cross the street but was entering the roadway to retrieve a ball or was being chased.

(2) The Midblock Dash Accident

The child runs out into the street in the middle of the block and is hit by or runs into an oncoming vehicle. This accident type differs

from a Dart-Out in that the child is not obstructed from the driver's range of vision by a parked car or some other obstacle. The driver may in fact be aware of the child's presence, but he or she does not anticipate the child's sudden entry into the street.

(3) The Intersection Dash Accident

The child suddenly runs into the intersection and is struck by or runs into an oncoming vehicle. The driver does not usually see the child until it is too late to prevent an accident.

(4) The Backing-Up Accident

The child is struck by a backing vehicle in a street, or in a driveway, an alley, or a parking lot. The child is usually hidden from the driver's range of vision.

(5) The Pedestrian Not in Roadway Accident

The child is struck by a vehicle moving forward or turning into a driveway, alley, parking lot, gas station, or private road.

The midblock area has been identified as the area most likely for a preschooler to become involved in an accident. In fact, for the ages 2 through 6, a full two-thirds of all accidents take place in this locale. Dart-Out accidents alone account for 50% of preschool pedestrian accidents.

Typically, the young child is injured in the late afternoon on a residential street in the vicinity of his/her home. The child is usually involved in a play related activity, not travel. Rarely is weather a factor.

These accounts of typical accident situations are reflective of cross-cultural analyses of children's accidents. Nearly all available literature report these same trends. To address the problem, a number of countries have established programs of preschool traffic safety specifically targeted towards reducing the incidence of pedestrian accidents for this age group. The programs of Sweden, Norway, Denmark, Finland, England, and Japan have an established working history.

In 1979, the National Traffic Highway Safety Administration (NHTSA) of the Department of Transportation (DOT) let a contract to Applied Management Sciences, Inc. to develop and test a preschool traffic safety program. Like

the foreign initiatives, this program, known as the Walking in Traffic Safely (WITS) Program for Preschoolers was to be based on child development research. In addition, this program was to take the unique approach of directly tying content to empirical data on children's accidents. Thus program content was to be a direct outgrowth of an analysis of the types of accidents that children are involved in and the behavioral, environmental, and situational factors that lead to these accidents.

The original goals of the contract were to:

- Conduct an in-depth review of the relevant literature.
- Conduct an analysis of U.S. accident data that would lead to the designation of appropriate countermeasures for reducing the incidence of preschool traffic accidents.
- Develop materials aimed at parents and youngsters in all geographic areas of the U.S. that would educate these audiences about the problem.
- Field test the materials to see if there was a reduction in accidents based on use of the materials.
- Revise the developed materials in accordance with the results of the field test.

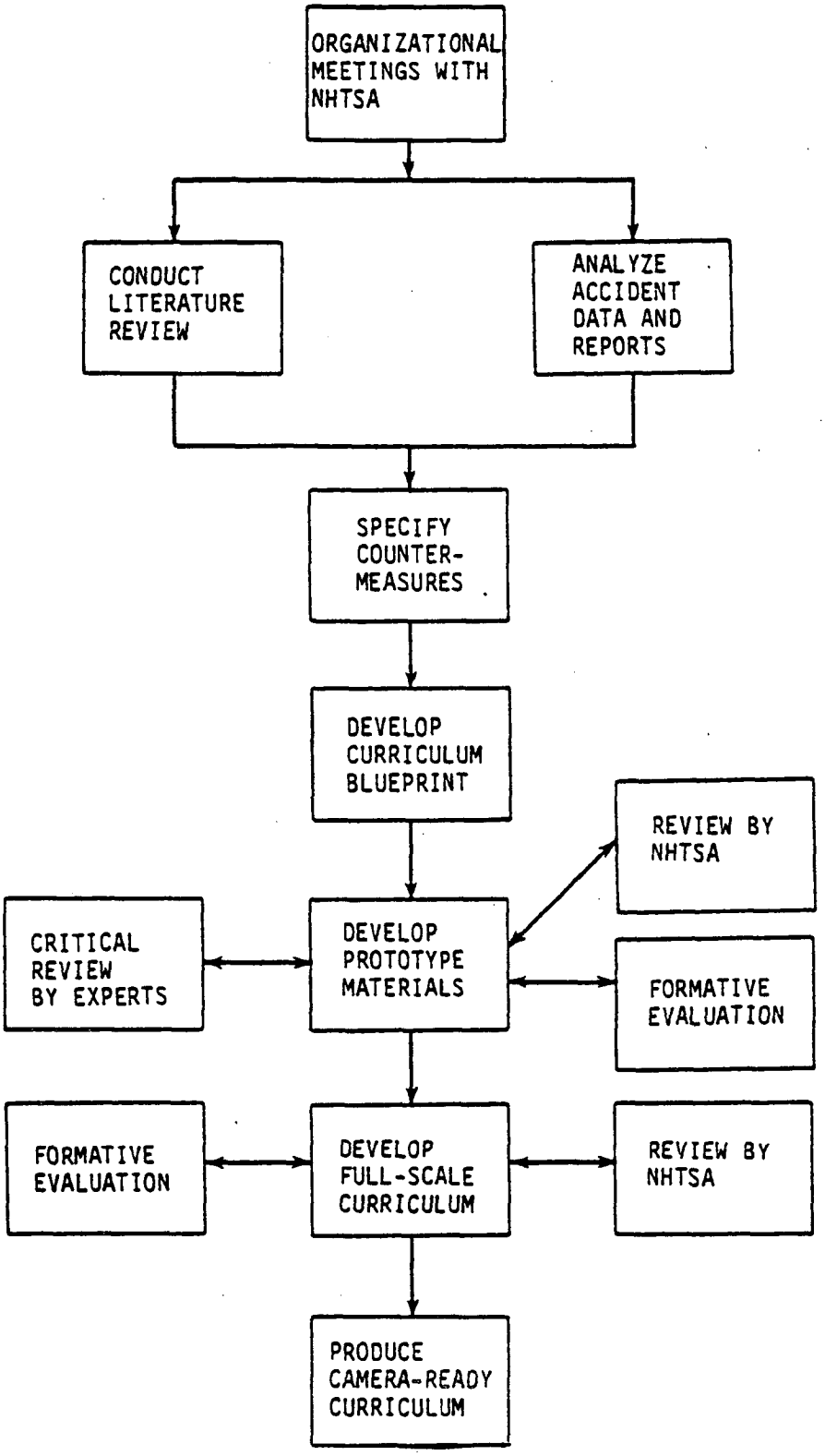
During the course of the project, cost limitations necessitated a change in scope of some of the original goals. Specifically, instead of developing materials relevant to children and parents in all geographic areas (i.e., urban, suburban, and rural), materials were targeted to children and parents in urban areas. This decision was based on the fact that: (a) the pronounced majority of preschool accidents occur in urban areas; and (b) to develop separate sets of materials for each geographic area would be too expensive because of the need for customized illustrations. Another major change in direction was the elimination of the field test. Analyses of the accident data showed that in order to evince documented accident reductions, the involved costs would far exceed the project's budget. Consequently, a decision was made to substitute formative evaluation for a field test. Through the use of formative evaluation and critical review, data were gathered on the materials during the developmental stage, rather than at a finished point.

The final change from the proposed scope of work was the addition of day-care/preschool materials for teachers of children 2 to 6. These materials were added in an effort to tap the ever-growing audience of preschoolers who attend day-care, Head Start, and other preschools.

The project as it evolved in its finished state is depicted diagramatically in Exhibit 1.1. The major tasks involved in this process are described in the chapters of this document. Chapter 2 is a review of the literature on the preschool pedestrian. A companion report, A Review of the Literature on The Preschool Pedestrian, is available for readers who wish to read a more detailed accounting of this research. Chapter 3 is a review of the data analysis efforts conducted. The types of accidents in which young children are involved are discussed. Chapter 4 describes the identification of countermeasure ideas that were developed to address the accident situations depicted in Chapter 3. Chapter 5 describes the approach to curriculum development selected by project staff. In Chapter 6, the implementation of this approach is described. The development and testing of the 22 WITS booklets is described. Chapter 7 presents a summary and recommendations for future efforts.

This report is thus an overview of the steps involved in bringing the WITS program from the planning stage into finished curricular form. This volume should be particularly useful to those attempting other curriculum development efforts, those interested in preschool pedestrian accidents, and those in the field of traffic safety education.

EXHIBIT 1.1: PROJECT OVERVIEW



2

THE REVIEW OF THE LITERATURE

As a first step in the project, an in-depth review of the literature was conducted. This was done in an effort to achieve these goals:

1. To obtain a profile of the child accident victim, i.e., who is most likely to be injured, and under what circumstances is the accident most likely to occur?

2. To obtain developmental information on the physical, social, and emotional characteristics of the preschool child that place him or her at risk in traffic.

3. To examine existing programs, both domestic and foreign, in order to obtain information on approaches and possible successes.

All of these goals were accomplished during this task. To gather the literature used in this extensive review, these resources were consulted:

- A panel of experts in traffic safety and child development was convened to obtain suggestions for materials to review. Access to volumes in these individuals' personal libraries was given to the project staff.

- Resources at the Library of Congress, the National Institute of Medicine Library, the NHTSA Library, and the National Institute for Education Library were researched. Hard copy and/or microfiche of relevant materials were obtained for in-house files.

- Foreign experts in the field were identified in the literature as well as through membership in the Organization for Economic Cooperation and Development's Special Research Group on Pedestrian Safety and were contacted by letter. Each of these distinguished individuals responded to these letter requests, many providing materials free of charge. For example, Stina Sandels, the Swedish pioneer in preschool pedestrian accidents, provided the project with

English translations of her landmark studies. Other materials, which were available only in their native languages, were, whenever possible, translated. Among those materials which were translated were materials written in Swedish, Finnish, Norwegian, German, and Japanese. Project staff also took the opportunity to meet with foreign experts who were on travel in the United States. Peter Arnberg, Senior Psychologist with the National Swedish Road and Traffic Research Institute, for example, spent an afternoon with project staff to explain firsthand the work being done in Sweden on preschool traffic safety.

- The Governor's Highway Safety Representative in each state was contacted for assistance in obtaining relevant materials produced by his or her state. Materials were gathered from all states that developed materials on preschool traffic safety education.

From these inputs, a large body of knowledge relevant to the research questions was amassed. Hard copy documents were housed in file cabinets, with articles filed by author. Materials developed by states and foreign countries were logged in under state or country name. Microfiche copies of articles were also filed by author. The key findings relevant to each major area of research are described in the remainder of this chapter.

Profile of the Child Accident Victim

An analysis of accident reports and descriptions collected both in the U.S. and abroad revealed several factors common to preschool accidents:

- Most preschool accidents fall into one of five major categories (see Chapter 3 for a full discussion of this topic). The most frequently occuring type of accident is known as the Dart-Out. Here, the child enters the street midblock, usually between parked cars, and does not search, or searches inadequately for oncoming traffic. The driver involved in the accident usually reports not having seen the child until it was too late to take evasive action.

- Most children are injured on urban, residential streets in the vicinity of the child's home. Frequently the accident site is the very street where the child lives.

- Most children were in the street not in an attempt to cross the roadway but for socially motivated reasons such as retrieving a ball or being chased.

- Most accidents take place in fair weather during the warm weather months.
- Most accidents occur in the late afternoon hours, with 3 to 5 p.m. being the peak hours in which children are involved in accidents.
- Accident victims are more than twice as likely to be male as female.
- Accident victims tend to exhibit impulsive, risk-taking behaviors.

Developmental Characteristics of the Preschool Child in Traffic

Cognitively, motorically, physically, and emotionally preschoolers are in the process of growing and developing. Research on the developmental growth of preschool children has pointed to these conclusions:

- Preschoolers possess the same visual system capabilities as adults. However, their ability to process the information provided by the visual system is limited. Research has shown that until age 6, there is very little order in the way a young child searches the environment for salient features or on the choice of features selected by the child.
- Preschoolers are limited in their ability to process sound. Children at age 6 have difficulty localizing sounds; younger children have even greater difficulty. Sensitivity to sounds does not peak until age 12.
- Children's ability to determine where they are in the traffic environment vis-a-vis the driver's field of view does not occur until age 6. Preschool children are lacking this capability.
- Children's perception of velocity is dependent upon the application of other developmental skills in which a preschooler is not fully proficient, namely the use of vision, distance judgments, audition and spatial perception. Studies have found that preschoolers--if they have any capability to judge velocities accurately--can do so only in the simplest cases.
- A true understanding of rational causality does not occur until age 7 or 8.
- Laboratory tests of preschoolers' reaction times to visual and auditory stimuli show that times slowly decrease with age. Because this action is dependent upon attentional and motoric skill, young children's reaction times to traffic stimuli are slow.

- Young children have a difficult time suppressing impulses, making them likely to run into a road without warning.
- Short-term memory, which affects a youngster's ability to remember information about the position, speed, and direction of traffic, develops gradually during the preschool years.
- Long-term memory is developmentally learned, with learning retention over a long period of time only demonstrable during the elementary years.
- Only simple rules can be comprehended by youngsters during the preschool years.
- An understanding of the concepts "left" and "right" does not take place before age 5.
- Preschoolers have a limited vocabulary and often express misunderstandings about traffic vocabulary words.
- Preschool children's knowledge and comprehension of traffic signs and signals are poor.
- Preschoolers have a difficult time separating reality from fantasy. This may create dangerous situations in traffic.
- The natural curiosity of children may lead them to explore streets and expose them to danger.

Pedestrian Safety Programs For Preschoolers

During the conduct of the Literature Review (1979-1980), 52 programs in the U.S. were identified as having some materials developed for a preschool audience. Forty-five of these programs, however, were only tangentially targeted for this audience, being state-developed curricula for in-school use.

Most of the state curricula identified through the assistance of the Governor's Highway Traffic Safety Representatives were funded under the Federal Highway Safety Act of 1968. These programs as a group can be characterized by these features:

- Focus on the traffic environment
- Emphasis on understanding the dangers of traffic

- Stress on the need for responsible behaviors
- Focus on increasing knowledge, rather than behavioral orientation.

Despite a commonality in approach, the format and scope of the state-developed programs varied greatly. Coloring books, "hands-on" experiences, and fully developed sequential curricula all appeared in the states. As with formats used, the quality and educational comprehensiveness of these programs likewise varied. In Exhibit 2.1, a chart of the various programs developed by the states during the conduct of the Literature Review in 1979-80 is presented.

In addition to the in-school curricula developed by the states, there are a limited number of privately-sponsored programs directly geared toward preschoolers. These include:

- AAA's Preschool Children in Traffic series
- National Safety Town Center
- Officer Friendly Program (Sears Roebuck)
- Hartford Police Department's Officer Friendly Program
- Channing L. Bete Co. traffic safety education materials
- Green Cross Child Safety Club
- Aetna K-2 Pedestrian Safety Program

The use of these materials in the 50 states is noted in Exhibit 2.1.

Pedestrian programs aimed directly at preschoolers have been in use in European countries for nearly 25 years. England in 1961 and Norway in 1966 developed prototype "clubs." Today, in addition to England and Norway, the countries of Australia, Canada, Denmark, Finland, France, Germany, Iceland, Japan, Luxemburg, the Netherlands, New Zealand, and Sweden all have ongoing programs of traffic safety. Most of these programs are behavioral in approach and rely on the parent as a integral part of the program. Many programs

EXHIBIT 2.1: SAFETY EDUCATION PROGRAMS DEVELOPED BY THE STATES

State/Territory	State Sponsored		Locally Sponsored							
	Preschool Program	K-3 Program	AAA Preschool Children in Traffic	National Safety Town Center	Officer Friendly (Sears Roebuck)	Baltimore Safety Signs (Fifth Corps Corp.)	Texas Safety Ranger Kit	Discovering Traffic Safety Series (Automotive Safety Foundation)	Careful Buddy's Safety Garage Theatre, Safe in Sound (Radio Information Learning Corps)	Brown Cross Child Safety Club (National Safety Council)
Alabama		•	•	•	•	x				
Alaska		•	•	•						•
Arizona			•	•	•	x				
Arkansas			•	•		x				
California		•	•	•	•					
Colorado			•	•						
Connecticut	o o		•	•	•		•	x		
Delaware		•		•	•	x				
District of Columbia		x	•		•					
Florida		• •	•	•	•					
Georgia		*	•	•	•					
Hawaii		o	•	•						

EXHIBIT 2.1: SAFETY EDUCATION PROGRAMS DEVELOPED BY THE STATES (Continued)

State/Territory	State Sponsored		Locally Sponsored							
	Preschool Program	K-3 Program	AAA Preschool Children in Traffic	National Safety Town Center	Officer Friendly (Sears Roebuck)	Guidance Safety Signs (FFTW Loops Corp.)	Texas Safety Ranger Kit	Discovering Traffic Safety Series (Automotive Safety Foundation)	Careful Buddy's Safety Garage (Radio Intensive Learning Corps)	Green Cross Child Safety Club (National Safety Council)
Idaho		•	•	•	•					
Illinois		•	•	•	•					
Indiana		•	•	•	•					
Iowa		•	•	•	•					
Kansas			•	•	•					
Kentucky		• x	•	•	•	x	•		x	
Louisiana		•	•	•	•					
Maine			•	•	•					
Maryland		•	•	•	•					
Massachusetts	• (AAA)		•	•	•	x				
Michigan	o • (AAA)	•	•	•	•	x				
Minnesota	• (AAA)	*	•	•	•					

EXHIBIT 2.1: SAFETY EDUCATION PROGRAMS DEVELOPED BY THE STATES (Continued)

State/Territory	State Sponsored			Locally Sponsored						
	Preschool Program	K-3 Program	AAA Preschool Children in Traffic	National Safety Town Center	Officer Friendly (Sears Product)	Bottom, Safety Steps, (Film Loops Corp.)	Texas Safety Ranger Kit	Discovering Traffic Safety Series (Automotive Safety Foundation)	Careful Buddy's Safety Surge Theatre, Site & Sound (Radio Television Learning Corps)	Green Cross Child Safety Club(National Safety Council)
Mississippi		•(gr.1-6)		•	•					
Missouri	• (PK-3)	• (PK-3)	•	•	•	x				
Montana		•	•	•	•					
Nebraska		• •	•	•	•					
Nevada		•	•	•	•					
New Hampshire			•	•	•					
New Jersey	x (Film Loops)		•	•	•	x				
New Mexico		*		•	•					
New York	x(4-6 yrs)	x(4-6 yrs)	•	•	•			x		
North Carolina		•	•	•	•					
North Dakota		*	•	•	•					
Ohio	•(AAA) o	•	•	•	•					

EXHIBIT 2.1: SAFETY EDUCATION PROGRAMS DEVELOPED BY THE STATES (Continued)

State/Territory	State Sponsored		Locally Sponsored								
	Preschool Programs	K-3 Programs	AAA Preschool Citizens in Traffic	National Safety Town Center	Officer Friendly (Sears Roebuck)	Bolsman Safety Signs (Fifth Coast Corp.)	Texas Safety Ranger Kit	Discovering Traffic Safety Series (Automotive Safety Foundation)	Careful Buddy's Safety Garage (Health Safety & Fire Prevention Learning Camp)	Green Cross Child Safety Club (National Safety Council)
Oklahoma		•	•	•						
Oregon		•	•	•	•					
Pennsylvania	• (AAA)	•	•	•	•					
Rhode Island	• (AAA)	*	•	•	•					
South Carolina				•	•					
South Dakota			•	•						
Tennessee		•	•	•	•					
Texas			•	•					x	
Utah		o	o(safety cities)	•	•					
Vermont		*	•	•	•					
Virginia	• (AAA) x	x	•	•	•					
Washington		•	•	•	•					

EXHIBIT 2.1: SAFETY EDUCATION PROGRAMS DEVELOPED BY THE STATES (Continued)

State/Territory	State Sponsored			Locally Sponsored							
	Preschool Program	K-3 Program	AAA Preschool Children in Traffic	National Safety Town Center	Officer Friendly (Sears Roebuck)	Optimum Safety Signs (Traffic Logos Corp.)	Texas Safety Ranger Kit	Discovering Traffic Safety Series (Automotive Safety Foundation)	Careful Buddy's Safety Surveys (Walt's Automotive Learning Corps)	Green Cross Child Safety Club (National Safety Council)
West Virginia			●	●						
Wisconsin		* ● x	●	●	●					
Wyoming					●					
American Samoa										
Guam		x								
Indian Tribes										
Northern Marina Islands										
Puerto Rico										
Virgin Islands										

● = program

o = program being developed

* = coloring book/comic book

x = audio-visual material

●(AAA) = Preschool Children in Traffic series

N.B. The above information comes from the following sources: Governor's Highway Safety Representatives, AAA, and the National Safety Town Center. As the National Safety Council did not have readily available data on the states in which the Green Cross Child Safety Club was being used, the blank spaces in that column do not represent an absence of NSC materials being used in that state.

reinforce what is taught in the home with activities for use in preschools. The use of the mass media to supplement instruction through records, films, and television is also common.

Summary

The Literature Review provided project staff with a foundation for program development. Three major inputs were obtained: (1) information on the types of accidents that preschool children are involved in, plus data on when, where, and under what circumstances these accidents are likely to occur; (2) research data on the developmental capabilities of young children that impact on their ability to function in traffic; and (3) program information on existing programs in the U.S. and abroad.

3

ANALYSIS OF THE DATA

In order to obtain an empirical basis on which to steer the course of development, Applied Management Sciences, with guidance from the NHTSA, undertook an analysis of preschool traffic accidents. Several data sources were utilized in this effort:

- ORI, Urban Data Base, 1969-1970
- URBAN, Urban Pedestrian Accident Data Base, 1973-1978
- RUPED, Rural Data Base, 1974
- CITY, City Data Base, 1973-1978
- NEW YORK, New York State Accident Data Base, 1974-1978
- WISCONSIN, Wisconsin State Accident Data Base, 1973-1979
- OHIO, Ohio State Accident Data Base, 1974-1979.

In addition to these seven computerized data bases, over 10,000 hard-copy accident reports were reviewed firsthand.

The aim of the investigation was fourfold:

(1) To determine trends across ages. Do accident types vary with age? Are older preschoolers involved in different types of accidents than are younger preschoolers?

(2) To determine trends across geographic areas of the country. Do urban, suburban, and rural accidents differ in type? Are any patterns consistent across geographic areas?

(3) To determine the situational and predisposing conditions which caused an accident to occur. What was the victim doing just prior to the accident? What were the driver's perceptions? Was weather or daylight a factor? Was the child supervised?

(4) To validate the findings of the Literative Review. Were most accidents of the Dart-Out variety? Were most children injured in late afternoon hours on residential streets near their homes? Were most children unsupervised at the time of an accident?

All of these questions were ultimately answered by the conducted analysis. The process of arriving at this end point, however, involved complicated manipulations of data. The major problem encountered was in making the data bases compatible so that comparisons could be made across data tapes. The NHTSA-sponsored studies (ORI, URBAN, RUPED and CITY) contained high quality data that had been typed according to NHTSA's classification scheme (See Exhibit 3.1). However, the number of preschoolers represented on these four data tapes combined was but 5,852. To augment this number, it was deemed desirable to also consult the state files of New York, Wisconsin, and Ohio. By so doing, we were able to add another 15,997 preschoolers to the analysis pool. Unfortunately, though, each of the state data bases was typed according to its own system and all state files departed in some ways from the NHTSA standard.

To remedy this situation, a system of "pseduo-typing" was developed to make the data compatible. Using the raw accident reports as guidelines, a system was developed for each state that would allow for categorization consistent with the NHTSA typology. In general, these guidelines were used in pseudo-typing state files:

- "Pedestrian action" information was consulted to determine what the accident victim was doing at the time of the accident.
- "Vehicle action" was used to verify decisions.
- Any accident in which the vehicle action was noted as "backing" was automatically classified as a Backing-Up accident, regardless of pedestrian action or location.
- Non-backing accidents which took place at an intersection were designated as an Intersection Dash type of accident, regardless of pedestrian action.

EXHIBIT 3.1 EXAMPLES OF NHTSA ACCIDENT TYPOLOGY

01	Dart-Out, First Half: Not at an intersection, ped appeared suddenly, crossed less than halfway
02	Dart-Out, Second Half: Same as Dart-Out, First Half, except ped crossed more than halfway
03	Midblock Dash: Not at intersection, ped running but <u>not</u> short-time exposure (i.e., not 01)
11	Intersection Dash: At intersection, short-time exposure <u>or</u> running
12	Vehicle Turn/Merge with Attention Conflict: Driver turning and attending to traffic, not pedestrian
13	Turning Vehicle: Ped, not running (i.e., not 11). Struck by turning vehicle, attention conflict not documented
14	Trapped: At signalized intersection, ped hit when light changed and traffic started moving (not 22)
22	Multiple Treat: Ped struck by vehicle traveling in same direction as other cars that had stopped for ped
23	Backing-Up: Ped struck by Backing-up vehicle but ped not clearly aware of the vehicle movement
24	Ped Not in Roadway: Ped struck while not in the roadway (not 23, 33, 34, or 25)
25	Walking Along Roadway: Ped struck while walking along the edge of the roadway or on the shoulder, can be either walking with traffic or facing traffic
31	Bus Stop-Related: Ped struck while crossing in front of a bus standing at a bus stop located on the "near side" of the intersection
32	Vendor/Ice Cream Truck-Related: Ped struck going to or from a vendor in a vehicle on the street
34	Result of Auto-Auto Crash: Ped struck by vehicle(s) as a result of an Auto-Auto accident
36	School Bus-Related: Ped struck while going to or from a school bus
97	Other: Unusual circumstances, countermeasure corrective

Reference: Knoblauch, 1977

While this system allowed us to approximate accident classifications, it in no way yielded as accurate results as contained on those data bases which were originally coded to correspond to the NHTSA typology. In particular, it was believed that a greater preponderance of Dashes were shown in the state tapes than in actuality existed. This situation was due to the fact that the descriptions contained on the tapes made it difficult to distinguish Dart-Outs from Midblock Dashes.

Once this process was completed, each data base was examined to obtain information on preschool pedestrian accidents. Data were examined for each group (ages 1-5) in urban, suburban, and rural settings. Descriptions of findings are presented in the remainder of this chapter. The rankings of accidents by geographic areas are summarized in three exhibits.

Urban 1-Year-Olds

Combined data from the seven sources revealed this ranking of accidents: (1) Intersection Dash, (2) Midblock Dash, (3) Dart-Out, (4) Backing-Up, (5) Pedestrian in Roadway, and (6) Pedestrian Not in Roadway. The high incidence of Intersection Dashes, however, were not felt to be reflective of the national situation since they occurred chiefly in New York City and may have been misinterpreted in the coding process. Reviewing hard copy reports of these accidents lent credence to this theory. What were reported to be Intersection Dashes, were most probably instances of "babes in arms" accidents in which a parent who is holding or pushing a child in a stroller is actually the pedestrian involved in the accident. Even with the high incidence of intersection-related accidents, it should be noted that midblock-related accidents nonetheless appear to be the greatest threat to urban 1-year-olds.

Urban 2-Year-Olds

The clear majority of accidents involving urban 2-year-olds take place in midblock areas. Midblock Dash accidents represented 30.8% of all accidents; Dart-Outs accounted for another 25.1% of accidents. The next most frequently occurring accidents, in order of representation in the data, were the Intersection Dash, Pedestrian in Roadway, and the Backing-Up accident.

Urban 3-Year-Olds

Three-year-olds were involved in the same types of accidents as 2-year-olds. The top five accidents involving this age group were as follows: (1) Midblock Dash, (2) Dart-Out, (3) Intersection Dash, (4) Pedestrian in Roadway, and (5) Pedestrian Not in Roadway. Together, the Midblock Dash and Dart-Out accidents accounted for 58.5% of all accidents involving urban 3-year-olds.

Urban 4-Year-Olds

The same trends noted above also apply to urban 4-year-olds. Most accidents involving urban 4-year-olds take place in the midblock area (64.5%), with the Midblock Dash accident alone accounting for one-third of all accidents. The Intersection Dash accident is the third most commonly occurring accident, accounting for 23% of all accidents to this age group. No other accident category beyond this point accounted for more than 4% of accidents.

Urban 5-Year-Olds

Three accident categories accounted for 82.5% of all accidents involving 5-year-olds: The Midblock Dash (31%), the Intersection Dash (26.2%), and the Dart-Out (25.3%). For this age group, the intersection area has become a site of danger in addition to the midblock locale.

In Exhibit 3.2, a listing of the most frequently occurring pedestrian accidents involving urban preschoolers is presented.

Suburban 1-Year-Olds

As with the urban data, suburban data showed a wide range of accidents involving 1-year-olds. Intersection Dashes and Backing-Up accidents presented the greatest hazard to 1-year-olds. However, as with the urban profile, it was felt from reading hard-copy accident reports, that many of the Intersection Dash accidents were, in fact, cases of "babes in arms." Next in

EXHIBIT 3.2 RANKINGS OF ACCIDENTS INVOLVING URBAN PRESCHOOLERS

AGE 1:

Accident Type	Rank	N	%
Intersection Dash	1	97	24.8
Midblock Dash	2	76	19.4
Dart-Out	3	60	15.3
Backing-Up	4	47	12.0
Pedestrian In Roadway	5	43	11.0
Pedestrian Not In Roadway	6	32	8.2
Other	7	15	3.8
Walking Along the Roadway	8	5	1.3
Pedestrian Strikes Vehicle	9.5	3	0.8
Weird	9.5	3	0.8
Not Classified	12.5	2	0.5
Vehicle Turn Merge	12.5	2	0.5
Auto-Auto	12.5	2	0.5
BTI	12.5	2	0.5
Vendor	16	1	0.3
Turning Vehicle	16	1	0.3
Leaving-Entering Vehicle	16	1	0.3

AGE 2:

Accident Type	Rank	N	%
Midblock Dash	1	525	30.8
Dart-Out	2	428	25.1
Intersection Dash	3	292	17.1
Pedestrian In Roadway	4	207	12.1
Backing-Up	5	81	4.7
Other	6	51	3.0
Pedestrian Not In Roadway	7	44	2.6
Not Classified	8	17	1.0
Walking Along The Roadway	9	16	0.9
BTI	10	11	0.6
Pedestrian Strikes Vehicle	11	8	0.5
Vendor	12	7	0.4
Leaving-Entering Vehicle	13	5	0.3
Multiple Threat	15	4	0.2
Weird	15	4	0.2
Auto-Auto	15	4	0.2
Turning Vehicle	17	3	0.3

EXHIBIT 3.2 RANKINGS OF ACCIDENTS INVOLVING URBAN PRESCHOOLERS (Continued)

AGE 3:

Accident Type	Rank	N	%
Midblock Dash	1	887	32.0
Dart-Out	2	735	26.5
Intersection Dash	3	522	19.9
Pedestrian In Roadway	4	280	10.1
Pedestrian Not In Roadway	5	71	2.6
Other	6.5	68	2.5
Backing-Up	6.5	68	2.5
Vendor	8	27	1.0
Walking Along The Roadway	9.5	23	0.8
Pedestrian Strikes Vehicle	9.5	23	0.8
BTI	11	19	0.7
Not Classified	12	17	0.6
Multiple Threat	13	8	0.3
Turning Vehicle	15	5	0.2
Weird	15	5	0.2
Auto-Auto	15	5	0.2
Leaving-Entering Vehicle	17.5	4	0.1
Bus Stop	17.5	4	0.1
Non-Pedestrian Activity	19	2	0.1
Trapped	20.5	1	0.4
Vehicle Turn Merge	20.5	1	0.4

AGE 4:

Accident Type	Rank	N	%
Midblock Dash	1	1195	34.3
Dart-Out	2	922	26.4
Intersection Dash	3	800	23.0
Pedestrian In Roadway	4	134	3.8
Other	5	114	3.3
Backing-Up	6	71	2.0
Pedestrian Not In Roadway	7	68	1.9
Vendor	8	53	1.5
Not Classified	9	23	0.7
BTI	10	21	0.6
Walking Along The Roadway	11	20	0.6
Pedestrian Strikes Vehicle	12	19	0.5
Turning Vehicle	13.5	14	0.4
Multiple Threat	13.5	14	0.4
Vehicle Turn Merge	15	5	0.1
Auto-Auto	17	4	0.1
Weird	17	4	0.1
Leaving-Entering Vehicle	17	4	0.1
Bus Stop	20	1	0.3
Non-Pedestrian Activity	20	1	0.3
Trapped	20	1	0.3

EXHIBIT 3.2 RANKINGS OF ACCIDENTS INVOLVING URBAN PRESCHOOLERS (continued)

AGE 5:

Accident Type	Rank	N	%
Midblock Dash	1	1567	31.0
Intersection Dash	2	1324	26.2
Dart-Out	3	1282	25.3
Pedestrian In Roadway	4	415	8.2
Other	5	140	2.8
Backing-Up	6	83	1.6
Pedestrian Not In Roadway	7	65	1.3
Vendor	8	59	1.2
BTI	9	32	0.6
Multiple Threat	10	28	0.6
Walking Along The Roadway	11	25	0.5
Pedwstrian Strikes Vehicle	12	18	0.4
Turning Vehicle	13	12	0.2
Not Classified	14	14	0.3
Leaving-Entering Vehicle	15	9	0.2
Bus Stop	16	9	0.2
Weird	17	6	0.1
Vehicle Turn Merge	19	5	0.1
Trapped	19	5	0.1
Auto-Auto	19	5	0.1
Non-Pedestrian Activity	21	1	0.2

frequency of occurrence were the Midblock Dash and the Pedestrian Not in Roadway accidents. Pedestrian in Roadway, Walking Along the Roadway, and Vendor accidents each accounted for less than 10% of accidents to suburban 1-year-olds.

Suburban 2-Year-Olds

For 2-year-olds, the same three accidents that accounted for the majority of accidents to 1-year-olds also claimed the most 2-year-old victims. The ranking of these accidents, though, differed somewhat. For suburban preschoolers, the accidents which accounted for the majority of injuries to 2-year-olds were, in order of frequency: (1) Midblock Dash, (2) Intersection Dash, and (3) the Dart-Out. The next most frequently occurring accidents were the Pedestrian in Roadway accident (#4) and the Backing-Up (#5).

Suburban 3-Year-Olds

For this age group, the midblock area posed the greatest threat. Dart-Outs and Midblock Dashes represented, respectively, 28.2% and 23.5% of all accidents. Together, these two categories accounted for over half of all suburban 3-year-old accidents. The next two most frequently occurring accidents were the Intersection Dash and The Pedestrian in Roadway accidents.

Suburban 4-Year-Olds

Here again, the top three accidents were: (1) the Midblock Dash, (2) the Dart-Out, and (3) the Intersection Dash. Each of these categories represented approximately one-fourth of the 435 accidents analyzed. The only other accident category that accounted for a substantial number of accidents was the Pedestrian in Roadway category (13.6%).

Suburban 5-Year-Olds

With this age grouping, the same three categories once again represented the majority (76.4%) of accidents. Intersection Dashes, however, claimed a higher ranking (#2 or 25.7%) than they did with 4-year-olds. The increased

mobility of youngsters this age would seemingly explain this tendency. The midblock area, represented by Midblock Dashes (29.6% of accidents) and the Dart-Out (21.1% of accidents) continued to be the site of greatest risk.

Rankings of all accidents involving suburban preschoolers appear as Exhibit 3.3.

Rural 1-Year-Olds

As with data files on 1-year-olds in the other geographic areas (i.e., urban and suburban), accidents involving rural 1-year-olds were not concentrated in one or two major categories. However, Intersection Dash accidents, which were felt to be a "babes in arms" type of accident, held a lower ranking here (#5) than in the other areas. Given the lay-out of the rural environment, it is not surprising that fewer accidents were reported at intersections. The chief types of accidents involving 1-year-olds were, in order of reported frequency, the Backing-Up, Pedestrian in Roadway, Midblock Dash, and Pedestrian Not in Roadway.

Rural 2-Year-Olds

The midblock area emerged as the most dangerous site for rural 2-year-olds. Thirty-eight percent of all accidents fell into the Midblock Dash category. Another 17% of accidents were attributable to Pedestrian in Roadway accidents. Backing-Up accidents continued to be a substantial threat to youngsters this age, accounting for 17.5% of all accidents.

Rural 3-Year-Olds

As with 2-year-olds, Midblock Dashes overwhelmingly accounted for the greatest percentage of pedestrian accidents (45.7%). The second most frequently occurring accident, the Intersection Dash, accounted for a much smaller 14.1% of accidents. Even this level, however, was felt to apply more to small towns than to truly rural areas. Examinations of hard-copy reports revealed that most Intersection Dash accidents occurred in small towns, not areas that were truly rural in makeup.

EXHIBIT 3.3 RANKINGS OF ACCIDENTS INVOLVING SUBURBAN PRESCHOOLERS

AGE 1:

Accident Type	Rank	N	%
Intersection Dash	1	16	23.9
Backing-Up	2	15	22.4
Midblock Dash	3	9	13.4
Pedestrian Not In Roadway	4	8	11.9
Pedestrian In Roadway	5	6	9.0
Dart-Out	6	5	7.5
Other	7	4	6.0
Walking Along The Roadway	8	3	4.5
Vendor	9	1	1.5

AGE 2:

Accident Type	Rank	N	%
Midblock Dash	1	47	22.5
Intersection Dash	2	41	19.6
Dart-Out	3.	36	17.2
Pedestrian In Roadway	4	31	14.8
Backing-Up	5	23	11.0
Other	6	13	6.2
Pedestrian In Roadway	7.	10	4.8
Walking Along The Roadway	8	4	1.9
Weird	9	3	1.4
Vendor	10	1	0.5

AGE 3:

Accident Type	Rank	N	%
Dart-Out	1	9.6	28.2
Midblock Dash	2	80	23.5
Intersection Dash	3	61	17.9
Pedestrian In Roadway	4	46	13.5
Backing-Up	5	19	5.6
Pedestrian Not In Roadway	6	15	4.4
Other	7	14	4.1
Walking Along The Roadway	8	5	1.4
Turning Vehicle	10.5	1	0.3
Vehicle Turn Merge	10.5	1	0.3
Vendor	10.5	1	0.3
Weird	10.5	1	0.3

EXHIBIT 3.3 RANKINGS OF ACCIDENTS INVOLVING SUBURBAN PRESCHOOLERS (Continued)

AGE 4:

Accident Type	Rank	N	%
Midblock dash	1	117	26.9
Dart-Out	2	110	25.3
Intersection Dash	3	103	23.7
Pedestrian In Roadway	4	59	13.6
Other	5	19	4.4
Backing-Up	6	12	2.8
Pedestrian Not In Roadway	7	10	2.3
Vehicle Out Of Control	8	2	0.5
Vendor	10	1	0.2
Walking Along The Roadway	10	1	0.2
Limited Information	10	1	0.2

AGE 5:

Accident Type	Rank	N	%
Midblock Dash	1	188	29.6
Intersection Dash	2	163	25.7
Dart-Out	3	134	21.1
Pedestrian In Roadway	4	77	12.1
Backing-Up	5	28	4.4
Other	6	22	3.5
Pedestrian Not In Roadway	7	12	1.9
Walking Along The Roadway	8	10	1.6
Vendor	9	1	0.2

Rural 4-Year-Olds

The midblock area was without a doubt the most dangerous site for 4-year-olds. A full 52.4% of all accidents involving this age group fell into the Midblock Dash category. The next most frequently occurring accidents accounted for far fewer numbers of children: Pedestrian in Roadway (12% of accidents), Intersection Dash (10.8% of accidents), and Dart-Outs (7.1% of accidents).

Rural 5-Year-Olds

Again, the Midblock Dash type of accident accounted for the decided majority of all accidents (46%). The other categories of accidents that 5-year-olds were involved in were, in descending order: Intersection Dask (18.3%), Pedestrian in Roadway (12.5%), and Dart-Out (9.2%).

The rankings of all accident types involving rural preschoolers are shown in Exhibit 3.4.

SUMMARY

Comparisons of accident data contained on seven files were made. In order to have a wide representation of preschoolers, adjustments had to be made to state data files to make them compatible with the NHTSA system of classifying accidents. The system of pseudo-typing employed enabled gross comparisons to be made. The system, however, was not without its flaws. For example, in Ohio it was impossible from the information provided to distinguish Dart-Out accidents from Midblock Dash accidents. All such accidents were arbitrarily lumped together as Midblock Dash accidents. Likewise, in New York, the sole labeling factor for a Dart-Out accident was that it occurred when the pedestrian, not in view of the driver, entered the street from between parked cars. Dart-Outs which occurred in the presence of obstacles other than parked cars could not be identified by the data included on the tape and consequently became known as Midblock Dashes. Another problem inherent in the classification scheme, as verified by consultation with hard-copy reports, was the fact that in many instances (particularly New York) what was reported as an

EXHIBIT 3.4 RANKINGS OF ACCIDENTS INVOLVING RURAL PRESCHOOLERS

AGE 1:

Accident Type	Rank	N	%
Backing-Up	1	25	25.5
Pedestrian In Roadway	2	21	21.4
Midblock Dash	3	20	20.4
Pedestrian Not In Roadway	4	15	15.3
Intersection Dash	5	9	9.2
Walking Along The Roadway	6	7	7.1
Leaving-Entering Vehicle	7	1	1.0

AGE 2:

Accident Type	Rank	N	%
Midblock Dash	1	82	37.8
Backing-Up	2	38	17.5
Pedestrian In Roadway	3	36	16.6
Intersection Dash	4	22	10.1
Pedestrian Not In Roadway	5	19	8.8
Dart-Out	6	9	4.1
Walking Along The Roadway	7	5	2.3
Other	8	4	1.8
Mailbox	9	2	0.9

AGE 3:

Accident Type	Rank	N	%
Midblock Dash	1	142	45.7
Intersection Dash	2	44	14.1
Pedestrian In Roadway	3	43	13.8
Dart-Out	4	21	6.8
Other	5	16	5.1
Backing-Up	6	15	4.8
Pedestrian In Roadway	7	12	3.9
Pedestrian Not In Roadway	8	10	3.2
Walking Along The Roadway	9	8	2.6

EXHIBIT 3.4 RANKINGS OF ACCIDENTS INVOLVING RURAL PRESCHOOLERS (Continued)

AGE 4:

Accident Type	Rank	N	%
Midblock Dash	1	242	52.4
Pedestrian In Roadway	2	56	12.1
Intersection Dash	3	50	10.8
Dart-Out	4	33	7.1
Backing-Up	5	23	5.0
Pedestrian Not In Roadway	6	19	4.1
Other	7	18	3.9
Walking Along The Roadway	8	15	3.2
Mailbox	9	4	0.9
Vendor	10.5	1	0.2
Weird	10.5	1	0.2

AGE 5:

Accident Type	Rank	N	%
Midblock Dash	1	244	46.0
Intersection Dash	2	97	18.3
Pedestrian In Roadway	3	66	12.5
Dart-Out	4	49	9.2
Other	5	25	4.7
Pedestrian Not In Roadway	6	16	3.0
Backing-Up	7	14	2.6
Walking Along The Roadway	8	9	1.7
Mailbox	9	5	0.9
Leaving-Entering Vehicle	10	4	0.8

Intersection Dash was in fact a case of a child being carried by an adult who was involved in an Intersection Dash accident.

Yet, despite these limitations, an analysis of the data did provide clear-cut results. In all geographic areas, the midblock area was the most dangerous site to youngsters. Both urban and suburban youngsters were most frequently injured in Midblock Dash and Dart-Out accidents. The chief difference in accidents reported in these areas was not the type of accident which occured but the circumstances which contributed to these accidents. Through an analysis of hard-copy reports, it was revealed that urban youngsters most often had an accident when they ran into a street midblock, usually from between parked cars. In suburban areas, a greater proportion of these accidents involved driveways. In rural areas, obstacles were not likely to be a precipitating factor in accident causation. In addition, Backing-Up accidents and Pedestrian in Roadway accidents were a more persistent threat to rural youngsters than they were in other geographic areas.

4

DEVELOPMENT OF COUNTERMEASURES

Knowing the types of accidents that young children are involved in is the first step in addressing the preschool pedestrian accident problem. The second step entails determining how these accidents might be reduced--i.e., what countermeasures could be employed to lessen the likelihood of a particular type of accident?

Using the results of the accident analysis plus the findings of the Literature Review, staff was able to identify a series of countermeasure ideas. These countermeasure ideas were viewed as actions that could be implemented to reduce the incidence of preschool pedestrian accidents. From the accident analysis, the major types of accidents were identified and the factors which predisposed children towards these accidents were delineated. From the Literature Review, the capabilities of children in traffic were identified. Thus it was possible to identify what factors needed to be addressed and how best to tailor countermeasure advice to achieve the maximum effect, given the developmental capabilities of preschool children. Countermeasures were aimed at two prime audiences: (1) preschool children and (2) adults who are responsible for supervising children in traffic.

In all, five types of countermeasure ideas were identified:

1. Those aimed at improving and/or increasing the presence of adult supervision of young children
2. Those aimed at making the child's environment near traffic safer
3. Those aimed at improving adult behavior in traffic situations in which children are present

4. Those aimed at adults as drivers

5. Those aimed at teaching youngsters (specific) traffic safety concepts and skills.

The countermeasure ideas for each of these categories were originally designated as follows:

Improve and increase adult supervision of children--

(1) Inform adults about preschool children's accident characteristics, limitations in traffic, behavior in traffic, and their consequent need for constant adult supervision.

(2) Teach adults that preschool children must be supervised at all times when they are outdoors near traffic.

(3) Teach adults that preschool children must be supervised only by adults, not by peers.

(4) Teach adults not to leave children unattended in a yard or in vehicles when they (the adults) leave to go somewhere--even for a minute.

(5) Teach adults to put the children in a safe location while loading and unloading parcels from the car.

(6) Teach adults to walk next to the child, between the child and the roadway.

(7) Teach adults to hold onto the child's hand when walking next to or entering any roadways.

(8) Teach adults to go to the child rather than call to him/her from across the roadway.

(9) Teach adults to have the child exit and enter a vehicle on the sidewalk side and walk with an adult to a safe location.

(10) Teach the adult to pick the child up on the side of the street where the child is waiting.

(11) Teach adults to set up an agreement with neighbors that whenever a child visits, the adult will escort the child from one home to the other.

Increase the safety to the traffic environment--

(12) Instruct adults to lobby for children's safety, e.g., getting local governments to construct walking/bicycle paths in the neighborhood, put up "slow--children" signs, and lower the speed limit.

(13) Instruct adults to separate child play spaces from vehicles spaces by a barrier so that the child cannot run into a roadway. Barriers may be physical or symbolic.

(14) Encourage parents to discuss preschoolers' traffic needs with neighbors so they all can enforce pedestrian rules, set up boundaries for play, take turns supervising children.

(15) Teach adults about pedestrian rules and appropriate safety behaviors.

(16) Teach adults about the importance of the adult role model for young children.

Increase safe driving behavior--

(17) Teach parents to walk around their own vehicles to check for children before driving.

(18) Teach adults to automatically ask a driver whose car is in the driveway to wait while the adult checks for children around and near the vehicle and then gives the driver the "OK" to go.

Communicate pedestrian safety education knowledge to children--

(19) Encourage parents to instruct children in pedestrian safety behavior in everyday traffic situations and particularly when the child is at risk.

(20) Teach children to recognize and label parts of the traffic environment, e.g., street, sidewalk, curb, yard, car, intersection.

(21) Teach children that cars and other vehicles can seriously hurt people by striking them.

(22) Teach children where vehicles are driven, i.e., streets, driveways, alleys, and parking lots.

(23) Teach children where it is safe for them to play.

(24) Teach children where pedestrians should walk/stand.

(25) Teach children the directions that vehicles can move.

(26) Teach children the directions vehicles move on streets at midblock.

(27) Teach children to cross a roadway only with an adult.

(28) Teach children to stop before crossing a street.

(29) Teach children where to stand to cross the street at midblock, i.e., curb or edge of parallel-parked vehicles.

(30) Teach children how to tell when it is safe to stand between parallel-parked vehicles--to recognize the signs that a vehicle may move (engine noise, driver in vehicle, back-up lights, exhaust, turn signal).

(31) Teach children how to scan and listen for moving vehicles.

(32) Teach children how to judge if it is safe to cross the street.

(33) Teach children to look for vehicles while crossing the street.

(34) Teach children to walk rather than run across a street or roadway.

(35) Teach children to stop, scan for moving vehicles, and cross only when safe at other roadways such as driveways, alleys, and parking lots.

(36) Teach children the directions vehicles and pedestrians move at intersections.

(37) Teach children to stop and carry out road crossing procedures at intersections.

(38) Teach children where to stand when crossing an intersection.

(39) Begin teaching children the meaning of stop signs at intersections for both drivers and pedestrians.

(40) Begin teaching children the meaning of traffic and walk lights at intersections for drivers and pedestrians.

(41) Begin teaching children how to interpret vehicle turn signals.

(42) Begin teaching children how to judge when it is safe to cross an intersection.

(43) Teach children where to walk when crossing an intersection.

(44) Teach children how to look for moving traffic when crossing at an intersection.

Subsequent to the identification of countermeasure ideas, it was determined which countermeasure ideas would be most useful in addressing each of the five types of accidents targeted by the project. Many of the countermeasure ideas (for example, numbers 1-11, 20-25, 31-34) were useful in addressing all accident categories because of their general nature. Other countermeasure ideas (for example, numbers 36-44) were linked directly to specific accident types.

The original plan of the project staff was to include all 44 countermeasures in the program materials. However, as the project evolved, shifts in development took place which, in turn, affected the choice of countermeasure ideas. To illustrate, original plans called for the development of parent meeting clubs. The intent of these clubs was for parents to meet as a group to discuss the program materials and to take an active role in making the neighborhood safe for young children. Countermeasures 12-18 were identified with this approach in mind. When it became clear that parent meeting clubs would not be a focus of the materials, countermeasures 12-18 became less prominent in the materials. Ideas 13-18 were still included in the parent brochures, but their presentation was not as prominent as it would have been had the original approach been used. Countermeasure 12, was not used at all in the materials because of its orientation to a group activity.

Similarly, countermeasure ideas numbered 36-44 were not presented to the extent originally envisioned. The initial approach called for two storybooks for children age 5-1/2 that would deal with the intersection situation. Because of the complexities of crossing an intersection and the developmental immaturity of the preschool child, it was decided that children under age 5-1/2 would not be able to master intersection-related instruction. Moreover, because of the bulk of information that needed to be transmitted, it was felt that two storybooks would be necessary to convey the appropriate information.

During the course of development, however, it was decided that due to budgetary considerations, only one storybook could be developed for this age group. Having one storybook serve as both (1) a review of earlier materials and (2) an introduction to intersection crossings did, however, necessitate

that content be delimited. It was decided that from an educational standpoint, it would be best to present children with only the beginning concepts for crossing an intersection. Hence countermeasure ideas numbered 36-38 and 42-44 were included in the materials; ideas numbered 39-41 were dropped.

The remaining countermeasure ideas referenced in this chapter were directly reflected in the curriculum approach outlined in the next chapter.

5

CURRICULUM APPROACH

Using the countermeasure ideas outlined in the preceding chapter as a foundation, a plan was developed for instructing preschoolers and responsible adults in these countermeasures.

The original plan called for the development of materials for all geographic areas. However, as noted in Chapter 1, budgetary constraints necessitated selecting only one geographic area as a target for the materials. Since preschool pedestrian accidents are primarily an urban problem (see Chapter 2), the selection process was clearly weighted towards selection of the urban area as the focus for the program. Thus, while it was anticipated that youngsters living in all geographic areas would benefit from the materials, it was decided to tailor the materials to the needs of urban youngsters. This meant that the accident types addressed by the countermeasure ideas were those evidenced in urban areas (i.e., Dart-Out, Midblock Dash, Backing-Up, Intersection Dash, Pedestrian Not In Roadway).

Following the assignment of countermeasures to particular urban accidents, an approach to development of the curriculum was outlined. This plan used (1) the analysis of the data as a guidepost as to what content should be taught and (2) developmental knowledge as to when children would be most receptive to learning this content. In all, 22 booklets were developed:

- Nine storybooks for children in the age ranges 0-2, 2-2 1/2, 2 1/2-3, 3-3 1/2, 3 1/2-4, 4-4 1/2, 4 1/2-5, 5-5 1/2, and 5 1/2-6.
- Nine booklets for parents to accompany the storybooks.

- Two introductory brochures for parents.
- Two guidebooks for instructors of children ages 2-3 and 4-5 for use in classroom settings.

In developing all of the WITS materials, educational tenets and learning theory were applied. Every effort was made to write materials which would be motivating to the reader, as well as informative.

In the children's books, these curriculum decisions were made in designating an appropriate approach:

- Separate books were developed for each age group, as noted above. The rationale for this decision was rooted in child development theory. Children differ greatly during the preschool years; the child under 2 is just learning to walk and talk while the child of 5 is highly mobile, social, and preparing for school. To reach children where they are developmentally, it was decided that this could only be accomplished through the development of books geared to each developmental level.

  In addition, it should be noted that the idea of a six-month age breakdown (after age 2) comes from the model used by most of the European countries.

- The curriculum was sequential in nature. Concomitant with the need to write books at graduated developmental levels is the need to sequence the content. Obviously, young children cannot grasp the depth or amount of knowledge that older preschoolers can. When presenting countermeasures, therefore, we cannot teach 2-years-olds the full range of countermeasures that will prevent Dart-Outs. The groundwork must first be laid and then gradually built upon. For this reason, the nine children's storybooks were designed to be sequential. The learnings presented in early books are reviewed, reinforced, and elaborated upon in later books. Because learning occurs in increments, the traffic safety storybooks help children to gradually amass the knowledge and skills that will ultimately make them safer in traffic.

- Each children's book was based on one concept. Because of the nature of preschool children, they are cognitively able to focus on only one concept at a time. Too much information tends to either overwhelm children or cause them to lose interest. One topic, however, when presented interestingly and at an appropriate developmental level, is able to absorb the young child's interest.

- Factual presentations were interwoven with dramatic stories. As part of the planned sequence for the curriculum, it was decided that new

information would be presented in one book using a factually oriented approach and reinforced in the next book in the series using a dramatic approach. This allowed us to review and reinforce content sequentially. It also enabled us to help children generalize the content being taught by presenting it in a second context.

A final byproduct of this approach was that it added variety to the materials. Because the storybooks vary in their styles, children are more likely to find them exciting and pleasurable reading than if every storybook took the same approach to presenting content.

- The scenarios presented in the dramatic stories were based on actual case histories. In order to obtain a "feel" for the types of situations which predispose children to traffic accidents, over 10,000 actual accident reports were read. From these reports, we were able to establish (a) what actions most often placed children in danger; (b) what the consequences of the children's dangerous actions were; (c) who was present (or absent) at the accident scene; and (d) what accident features were particular to each age group.

  The plots presented in the stories were a direct outgrowth of the types of situations recorded by the accident reports.

In designing materials for parents, these curricular decisions were made:

- The accompanying parent materials provided readers with a thorough "walk-through" of the children's materials. In order to facilitate the parents' role as an educator, it was decided that the guides for parents would include a step-by-step plan for parents on how to teach the desired content. Questions to ask the child as well as reinforcement activities were included for each book.

- To help measure mastery, checklists were designed as an integral part of the parent materials. In order to assess when a child has learned the desired content, each booklet contained a checklist that a parent could use to measure progress. Those skills that needed further practice could be pinpointed through use of this check-off system.

- To provide parents with contextual information, child development information was a designated part of each booklet. Many accident reports and research studies have indicated that parents tend to overestimate their child's ability to cope with the traffic environment. To address this problem, each parent book outlined for the reader the developmental capabilities of a child that age and how these abilities impact on the child's coping powers in the traffic environment.

- To help parents keep their children safer in traffic, each booklet contained a series of "how to's." In addition to providing parents an educational and philosophical approach to traffic safety education, each booklet provided the reader with concrete advice that could be applied. This gives parents not only a philosophical framework but also specific activities and advice to use with their child.

- To facilitate parents in their role as "teacher," advice on behavior reinforcement was interwoven throughout the parent materials. Specific guidance on the use of smiles, hugs, and verbal reinforcers was given throughout the guides. Parents were told how such reinforcers, when used to reward learning, motivate youngsters to want to display safe walking behaviors.

- To provide parents with further knowledge of the subject, background brochures were written. Parents--like all learners and users of education materials--vary in the amount of information they need and/or want to consult. For some parents, the information contained in the parent guides more than meets their needs. For others, there is a desire to learn more about the subject--to understand why and how the WITS program was developed and to gain a deeper understanding of the nature of children's accidents. For this latter group of parents, supplementary materials were written and made available.

- All parent materials were written at a sixth grade reading level. In order to ensure full use of the materials by a broad audience, all booklets were written in an easy-to-comprehend style. A low reading level, however, is in no way synonymous with a condescending style. Rather, parent materials were written in a direct, punchy style, which respects the parents' roles and responsibilities.

For the materials directed at teachers in preschool settings, these principles of design were at the cornerstone of development:

- The guidebooks were designed to maximize ease of use. Because preschool teachers do not have a lot of time to devote to familiarizing themselves with new materials, the booklets were organized into an easy-to-use design. A maximum of information was presented in a minimum of space.

- Learning objectives and skills targeted for development were highlighted for each lesson. Because the WITS program is in fact a curriculum, each lesson (corresponding to the nine children's books) had a designated learning objective. In addition, featured information on the skills targeted for instruction were highlighted for the teacher. This information could thus be used by teachers to focus the learning process.

- Examples of appropriate activities and questions were provided for each of the lessons. To assist teachers in the instructional task, specific illustrations of questions to ask and activities to use with their classes were provided. These were intended to serve as "models" for the teacher.

- Material was developed which could be adapted by the teacher. Because children, teachers, and teaching situations are all unique, no one approach can be uniformly adopted by all teachers to fit all classrooms. The guidebook, therefore, was designed to permit flexibility of approach.

- Checklists were developed to help teachers measure progress. To assist teachers in determining when learning objectives have been met, checklists were incorporated into the guide for every lesson introduced.

- Activities for coordination with parents were incorporated into the design. Because Head Start and many other preschools consider parent involvement to be a basic component of their objectives, the WITS materials built this element into each lesson. Specific activities and handout sheets for linking traffic safety education taught in the classroom to the child's home life were presented.

In sum, the nine storybooks for children were viewed not just as individual booklets of advice on pedestrian safety, but as an integrated curriculum. The first two books are intended for children who are cognitively, motorically, and physically immature--yet in need of pedestrian safety advice. The approach used by the WITS materials was to lay a foundation for instruction. In Storybook 1, children are taught to recognize and identify key parts of the traffic environment. Storybook 2 presents the idea of pedestrian and vehicle boundaries.

The next six storybooks progressively teach children how to safely cross a roadway midblock. The beginning books teach youngsters the skills in crossing a street where no obstructions are present. Later books teach children how to perform this street crossing exercise when parked cars are present. Learning to detect possible movement in parked cars is integral to reducing Backing-Up accidents as well as Dart-Outs.

The last storybook reviews content presented in the first eight storybooks. It also introduces children to the skills needed to cross at an intersection.

In addition to the child guidance provided in the storybooks, reinforcement activities and skill-building techniques for children are presented as part of the parent and instructor's materials. Moreover, countermeasure ideas focusing on the role of the adult as a supervisor and role model to the child are a major component of the adult materials.

6

MATERIALS DEVELOPMENT AND TESTING

Based on the curriculum approach described in the previous chapter, eight prototype booklets were developed:

- Storybook for children age 2 and under
- Storybook for children age 2 - 2-1/2
- Storybook for children age 2-1/2 - 3
- Parent book to accompany child's storybook (age 2 and under)
- Parent book to accompany child's storybook (age 2 - 2-1/2)
- Parent book to accompany child's storybook (age 2-1/2 - 3)
- Introductory parent book on use of the WITS program
- Supplemental book for parents on preschool pedestrian accidents.

After these materials were developed, they were critically reviewed by experts and formatively evaluated by groups of parents and teachers. These groups were involved in the evaluation of the materials:

1) Consultants on child development and traffic safety education who were a part of our Advisory Panel. These individuals included:

   - Professor Carol Seefeldt
     Institute for Child Study, University of Maryland
   - Ms. Sylvia Ross
     Charlotte, North Carolina
   - Mr. Donald LaFond
     Maryland State Department of Education

- Ms. Rita Weiss
  American Automobile Association

Each of these experts commented on the materials in writing and in telephone interviews.

2) NHTSA staff who were responsible for oversight of the project, as well as those who would eventually disseminate the materials. Comments were received both in writing and through a series of meetings held at NHTSA.

3) Parents of children corresponding to each of the target age groups. Group sessions with parents were held at:

   - Village Day Care
     Washington, D.C.

   - Rosemount Day Care Center
     Washington, D.C.

   Parents were given the booklets one week prior to the sessions and asked to use them with their children. At the meetings, a group discussion was held to obtain parents' input on their subjective and objective reactions to the materials.

Based on these reviews, substantial changes were made to the prototype materials. Specifically, these changes were made:

- The parent guides were revised and reformatted. As most reviewers found the original guides to be too lengthy, it was decided to (1) edit the amount of material in the guides and (2) move all of the introductory material about the program to a separate brochure.

- Countermeasure advice to parents was presented in a more direct fashion. An attempt was made to link advice to the types of accidents in which children are involved.

- The technique of varying gender reference throughout the guides was abandoned, as most readers found it irritating.

- The child's book for children under 2 had the artwork totally redone. All reviewers (as well as project staff) were dissatisfied with the artwork: much of it was technically incorrect and it represented a suburban rather than urban environment. Instead of employing two artists, it was decided to use the artist who had done the book for 2-1/2-year-olds for the entire series.

- Vocabulary in Storybook 1 relevant to the traffic environment was in some cases changed to reflect parent suggestions. "Bus" was substituted for "bike" since most parents thought that learning the word "bus" was more important for this age group.
- In the storybook for children age 2, several activities were changed because reviewers found them difficult and/or confusing.
- The emphasis of Storybook 2 was changed from "people" to "children," so as to make this book more identifiable for youngsters.
- The storybook for children age 2-1/2 underwent very few changes, due to favorable reactions from all groups.
- The two parent brochures were shortened in length. Information relevant to accident types was moved to the supplemental brochure. The Introductory brochure was rewritten to include more procedural information.

Following revisions of the prototype materials, development of the remaining materials ensued. Children's and parents' books were written with a consistent approach to development that gave the series a unified look. Specifically, these features were incorporated into their design:

- Standard lengths
- Standard sections in the parent booklets
- Standard numbers of illustrations in the children's materials
- Artwork by one artist.

The materials for instructors of preschoolers were designed to be consistent with the approach used in the parent/child materials. To work out the actual layout of the materials, conferences were held with preschool teachers to obtain their input on what type of guidebook would be most useful. Eight teachers of day-care/preschool centers in Washington, D.C., were interviewed in this capacity. The director of one Washington, D.C., Head Start Center and two Baltimore day-care centers were also consulted in making plans for a model. The instructors' booklets, therefore, not only represented what had been learned about designing parent/child materials but also reflected the suggestions of the potential audience.

Evaluation of the Materials

All of the developed materials--not merely the eight prototype booklets--underwent both critical review and formative evaluation. Critical reviews of all written materials were conducted by NHTSA staff on an ongoing basis. Each booklet was reviewed by NHTSA staff a minimum of three times before receiving final approval.

Evaluation of the materials by users was an integral part of the development process. Informal evaluation with parents, teachers, and children was ongoing. The writers of the materials maintained a working relationship with several preschools in the metropolitan Washington, D.C., area. Whenever a storyline needed testing, there was uncertainty over whether a particular activity would work, or it was questionable if an activity was age-appropriate, the authors would sit down with youngsters of the target age and read the materials to them. Based on these reactions, the material was either left as it was or revised to accommodate the received reactions. Teachers and cooperating parents were likewise involved in this process throughout the duration of the project. It is estimated that over the course of the project, 18 teachers and 80 children and their parents participated in this informal review process.

To obtain user input on a more formalized basis, a program of formative evaluation was instituted. The procedures employed by Applied Management Sciences are standard to the conduct of materials evaluation and have been effectively used by Applied Management Sciences for the past 12 years. Specifically, these steps were followed:

1. An Applied Management Sciences Parent Interviewer made contact with urban day-care/preschool/Head Start centers to see if they would be interested in participating in this effort.

2. Those centers which showed interest were contacted in person. The center director was shown the materials to be tested. Procedures were worked out with the center to facilitate participation.

3. Parents in those classrooms designated by the center director were given the materials to be used with their children at least one week prior to the appointed meeting time.

4. At the meetings (convened at a time most convenient for the participants), parents were encouraged to discuss their reactions to and experiences with the materials. Both subjective feelings about the materials as well as the perceived ability of the materials to convey the desired content were solicited.

5. The results of the meetings were summarized by the Interviewer in memoranda circulated to all project staff. Tape recordings of the proceedings were made available for the writers as well as interested NHTSA staff.

6. Participating parents were shown revised copy of the materials they had evaluated so that they could see for themselves how their comments affected the development process. For each book tested, urban parents of children the same age as in the target books were used for formative evaluation. In addition, every effort was made to include as wide a representation of parents as possible. A concerted attempt was made to obtain input from parents of different races and different socioeconomic backgrounds. In order to obtain such a range of input, it was decided midway through the effort to pay parents $10 for their participation. This honorarium helped defray transportation and/or babysitting fees attached to attending the meetings. It also made parents feel vested in the effort.

In Exhibit 6.1, a sample letter sent to a preschool director is presented. Exhibit 6.2 presents a letter sent to participating parents. In Exhibit 6.3, sample questions used in testing the parent materials are presented. Exhibit 6.4 presents sample questions asked of parents about the children's materials. Exhibit 6.5 lists specific questions asked of parents about a particular children's storybook.

In all, the following participants took part in the formative evaluation of Storybooks 4-9 and the accompanying parent guides:

- Storybook 4/Parent Guide 4
  Four parents from Rosemount Center, Washington, D.C.
  Three parents from Village Day Care Center, Washington, D.C.

- Storybook5/Parent Guide 5
  Two parents from Rosemount Center, Washington, D.C.
  Five parents from Village Day Care Center, Washington, D.C.

EXHIBIT 6.1: SAMPLE LETTER SENT TO PRESCHOOL DIRECTOR OUTLINING FORMATIVE EVALUATION PLANS

Applied Management Sciences
Corporate Headquarters • 962 Wayne Avenue • Silver Spring, Maryland 20910-4486 • (301)585-8181

October 20, 1983

Ms. Judi Farber
HUD Child Day Care Center
Room B-278
451 7th Street, S.W.
Washington, D.C. 20410

Dear Ms. Farber:

This letter briefly describes our project, preparation for the parent interviews, and the letter to parents that accompanies the materials they will evaluate.

Applied Management Sciences has a contract with the National Highway Traffic Safety Administration (NHTSA) to develop traffic safety materials for preschoolers. Our materials are designed to help prevent pedestrian accidents among children. These materials will be distributed by NHTSA upon completion.

A series of nine books will be developed. We have completed the eighth book in the series for children ages 5 to 5-1/2 and its companion parent guide. We are testing them now with children and parents before going to press.

We ask that parents follow a few simple procedures as they help us evaluate the materials. Each parent who is willing to help us will receive a xeroxed copy of the parent's guide and the appropriate child's book, along with a letter that gives instructions and thanks the parent. Each parent is asked to read the parent guide before reading the traffic safety booklet aloud to the child. Parents are asked to note good and bad points and to make suggestions for improvements. For example, the parent might say that the tone of the book is too preachy.

Then a group of five to nine parents will meet with me for about an hour to give their opinions and describe their children's reactions to the book as they read it aloud.

As a token of our appreciation, each parent who participates will receive a payment of ten dollars. We hope this will offset any out-of-pocket expenses, (e.g., transportation, etc.) the parent may incur in order to attend this meeting.

Corporate Headquarters • 962 Wayne Avenue • Suite 701 • Silver Spring, Maryland 20910 • (301) 585-8181
8388 Vickers Street • Suite 233 • San Diego, California 92111 • (714) 560-7402

EXHIBIT 6.1: SAMPLE LETTER SENT TO PRESCHOOL DIRECTOR OUTLINING FORMATIVE EVALUATION PLANS (Continued)

Ms. Judi Farber
October 19, 1983
Page 2

Thank you for your cooperation. I will call you prior to delivering the traffic safety materials to finalize plans for the parent meeting on November 15th at noon.

Sincerely,

APPLIED MANAGEMENT SCIENCES, INC.

Marie Pogozelski
Project Analyst

MP/rcc

EXHIBIT 6.2: SAMPLE LETTER SENT TO PARENT PARTICIPATING IN FORMATIVE EVALUATION

October 5, 1983

Dear Parent:

We are interested in your opinion of this booklet that we have developed to teach traffic safety rules to preschool children the age of your child.

What we ask of you is simple and doesn't take long:

1. Read the parent guide, then read the traffic safety booklet to your child several times over three or four days.

2. Come to a meeting at your center on Thursday, October 13th at 5 P.M. to discuss the booklet and parent guide with me and five to nine other parents for about an hour. I need to know what you like and don't like about the booklet and parent guide. I also want your ideas for making them better.

As a token of our appreciation, you will receive a payment of ten dollars. We hope this will offset any inconvenience this meeting may cause you.

If these booklets are to help reduce accidents among children, they must be done well. We sincerely appreciate your help in testing them with your child and sharing with us your insights and reactions.

Sincerely,

Marie Pogozelski

Marie Pogozelski
Parent Interviewer

MP/rcc

EXHIBIT 6.3: SAMPLE QUESTIONS USED FOR TESTING PARENT MATERIALS

- Did you like the parents' guide?
- Would you use it with your child?
- What did you like best about the guide? Least?
- Is this traffic safety series one that you and your child would enjoy using together?
- Was the parent guide clearly written?
- Was the reading level appropriate? (too hard or too easy)
- Were the traffic safety ideas clearly presented?
- Were the instructions on how to use the children's book with your child clear?
- Did you use the checklist on the last page of the parent's guide? Why or why not?

EXHIBIT 6.4: SAMPLE QUESTIONS ASKED TO PARENTS ABOUT THE CHILDREN'S BOOKS

- Did your child enjoy reading the storybook? Would he/she like to have the book read to him/her again?
- Could your child identify with the characters?
- Did your child understand the message/moral of the story? Was it clear? In any way confusing?
- Did your child like the artwork? (Note: The final version will be in color.)
- Was there any part of the book that was confusing to your child?
- Was the reading level appropriate?
- Was the tone of the story appropriate?
- Do you think your child would enjoy using other books in the WITS series?
- Was your child able to understand the traffic safety ideas/rules in the story?

EXHIBIT 6.5: SAMPLE QUESTIONS ASKED OF PARENTS IN REFERENCE TO TESTING STORYBOOK 9--SHARON GOES TO SCHOOL

- Did your child understand why Sharon has to cross the street with a grown-up?
- Was your child able to understand the idea of a "family rule?"
- Did the family in the story seem realistic to your child?
- Did your child understand the use of "left" and "right" in the story?
- Could your child understand that the map on the last page of the book was the route Sharon used in walking to school?

- Storybook 6/Parent Guide 6
  Two parents from Rosemount Center, Washington, D.C.
  Three parents from Village Day Care Center, Washington, D.C.

- Storybook 7/Parent Guide 7
  Four parents, one grandmother, one uncle from Project Head Start, Seaton Elementary School, Washington, D.C.
  Three parents from Asbury Child Development Center, Washington, D.C.

- Storybook 8/Parent Guide 8
  Two parents from HUD Child Day Care Center, Washington, D.C.
  Eight parents from Asbury Child Development Center, Washington, D.C.

- Storybook 9/Parent Guide 9
  Five parents from HUD Child Care Center, Washington, D.C.
  Five parents from Asbury Child Development Center, Washington, D.C.

The following list summarizes some of the major changes made to the materials based on the input received from the focus group interviews:

- The parent guide for Storybook 4 was expanded to include more information on the consequences of not following safe crossing behaviors.

- The artwork on the last pages of Storybook 5 was revised since there had been some confusion over what the pictures were depicting.

- The segment in Book 6 that has the brothers checking for moving cars in the street was expanded to show left-right-left head movements.

- Because of the confusion involved with walking through an alley (Storybook 9), this situation was changed to crossing a driveway.

- The use of Storybook numbers was linked to the book names in both parent and child booklets to make cross-referencing easier for parents.

To test the Instructor's Guide, a similar process of formative evaluation was used. In this instance, preschool teachers and administrators were given the materials to use with their classes several weeks ahead of a scheduled meeting. Staff were asked not to discuss the materials with one another ahead of time so that their reactions would be "fresh." As with the parent and child materials, interviewers sought teachers/administrators of differing ethnic backgrounds who represented schools of differing socioeconomic status. Sessions with the instructors were recorded on tape cassettes and summarized in memorandum form. In Exhibit 6.6, sample questions used in testing the Instructor's Guide are presented.

EXHIBIT 6.6: SAMPLE QUESTIONS USED IN FORMATIVELY EVALUATING THE INSTRUCTOR'S GUIDE

- What were your reactions to the guide?
- Is the WITS series one that you would use?
- Was the guide clearly written?
- Was the reading level of the guidebook appropriate?
- Was the tone of the guide appropriate?
- Was the background material appropriate? Was there enough information? Too much?
- Were the lessons clearly presented?
- Were the instructions on how to use the Instructor's Guide with your students clear?
- Are the activities ones that you would use with your students?
- Is there anything you would change in the Instructor's Guide?
- Is there anything you would change about the WITS series?

In testing the guide, both versions (for instructors of 2-3-year-olds and instructors of 4-5-year-olds) were reviewed by teachers at the Asbury Child Development Center, Washington, D.C., and The HUD Child Day Care Center, Washington, D.C. Based on comments from the four teachers and two directors at these centers, these changes were made to the guides:

- A full explanation of why the WITS program teaches children how to cross the street midblock was written into the materials to address teacher concerns.
- Several of the activities for two-year-olds were thought to be too advanced for children this age. These activities were revised and submitted to the teachers for their assessment before being included in the final version.
- The type in Storybook 1 was enlarged, as per the teachers' suggestion.

Production

Once the materials were formatively tested, they were revised to reflect the obtained comments. As final drafts were produced they were sent to the CTM for approval. At this point, all written materials were submitted to a professional editor for review and quality control.

Upon receipt of the edited drafts, both Applied Management Sciences and the CTM gave final approval of the material before sending it to the artist for finalization.

To produce camera-ready copy, the artist had all materials typeset and professionally pasted-up. All artwork was produced in full-color watercolor on boards 8-1/2 x 14 inches.

With the production of materials in publishable form, Applied Management Sciences submitted the 22 booklets to NHTSA for printing and dissemination to the user audience. The submission of these products marked the completion of the contract.

7

SUMMARY AND CONCLUSIONS

The WITS project involved the development and formative testing of 22 booklets aimed at reducing the incidence of preschool pedestrian accidents. These booklets were a unique approach to the problem in that they were based jointly on child development research and an empirical analysis of accident data. While other projects have attempted to incorporate one or the other factors into their design, no other project has combined both facets.

The project was unique, too, in its ability to incorporate principles of learning theory and curriculum design into its philosophical approach. Children and adults were not just presented with traffic safety information; they were presented traffic safety information in a way which should motivate them to want to learn more about the subject. The children's materials, in particular, were targeted towards involving the child in the learning process. Each storybook in the series built on the book before it and laid the foundation for the next element. A variety of techniques were used to make the child an active participant in his or her own learning.

The nine children's storybooks formed the cornerstone of the WITS series. The first storybook helped children to label elements of the traffic environment: curb, street, car, etc. The second book assisted children in understanding the concept of boundaries: which areas are meant for vehicles and which for pedestrians. The next six storybooks gradually taught children the procedures for crossing a street midblock. The earlier books taught children the skills involved in crossing from an unobstructed position; the

later books focused on safe crossing from a point between parked cars. The last storybook served a dual purpose: to review content presented in the earlier books and to introduce the skills involved in crossing at an intersection.

The development of these materials represents a great stride forward in attacking the problem of preschool pedestrian accidents. However, in many ways, this progress should only be considered a "first step" in truly counteracting the problem. To augment the important efforts begun here, the following suggestions are offered for future consideration:

1. Materials ought to be developed that are specifically targeted for suburban and rural audiences. As noted in Chapter 5, by addressing the urban audience, the WITS material is targeted towards the area with the greatest problem. It is also anticipated that there will be some carryover to children in suburban and rural areas as well. However, because preschool children identify heavily with the characters and environment they see in picture books, to truly reach a suburban or rural audience, artwork should be drawn to conform to these environments. Moreover, as the accident analysis research showed, children in other geographic areas are involved in somewhat different types of accidents than are urban youngsters. The content in the children's booklets, therefore, should be made to reflect the situation in these areas.

2. The WITS program should be expanded to included a multi-media approach to instruction. In addition to print materials, preschoolers (and their parents) are especially receptive to instruction via television, records, and films. Were we to augment the program to include these forms of instruction, we would most likely be able to guarantee reaching a large audience. Moreover, these media are considered to be a form of instruction that is intrinsically motivating to children. Denmark and Sweden have established histories of using records to supplement learning; Finland, with television.

3. The WITS program should undergo field testing to ascertain if program goals have in fact been met. To see if the WITS program can accomplish the "acid test" of success--the reduction of accidents--a field test should probably be conducted. While expensive to implement, such a test would be able to conclusively determine the effectiveness of the curriculum. Moreover, any detected weaknesses in the materials could be pinpointed so that appropriate revisions can be made.

4. An expanded dissemination program should be launched, should the program prove to be popular. If the program is well received, dissemination efforts could be expanded to reach more youngsters in the target audience. Clinics, doctors' offices, and play groups are likely targets for reaching additional youngsters.

By implementing some or all of the recommendations it is hoped that this important effort will, in fact, be able to make the high incidence of preschool pedestrian accidents a statistic of the past.

REFERENCES

Knoblauch, R.L. Causative factors and countermeasures for rural and suburban pedestrian factors: Accident data collection and analysis. Falls Church, Va.: Bio Technology, Inc., March 1977.

National Safety Council. Accident facts, 1978.

Reiss, M.L. Young pedestrian accidents and how to prevent them. Journal of Traffic Safety Education, July 1978, 25, 17-18; 26.