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COMPREHENSIVE PROGRAM FOR INCREASING USE OF SAFETY SEATS AND SEAT BELTS FOR CHILDREN AND YOUNG ADULTS

FINAL REPORT
1992

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ACKNOWLEDGMENTS

The authors of this report are very grateful to have had another productive year of conducting programs in an effort to increase the use of child safety seats and safety belts for infants, children and young adults in our state. The participation in educational and promotional efforts by hundreds of local volunteers, health professionals, educators and law enforcement officers has been very gratifying. It has only been through their commitment and cooperation that our efforts have helped to promote safer transportation for children in North Carolina.

Enough credit cannot be given to the staff of the NC Governor's Highway Safety Program who collaborated in the development of and helped fund many of the programs and activities conducted throughout the year.

Many members of the Highway Safety Research Center staff other than the authors have assisted with the efforts of this project. Lauren Marchetti contributed valuable time and effort to most effectively promote safety seats and belts through public information and education efforts. Computer programming efforts were performed by Chris Little, Carol Martell and Eric Rodgman. Paula Hendricks has provided administrative assistance with this project as well as valuable assistance with report preparation. Other secretarial assistance was provided by Peggy James and Teresa Parks. Phyllis Alston has answered the toll-free phone line for many years and has provided information to many of the callers. In addition, she has supervised the UNC student personnel who send out the bulk of the educational materials. A final debt of gratitude must be expressed for the assistance of Janie Thomas and Flo Land who collected the data for the observational surveys.

INTRODUCTION

In 1977 the Highway Safety Research Center (HSRC) and the N. C. Governor's Highway Safety Program (GHSP) began a child passenger safety education program. With the cooperation and support of the N. C. GHSP, HSRC has continued and expanded its efforts and goals to increase the proper use of safety seats and belts for children and young adults through a diversity of programs and activities. Over the years, legislation mandating the use of restraint systems for children was enacted and later expanded. Due in part to the results of this legislation, the use of safety belts for drivers and front seat occupants was also mandated by the N.C. Legislature. At the same time, state-wide public information and education programs were conducted targeting many different audiences, teaching and training of health and safety professionals were routinely provided, and safety seat rental programs were established throughout the state.

Safety seat and belt usage rates for children in accidents have increased dramatically and fatal and serious injury rates have declined. Occupant protection has become an integral part of educational messages and services provided by health professionals. Law enforcement officers serve as role models and educators as well as enforcers of the occupant protection laws. The use of safety seats and belts is now the norm rather than the exception.

This report summarizes a year of activity and HSRC's collaboration with other state agencies, advocacy groups, and the law enforcement community to continue efforts to reduce occupant casualties among our state's infants, children and young adults. This report is focused on three areas: (1) advisory, training and coordination activities, (2) public information and education efforts, and (3) evaluation activities. Finally, recommendations for continuing and expanding these efforts in the most effective and efficient manner are made.

ADVISORY, TRAINING AND COORDINATION ACTIVITIES

The Highway Safety Research Center (HSRC) has been conducting programs in the use of safety seats and belts for children and young adults for many years. During this time, Center and project staff have gained a great amount of knowledge in the areas of programming and hardware issues and efforts are made to share this knowledge with other groups and agencies in a variety of ways.

Advice and Counsel to North Carolina Safety Seat Rental Programs

For years, HSRC has been active in establishing seat belt distribution programs across the State and providing advice and counsel to existing programs. These programs typically target parents in the lower socioeconomic income level by offering seats at low cost to families who cannot afford to purchase a seat on their own. Most of these programs are based in county health departments and offer infant and convertible safety seats to county residents. Hospital-based programs have large inventories of infant car seats that are rented to parents of babies born in their hospital while others give car seats to the parents after the birth of the child. There are also a small number of programs operated by local service groups, clubs, the Red Cross, and police departments.

HSRC is heavily involved in implementing programs designed to educate parents about the correct use of car seats and the importance of motor vehicle occupant protection for the whole family. The distribution of safety seats is usually a component of these programs. HSRC aids these programs through: (1) training health educators to teach parents proper use of car seats; (2) advising on bulk seat purchases; and (3) providing guidelines on how to set up and maintain an effective program. Most of these programs have been funded by grants from the Department of Environment, Health, and Natural Resources, Injury Control Section.

All programs are encouraged to have the professionals and volunteers involved in the operation of these programs receive training in the correct use of child safety seats and safety belts. One-day Occupant Protection Training Workshops or half-day Rental Program Training Seminars are offered at the HSRC facilities in

Chapel Hill on a monthly or as-needed basis. Registrants are offered financial support to attend if funding is not available through their program or agencies.

Much of the communication between HSRC and child safety seat distribution program contacts is through HSRC's toll-free phone line. The toll-free number is printed on all HSRC bulk handouts and information sheets. Safety seat program operators are encouraged to call HSRC when they (1) are unable to answer a parent's question; (2) have a question about a rental seat or a used seat (often parents ask program directors to determine if a used seat is safe to use); (3) need the latest child passenger safety information/fact sheet/audio visuals, etc., for use in their program or planned activities; (4) want to discuss problems or frustrations they are having in operating their program; and/or (5) need training for new employees and/or volunteers who will be involved in the distribution of seats. The most prevalent types of questions asked by health educators over the toll-free line concern how to advise parents on which type of car seat to use as well as when and how to use it. A packet of child safety information is generally mailed to those making telephone inquiries. Distribution program operators are strongly encouraged to copy and distribute the question-and-answer reference sheets provided in the packet and to order items available in bulk from the NC Governor's Highway Safety Program office.

In addition to advice and training, the distribution programs also receive HSRC's newsletter, *Directions* which provides updated safety related information. If the contact person is a member of the NC Passenger Safety Association, they receive the Association's *Beltline* newsletter to keep them informed of passenger safety activities across the state. Groups inquiring about setting up a distribution program are sent the HSRC produced guidebook, "*A Guide for Establishing a Car Seat Safety Rental Program,*" which provides step-by-step instructions and training information.

According to the last survey of rental programs conducted by HSRC in the fall of 1989, approximately 92 existing programs had an inventory of more than 9,200 seats available for rental. The rental program listing generated from the survey has

been utilized extensively to assist parents in locating rental programs in their respective counties. The program listing is updated throughout the year as information is received from program contacts or word-of-mouth. No program, however, is under contractual commitment to provide updates to HSRC.

Since the last survey, some programs that were considered exclusively "rental" programs are now shifting to the "sale" of safety seats at near cost. A number of programs are renting out only infant car carriers and selling convertible seats to parents upon return of the infant seat. These "sale" programs are important to the community in that they provide a critically needed service to families who cannot purchase a seat at full price, or who perhaps would not be inclined to purchase a seat without the encouragement of trained health professionals or dedicated volunteers. The programs continue to instruct parents in the proper use of the safety seat regardless of whether it is rented or purchased.

In fiscal year 1992, efforts were begun to revitalize communications between HSRC and safety seat rental programs. An attempt was made to identify and contact all existing rental programs to determine their status. Since rental programs have not been obligated to provide quarterly reports for several years, all information provided to HSRC by program contacts has been voluntary.

HSRC planned to conduct a mail survey to identify existing sales programs and offer them the same kind of support provided to existing rental programs.

However, as part of a N. C. Governor's Highway Safety Program grant to the North Carolina Department of Environment, Health, and Natural Resources, Injury Control Section (NC DEHNR, ICS), a telephone survey of county health departments was initiated in late summer of 1991 to ascertain the number of child safety seat distribution programs in each county. Just prior to the start of the FY 92 Child Restraint Project, HSRC was informed of the survey completed by the NC DEHNR, ICS. HSRC compared ICS's telephone interview results to its then current rental program listing. Because there were major differences between the two lists, both HSRC and ICS decided to combine the lists and conduct a follow-up survey to resolve the discrepancies.

This follow-up questionnaire was developed by HSRC with input from ICS and mailed to programs confirmed by the telephone survey as currently operating a rental, sale, give-a-way or voucher program. The questionnaire was designed to obtain detailed information about these North Carolina programs such as: types and numbers of seats in inventory, rental or sale procedures, program education component, training status of professionals and volunteers involved in the program, seat loss due to non-return, seat durability, and recall notifications. Program contacts were encouraged to enclose fliers, rental agreements, newspaper clippings, etc. along with the completed questionnaire.

Survey Results

Seventy-seven of 129 surveys sent to safety seat rental and sales programs were returned. An additional 31 programs were confirmed by means of verbal communication. In all, a total of 118 programs were identified in 81 counties. Appendix A presents an overview of the programs identified in each county with information on program type and the type of seats available at each site.

Since 1980, there has been a gradual increase in the number of child safety seat distribution programs. Twenty-seven percent of the 71 programs that listed the year they were established were established between 1980 and 1984 (n=19). Between the years 1985-1988, an additional 35 percent of the programs were established (n=25). Since that time, 27 programs reported their establishment, or 38 percent of those reporting. Table 1 provides a detailed summary of the number of programs started since 1980.

Forty-one percent of programs identified are under the direction of county health departments. Hospitals provide 11 percent of the remaining programs, with hospital auxiliary staff and volunteers in charge of an additional 9 percent. The remaining programs are provided by civic groups and other clubs. A total of 18 (14%) programs reported that they were not affiliated with any particular group or organization (see Table 2).

Table 1. Year Program Started

Year Programs Started	Number	Percentage
1980	2	3
1981	6	9
1982	7	10
1983	1	1
1984	3	4
1985	5	7
1986	5	7
1987	7	10
1988	8	11
1989	5	7
1990	9	13
1991	8	11
1992	5	7
Total Responses	71	100

Table 2. Type of Agency Operating Rental Program

Type of Agency	Number	Percentage
Health Dept.	52	48
Hospital	14	13
Hospital Aux/Volunteer	11	10
Civic Group/Club	8	7
Unknown	25	23
Total	110	100

Despite the shift of some programs from rental to sale, the overwhelming majority of the programs identified are considered solely rental programs (64%), while only two were reported as being solely "sale". A much smaller number were give-away (8%) followed by programs with a mixed assortment of distribution types (5%). A small number of programs give seats on a

free loan basis (3%). Only 3 programs were reported to provide seats on a "special needs" basis (2%) (see Table 3).

Table 3. Program Type, Number, and Percent

Program type	Number	Percent
Rental only	82	64
give-away	10	8
Sales only	2	2
Special needs	3	2
Combination	7	5
Free Loan	4	3
Unknown	20	16
Total	128	100

The different program types also reported somewhat different populations as the target of their services. County residents were the most common target of rental programs. Out of a total of 73 programs listing specific targets, 19 rental programs listed county residents as their target (Table 4). The second most common target for rental programs was health department clients (7) followed by a small number of hospital deliveries (4), low income families (3), and low income county residents (1). Only one rental program targeted OB patients. Sixteen rental programs were reported as having no specific target population.

Programs classified as give-away programs were typically found in hospitals and provided seats to the parents of infants born at the hospital. Only one give-away program targeted health department clients. In general, combination programs were very diverse in terms of their targeted populations. One program was targeted at each of the following target populations: hospital deliveries, health department clients, and special needs. Two combination programs were specifically targeted at county residents.

Each of the special needs programs identified in the survey catered to three different target populations. One focused on county residents, a second on hospital deliveries, and the third on low income county residents.

Table 4. Program Type by Target Population (n=74).

Target Population	Rental	Sales	Give	Combo	Sp. Needs	Free Loan	Total
County Residents	19	0	2	0	1	0	22
Low Income	3	0	0	0	0	0	3
Hospital Delivery	4	8	1	1	1	0	15
Health Department Clients	7	1	1	0	0	0	9
City Residents	0	1	0	0	0	0	1
No Specific Target	16	0	0	0	0	2	18
OB Patients	1	0	0	0	0	2	3
Low Income County Residents	0	0	1	0	0	0	1
Special Needs	1	0	1	0	0	0	2
Total	51	10	6	1	2	4	74

The primary source of funding for most programs is rental fees, civic donations, GHSP, and the program's own agency. Rental programs listed the most sources of funding. Of the 48 rental programs responding to this item, nearly one third of the programs (15) used rental fees as the primary source of funding. The second most common type of funding reported for rental programs were civic donations (11) followed closely by GHSP (10). A smaller number of programs were supported by NC DEHNR (6) and the program's own agency (4). Only one program was reported to use seats from other programs and one program received funding from NC Health Start. As a second funding source nearly one third of those programs (16) who did not use rental fees as a primary source of funding did use them as a secondary source. Next came funding by the program's own agency (3), GHSP (2), NC DEHNR (2), and civic donations (1). Rental programs were the only type program to report a third funding source, with 15 programs being funded by at

least three sources. A few of these programs were supported by their own agency (5) as a third source of funding, followed by rental fees (3), and civic donations (3). One program cited the use of one of the following as a third funding source: NC DEHNR, hospital auxiliary, the Foundation of Better Health, and United Way. Based on the reported results, it appears that the use of rental fees by those programs classified as primarily rental program, offers them a monetary advantage over other types of programs. The greater availability of funds to rental programs could explain why these programs are more abundant than others.

Programs classified as give-away obtain the bulk of their funding from their own agency. Of 10 programs responding, 7 reported the use of its own agency as its primary funding source. One give-away program used civic donations and a second relied on the March of Dimes as its primary funding source. Only one give-away program reported GHSP as a primary funding source. By contrast, one-third of all rental programs rely on GHSP as their primary source of funding. Secondary funding was reported by two give-away programs; one used funds from its own agency while the other used civic donations. None of the give-away programs used funds from a third source to provide support for their operation.

Four programs reported using multiple distribution methods and each relied on a diverse range of funding sources. These sources included GHSP, NC DEHNR, civic donations, and hospital auxiliary. Two of the four programs used rental fees as a secondary source of funding. The three programs labeled "special needs" also reported the use of different primary funding sources. One program relied on its own agency's funds, a second on NC DEHNR, and the third on civic donations. Two of these programs also reported using secondary funding sources, one being supported by rental fees, and the other by civic donations. The only sale program to respond to the survey used its own agency as a primary funding source and hospital auxiliary as a secondary source.

In examining overall funding sources of the 66 programs responding, it appears that rental fees (23%), civic donations (21%), and funding from the program agency (20%) are the primary sources used. These are followed closely by GHSP

(18%) and NC DEHNR funding (12%). Rental fees also make up the majority (58%) of secondary funding sources. Civic donations and hospital auxiliary each make up 9 percent of other reported secondary sources. Although only a few programs reported the use of a third funding source, among these, own agency support, rental fees and civic donations were the most common. Because of the small number of programs reporting, these numbers should be cautiously interpreted.

Not all distribution programs have available in their inventories the same types of seats. Only 42 percent of programs reported the use of both infant and convertible seats (Table 5). Forty-one percent of the programs offer infant seats only, while 12 percent offer convertible seats only. Surprisingly, only 9 percent of the programs report having booster seats in their inventories. All three types of seats, (infant, convertible, and booster) are available at only 5 percent of the programs. It should be noted that approximately 12 percent of the programs do not provide locking clips with the seats they distribute.

Table 5. Percentage of Programs Offering Different Seat Types.

Types of seats available	Percentage
Infant	41
Convertible	12
Infant and convertible	42
Booster	9
Infant, convertible and booster	5

More than 9,300 child safety seats are available from NC distribution programs. Close to 75% of these seats are infant while boosters make up less than 1percent (n=73) with the rest being convertibles. The most commonly used primary seat is the Century 560 (29%), followed by the Infant Love (25%), the Cosco 590 (13%), and the Pride Trimble 820/25 (11%). Among secondary models, most common is the Century 2000 (36%), followed by the Century 1000 (20%), and the Pride Trimble

820/25 (12%). Beyond the secondary model, no particular type of seat was more widely used than others.

One important aspect of the process of distributing child safety seats to clients is providing some type of education to parents along with the child safety seat. Although most programs provide this service to clients, the amount and type of education provided vary a great deal. Out of a total of 70 programs reporting, the most frequently reported primary source of education provided to clients was child passenger safety information (30 programs), followed by videotapes demonstrating the use of the seats (25 programs). Eight programs report the use of the manufacturer's instructions that come with the seats. Six others report the use of seat belt demonstrators as their primary educational tool. One program does not provide any type of education to its clients.

The most commonly used secondary educational method is the use of seat belt demonstrators (38 programs), followed by the use child passenger safety information (21 programs). Twenty-four programs use seat belt demonstrations as a third type of educational toll, making it the most widely used third type.

In terms of specific program types, differences were also noted. Rental programs primarily rely on child passenger safety information to educate their clients. Almost half of the 51 rental programs responding use child passenger information, 19 of these programs rely on videotaped demonstrations. Others use manufacturer's instructions (4) and actual seat belt demonstrations (2). As a secondary source of education, rental programs rely on seat belt demonstrations (29) and child passenger safety information (16). Nineteen programs offer seat belt demonstrations as a third type of education. One program uses a video as a third source, while 2 programs take the seat to the car and demonstrate its proper use.

Other types of programs show no distinct pattern in the method of education given to clients. The only finding worth noting is that in addition to the primary education given to clients, most programs use demonstrations.

Of concern to most program coordinators is deciding upon the best method of retrieving seats that clients fail to return on time. The majority of programs

surveyed rely on reminder letters in order to retrieve seats. If no response is obtained from their first notices, 43 of the programs send out second reminders (Table 6). Only 14 of the programs surveyed report the use of certified letters sent to clients as a means of retrieval. Another popular technique is the use of phone calls (79%). Twenty-one programs flag the client's medical records in order to retrieve late seats. A smaller number of programs rely on police assistance (12%), DMV address updates (10%), and other techniques (5%).

Table 6. Method of Retrieving Seats not Returned on Time

Method	Number	Percentage
One reminder	53	79
Two reminders	43	64
Certified letter	14	20
DMV address update	7	10
Phone calls	52	79
Police assistance	8	12
File charge	8	12
Flag medical records	21	32
Other	6	5

Occupant Protection Training Workshops

HSRC continues to stress the importance of training for all volunteers and professionals involved in rental programs in order to assure that parents are provided accurate instruction and to reduce program liability. Additionally, HSRC strives to increase the pool of volunteers and professionals who would advocate the proper use of child safety seats and seat belts at the local level through a variety of activities such as conducting education programs, distributing highway safety literature, and conducting safety seat/belt proper use installation clinics.

Occupant Protection Training Workshops for highway safety and health professionals along with volunteers are conducted on a monthly (or as-needed) basis at the Highway Safety Research Center facilities in Chapel Hill. When circumstances warrant, HSRC staff travel to locations around the state to provide training. This is done when a large number of an agency's staff or group of persons

who are unable to travel to Chapel Hill need training. When traveling to other locations, HSRC strongly encourages the sponsoring agency to recruit attendees from surrounding locations to maximize travel by HSRC staff.

Each workshop is adapted to the needs of the participants. The one-day workshop agenda includes a core segment that provides accurate and up-to-date information related to car crashes and restraint use; the effectiveness of restraint systems and occupant restraint laws in reducing motor vehicle related death and injury; and the correct use of child safety seats and safety belts.

Participants learn about the different types of safety seats and belts, how to properly use them, and of the consequences when they are used improperly. Resource information is provided to enable the participants to serve as knowledgeable educators within their own programs and communities. As necessary, concurrent break-out sessions follow the core segment of the workshop. One session provides training for those interested or involved in conducting safety seat rental programs and the other is for those who wish to be trained to conduct a safety seat/belt proper use installation clinic. Those participants attending the breakout session on installation clinics receive hands-on experience working with safety seats and seat belts by going to a local day care center to watch and participate in a safety seat check clinic conducted by the workshop instructors.

HSRC staff conducted the following Occupant Protection Training Workshops during the grant period:

Date	Location	Group Represented	# Attendees
10/22	Sylva	Jackson County Health Department & Jackson County Head Start personnel	20
10/23	Waynesville	Haywood County & GHSP OPUE Training	10
11/15	Creedmore	South Granville Junior Woman's Club	20
12/06	Durham	Wake AHEC Wellness Institute	20
1/8	Winston-Salem	CPS Workshop	15

Date	Location	Group Represented	# Attendees
1/15	Greenville	CPS Workshop	23
2/28	Charlotte	Special Needs Workshop	20
3/10	Greenville	GHSP OPUE Training	25
3/11	Raleigh	NC School Bus Safety Conference	30
8/21	Murphy	Cherokee County Health Department Cherokee County Headstart Swain County Health Department Macon County Health Department NC DEHNR Western Coordinator	35
9/2	Chapel Hill	Alamance County Health Dept.	1
		Haywood-Moncure Health Center	1
		Kiwanis Club of Siler City	3
		Martin County Health Dept.	3
		Person County Health Dept.	3
		Prospect Hill Community Health Center	2
		Tyrrell County Health Dept.	2
		Washington County Health Dept.	1
		UNC Hospitals	1

Communications and Coordination on the State Level

There are two primary organizations within North Carolina that conduct programs and activities related to occupant protection: the NC Governor's Highway Safety Program, and the UNC Highway Safety Research Center. It is important that these organizations maintain communications between themselves and coordinate activities so that the limited funds and personnel available are used in the most efficient and effective manner possible. Representatives of GHSP and HSRC met several times during the project year to discuss and plan major educational and promotional campaigns, and to divide up tasks and funding responsibilities. Routine communications also helped to keep the agencies apprised of the other's activities and reduce duplication of effort, and to develop as comprehensive a program as possible.

Participation at State and National Conferences and Advisory Committees

In an effort to remain abreast of programs and activities being conducted across the United States as well as within North Carolina and to share North Carolina's programs and experiences, HSRC staff members attend relevant conferences whenever possible. During this project year, HSRC staff attended, and participated in the National Lifesavers 10 Conference as well as the Child Passenger Safety Conference held in Denver. HSRC project staff also participated in an advisory committee to plan for the National Child Passenger Safety Conference held in Denver.

The Project Director was asked by NHTSA Office of Occupant Protection to serve as an instructor for a series of NHTSA/state-sponsored child passenger safety workshops. These workshops are being conducted by NHTSA in an effort to train more child passenger safety advocates within states to conduct educational and distribution programs and to be better prepared to provide accurate and up-to-date technical information to parents in their communities. During this year, the Project Director served as lead instructor for the southeastern states and conducted or assisted in workshops held in Maryland, West Virginia, Kentucky, Florida, South Carolina, Louisiana, and Tennessee.

PUBLIC INFORMATION AND EDUCATION EFFORTS

North Carolina is very similar to the rest of the nation in that the use of restraint devices for children in cars has become the accepted norm rather than the exception, but at the same time, many parents and others who transport children find this subject very confusing. Thus, the distribution of educational materials and dissemination of information related to child safety seats and belts have been a focal points of this project in an attempt to provide accurate and readily accessible information. North Carolina also has the problem that many parents do not use restraint devices that are appropriate for the size of their child and there still continues to be a minority of drivers who do not buckle their children at all. These problems have all been addressed through this project in a number of ways.

Distribution of Educational Materials

HSRC continued to be a major source of information on highway safety in general and occupant protection in particular for the State of North Carolina and to some degree the United States. For the most part, materials developed and produced by HSRC are distributed free of charge to North Carolina residents.

Growing Up Buckled Up is the brochure developed in 1985 to provide parents with general information on the Child Passenger Safety and Seat Belt Laws as well as basic information on the use of safety seats and belts for children. This brochure, revised during FY88 to present more information on the two laws and updated information on recommendations for the use of seat belts by children was widely distributed during this project year with approximately 50,000 copies printed for distribution to North Carolina residents through GHSP.

While *Growing Up Buckled Up* is the only brochure provided in bulk, HSRC maintains a supply of other informational handouts that provide more detailed information on a variety of issues related to safety seats and belts. Many of the informational sheets were developed by project staff while others are reprints of materials developed by others. A number of these information sheets were updated

and re-designed during this reporting year. These handouts are one or two page reproducible handouts, provided with the intent that local programs will make as many copies as they need. Topics included through these handouts include a safety seat shopping guide, commonly asked questions about the Child Passenger Safety and Seat Belt Laws, safety seat recalls, car pool safety tips, guide to purchasing used safety seats, restraint options for older children, child seat use with automatic seat belt systems, and questions and answers about air bags and automatic seat belts.

HSRC continues to maintain a collection of films and videotapes related to occupant protection that are available on a loan basis to North Carolina residents. These programs are a valuable resource for health professionals, teachers, and other health and safety advocates who are making presentations within their own communities or who want to preview programs that are available. During this project year, 85 films and videotapes were loaned to schools, police departments and health professionals and other highway safety advocates throughout the state.

One of the most efficient means for the dissemination of timely information is through the *Highway Safety Directions* newsletter that is partially funded under this project. Directions is sent to a mailing list of over 3,800 addresses, including all North Carolina law enforcement agencies, health department directors and health educators, rental program coordinators and NC Passenger Safety Association members. New or revised informational handouts are published in *Directions* with the intent that they will be reproduced for distribution at the local level. The *Directions* mailing list also contains approximately 1000 out-of state and 140 foreign addresses, therefore reports of North Carolina activities and research results and informational handouts are distributed across the country and in fact internationally.

HSRC's toll-free phone line continues to be a valuable resource of information for North Carolina residents. This service is available to anyone in North Carolina to ask questions pertaining to safety seats or seat belts or to request educational materials or audiovisuals. Most of the calls received through this line come from concerned parents who want information on NC's Child Passenger

Safety Law, what is the "best" safety seat to buy, when they can or should move their children out of the safety seat into a booster seat or seat belt, solving car pooling problems, etc. Many people also call in with questions about seat belts for adults and the Seat Belt Law. This line also serves as a means for local programs to contact HSRC with requests for materials, information, or assistance with problems. During this project year, HSRC staff spent a total of 328 hours (or 41 working days) responding to North Carolina citizens through this line. In addition, countless hours were spent by HSRC staff responding to call and providing advice or materials for out-of-state callers.

Highway Safety Directions Newsletter

Under the 1986-87 grant, HSRC merged the *Totline* and *Highway Safety Highlights* newsletters into one -- *Highway Safety Directions*. *Highway Safety Directions* covers passenger safety and general highway safety issues and profiles research being conducted at HSRC. The merger combined the mailing lists of the two previous publications and included the addition of other groups and agencies to the list.

Three issues went out during this reporting year (copies of covers included as Appendix B).

The first issue, Winter 1992, featured articles looking at wide truck safety in relation to narrow roads, alcohol-related crashes and arrests by age, race and sex of drivers, and trends in automatic restraint use by North Carolina drivers. The automatic restraint article relayed information gained through the GHSP-HSRC occupant restraint monitoring project.

The second issue, Summer 1992, reported on the National Bicycling and Walking Study conducted by HSRC, a project looking at different types of roadside guardrail and related crash injuries, and a just-begun study examining the driving records of older drivers over time. This issue also contained a brief article informing readers of a new booklet listing HSRC audiovisual materials available to North Carolina residents.

The year's third issue, Fall 1992, served as the Center's annual publications guide. This issue listed HSRC publications available through the Center's library. Reports and articles listed fell under several different categories: Accident Analysis, Alcohol, Bicycles and Pedestrians, Child Passengers, Driver Studies, General Topics, Motorcycles, Roadway Research and Safety Belts. The Child Passenger section contained three different publications while the Safety Belts section included seven.

Overall, all three issues received favorable responses with inquires and requests from agencies, groups and persons for further information or permission to copy and distribute articles.

Development of Public Awareness Campaigns

During this project year, HSRC teamed up with other organizations to conduct two public awareness campaigns -- North Carolina Child Passenger Safety Awareness Week and North Carolina Lifesavers Month activities. These campaigns represent efforts to reach the largest audiences possible with limited personnel and funds. The basic premise behind all of these efforts is to encourage groups and individuals to conduct activities and disseminate occupant protection information in their own communities.

Child Passenger Safety Awareness Week

HSRC staff worked with GHSP, UNC News Services and several local project people to bring two of the Teenage Mutant Ninja Turtles to North Carolina. The cartoon characters' one-day tour of the state kicked off North Carolina Child Passenger Safety Awareness Week. The visit also was the first time the Turtles served as public advocates for child safety seats, safety belts and highway safety for children and adults.

Two of the life size Teenage Mutant Ninja Turtles, Donatello and Michaelangelo, greeted day care and elementary school children and appeared at airport news conferences in Asheville, Greensboro, Raleigh and Wilmington. GHSP made arrangements for the Turtles and project staff to make the trip using an

NCDOT airplane. At each site, law enforcement officers and emergency medical professionals presented "Saved by the Safety Seat" and "Saved by the Safety Belt" awards to local children who survived serious automobile crashes because they were restrained by a safety seat or safety belt. HSRC and GHSP coordinated the awards through the local law enforcement and EMS agencies.

During the news conferences, Donatello and Michaelangelo joined with state representatives and local officials to unveil "Cowa-BUCKLE Dude!" -- a slogan being used for the first time on Teenage Mutant Ninja Turtle materials to encourage kids to buckle up. "Cowa-BUCKLE Dude!" is a spin-off of "Cowabunga Dude," the Turtles' popular saying.

HSRC staff worked with UNC News Services to inform newspapers and radio and television stations in each city of the Turtles' appearance, news conference and support of occupant restraints. News advisories were mailed and faxed to all of the media outlets in each of the four cities. HSRC and UNC also prepared a news release that was sent to newspapers and stations in other NC cities.

The media's response was tremendous. Reporters and photographers from TV stations and newspapers attended each city's event. Newspapers such as the Asheville Citizen-Times, Durham Herald, Greensboro News and Record, and Wilmington Morning Star ran stories accompanied by large photos of the Turtles' and adoring children.

The Teenage Mutant Ninja Turtles' involvement with seat belts and child passenger safety originated from discussions between officials from the New Hanover Regional Medical Center's Traffic Injury Prevention Program in Wilmington and Surge Licensing Inc. HSRC and GHSP then negotiated with Surge Licensing to bring Donatello and Michaelangelo to North Carolina.

As part of the visit, HSRC developed a Teenage Mutant Ninja Turtle coloring sheet master. The sheet shows one of the Turtles and displays the "Cowa-BUCKLE Dude!" slogan (Appendix E). HSRC and GHSP has distributed hundreds of the coloring sheet masters to in- and out-of-state agencies and persons.

Three days after the Turtles' North Carolina tour, they appeared at a NHTSA news conference in Washington, DC to announce their support of child seats and safety belts nationally.

NC Lifesavers Month Activities

For the seventh consecutive year, Governor Martin proclaimed the month of May as Lifesavers Month in North Carolina. Governor Martin and GHSP chose May because it is the traditional start of the summer vacation and travel season and to coincide with National Buckle Up America Week. Therefore, May comes as a good time to remind the motoring public of the importance of using safety belts and child seats, obeying speed limits and driving sober.

The activity chosen for this year's efforts was to form several caravans that started out in different parts of the State and converged on Raleigh for a large press conference. HSRC's participation in this activity consisted of riding along and participating in events for the caravan that originated in Wilmington.

EVALUATION ACTIVITIES

The NC Governor's Highway Safety Program has been funding activities designed to convince parents to buckle up their children in cars since 1978. This was done due to the large number of children who were being killed or seriously injured in car crashes due to the non-use of restraint systems. Educational activities and legislation have had a tremendous impact on child transportation safety in North Carolina.

Overview of North Carolina Accident Data

Table 7 presents an overview of the restraint and fatality status of children involved in North Carolina car crashes during the past 15 years.

Table 7. Police Reported Restraint Usage and Fatalities for All 0-5 Year-Old Occupants in North Carolina Crashes.

Year	% Restrained	# Killed	# Unrestrained	# Restrained
1974	5.4	28	28	0
1975	5.0	29	29	0
1976	4.6	26	26	0
1977	5.9	28	28	0
1978	4.7	36	36	0
1979	7.0	24	24	0
1980	10.5	18	18	0
1981	11.0	22	21	1
1982	17.4	17	16	1
1983	25.1	21	19	2
1984	34.4	20	17	3
1985	61.8	23	20	3
1986	75.7	25	18	7
1987	86.2	21	17	4
1988	86.4	39	28	11
1989	87.2	33	28	5
1990	88.3	13	08	5
1991	88.4	28	19	9

Beginning in 1979, after educational efforts were begun, there was a slow but steady increase in the percentage of children who were reported to be buckled up in crashes. In July 1982, the first Child Passenger Safety Law went into effect requiring parents to restrain their children under age two. Larger increases in reported restraint usage rates were seen beginning in 1982. In July 1985, this law was expanded to require all drivers to buckle up all children less than age six. This legislative activity was associated with the largest increase in usage rates.

A quick glance at the fatality figures in Table 7 could raise questions about the benefits, or lack thereof, of increased restraint usage. With the exception of 1990, as many or more children have been killed in recent years with reported restraint usage at a high level, as were killed in earlier years with restraint usage very low. It is clear from an examination of the accident reports that the vast majority of these children who were killed were not restrained at the time of the crash with many of the deaths being due to ejection, deaths that almost certainly would not have occurred if the children had been secured in restraint systems.

Another aspect to note is the number of children who have been killed while restrained. Concern over this trend is related to the potential for negative publicity that could have an adverse effect on continued educational efforts. In reality, it should be the goal of any safety seat or seat belt educational program to see that all occupant fatalities are restrained at the time of the crash. This goal acknowledges the fact that there are going to be crashes that are so severe that they cannot be survived regardless of restraint status. Thus, if all vehicle occupants are properly restrained, all persons killed will be restrained and fatalities will have been reduced to the greatest extent possible.

As shown in Figure 1, the police-reported restraint usage rate for children less than two (covered by the initial law) has increased from 28 percent in the year prior to the law to more than 90 percent from July 1991 through June 1992. While the reported usage rate for 2-5 year-olds also increased substantially (from 8% to 89%) since 1982, the largest increase came after the expanded law went into effect in 1985. Note that the same trend holds true for the 6-15 year-olds. These children became

Figure 1. Police-Reported Restraint Usage Rates for Crash-Involved Children, 1981 through June 1992.

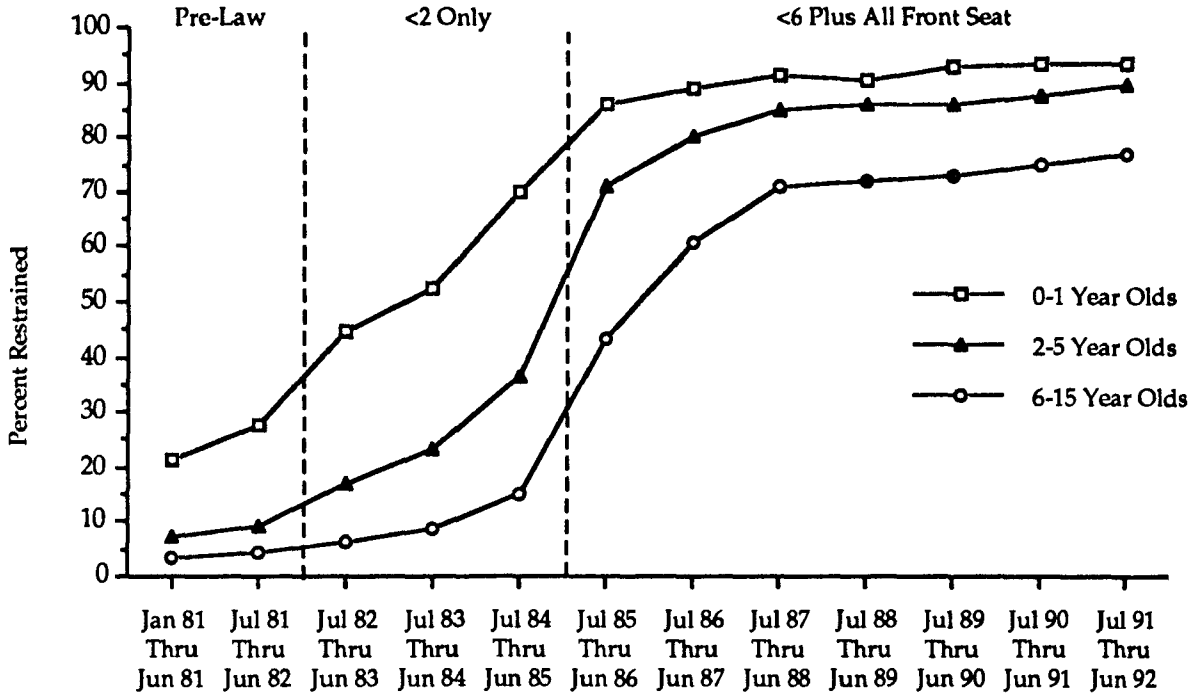
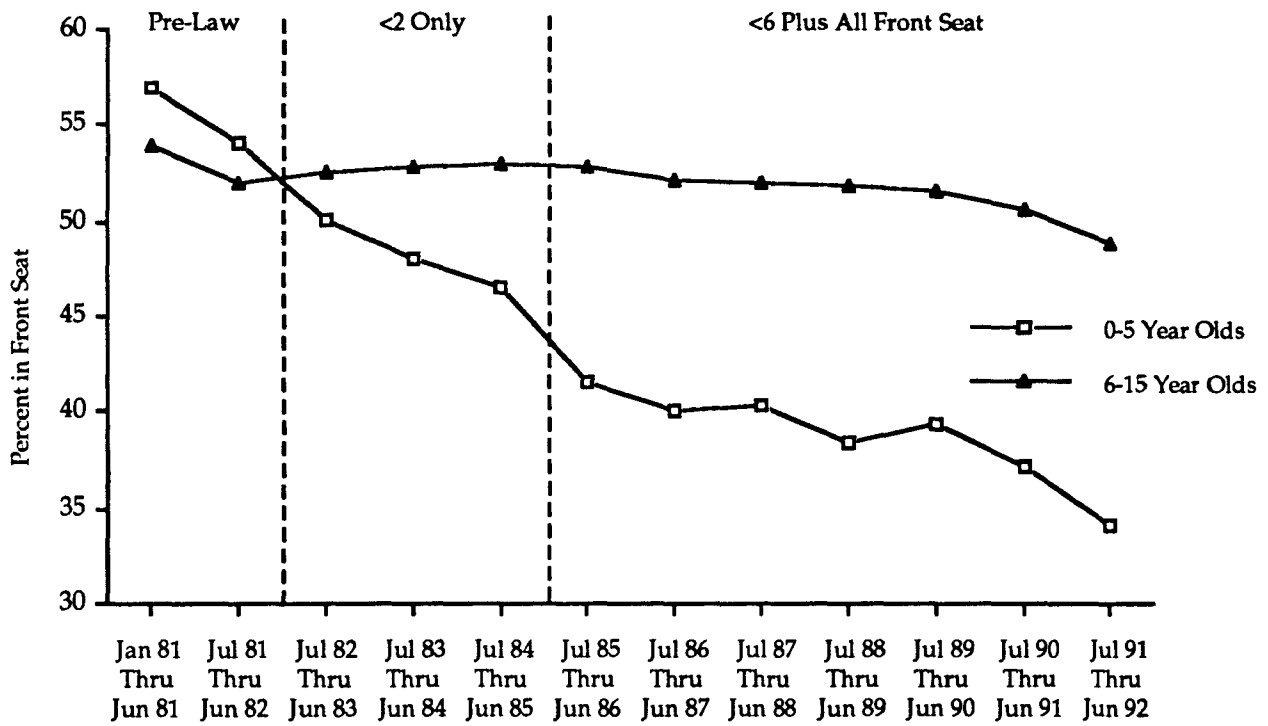


Figure 2. Percent of Crash-Involved 0-15 Year Old Children Riding in Front Seat, 1981 through June 1992.



covered under the NC Seat Belt Law in October 1985 if riding in the front seat. Reported restraint usage rates for these children (from 4% prior to 1982 to 77% in 1992) also increased substantially only after it was legislatively mandated.

Figure 2 indicates another important trend that has been occurring during the past few years. Accident data in general, and North Carolina data in particular, indicates that the rear seat tends to be safer than the front seat regardless of restraint status. General child transportation safety information as well as instructions from safety seat manufacturers recommend that children be placed in the rear seat. As Figure 2 shows, more drivers are placing 0-5 year old children in the rear seat. In the first six months of 1981, 57 percent of these children in crashes were in the front seat with 43 percent in the rear. During the last year, these proportions had been reversed and the differential was much larger. Between July 1991 and June 1992 only 34 percent of the children were in the front seat and 66 percent were being transported in generally safer rear seating positions. This same trend has not occurred among the 6-15 year-olds for whom the level of rear seat positioning has increased from 46 to 51 percent during this time period. The North Carolina data shows that the percent of children who are seriously injured or killed in the front seat is consistently larger than that for the rear seat. Even without increasing the percentage of 6-15 year-olds who buckle up, reductions in deaths and serious injuries to this age group could be realized by encouraging more rear seat travel.

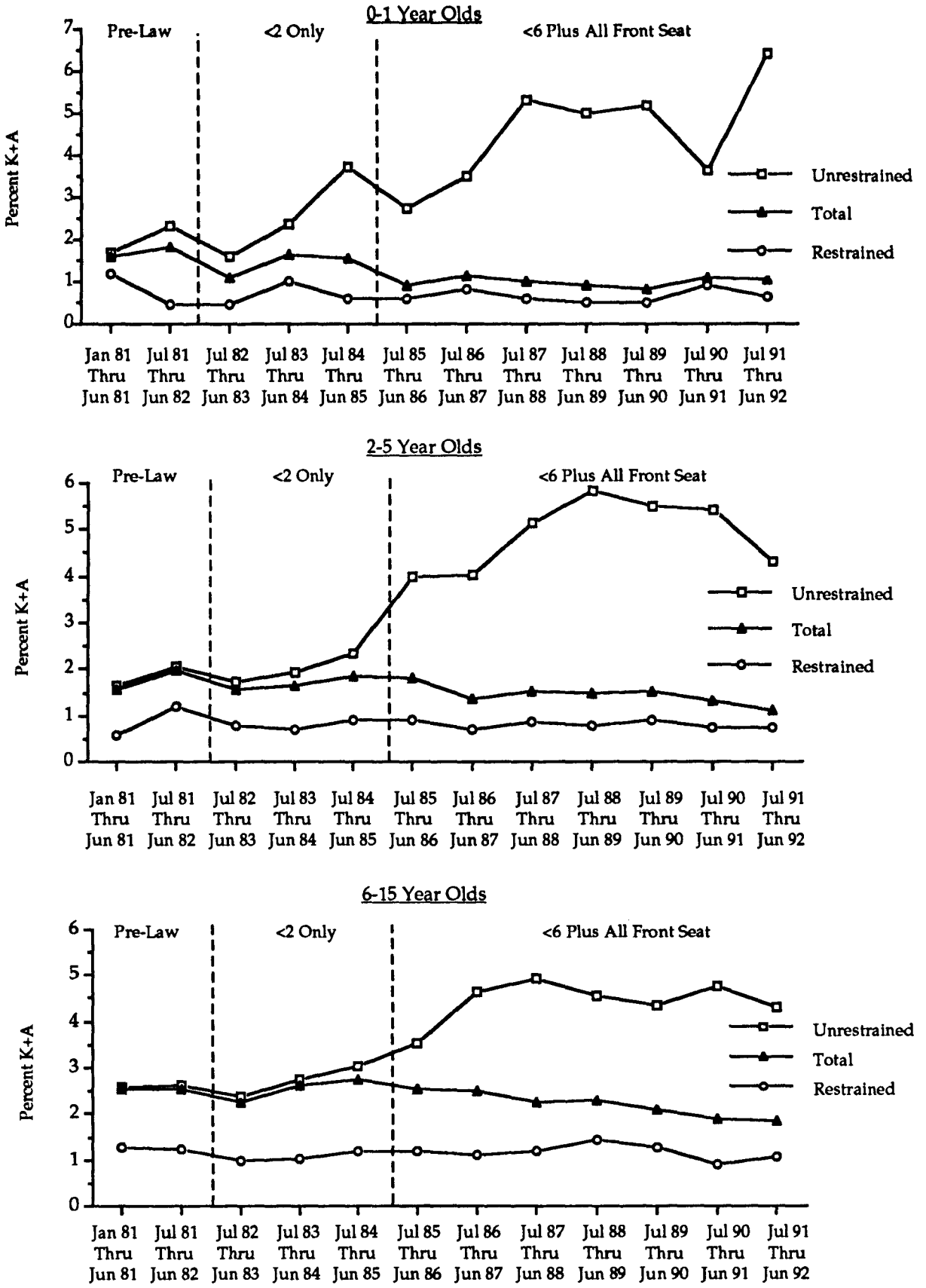
Before proceeding any further in analyses of these accident data, mention should be made of possible biases in these restraint usage rates. In the "typical" accident in North Carolina, the investigating officer arrives at the accident scene some time after the crash. By then, the occupants may have already exited the vehicles and perhaps have already been transported for medical treatment. Many times, the investigating officer will have to rely on the statements of the occupants to determine use or non-use of restraints. With the use of restraints for children now mandatory, parents may or may not be truthful in their statements of restraint use for their children.

Previous comparisons of observed restraint usage rates for children and reported usage rates from the accident data appears to indicate that as children grow out of, or are taken out of their seats, they are more likely to go unrestrained but that when an accident occurs, the parent or driver tells the officer that the child was in a seat belt. Unless the officer has reason to believe otherwise, he or she will probably accept the statement and record the child as restrained. Observational surveys conducted for North Carolina in 1989 found that 72 percent of the 0-5 year old children were restrained (Hall, et. al, 1989). This figure itself is well below the 86 percent usage rate derived from 1989 accident reports but similar to the self-reported figure for respondents buckling up children "all the time" on mail-back questionnaires distributed in conjunction with the observational surveys. In addition, other HSRC research (Hunter, et al. 1988) found non-belt wearers to be overrepresented in crashes and thus one would expect usage rates to be lower for crashes than for observed usage rates.

The implications of this situation for the following analyses are several. First, actual restraint usage rates for children will not be as high as the accident data indicates. Secondly, comparisons between children classified as "restrained" and "unrestrained" must be viewed with caution since we cannot really be sure who was and who was not restrained. Thus, trends such as injury rates for the total age group will be more valid than those for children classified as either restrained or unrestrained. Third, this misclassification of restraint use may lead to a conservative estimate of the injury reduction potential of restraint use since many of the unrestrained children are actually being classified as restrained and thus their injuries are being counted among the restrained. On the other hand, an exaggerated estimate of effectiveness can result when bias on the part of the investigating officer leads to assumptions, and subsequent reporting, of restraints being used if injuries are minor and not used if injuries are more severe.

Figure 3 shows the fatal plus serious injury (K+A) rates for children in the 0-1, 2-5, and 6-15 age groups since 1981. For all age groups, the K+A rates for children reported to be unrestrained have been increasing across time by a factor of 70 to

Figure 3. Fatal plus Serious Injury Rates for 0-15 Year-Old Children Involved in Crashes, 1981 through June 1992.



more than 200 percent. At the same time, the K+A rate for the children reported to have been restrained has remained steady or increased only slightly across time (with any increases probably due to the increased exposure of more children to the most severe crashes, high levels of misuse of safety seats, and/or increased misreporting of restraint use). Since the 0-1 year-olds have had a much larger proportion of children restrained, with a lower K+A rate, the overall K+A rate has been declining since 1982 with some fluctuations. On the other hand, the relatively small increases in restraint usage rates for the older children had the effect of keeping the K+A rates for the 2-5 and 6-15 year-olds almost level rather than decreasing until the last few time periods.

Table 8 shows the actual fatal and serious injury rates and the injury and population figures used to calculate the rates for Figure 3. Furthermore, average fatal plus serious injury rates have been computed for three time periods in an attempt to measure the effects of legislation upon these rates. Time period "(A)" consists of the 18 months immediately preceding the implementation of any child passenger protection law in North Carolina. Time period "(B)" consists of the three years (July 1982 - June 1985) that the original Child Passenger Safety (CPS) Law was in effect. During this time, only children less than age two being driven by their parents were required to be restrained. Period "(C)" includes the first three years (July 1985 - June 1988) after the effective date of the expanded CPS Law. This expanded law requires all drivers to restrain all children through age five. Also, drivers and front seat occupants of any age have been required to be buckled up since October 1985.

The youngest age group, 0-1 year-olds, showed a fatal plus serious (K+A) injury rate of 1.74 per 100 children involved in crashes during the first time period. This rate was reduced by 17 percent to 1.45 during the second time period. The K+A rate dropped 29 percent to 1.03 between the second time period and the third time period representing the expanded law. Overall, the K+A rate for 0-1 year-olds was reduced by 41 percent (from 1.74 to 1.03) between the first and third time periods.

Table 8. Average Fatal Plus Serious Injury (K+A) Rates and Percent Change for Children <16 Associated with NC Child Passenger Protection and Seat Belt Legislation, 1981 through June 1992.

		(A) PRE-LAW			(B) <2 CPS LAW				(C) <6 CPS LAW & SEAT BELT LAW								PERCENT CHANGE		
		Jan 81 Thru Jun 81	Jul 81 Thru Jun 82	Total	Jul 82 Thru Jun 83	Jul 83 Thru Jun 84	Jul 84 Thru Jun 85	Total	Jul 85 Thru Jun 86	Jul 86 Thru Jun 87	Jul 87 Thru Jun 88	Jul 88 Thru Jun 89	Jul 89 Thru Jun 90	Jul 90 Thru Jun 91	Jul 91 Thru Jun 92	Total			
AGE	# K+A	20	45	65	30	35	42	107	33	34	31	33	29	39	35	234			
0-1	Total #	1221	2514	3735	2553	2133	2701	7387	3337	2895	3046	3429	3458	3256	3376	22797	(A)>(B)	(B)>(C)	(A)>(C)
	% K+A	1.64	1.79	1.74	1.18	1.64	1.55	1.45	0.99	1.17	1.02	0.96	0.84	1.20	1.04	1.03	-16.7	-29.0	-40.8
	# K+A	75	205	280	169	183	214	566	213	178	213	225	233	179	150	1391			
2-5	Total #	4729	10204	14933	10671	10926	11290	32887	11798	12782	13479	14266	14544	13188	13114	93181			
	% K+A	1.59	2.01	1.88	1.58	1.67	1.90	1.72	1.81	1.39	1.58	1.58	1.60	1.36	1.14	1.49	-8.5	-13.4	-20.7
	# K+A	95	250	345	199	218	256	673	246	212	244	258	262	218	185	1625			
0-5	Total #	5950	12718	18668	13224	13059	13991	40294	15135	15677	16525	17695	18012	16444	16490	115978			
	% K+A	1.60	1.97	1.85	1.50	1.67	1.83	1.67	1.63	1.35	1.48	1.46	1.45	1.33	1.12	1.40	-9.7	-16.2	-24.3
	# K+A	295	660	955	604	697	780	2081	719	789	737	774	710	564	524	4817			
6-15	Total #	11335	25269	36604	25928	26145	27206	79279	27737	30356	30473	31024	31602	28126	27401	206719			
	% K+A	2.60	2.61	2.61	2.33	2.67	2.87	2.62	2.59	2.60	2.42	2.49	2.25	2.01	1.91	2.33	+0.4	-11.1	-10.7

K+A rates have also been reduced for the 2-5 year-olds as well, though not by the same degree. The second period K+A rate of 1.72 was a nine percent reduction from the rate of 1.88 for the first time period. During this time, the 2-5 year-olds were not covered by the CPS Law, but their restraint usage had increased nonetheless. After they became covered by the CPS Law during the third time period, their K+A rates were reduced another 13 percent to 1.49. The total reduction in the K+A rate for the 2-5 year-olds was 21 percent (from 1.88 to 1.49) between the first and the third time periods.

Taken as a whole, the expanded Child Passenger Safety Law has resulted in a 24 percent decrease (from 1.85 to 1.40) in fatal plus serious injury rates for children less than age six since the eighteen months prior to implementation of child passenger safety legislation in North Carolina.

The importance of restraint legislation is clearly documented by the K+A experience of the 6-15 year-olds. These children and youths were not covered by any mandatory usage legislation until October 1985, and then only when riding in the front seat. Furthermore, high levels of restraint usage for all front seat occupants (60 78%) was not achieved until January 1987 when the penalty phase of the Seat Belt Law went into effect. As shown in Figure 1, reported usage rates for the 6-15 year-olds did not increase to any significant degree until they became covered and this is reflected in their K+A rates that have remained virtually constant across the three time periods. In fact, there was actually a small (.4%) increase in the K+A rate between the first and second time periods. There was, however, an 11 percent decrease between the second and third time periods after they became subject to the Seat Belt Law with most of this decrease coming after January 1987 when the full penalty phase of the seat belt law went into effect.

Table 9 shows how these reductions in fatal and serious injury rates can be translated into estimates of actual lives saved and serious injuries reduced by increased restraint use associated with the Child Passenger Safety Law and to some degree the Seat Belt Law. In this table, an expected number of K+A injuries was computed for two time periods for each age group. This expected number was

Table 9. Casualty Benefits for Children and Youths Associated with Implementation of Restraint Laws in North Carolina, 1981 through June 1992.

	Jan 81 - June 82	July 82 - June 85				July 85 - June 92				July 82 - June 92
Age	Percent K+A	Number Involved	Expected K+A	- Actual K+A	= K+A Benefit (% Change)	Number Involved	Expected K+A	- Actual K+A	= K+A Benefit (% Change)	K+A Benefit (% Change)
0-1	1.74	7387	129	107	-22 (-17.1%)	22797	397	234	-163 (-41.1%)	-185 (-35.2%)
2-5	1.88	32887	618	566	-52 (-8.4%)	93181	1752	1391	-361 (-20.6%)	-413 (-17.4%)
0-5	1.85	40274	747	673	-74 (-9.9%)	115978	2146	1625	-521 (-24.3%)	-595 (-20.6%)
6-15	2.61	79279	2069	2081	+12 (+0.6%)	206719	5395	4817	-578 (-10.7%)	-566 (-7.6%)

produced by multiplying the actual number of accident involved children of each age for the time periods July 82 - June 85 and July 85 - June 92 by the average K+A rate for the January 81 - June 82 period for the appropriate age group. This expected number is then compared to the actual number of K+A injuries seen in that time period. For instance, if the 0-1 year-olds had continued to be killed at the same rate during July 82 - June 85 that they had during the Jan. 81 - June 82 period (1.74%), 129 0-1 year-olds would have been killed or seriously injured during the time (.0174 x 7387 = 128.5). Instead, there were 107 actual K+A injuries during that time for a 17.1 percent reduction in K+A injuries of 22. Stated another way, this means that 22 children below age two were saved from death or serious injury between July 1982 and June 1985 due to implementation of the original Child Passenger Safety Law. During the next seven years (July 85 - June 92), there was a 41 percent reduction in K+A injuries of 163. Overall, there has been a 35 percent benefit, which can be translated as 185 0-1 year old children saved from K+A injuries, since the original CPS Law was implemented in July 1982.

Among the 2-5 year-olds, there has been a 17 percent reduction of 413 K+A injuries below what would have been expected since July 1982. These children were not actually covered in the July 82 - June 85 period, but there was apparently enough of a spillover effect in terms of increased restraint use to produce an 8 percent (-52 K+A) benefit to these children during that time. Once they became covered by the expanded law in July 1985 the benefits more than doubled (8.4% vs. 20.6% reduction).

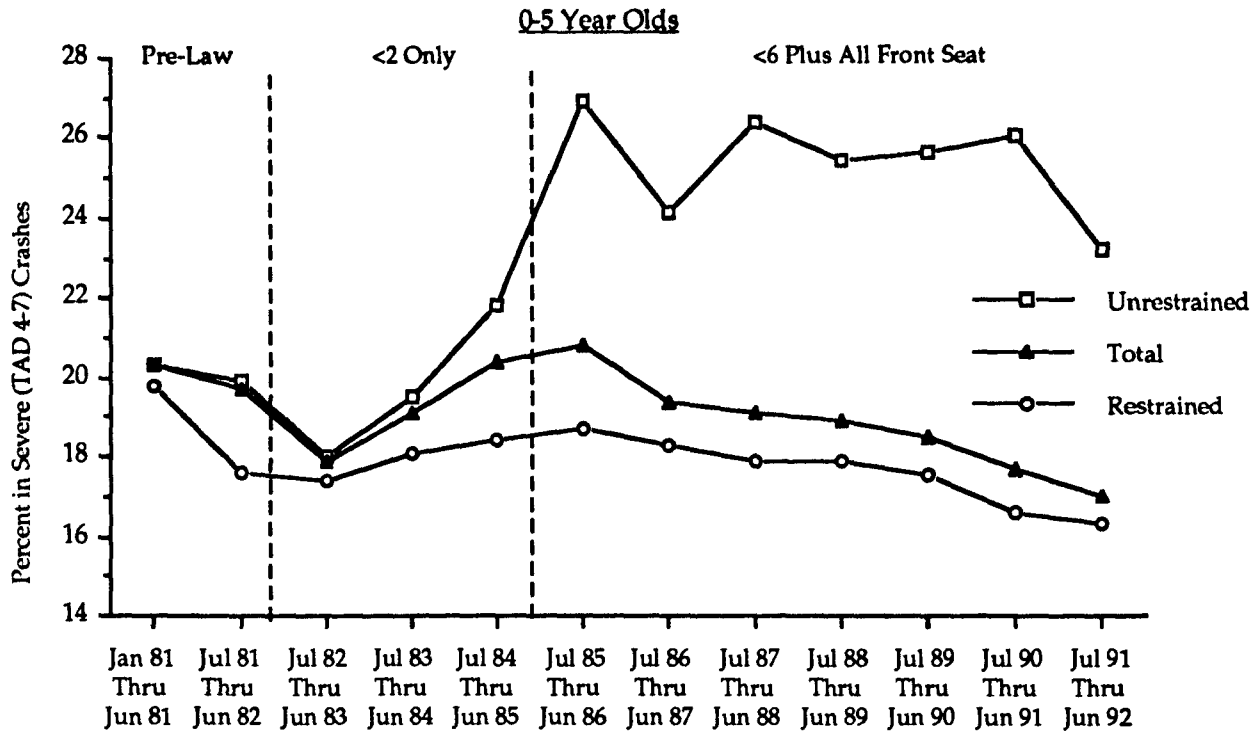
Apparently, the 6-15 year-olds have benefited very little from any spillover effects of the Child Passenger Safety Law. In fact, during the July 82 - June 85 period, a slight increase in the actual K+A rate translated into a 0.6 percent increase in actual K+A injuries over the expected number. There was a small 10.7 percent benefit associated with the actual number of K+A injuries seen in the July 85 - June 92 period (4817) when compared to the expected number (5395) based on the 2.61 K+A rate for the first time period. There was an overall reduction of 566 K+A injuries seen for the 6-15 year-olds after July, 1982.

One may wonder, however, why the actual number of fatalities for 0-5 year-olds has not declined very much in recent years even with a reported restraint usage rate of 86 percent. It appears that there are several factors operating to keep this number up. One is exposure. Involvement figures from Table 8 indicate that in the January 1981 - June 1982 period, 18,668 children between ages of 0-5 were involved in N.C. car crashes for an average of 12,445 per year. In the July 1982 - June 1985 period, however, an average of 13,425 children were involved each year and this yearly average increased to 16,568 during the July 1985 - June 1992 period. This means that many more children are exposed each year to car crashes and potential injuries and even greater reductions in injury rates will be needed to reduce actual numbers.

Another factor to consider is crash severity. It does appear that crash severity is related to the increasing K+A rates for children reported to be unrestrained. Figure 4 illustrates that for each time period, children reported to be unrestrained tend to be involved more in severe crashes than the restrained children. Crash severity here is measured as the investigating officer's assessment of vehicle deformation (TAD rating). Severe crashes are herein defined as TAD ratings 4-7 on the 1-7 point TAD scale. For each time period, children reported to be unrestrained are overrepresented in severe crashes. Beginning in the July 84-June 85 period, the proportion of unrestrained children in severe crashes began to increase even more. While it appears that overall crashes are not becoming more severe, it is the case that the children who are reported to be not protected by restraint systems tend to be in more of the severe crashes and thus doubly exposed to serious injuries. While much of this difference is possibly real, it may be the fact that some of this difference is due to reporting bias. That is, an unrestrained child in a severe crash is more likely to be injured than one in a less severe crash and the investigating officer would be less likely to accept the driver's report that the child was restrained, thus coding the child as unrestrained.

Crash severity is affected by various factors, one of which is vehicle size. Due to their greater mass, larger heavier vehicles are inherently safer than smaller

Figure 4. Proportion of Restrained and Unrestrained 0-15 Year-Old Children in Severe (TAD Severity 4-7) Crashes, 1981 through June 1992.



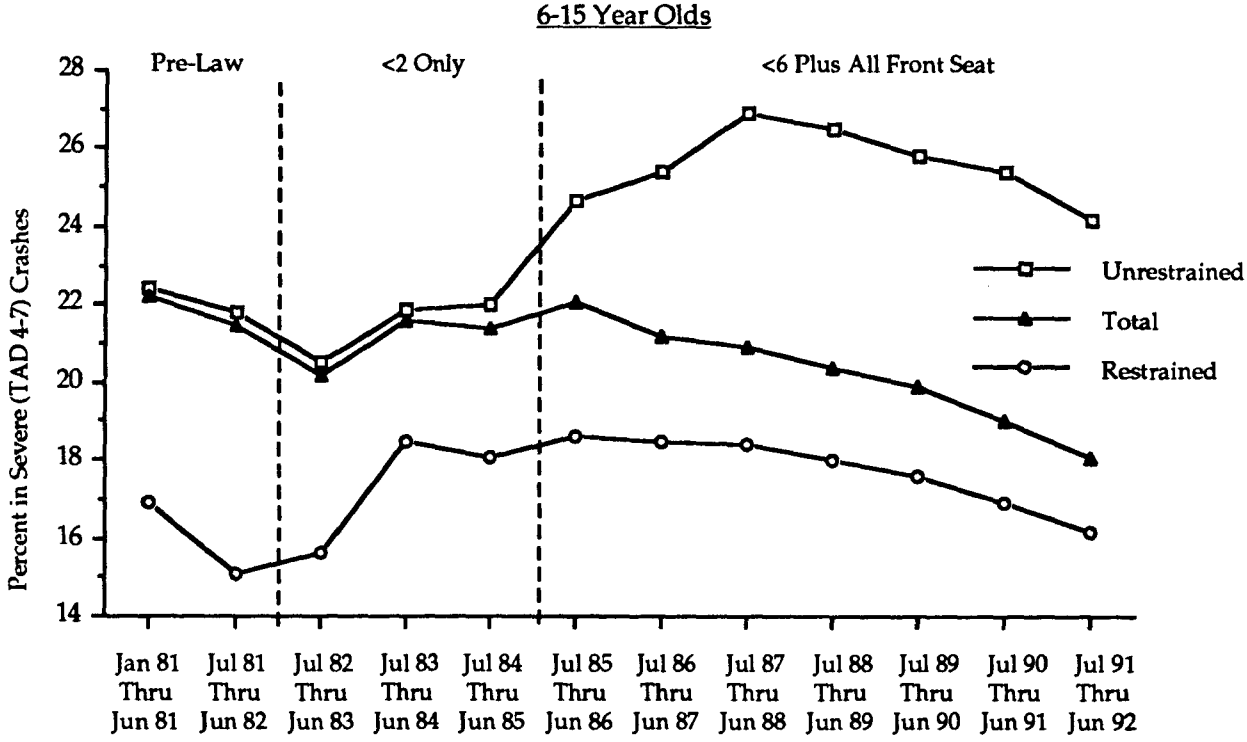
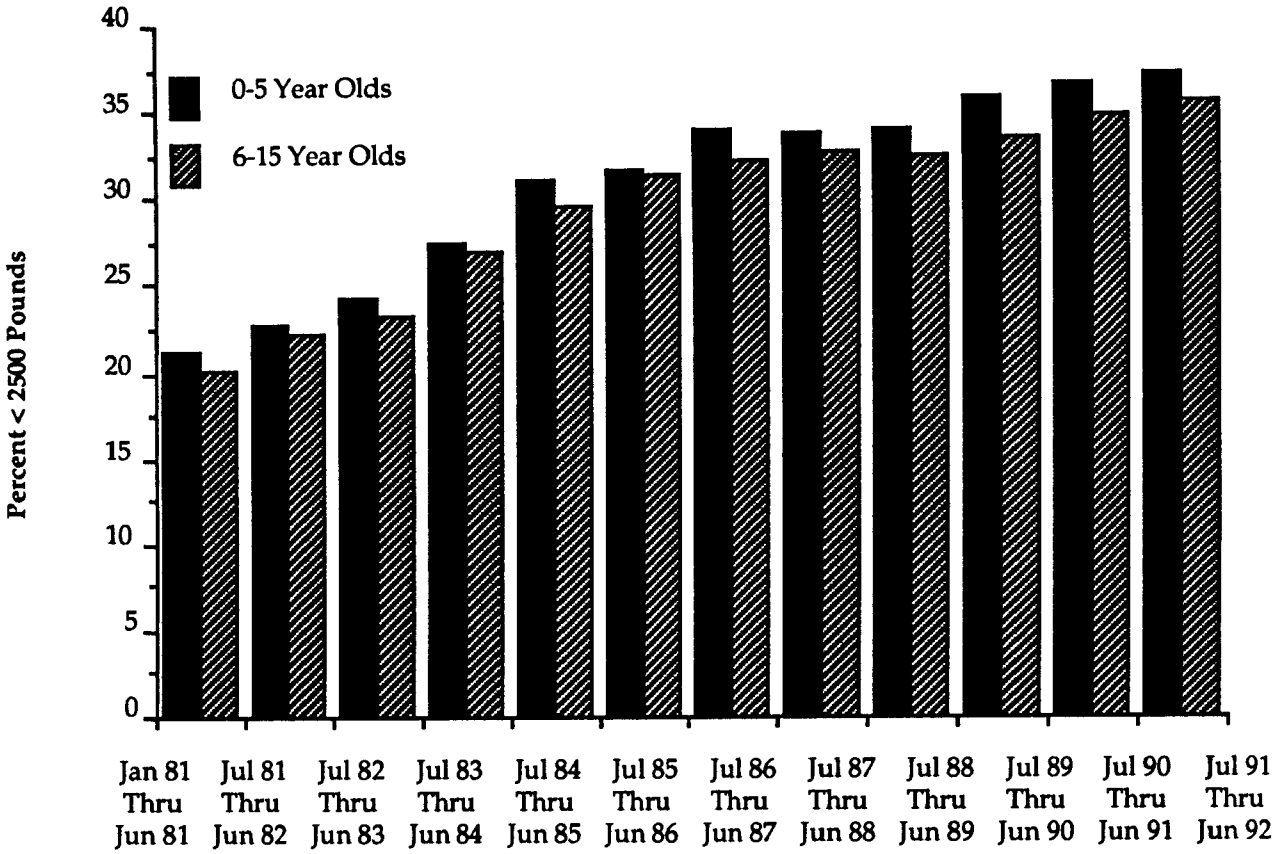


Figure 5. Percent of Crash-Involved 0-15 Year-Old Children Riding in Vehicles Weighing Less Than 2500 Pounds, 1981 through June 1992.



vehicles in similar crashes. The population of accident-involved North Carolina children reflects current trends toward downsizing of vehicles. As Figure 5 indicates, about 21-23 percent of the accident-involved children were in vehicles weighing less than 2500 pounds (roughly comparable to light compact and subcompact sized cars) during the first two time periods. This proportion increased to about 35 percent for the last year, a 50 percent increase. This trend is important for at least two reasons. First, with the shift toward less safe downsized vehicles it is crucial that efforts be continued to get children properly buckled up. Second, this trend may help to explain why overall injury rates for young children have not decreased as much as might be expected based on the increased proportion of children reported to be buckled up. Even with correct restraint use, injuries are more likely to occur in smaller vehicles.

A look at other factors provides additional areas where improvements in child passenger safety can be made to help reduce deaths and injuries further. Table 10 presents K+A rates for North Carolina by region of the state. Appendix C indicates the counties that have been included in the West, Central and East regions. As Table 4 indicates, the Central region has the lowest, and the West has the highest, total K+A rate for both the 0-5 and the 6-15 year-olds. For the 0-5 year-olds, the Central region has shown an appreciable decline of one-third in K+A injuries over the three legislative periods. The rate for the West has been reduced by only 8 percent and for the East by 4 percent. For the 6-15 year-olds, the K+A rate for the West has actually increased during this time. While these rates have decreased for the Central and East, the reductions have been rather modest. Statewide seat belt surveys have shown that belt-wearing rates for drivers and front seat passengers are highest in the Central region and lowest in the West (Reinfurt, et al, 1990). If the assumption is made that the patterns for restraining children are the same as for drivers and front seat occupants, this would mean that fewer children and youths are buckled in the West and East than in the Central region. The injury rates in Table 10 would seem to reflect such a pattern.

Table 10. Fatal Plus Serious Injury Rates for Crash-Involved Children in North Carolina by Region of State, 1981 through June 1990.

Region	0-5 Year Olds				6-15 Year Olds			
	Jan81-Jun82	Jul82-Jun85	Jul85-Jun90	Total	Jan81-Jun82	Jul82-Jun85	Jul85-Jun90	Total
West	1.90 * (14.7)**	2.08 (13.8)	1.74 (13.5)	1.85 (13.7)	2.86 (16.7)	3.14 (15.8)	3.33 (15.1)	3.21 (15.6)
Central	1.89 (53.6)	1.51 (56.0)	1.25 (56.0)	1.39 (55.2)	2.52 (54.6)	2.42 (55.3)	2.13 (55.3)	2.26 (55.2)
East	1.75 (31.7)	1.77 (31.5)	1.68 (30.7)	1.71 (31.1)	2.63 (28.8)	2.73 (29.0)	2.40 (29.6)	2.52 (29.3)

* Percent K+A injuries
** Percent of total occupants for each time period in each region

Table 11. Fatal Plus Serious Injury Rates for Crash-Involved Children in North Carolina by Urban/Rural Locality, 1981 through June 1990.

Locality	0-5 Year Olds				6-15 Year Olds			
	Jan81-Jun82	Jul82-Jun85	Jul85-Jun90	Total	Jan81-Jun82	Jul82-Jun85	Jul85-Jun90	Total
Rural	3.02 * (26.4)**	2.79 (27.1)	2.57 (25.0)	2.68 (25.7)	3.99 (30.3)	4.16 (29.9)	4.03 (29.9)	4.06 (29.0)
Mixed	1.87 (21.6)	1.72 (19.7)	1.60 (18.3)	1.67 (19.0)	2.45 (22.0)	2.68 (20.0)	2.54 (20.0)	2.57 (19.5)
Urban	1.25 (52.0)	1.08 (53.3)	0.91 (56.8)	0.99 (55.3)	1.81 (47.8)	1.69 (50.1)	1.47 (50.1)	1.56 (51.5)

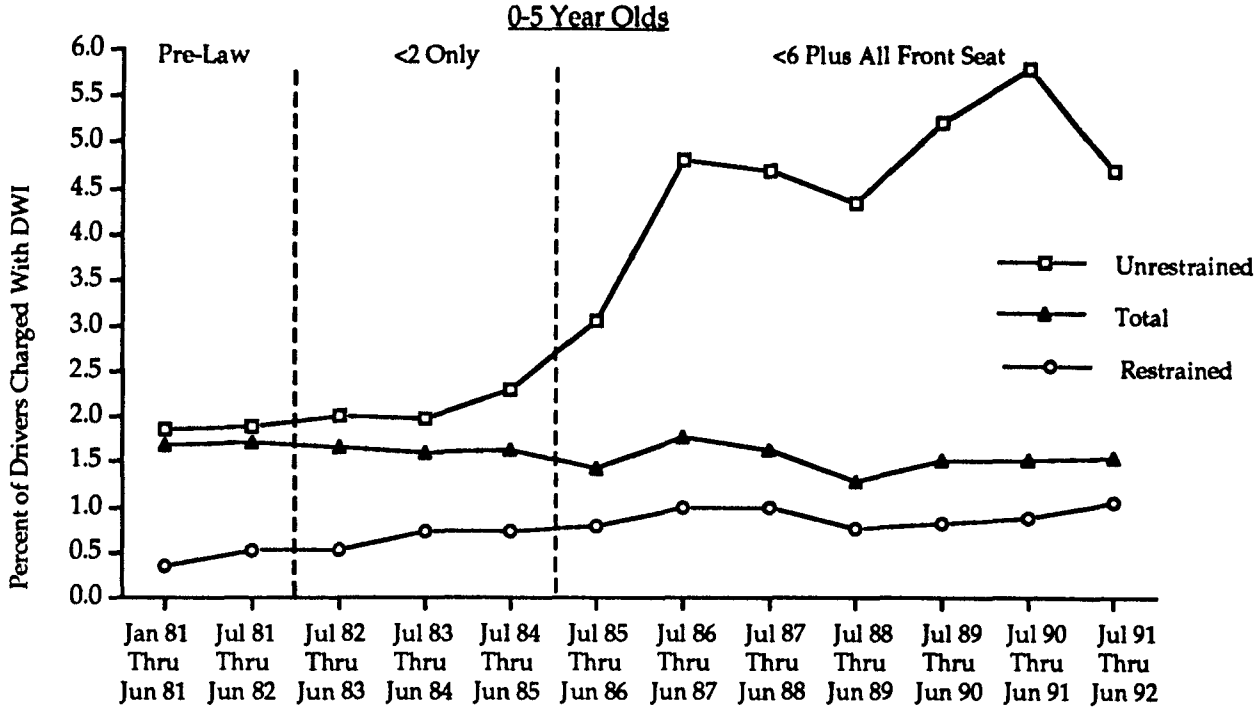
Rural = <30% Developed, Mixed = 30% - 70% developed, Urban = >70% Developed
* Percent K+A injuries ** Percent of total occupants for each time period in each locality

Table 11 indicates how K+A rates vary by urban/rural localities. As would be expected due to generally higher speeds and greater distances from medical treatment, K+A injury rates are highest in rural (<30% developed) localities for both the younger and older children. As would also be expected, due to generally lower speeds and shorter distances from medical treatment, the rates are lowest in the urban areas (>70% developed) for both age groups. In fact, the K+A rate for the rural areas is approximately two an a half times greater than for urban areas for both age groups. For the 0-5 year-olds, injury rates have declined for all three localities, but the 25 percent reduction in urban areas has been greater than the 16 and 11 percent reductions for rural and mixed localities. For the older children, injury rates increased by four percent for the rural and mixed localities and declined by 15 percent for the urban areas. The above mentioned seat belt surveys indicate that belt usage is higher in urban areas than in rural areas and this would help to explain at least some of the differences in injury rates between localities.

While looking at various trends associated with accident-involved children, it is important to look at various factors in addition to restraint use in order to determine why the increased use of restraints for children has not had as great an impact on injuries, and especially fatalities, as might be expected. In addition to restraint use and vehicle factors, the driver is also an important component of safe transportation.

One of the most dangerous practices is that of drinking while driving and Figure 6 indicates the percentage of drivers who were charged by the investigating officer with a Driving While Impaired violation after the accident. As can be seen, there has been an almost constant proportion, in the 1.5 to 1.7 percent range, of all drivers who were charged with DWI after the accidents involving 0-5 year-olds. As can also be seen, there have always been large differences between drivers of children reported to be restrained and unrestrained. Drivers of reportedly unrestrained children are much more likely to have been charged with DWI. While down from last year, this difference has increased greatly in recent years. The same general relationship is found for the 6-15 year-olds as well. In essence, what

Figure 6. Percent of Drivers of Crash-Involved 0-15 Year-Old Children Charged with Driving While Impaired, 1981 through June 1992.



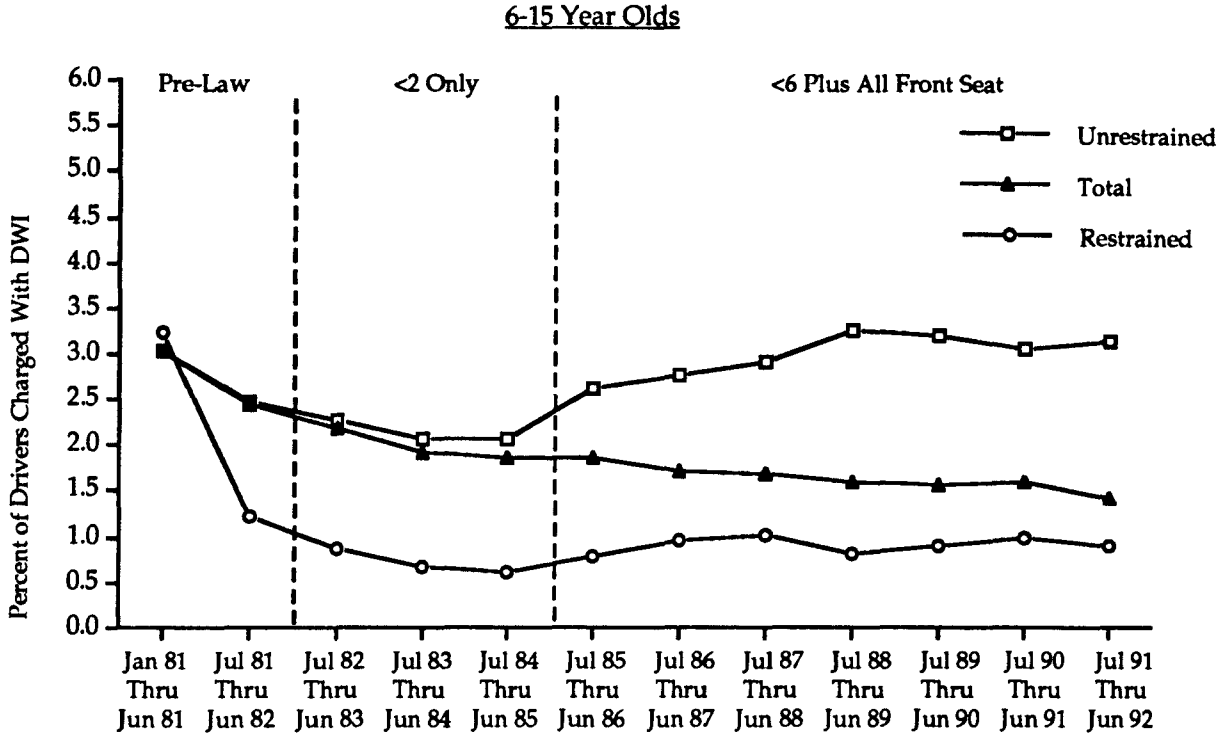


Figure 6 indicates is that the children who need protection the most, that is, those riding with drinking drivers, are much less likely to receive the protection that they need.

In large part, what the above discussion has shown is that the issue of restraint use for children is a complex one. North Carolina has a law that has had a great impact on this issue in that it has been the most effective means of getting parents and other drivers to restrain children in cars. At odds with the primary intent of this law -- to reduce deaths and injuries to children in car crashes -- are various driver and vehicles issues. As has been shown, most drivers are buckling up their children but the non-use of restraints by a minority of other drivers may be counteracting some of the potential overall benefits of increased restraint usage. As was shown, drivers of children reported to be unrestrained were more likely to have been drinking prior to the accident. At the same time, more and more children are riding in smaller vehicles which means that even when buckled up, chances of injury are increased.

Observational Surveys

Observational surveys were last conducted during the spring and summer of 1989. These surveys were repeated during this project year for several reasons. Through these surveys, we are able to actually see how children are being restrained in cars rather than relying entirely on information contained in the NC accident files and to some degree determine the accuracy of information on the accident files. Through these surveys we can determine the type of safety seats that are being used and to some extent we are able to determine whether or not these seats are being used correctly. In order to compare the results obtained through the 1992 surveys with those conducted during 1989, the same methodology and instruments were used for both. A detailed discussion of the survey as it was originally conducted in 1989 can be found in Hall, et al., 1989.

Observational surveys were conducted during June and July in the eight North Carolina cities of Wilmington, Greenville, Fayetteville, Greensboro, Winston

Salem, Charlotte, North Wilkesboro, and Asheville. In most cases, two days were spent in each city with surveys being conducted at a shopping center during the morning and at a day care center during the afternoon pick-up time. In three cities, Greenville, Charlotte, and Greensboro, additional days were spent in an effort to collect more data for purposes of assisting in the evaluation of local Traffic Injury Prevention Programs (TIPPs). Analysis of this additional data, however, found insignificant differences between TIPP cities and non-TIPP cities. This being the case, no additional effort will be made to differentiate between cities based on presence of a local Traffic Injury Prevention Program.

Shopping centers were based on factors such as traffic flow, the presence of a stop light at one or more major exits, and the cooperation of the shopping center management. Day care centers were selected based on factors such as size, presence of a parking lot rather than on-street parking, and the cooperation of the center director. In addition, at least one of the day care centers in each city was subsidized, that is, the fees for at least some of the children were being subsidized for parents who needed assistance. The other center in each city was non-subsidized, that is, no public assistance was provided for any of the children at the center. This selection procedure was implemented in order to assure as much variation in socioeconomic status as possible. In general, observations were conducted from 10:00 a.m. until 3:00 p.m. at the shopping centers. The observers then moved to the day care center to collect data from about 3:30 until the centers closed at 5:30 or 6:00.

The observers, HSRC project staff or persons hired and trained by HSRC for seat belt and child safety seat data collection, conducted the surveys by positioning themselves at one or two exits (depending on traffic flow) at each location where they could watch children in cars as they prepared to pull out into traffic. At shopping centers, only those drivers already stopped for a stop light or sign were approached by the observers. The observers attempted to stop all of the cars exiting the day care centers. At all locations, drivers who did not wish to participate were allowed to drive past.

Once the observers approached a stopped car, the driver was asked to give the ages of the children in the car and how their relationship to the driver. For all occupants in the car, the observer noted and recorded their seating position, age, sex, race, relationship to the driver (for children), and restraint status. If time allowed, the drivers were asked if they were aware of the existence of North Carolina's Child Passenger Safety and Seat Belt laws and how far they would be travelling to their next stop. See Appendix D for a copy of the observational survey form.

In 1989, 2,396 occupants in 928 cars were observed with 1,056 of the occupants being less than six years of age. In 1992, 3,201 occupants in 1,351 cars were observed with 1,564 being less than six. For the most part, the same data collection sites were used for both years, but in some cases changes in sites had to be made for various reasons.

The hurried nature of the surveys did not enable the observers to ask for as much information as was desired. For this reason, each driver was handed an envelope containing a mail-back questionnaire (Appendix D). Also enclosed in the envelope was another sealed envelope containing information on North Carolina's restraint laws. Respondents were asked not to open and review this material until after they had completed the survey. As an incentive for drivers to fill out and return these questionnaires, the envelopes also contained a card that made the respondents eligible for a drawing for $100 if they returned the card along with their completed questionnaire. A total of 557 mail-back questionnaires were received for a 41 percent completion rate.

Table 12 shows the observed restraint usage rates for children less than age six for the years 1989 and 1992. In 1989, 73 percent of the 0-5 year old children were restrained in some manner. In 1992, this figure increased by five percentage points to 78 percent. The biggest changes seem to be among the two year-olds and the five year-olds. In 1989, 24 percent of the two year-olds were unrestrained but in 1992 only 17 percent were. Forty-one percent of the five year-olds were unrestrained in 1989 and this figure decreased to 33 percent in 1992. Overall, there was a moderate increase from 38 to 44 percent in the percentage of 0-5 year-olds who were buckled in

safety seats. There was no difference in the proportion of children who were buckled in safety belts, but there was a definite shift in the types of belts being used. In 1989, 16 percent of the 0-5 year-olds were in lap belts and 19 percent were in

Table 12. Observed Restraint Usage Rates for Children by Age

	1989					1992				
Age	None	Lap Belt	Lap & Shldr	Safety Seat	Total	None	Lap Belt	Lap & Shldr	Safety Seat	Total
	Row %/(N)				Col. %	Row %/(N)				Col. %
0	2.4	1.2	0.0	96.4	7.95	1.7	0.8	0.0	97.4	9.0
	(2)	(1)	(0)	(81)	(84)	(2)	(1)	(0)	(114)	(117)
1	10.6	3.5	2.8	83.1	13.5	6.9	2.8	0.7	89.6	11.1
	(15)	(5)	(4)	(118)	(142)	(10)	(4)	(1)	(129)	(144)
2	24.4	12.4	9.6	53.6	19.8	16.7	7.6	8.3	67.4	20.3
	(51)	(26)	(20)	(112)	(209)	(44)	(20)	(22)	(178)	(264)
3	30.1	22.9	22.1	24.9	23.6	28.7	15.3	18.4	37.5	22.6
	(75)	(57)	(55)	(62)	(249)	(84)	(45)	(54)	(110)	(293)
4	30.0	34.3	33.3	5.2	21.9	28.2	20.8	37.6	13.3	19.6
	(86)	(68)	(56)	(21)	(231)	(72)	(53)	(96)	(34)	(255)
5	41.1	23.4	29.1	6.4	13.4	33.2	23.0	40.3	3.5	17.4
	(58)	(33)	(41)	(9)	(141)	(75)	(52)	(91)	(8)	(226)
0-5	27.2	15.9	18.8	38.2	100.0	22.1	13.5	20.3	44.1	100.0
	(287)	(168)	(198)	(403)	(1056)	(287)	(175)	(264)	(573)	(1299)

lap/shoulder combinations. In 1992, the percentage secured by lap belts decreased to 14 percent and those in lap/shoulder belts increased to 20 percent. The largest change can be seen among the five year-olds. In 1989, only 30 percent of five year-olds were restrained using lap/shoulder combination belts. In 1992 this figure increased to 40 percent.

The level of safety seat usage shows mixed results. Overall, there was an increase from 38 to 44 percent in the percentage of 0-5 year-olds observed to be in

safety seats. Looking at the separate ages, however, it can be seen that there were large increases between the two years in safety seat usage for the two year-olds and the three year-olds, moderate increases for four year-olds, and only a slight increase for infants and one year-olds. There was, however a small decrease in safety seat usage for five year-olds. It appears that while more children are being buckled up, parents of older children are relying on safety belts rather than seats.

The biggest area of concern in 1992 is the same as for 1989 and that is that the older children are protected by restraint systems much less often that the younger ones. The difference is much larger, however, for the 1992 sample. In 1989 two percent of the infants under one were unrestrained and this proportion increased to 41 percent unrestrained for the 5 year-olds for a difference of 39 percentage points. In 1992, only two percent of the infants were unrestrained and 33 percent of the 5 year-olds were for a difference of 31 percentage points. The increase in the use of restraint among the older children is encouraging.

Table 13 shows restraint usage status for children observed at the three different types of locations of subsidized day care centers, non-subsidized day cares, and shopping centers. Table 13 contains some relatively surprising findings. In 1989, subsidized day care centers, with a presumably lower socioeconomic status clientele, showed a rate of 27 percent of the children unrestrained. In 1992 this figure increased to 32 percent. In contrast, the non-subsidized day cares in 1989 showed an unrestrained rate of 29 percent but in 1992 this figure actually decreased to 16 percent unrestrained. In 1992, children at non-subsidized day care centers were unrestrained only about half as often as children at subsidized day care centers, in contrast to the 1989 study where the rates for children being unrestrained were very similar. The unrestrained rate of children at the shopping center locations remained somewhat constant between the two years, with 25 percent unrestrained in 1989 and 23 percent unrestrained in 1992.

Table 14 presents a breakdown of restraint status for children less than six by race. In 1992 as was the case in 1989, white children were observed to be restrained more often than the non-white children. There was however a closing of the

Table 13. Observed Restraint Usage Rates for Children <6 by Survey Location

	1989					1992				
Location	None	Lap Belt	Lap & Shldr	Safety Seat	Total	None	Lap Belt	Lap & Shldr	Safety Seat	Total
	Row %/(N)				Col. %	Row %/(N)				Col. %
Subsidized Day Care	27.5 (104)	20.1 (76)	21.7 (82)	30.7 (116)	36.0 (378)	32.0 (109)	15.0 (51)	20.5 (70)	32.5 (111)	26.2 (341)
Non-Sbsdzed Day Care	29.0 (102)	21.3 (75)	15.1 (53)	34.7 (122)	33.5 (352)	15.9 (97)	12.5 (76)	24.2 (148)	47.4 (289)	47.0 (610)
Shopping Center	24.6 (79)	14.6 (47)	9.4 (30)	51.4 (165)	30.5 (321)	23.3 (81)	13.8 (48)	13.2 (46)	49.7 (173)	26.8 (348)
Total	27.1 (285)	18.8 (198)	15.7 (165)	38.3 (403)	100.0 (1051)	22.1 (287)	20.3 (264)	13.5 (175)	44.1 (573)	100.0 (1299)

Table 14. Observed Restraint Use for Children <6 by Race

	1989			1992		
Race	Yes	No	Total	Yes	No	Total
	Row %/(N)		Col. %	Row %/(N)		Col. %
White	79.9 (581)	20.1 (146)	68.9 (727)	83.5 (873)	16.5 (173)	68.5 (1046)
Non-White	56.7 (486)	43.3 (142)	31.1 (628)	63.8 (307)	36.2 (174)	31.5 (481)
Total	72.7 (767)	27.3 288	100.0 (1055)	77.3 (1180)	22.7 (347)	100.0 (1527)

difference between the two time periods. In 1989, 80 percent of the white children and only 57 percent of the non-white children were observed to be restrained. In 1992, the restraint rate for white children had increased slightly to 83 percent but there was a larger increase to 64 percent in the restraint usage rate for the non-white children. This increase among a specific population is encouraging. A closer inspection of the data will reveal that the major difference in restraint use between the white and non-white group lies with the type of restraint that is used. Both groups use belts at a similar rate, with a 41 percent observed usage rate by white children and a 39 percent usage rate by non-white children. Concerning child restraint devices, however, there is a large difference in the observed usage rate. Forty-two percent of white children were observed to be restrained in a child restraint device, while only 25 percent of non-white children were, for a difference of 17 percentage points.

As Table 15 shows, parents and grandparents were more likely to buckle children in their cars as were other relatives and non-relatives in 1989. This same pattern held for 1992. Surprisingly, results for 1992 indicate that both the other relative and non-relative groups decreased in the proportion of children riding in their cars being buckled up. The use of restraint by the non-relatives dropped from 70 percent to 67 percent. Likewise, there was a drop in the proportion of children riding buckled up in the vehicles of other relatives. In 1989 the number was at 57 percent, for 1992, this figure dropped to 45 percent, a change of 12 percentage points.

During the 1992 surveys, 578 children were observed to be riding in some type of safety seat, either an infant carrier, toddler seat or booster seat. Of that number the observers were able to make a judgment on the correctness of use for 559 safety seats. The proportion of safety seats observed to be correctly and incorrectly used is shown in Table 16. It must be pointed out that due to the nature of the survey procedures, the observers were able to make judgments on "gross misuse" only. With a limited amount of time for each observation and being positioned outside of the vehicle where it often was difficult to clearly see inside, it was possible only to determine if the seat faced in the proper position, if there was a harness being

Table 15. Observed Restraint Use for Children <6 by Their Relationship to Driver

Relationship to Driver	1989 Yes	1989 No	1989 Total	1992 Yes	1992 No	1992 Total
	Row %/(N)		Col. %	Row %/(N)		Col. %
Child	74.5 (631)	25.5 (216)	83.2 (847)	80.45 (852)	19.55 207)	83.6 (1059)
Grandchild	70.4 (57)	29.6 (24)	8.0 (81)	73.7 (73)	26.3 (26)	7.81 (99)
Other Relative	56.8 (21)	43.2 (16)	3.6 (37)	44.9 (22)	55.1 (27)	3.9 (49)
Non-Relative	69.8 (37)	30.2 (16)	5.2 (53)	66.6 (40)	33.3 (20)	4.7 (60)
Total	73.3 (746)	26.7 (272)	100.0 (1018)	77.9 (987)	22.1 (280)	100.0 (1267)

Table 16. Proportion of Safety Seats Observed to be Correctly and Incorrectly Used.

Type of Use	1989 Col%/(N)	1992 Col%/(N)
Correct Use	86.2 (325)	87.1 (487)
Front/Rear Error	2.7 (10)	3.4 (19)
No Harness Used	7.7 (29)	8.1 (45)
No Seat Belt Used	3.4 (13)	1.3 (7)
Total	100.0 (377)	100.0 (559)

used at all to hold the child within the seat, and if there was a seat belt being used at all to hold the seat within the vehicle. Other surveys that have allowed more time for closer inspections of seats in use found much higher levels of misuse than those found with this method (Cynecki and Goryl, 1984). Table 16 does show, however, that the level of gross misuse has been consistent from 1989 to 1992. In 1989, 86 percent of the seats were observed to be used correctly to the extent that they were facing in the right direction, a harness or shield was holding the child, and a safety belt was holding the seat in place. In 1992 the percentage of seats being used correctly was similar to the 1989 study at 87 percent. Of the remaining 13 percent, two percent were infants facing to the front of
the car, 8 percent had no harness being used and 1 percent had no safety belt being used to secure the seat. The percentages for front/rear-facing errors and no harness being used were both increases from the levels seen in 1989, while the one percent no belt used was a slight decrease over the 1989 figure. Even though the gross misuse of seats has been reduced, there is still much room for improvement to help insure that all children in safety seats are getting all of the protection that they deserve.

Mail-back Questionnaires

Tables 17- 26 are based on data obtained through the mail-back questionnaires. As was previously mentioned, 557 questionnaires were completed and returned. Table 17 shows the level of knowledge respondents had concerning the Child Passenger Safety Law for both 1989 and 1992. Overall, there is very little difference between the two years in terms of the levels of knowledge for the individual components. A decrease can be seen in the proportion of respondents who knew this law covers children less than six years of age and a twenty percent increase is noted in the proportion of respondents who knew that the penalty for a violation is a $25 fine. Table 18 lists the proportion of respondents who correctly answered various numbers of questions in this series about the CPS Law. Relatively small decreases are observed in the percentage of respondents who scored either one or

Table 17. Respondents' Knowledge of Components of Child Passenger Protection Law. Mail-back Questionnaire.

	1989			1992		
Law Component	Correct Answer	Incorrect Answer	Total	Correct Answer	Incorrect Answer	Total
	Row%/(N)			Row%/(N)		
Children <6 Covered	60.4 (247)	39.6 (162)	100.0 (409)	56.9 (317)	43.1 (240)	100.0 (557)
Belt Substitute at Age 3	72.4 (296)	27.6 (113)	100.0 (409)	69.1 (385)	30.9 (172)	100.0 (557)
Affects All Drivers	95.6 (391)	4.4 (18)	100.0 (409)	96.9 (540)	3.1 (17)	100.0 (557)
Penalty of $25	45.2 (185)	54.8 (224)	100.0 (409)	64.6 (360)	35.4 (197)	100.0 (557)

Table 18. Number of Correct Answers to Series of Child Passenger Protection Law Questions. Mail-back Questionnaires.

# of Correct Answers	1989 Col%/(N)	1992 Col%/(N)
0	1.2 (5)	0.7 (4)
1	5.9 (24)	5.6 (31)
2	31.3 (128)	24.4 (136)
3	41.3 (169)	44.0 (245)
4	20.3 (83)	25.3 (141)
Total	100.0 (409)	100.0 (557)

Table 19. Respondents' Knowledge of Components of Seat Belt Law. Mail-back Questionnaire.

Law Component	1989 Correct Answer Row%/(N)	1989 Incorrect Answer Row%/(N)	1989 Total	1992 Correct Answer Row%/(N)	1992 Incorrect Answer Row%/(N)	1992 Total
Drivers and Front Occupants Covered	68.7 (281)	31.3 (128)	100.0 (409)	66.8 (372)	33.2 (185)	100.0 (557)
Vehicles Exempted	12.5 (51)	87.5 (358)	100.0 (409)	9.2 (51)	90.8 (506)	100.0 (557)
Penalty of $25	43.5 (178)	56.5 (231)	100.0 (409)	66.4 (370)	33.6 (187)	100.0 (557)

Table 20. Number of Correct Answers to Series of Seat Belt Law Questions. Mail-back Questionnaires.

# of Correct Answers	1989 Col%/(N)	1992 Col%/(N)
0	18.6 (76)	12.9 (72)
1	43.8 (179)	38.2 (213)
2	32.0 (131)	42.4 (236)
3	5.6 (23)	6.5 (36)
Total	100.0 (409)	100.0 (557)

two questions correct and a related increase noted in the number of respondents who scored three or four correct questions. The percentage scoring all four correct increased by only five percentage points from 20 percent to 25 percent between the two years. It appears that more people are becoming aware of the components of this law but there is certainly much room for improvement.

Tables 19 and 20 present the same type of information for the Seat Belt Law. As Table 19 shows, the respondents' knowledge of the individual components of the Seat Belt Law are similar to the CPS Law for those items concerning coverage and penalties. As with the CPS Law, little difference was observed between the two years for those responding correctly to who is covered. A 23 percent increase in the percentage respondents who knew the correct penalty is a fine of $25was noted. There was a slight decrease in the percentage of respondents who knew that vehicles not required to have belts and certain delivery vehicles are exempt. Table 20 indicates that there may be more confusion over the components of the Seat Belt Law than for the CPS
Law. Due to the low number of respondents who knew the correct exemptions to the Seat Belt Law, only 6 percent answered all three questions in the series correctly. Whereas close to two-thirds answered either three or four questions on the CPS Law correctly, only half of the respondents were able to answer either two or three of the questions on the Seat Belt Law correctly. At the other end, only one percent did not answer any of the CPS Law questions correctly but 13 percent did not answer any of the Seat Belt Law questions correctly.

The respondents were asked to indicate how often they buckled up their children in cars. As Table 21 shows, 87 percent said that they buckled up their children all of the time. This self-reported figure is a full eleven percentage points higher than the 78 percent of the children who were actually observed to be restrained. When the category "most of the time" is included, 97 percent of the respondents said they buckle up their children all or most of the time. If respondents indicated that they buckled up their children other than all of the time, they were asked to indicate the reasons that did not do so all the time and

Table 21. How Often Do Respondents Buckle Children? Mail-back Questionnaire.

Buckle Children	1989 Col%	1989 (N)	1992 Col%	1992 (N)
All of the time	82.7	(334)	87.0	(480)
Most of the time	13.1	(53)	9.6	(53)
Half of the time	1.5	(6)	1.1	(6)
Some of the time	2.5	(10)	2.0	(11)
Never	0.2	(1)	0.4	(2)
Total	100.0	(404)	100.0	(552)

when they were most likely to buckle them up. Table 22 shows that the major reason (21%) given in 1992 for not buckling their children all of the time was to allow the child to sleep or to feed or otherwise tend to the child's needs. This is similar to the 1989 study where the same primary reason (24%) was given. In 1989, only 5 percent said that they forgot or were not in the habit contrasted with 17 percent in the 1992 study. Those who indicated they were less likely to buckle their

Table 22. Why Do Respondents Not Buckle Children All the Time? Mail-back Questionnaire.

Reason	1989 Col%	1989 (N)	1992 Col%	1992 (N)
Forget, not in habit	5.2	(3)	17.5	(10)
Short trips	19.0	(11)	10.5	(6)
To sleep, feed, tend child	24.1	(14)	21.1	(12)
Hassle, in a hurry	15.5	(9)	12.3	(7)
Child doesn't like	19.0	(11)	10.5	(6)
Other	17.2	(10)	28.1	(16)
Total	100.0	(58)	100.0	(57)

children on short trips decreased from 19 percent in 1989 to 10 percent in 1992. There was also a small decrease in the percentage who gave being in a hurry or that it was a hassle as a reason for not buckling up children all of the time. This pattern seems to indicate that drivers are making a conscious decision while driving children that restraints are not needed on that particular trip or under particular conditions. This would indicate that more effort needs to be made to convince drivers that protection is needed at all times and the increased protection is worth any extra effort.

Table 23 lists the times when respondents are most likely to restrain their children. The second most reported reason (14%) is when they remember to buckle them up which includes Tables 21 and 22 being reminded by their children. This figure has decreased by more than half since the 1989 study, dropping from 34 to 14 percent. The reason reported the most frequently (36%) was that they are most likely to buckle children on long trips. It appears that the perception that restraints are needed most on long trips continues to persist.

Table 23. When Are Respondents Most Likely to Buckle Their Children? Mail-back Questionnaire.

	1989		1992	
Reason	Col%	(N)	Col%	(N)
Bad conditions, weather	9.4	(5)	13.8	(8)
Long trips	37.7	(20)	36.2	(21)
Not sleeping, feeding	0.0	(0)	1.7	(1)
When remember	34.0	(18)	13.8	(8)
Other	18.9	(10)	34.5	(20)
Total	100.0	(53)	100.0	(58)

Respondents were also asked to indicate how often they wear their own safety belts. As Table 24 shows, 80 percent of the respondents indicated that they wear their own belts all of the time. This is a small increase over the 74 percent who reported likewise in 1989. When the "most of the time" category is added in, 94 percent indicated that they wear their own belts all or most of the time. This self-reported usage is much higher than the 75 percent observed usage rate for drivers in the 1992 observations. This rate, however, does indicate an increased usage rate over the 68 percent reported in 1989.

Table 24. How Often Do Respondents Wear Their Own Seat Belts? Mail-back Questionnaire.

	1989		1992	
Buckle Selves	Col%	(N)	Col%	(N)
All of the time	73.8	(301)	80.4	(446)
Most of the time	19.1	(78)	13.7	(76)
Half of the time	2.9	(12)	2.3	(13)
Some of the time	3.2	(13)	2.7	(15)
Never	1.0	(4)	0.7	(4)
Total	100.0	(408)	100.0	(554)

Tables 25 and 26 show the reasons that the respondents do not wear their own belts all of the time and when they are most likely to wear their belts. There is not much difference in Table 25 between 1989 and 1992 for the reasons given for not wearing belts. For both years, the reason given most was that they forget to buckle up or that they are not in the habit. There was a decrease in the percentage that said that they were least likely to buckle up on short trips and an increase in those who reported not buckling up when they were in a hurry. As Table 26 shows, the respondents reported in 1992 that they were most likely to wear their own belts when they are on long trips or when they remember. This is basically the same pattern that was reported in 1989. From this information it appears that work

continues to need to be done in the area of getting drivers in the habit of wearing their belts for every trip regardless of conditions and distance.

Table 25. Why Do Respondents Not Wear Their Own Seat Belts All the Time? Mail-back Questionnaire.

Reason	1989 Col%	1989 (N)	1992 Col%	1992 (N)
Forget, not in habit	43.5	(37)	41.8	(38)
Short trips	18.8	(16)	15.4	(14)
Uncomfortable, don't like them	16.5	(14)	16.5	(15)
Hassle, in a hurry	10.6	(9)	16.5	(15)
Personal choice	2.4	(2)	1.1	(1)
Other	8.2	(7)	8.8	(8)
Total	100.0	(85)	100.0	(91)

Table 26. When Are Respondents Most Likely Wear Their Own Seat Belts? Mail-back Questionnaire.

Reason	1989 Col%	1989 (N)	1992 Col%	1992 (N)
Bad conditions, weather	14.1	(11)	13.1	(11)
Long trips	43.6	(34)	38.1	(32)
When remember	29.5	(23)	23.8	(20)
Other	12.8	(10)	25.1	(21)
Total	100.0	(78)	100.0	(84)

Conclusions

The following conclusions can be drawn based on this analysis of children involved in North Carolina accidents:

a) The North Carolina Child Passenger Protection and Seat Belt Laws, along with associated public information and education efforts, have resulted in large increases in restraint use as reported on police accident forms. In the year prior to the implementation of the first Child Passenger Safety Law in 1982, 21percent of the 0-1 year-olds, 8 percent of the 2-5 year-olds, and 4 percent of the 6-15 year-olds were reported to be restrained. During the year July 1991 - June, 1992, these rates were 93, 89 and 77 percent respectively.

b) Average fatal plus serious (K+A) injury rates for children involved in accidents during this same time period have declined. During the 18 months (January 1981 - June 1982) immediately preceding the implementation of the original CPS Law, K+A rates were 1.74 for 0-1 year-olds, 1.88 for 2-5 year-olds, and 2.61 for 6-15 year-olds. During the July 1985 - June 1992 time period, average K+A rates were reduced 41% to 1.03 for 0-1 year-olds, by 21% to 1.49 for 2-5 year-olds, and by 11% to 2.32 for the 6-15 year-olds.

c) Children reported to be unrestrained are more likely to have been in more severe crashes and/or to have been riding with a driver charged with Driving While Impaired.

d) The downsizing of the cars in which children are riding means that there will continue to be a need to stress the importance of correct restraint use for children and adults.

e) The implementation of restraint legislation has resulted in 21 percent reduction in fatal and serious injuries to 0-5 year old children in North Carolina crashes since July 1982. For 6-15 year-olds, a 8 percent reduction was found. In terms of actual numbers, fatal and serious injuries have been reduced by 595 for 0-5 year-olds and by 566 for 6-15 year-olds since July 1982.

The following conclusions can be drawn from the analysis of observational and mailback questionnaire data collected during this project year:

f) There was a moderate increase in the percentage of children observed to have been restrained between the years 1989 and 1993. In 1989, 73 percent of the 0-5 year old children were restrained in some manner. In 1993, this figure increased by six percentage points to 79 percent. Overall, the percentage of 0-5 year-olds who were buckled in safety seats increased from 38 to 44 percent. There was little difference in the proportion of children who were buckled in safety belts, but there continues to be a shift in the types of belts being used. In 1989, 16 percent of the 0-5 year-olds were in lap belts and 19 percent were in lap/shoulder combinations. In 1993, the percentage secured by lap belts declined to 14 percent and those in lap/shoulder belts increased to 20 percent.

g) Overall, there was an increase from 38 to 44 percent in the percentage of 0-5 year-olds observed to be in safety seats. Looking at the separate ages it can be seen that there have been improvements for older children being secured in safety seats rather than belts. With the exception of infants, where virtually all were observed to be in seats for both years, and five year-olds, all ages showed good improvement in the percentage of children riding in seats rather than belts.

h) The fact that older children are protected by restraint systems much less often than younger ones continues to be an area of concern, although there have been some improvements. In 1989, two percent of the infants under one were unrestrained and this proportion increased to 41 percent unrestrained for the 5 year -olds for a difference of 39 percentage points. In 1992, two percent of the infants were still unrestrained but the percent of the five year-olds who were unrestrained decreased to 33 percent for a difference of 31 percentage points.

i) In 1992, as was the case in 1989, white children were observed to be restrained more often than the non-white children. In 1989, 84 percent of the white children and 64 percent of the non-white children were observed to be restrained.

j) Parents and grandparents continue to be much more likely to buckle children in their cars as are other relatives and non-relatives. Between 1986 and

1989, both the "other relative" and "non-relative" groups greatly increased in the proportion of children riding in their cars being buckled up. In 1993, however, the percentage of other relatives buckling children decreased from 57 to 45 percent and for non-relatives the decrease was from 70 to 67 percent.

k) The level of gross misuse of safety seats remained essentially the same between 1989 to 1993. In 1989, 86 percent of the seats were observed to be used correctly to the extent that they were facing in the right direction and that there was a harness or shield holding the child and a safety belt holding the seat in place. In 1993, the percentage of seats being used correctly increased slightly to 87 percent. Of the remaining 13 percent, three percent were infants facing to the front of the car, eight percent had no harness being used and one percent had no safety belt being used to secure the seat, all much the same as for 1989.

l) There were some differences between the two years in terms of the levels of knowledge that the respondents had concerning the Child Passenger Safety Law for the individual components. There was a decrease in the proportion of respondents that knew that this law covers children less than six years of age and there was an increase in the proportion of respondents who knew that the penalty for a violation is a fine of $25. The percentage who scored all four components correct increased from 20 to 25 percent between the two years.

m) The respondents' knowledge of the individual components of the Seat Belt Law is similar to that for the CPS Law for the items involving coverage and penalties. As with the CPS Law, there was little difference between the two years for who is covered and there is an increase in the percentage who knew the correct penalty is a fine of $25. There was a decrease in the percentage of respondents who knew that vehicles not required to have belts and certain delivery vehicles are exempt. Due to the low number of respondents who knew the correct exemptions to the Seat Belt Law, only seven percent answered all three questions in the series correctly.

n) Eighty-seven percent of the questionnaire respondents said that they buckled up their children all of the time. This self-reported figure is about ten

percentage points higher than the 78 percent of the children who were actually observed to be restrained. The major reason (21%) given in 1993 for not buckling their children all of the time was to allow the child to sleep, or to feed or otherwise tend to the child's needs. This is similar to 1989 when 24 percent cited this as their primary reason for not buckling children. Almost as many, 18 percent, said that they forgot or were not in the habit.

o) Eighty percent of the respondents indicated that they wear their own belts all of the time. This is an increase over the 74 percent who reported likewise in 1989. There is not much difference in between 1989 and 1993 for the reasons given for not wearing belts. For both years, the reason given most was that they forget to buckle up or that they are not in the habit.

References

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Hunter, W.W., Stutts, J.C., Stewart, J.R., and Rodgman, E.A. "Overrepresentation of Seat Belt Non-Users in Traffic Crashes." UNC Highway Safety Research Center, Chapel Hill, North Carolina, April, 1988. (HSRC-TR 74)

Reinfurt, D.W., Weaver, N.L., Hall, W.L., Hunter, W.W., and Marchetti, L.M. "Increased Seat Belt Use Through Police Actions." UNC Highway Safety Research Center, Chapel Hill, North Carolina, November, 1990 (HSRC-A144)

RECOMMENDATIONS

1) Most of the existing rental programs that serve lower socioeconomic families are run by county health departments. These health departments have little or no funding available to purchase new child safety seats to replace worn or non-returned rental seats. The GHSP office should consider providing funding to those departments that need financial assistance in order to continue this vital service to their communities. Ongoing training for these programs continues to be a much-needed service.

2) Seat belt use is lower in the western and eastern regions of the state as compared to the piedmont and is lower for the rural than urban areas. Promotional efforts should be designed with emphasis on reaching these populations. More information is needed concerning what messages will reach rural populations and the best avenues for communicating such information.

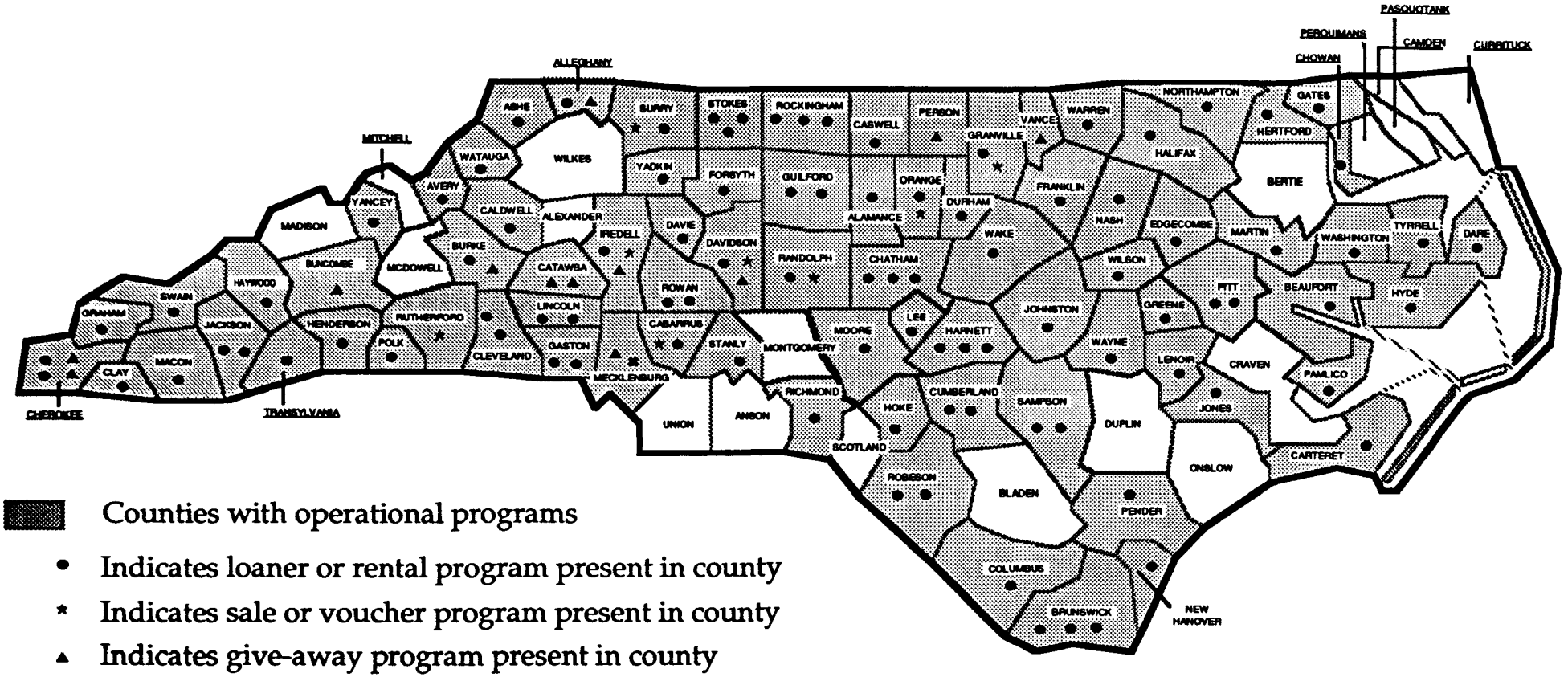
3) Efforts should be continued to encourage the law enforcement community to actively enforce the Child Passenger Safety and Seat Belt Laws. Restraint usage for children and young adults has increased over the years, but many children are still riding unprotected. Active enforcement campaigns should bring these rates up to the highest levels possible. Specific targets for any educational or enforcement campaigns should be older children and those riding with drivers other than parents or grandparents.

4) The observational surveys indicate that many older children are restrained by safety belts rather than seats. Efforts should be made to convince parents to secure their children in the seats rather than the belts as long as possible.

Appendix A

N.C. Operational Safety Seat Rental/Loaner Programs

North Carolina Safety Seat Distribution Programs - September, 1992



Counties with operational programs

- ● Indicates loaner or rental program present in county
- ★ Indicates sale or voucher program present in county
- ▲ Indicates give-away program present in county
- ✱ Indicates special needs program present in county

(Number of symbols do not equal number of agencies conducting distribution programs. Some agencies conduct more than one type of program.)

SAFETY SEAT DISTRIBUTION PROGRAMS IN NORTH CAROLINA October, 1992

COUNTY	AGENCY	LOCATION	PHONE	RENT	LOAN	GIVE	SALE	VCHER	SP NEED	INF	CVERT	BSTR	TOT
Alamance	Alamance Co. Health Dept.	Burlington	919-227-0101	X						20	18	0	38
Alexander	None												
Alleghany	Alleghany Co. Health Dept.	Sparta	919-372-5641	X		X				50	75	0	125
Anson	None												
Ashe	Ashe Co. Health Dept.	Jefferson	919-246-9449	X						53			53
Avery	Avery Co. Health Dept.	Newland	704-733-6031	X							25		25
Beaufort	Washington Police Department	Washington	919-946-1444		X					0	*10	0	10
Bertie	None												
Bladen	None												
Brunswick	Brunswick Co. Health Dept.	Bolivia	919-253-4381	X						0	65	0	65
Brunswick	Brunswick Hospital Volunteer Auxiliary	Calabash	919-579-3791	X						0	29	0	29
Brunswick	Southport Volunteer Rescue Squad	Southport	919-457-7916	X						0	33	0	33
Buncombe	Memorial Mission Hospital	Asheville	At Discharge			X				-	-	-	-
Burke	Burke Co. Health Dept.	Morganton	704-433-4250	X						79			79
Burke	Valdese General Hospital	Valdese	At Discharge			X				-	-	-	-
Cabarrus	Cabarrus Car Seat Loaner Program, Inc.	Concord	704-786-8121	X				X		125	4	0	129
Caldwell	Caldwell Memorial Hospital Auxiliary	Lenoir	704-757-5123			X				-	-	-	-
Camden	None												
Carteret	Carteret Hospital Auxilliary	Morehead City	919-247-1616	X						15	3	3	21
Caswell	Caswell Co. Health Dept.	Yanceyville	919-694-4129	X						2	17	0	19
Catawba	Catawba Memorial Hospital	Hickory	704-326-3200			X				X	XX	X	X
Catawba	Frye Regional Medical Center	Hickory	704-322-6070			X				-	-	-	-
Chatham	Haywood-Moncure Health Center	Moncure	919-542-4991		X					25	0	0	25
Chatham	Kiwanis Club of Siler City	Siler City	919-742-6000	X									
Chatham	Pittsboro S.A.F.E.	Pittsboro	919-542-2989	X						59	149		208
Cherokee	Cherokee Co. Health Dept. -Andrews	Andrews	704-321-4167	X		X							
Cherokee	Cherokee Co. Health Dept.- Murphy	Murphy	704-837-7486	X		X				31	38		69
Chowan	Chowan Co. Health Dept.	Elizabeth City	919-338-2167	X							115		115
Clay	Clay Co. Health Dept.	Hayesville	704-389-8052	X						10	17	0	27
Cleveland	Cleveland Co. Health Dept.	Shelby	704-484-5170	X						166	113	0	279
Cleveland	Shelby Woman's Club (Evening Division)	Shelby	704-482-1431	X						40			40
Columbus	Columbus Co. Health Dept.	Whiteville	919-642-5700	X						100	200	0	300
Craven	None												
Cumberland	Army Community Service	Fort Bragg	919-396-5521	X						150	75		225
Cumberland	E. Newton Smith Public Health Center	Fayetteville	919-433-3890	X									
Currituck	None												
Dare	Dare Co. Health Dept.	Manteo	919-473-1101	X						35	25	0	60

COUNTY	AGENCY	LOCATION	PHONE	RENT	LOAN	GIVE	SALE	YCHER	SP NEED	INF	CVERT	BSTR	TOT
Davidson	Community General Hospital	Thomasville	919-472-2000	X						25	0	0	25
Davidson	Lexington Memorial Hospital Auxiliary	Lexington	704-246-5161			X	X						
Davie	Davie Co. Health Dept.	Mocksville	704-634-5985	X						30	103	60	193
Duplin	None												
Durham	Durham Co. Hospital Volunteer Services	Durham	919-470-4150	X						500	0	0	500
Edgecombe	(See Nash County Listing)												
Forsyth	Northwest N.C. Chapter - Am. Red Cross	Winston-Salem	919-766-5576	X						120	0	0	120
Franklin	Franklin Co. Health Dept.	Louisburg	919-496-2533	X						70	62	0	132
Gaston	Gaston Memorial Hospital	Gastonia	704-866-2257	X						30			30
Gaston	Gastonia Police Dept.	Gastonia	704-866-6873	X						30	10	0	40
Gates	(See Hertford Co.)												
Graham	Graham Co. Health Dept.	Robbinsville	704-479-3361	X						14	6	0	20
Granville	Granville Medical Center	Oxford	919-690-3000				X						
Granville	Southern Granville Junior's Club	Creedmoor	919-528-1515	X						24			24
Greene	Greene Co. Health Dept.	Snow Hill	919-747-8181	X						0	37	5	42
Guilford	Jr. Womans Club of Greensboro	Greensboro	919-691-6586	X						419	0	0	419
Guilford	Wesley Long Comm. Hospital	Greensboro	919-854-6355	X						347	0	0	347
Halifax	Halifax Memorial Hospital	Roanoke Rapids	919-535-8112	X						68	0	0	68
Harnett	Western Medical Group- Anderson Creek	Maners	919-893-4730	X						13	14	0	27
Harnett	Western Medical Group- Benhaven	Maners	919-499-9422	X						6	4	0	10
Harnett	Western Medical Group- Boone Trail	Maners	919-776-3614	X						53	40	0	93
Haywood	Haywood Co. Health Dept	Waynesville	704-452-6675	X						150	1		151
Henderson	American Red Cross - Hendersonville	Hendersonville	704-693-5605	X						45	25		70
Hertford	Hertford-Gates Dist. Health Dept.	Winton	919-358-7833	X						36	0	0	36
Hoke	Hoke Co. Health Ctr.	Raeford	919-875-3717	X						62	10	0	72
Hyde	Hyde Co. Health Dept.	Swan Quarter	919-926-3561	X						4	0	0	4
Iredell	Davis Community Hospital	Statesville	704-873-0281	X			X			400	0	0	400
Iredell	Iredell Memorial Hospital	Statesville	704-878-4660			X				-	-	-	-
Iredell	Lake Norman Regional Medical Center Aux.	Mooresville	704-663-1113	X						72	0	0	72
Jackson	Eastern Band of Cherokee Indians	Cherokee	704-497-7297	X							50		50
Jackson	Jackson Co. Health Dept.	Sylva	704-586-8994	X						?	?	?	38
Johnston	Johnston Co. Health Dept.	Smithfield	919-989-5200		X					65	0	0	65
Jones	Jones County Health Dept.	Trenton	919-448-9111	X						33	63	Y	96
Lee	Sanford Jaycees	Sanford	919-775-2331	X						150			150
Lenoir	Lenoir Co. Health Dept.	Kinston	919-527-7116	X						60	25		85
Lincoln	Lincoln Co. Health Dept.	Lincolnton	704-735-3001	X						25	50		75
Lincoln	Lincoln County Hospital	Lincolnton	704-735-3071	X						1			1

COUNTY	AGENCY	LOCATION	PHONE	RENT	LOAN	GIVE	SALE	YCHER	SP NEED	INF	CVERT	BSTR	TOT
Macon	Macon Co. Health Dept.	Franklin	704-369-9526	X						61	2	0	63
Madison	None												
Martin	Martin Co. Health Dept.	Williamston	919-792-7811	X						100			100
McDowell	None												
Mechlenberg	Carolinas Medical Center	Charlotte	At Discharge			X				-	-	-	-
Mechlenberg	The Hemby Pediatric Trauma Institute	Charlotte	Referral by Stafi			X			X	-	-	-	-
Mitchell	None												
Montogomery	None												
Moore	Moore Co. Health Dept.	Carthage	919-947-3300	X						75	0	0	75
Nash	Tar River Jaycees	Rocky Mount	919-442-5156	X						40			40
New Hanover	Cape Fear Chapter - American Red Cross	Wilmington	919-762-2683	X						32	0	0	32
Northampton	Northampton Co. Health Dept.	Jackson	919-534-5841	X						7	6		13
Onslow	None												
Orange	Orange Co. Health Dept.	Hillsborough	919-732-7846	X			X			166		0	166
Pamlico	Pamlico Co. Health Dept.	Bayboro	919-745-5111	X						6	19	0	25
Pasquotank	None												
Pender	Pender Co. Health Dept.	Burgaw	919-259-1230	X						0	90	0	90
Perquimans	None												
Person	Person Co. Health Dept.	Roxboro	919-597-2204			X							
Pitt	Pitt Co. Health Dept./Tar River Civitans	Greenville	919-752-4141	X						70	150	0	220
Pitt	Pitt Memorial Hos. Volunteer Auxiliary	Greenville	919-551-4491	X						150	0	0	150
Polk	Hickory Grove Bapt Young Women	Columbus	704-894-8413	X						6	2	2	10
Randolph	Randolph County Health Dept.	Asheboro	919-629-2131		X			X		150			150
Richmond	Richmond Co. Health Dept.	Rockingham	919-997-8327	X						150	0	0	150
Robeson	Lumberton Jr. Womens Club	Lumberton	919-739-8509	X						80	0	0	80
Robeson	Robeson Co. Health Dept.	Lumberton	919-671-3200	X						264	201	0	465
Rockingham	Annie Penn Memorial	Reidsville	919-634-4578			X				-	-	-	-
Rockingham	Fraternal Order of Police	Eden	919-623-9755	X						0	50	0	50
Rowan	Rowan Co. Health Dept.	Salisbury	704-633-0411	X						91	184	0	275
Rowan	Zeta Phi Beta Sorority, Inc.	Salisbury	704-633-1970	X						30			30
Rutherford	Rutherford Hospital	Rutherfordton	704-286-5417				X			-	-	-	-
Sampson	Mt. Olive Jaycees	Mt. Olive	919-731-3640	X						5			5
Sampson	Sampson Co. Health Dept.	Clinton	919-592-1131	X						100	40	0	140
Sampson	Tri-County Community Health Center	Newton Grove	919-567-6194	X									
Scotland	None												
Stanly	Albemarle Police Dept.	Albemarle	704-982-1131	X						65	65	0	130
Stokes	Stokes Co. Health Dept.	Danbury	919-593-2811	X						8	10		18

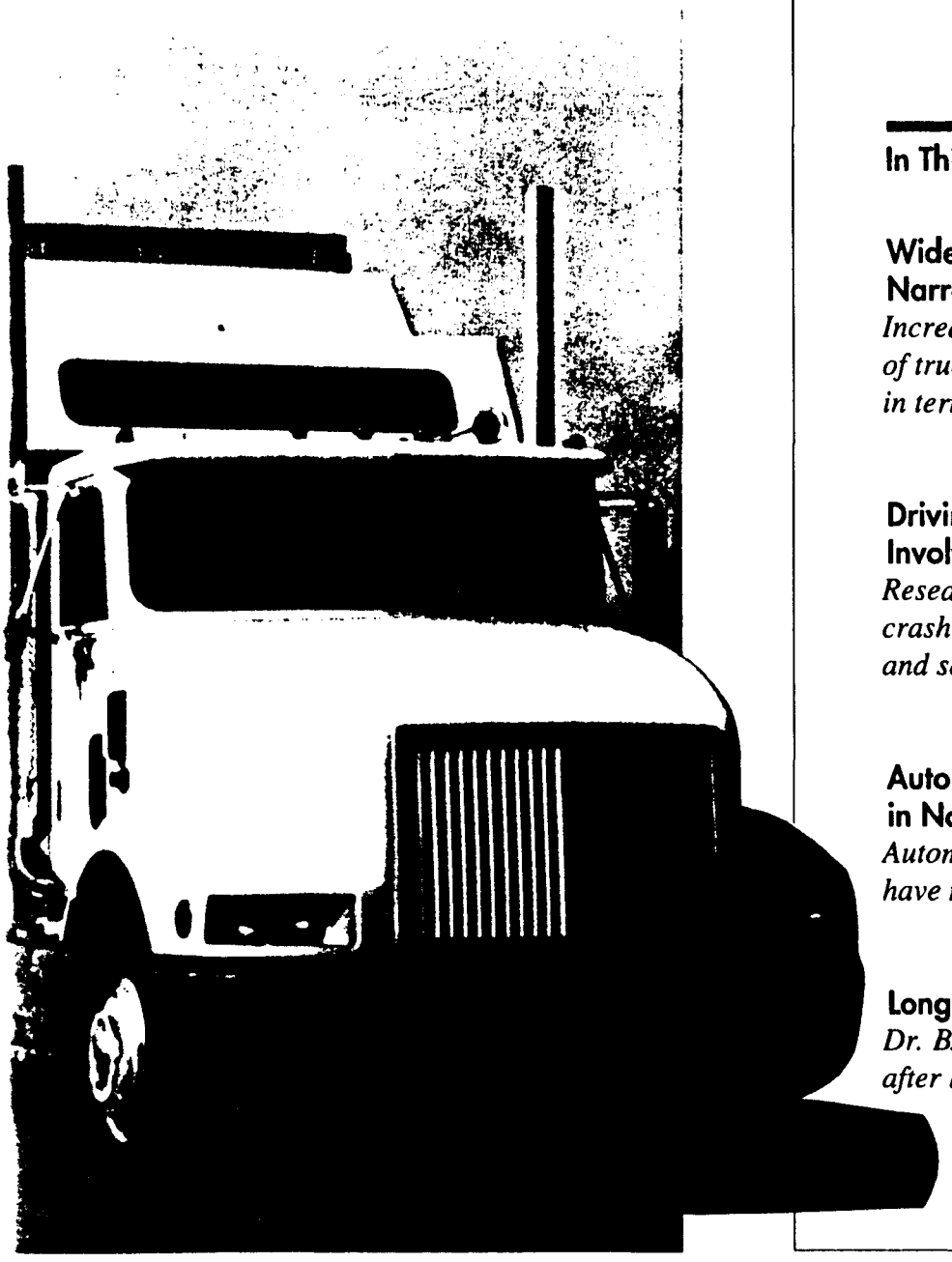
COUNTY	AGENCY	LOCATION	PHONE	RENT	LOAN	GIVE	SALE	VCHER	SP NEED	INF	CVERT	BSTR	TOT
Stokes	Stokes Cooperative Extension Service	Danbury	919-593-8179	X						5			5
Stokes	Stokes Service Center	Walnut Cove	919-591-4255	X						4	0	0	4
Surry	Surry Co. Health Dept.	Dobson	919-386-9400	X			X			60	0	0	60
Swain	Swain Co. Health Dept.	Bryson City	704-488-3198	X						60	10	0	70
Transylvania	Brevard Jaycees	Brevard	704-883-3116	X						50	50	0	100
Tyrrell	Tyrrell Co. Health Dept.	Columbia	919-796-2681	X						10			10
Union	None												
Vance	Vance Co. Health Dept.	Henderson	919-492-7915			X				-	-	-	--
Wake	Volunteers to Wake Co. Hosp. System, Inc.	Raleigh	919-250-8293	X						549	0	0	549
Warren	Warren Co. Health Dept.	Warrenton	919-257-1185	X						7	0	0	7
Washington	Washington Co. Health Dept.	Plymouth	919-793-3023	X						80			80
Watauga	Children's Council of Watauga County	Boone	704-265-5391		X					?	?	?	?
Wayne	Goldsboro Junior Woman's Club, Inc.	Goldsboro	919-736-1752	X						450	0	0	450
Wilkes	None												
Wilson	Wilson Co. Exten. Homemakers	Wilson	919-237-0112	X						7		3	10
Yadkin	Yadkin Co. Health Dept.	Yadkinville	919-679-4203	X						50	10	0	60
Yancey	Yancey Co. Health Dept.	Burnsville	704-682-6118	X							25	0	25

Appendix B

Highway Safety Directions Newsletter Covers

HIGHWAY SAFETY

DIRECTIONS



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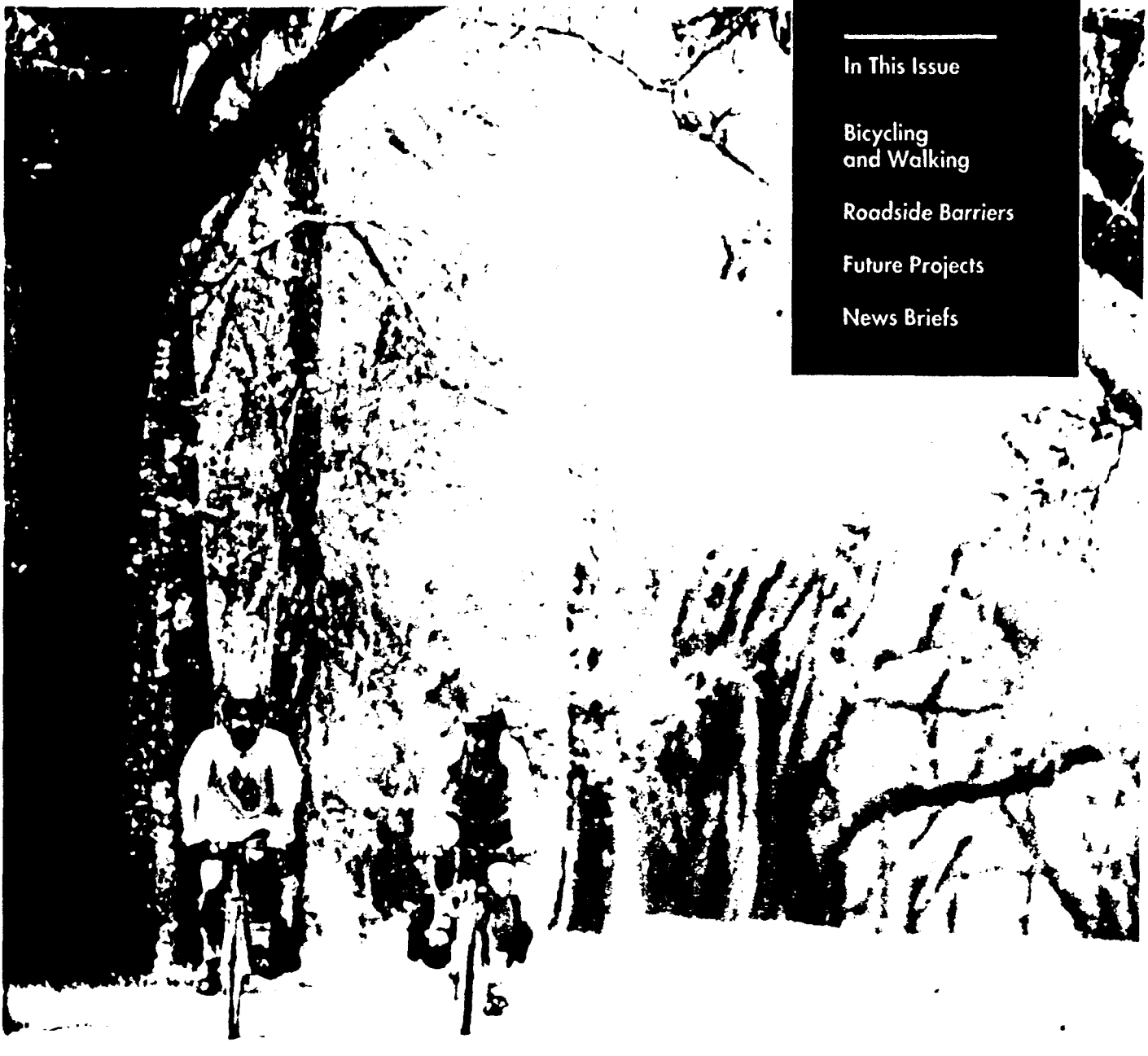

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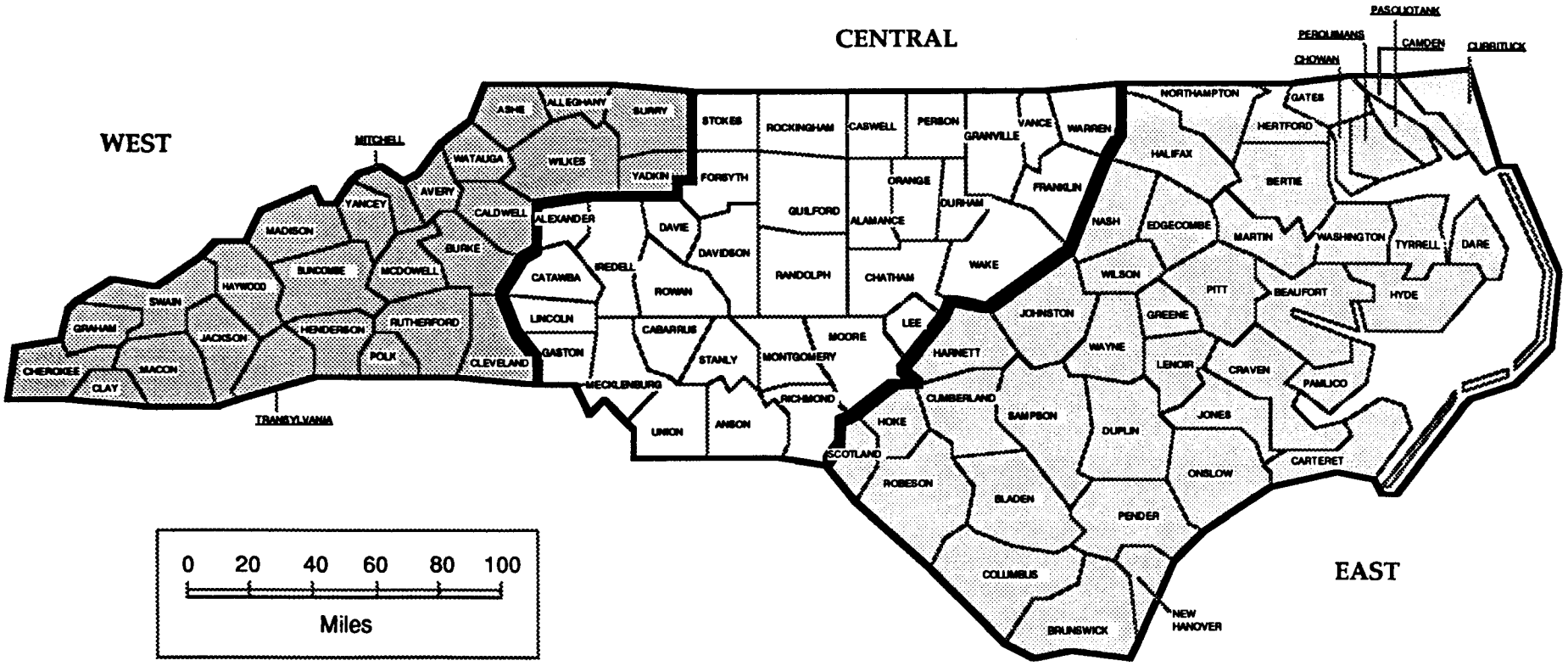
Appendix C

North Carolina Geographical Regions

North Carolina Geographical Regions



Appendix D

Observational and Mail-Back Survey Forms and Protocol

DATE: ___/___/___ (M / D / Y)

OBSERVER: ___ ___ ___

CITY: 1 AVLE 2 CRLT 3 FTVL 4 GBRO 5 GVLE 6 WKBO 7 WMTN 8 WSTN

LOCATION: 1 SHOPPING CENTER 2 DAY CARE - Private 3 DAY CARE - Subsidized

	OCCUPANTS →	DR	2	3	4	5	6	7	COMMENTS
POSITION	DRIVER	DR	DR	DR	DR	DR	DR	DR	
	CENTER FRONT		CF	CF	CF	CF	CF	CF	
	RIGHT FRONT		RF	RF	RF	RF	RF	RF	
	LEFT REAR		LR	LR	LR	LR	LR	LR	
	CENTER REAR		CR	CR	CR	CR	CR	CR	
	RIGHT REAR		RR	RR	RR	RR	RR	RR	
	OTHER		OT	OT	OT	OT	OT	OT	=
AGE									
SEX	MALE	M	M	M	M	M	M	M	
	FEMALE	F	F	F	F	F	F	F	
RACE	WHITE	W	W	W	W	W	W	W	
	BLACK	B	B	B	B	B	B	B	
	OTHER	O	O	O	O	O	O	O	
RELATION TO DRIVER	CHILD		C	C	C	C	C	C	
	GRANDCHILD		G	G	G	G	G	G	
	OTHER RELATIVE		R	R	R	R	R	R	
	NON RELATIVE		N	N	N	N	N	N	
RESTRAINT	NONE	1	1	1	1	1	1	1	
	ON LAP	2	2	2	2	2	2	2	
	SHOULDER ONLY	3	3	3	3	3	3	3	
	LAP ONLY	4	4	4	4	4	4	4	
	L & S - CORRECT	5	5	5	5	5	5	5	
	L & S - BEHIND BACK	6	6	6	6	6	6	6	
	L & S - UNDER ARM	7	7	7	7	7	7	7	
CHILD RESTRAINT	NON CRASH TESTED	8	8	8	8	8	8	8	
	INFANT ONLY	9	9	9	9	9	9	9	
	CNVRTBLE-HARNESS	10	10	10	10	10	10	10	
	CNVRTBLE-HAR/SHLD	11	11	11	11	11	11	11	
	BOOSTER-HARNESS	12	12	12	12	12	12	12	
	BOOSTER-SHIELD	13	13	13	13	13	13	13	
	BOOSTER-L/S BELT	14	14	14	14	14	14	14	
HOW CHILD RESTRAINT USED	CORRECT	1	1	1	1	1	1	1	
	FACING ERROR	2	2	2	2	2	2	2	
	NO HARNESS	3	3	3	3	3	3	3	
	NO BELT	4	4	4	4	4	4	4	

VEHICLE BELT TYPE
1 Manual
Automatic
2 3pt L/S
3 Motorized
4 Non-Motor
5 Shldr Only

ASK ALL DRIVERS:

1. Are you aware that NC has a law requiring children to be buckled up in cars? 1 YES 2 NO
2. Are you aware that NC has a law requiring adults to be buckled up? 1 YES 2 NO
3. About how far will you be driving to your next stop? _____ MILES

STATE OF CAR LICENSE: NC OTHER: ___ ___ LICENSE# _____

UNC Highway Safety Research Center
1992 CHILD RESTRAINT OBSERVATIONAL SURVEY PROTOCOL

The purpose of this survey is to determine how children are riding in cars. Thus, data collection will be done at shopping centers and day care centers. At each location, observers will be stationed at exits to the parking lots. Each observation team will consist of two persons. Use your own judgement to decide whether to cover one or two exits. Make this decision based on traffic flow, locations of stop lights/signs and personal safety. For shopping centers, try to station yourself at an exit controlled by a stop light if possible. Next best is a stop sign. We will observe only those cars that are stopped for a stop light or sign. Day care centers generally have only one exit and cars can be easily stopped there.

Regardless of location, try not to allow traffic to back up and create an unsafe situation. While you are conducting a survey, try to keep an eye on the stop light and if there is any traffic backed up behind the target vehicle. If the light turns green while you are conducting the survey, break off the conversation with the driver and allow the car to go through the light. Continue to look in the car to get as much observational information as you can. At day cares, try to position yourself and the car you are surveying so that vehicles exiting can go around you if they do not want to stop.

The target for this survey is cars with young children. We are primarily interested in children younger than six. Use your own judgment if the youngest child in the car appears that he/she might be slightly older.

One survey sheet will be used for each vehicle. If there are more than seven occupants in the vehicle, use the "Comments" section to record appropriate information.

On each survey form, write in the DATE and your initials as OBSERVER. Circle the CITY in which you are collecting data and the LOCATION. This information can be noted during slack periods or after the actual observations.

On each survey sheet, there is room to record information for the Driver and six other occupants. These seven occupants are represented by the seven columns. **You will record information by going down each column and circling the appropriate code for each variable.** For each occupant in the vehicle, you will record seating position, age, sex, race, and restraint usage. You will also record the relationship of children to the driver and ask three questions of the driver.

To get some of the needed information, you will have to engage the driver in conversation. As the car stops, approach the driver and say, "Good morning/afternoon. The UNC Highway Safety Research Center is doing a survey of how children ride in cars. Could you please tell me how old each of the children in your car are?"
After they give you this information, ask, "Are they all your children?" or "Is this your child?" or some such phrase to try to determine how the children in the car are related to the driver. Finally you will ask, if you have time, "About how far will you be driving to your next stop?"

When you first approach the vehicle, the driver may be reluctant to talk to you and ask what this is all about. Within the time you have, quickly explain that this is a safety survey for the Highway Safety Research Center. Do not try to pressure anyone who does not want to participate.

More detailed instructions for filling out the form follows:

POSITION

Always list the driver in the "DR" column. It does not matter which column you use for the other occupants, but since we are trying to get information on children, you should start off with them rather than adults for occupants 2-7. Do include adults as well as children if you have time.

Within each column, circle the correct code for the seating position of that occupant. If the occupant is sitting in a position other than a standard position, circle "other (OT)" and note in the comments box what that position is (e.g., bed of pick-up truck, station wagon cargo area, floor of van). Note that it can be valid to list a child as being in the driver's position if the child is sharing the seat with the driver. You can also have two occupants in any other position as in the case of a lap held child or two children sharing one seat belt. For instance, in the case of a child being held in the lap of an adult in the front passenger seat, you would circle "RF" for the position for both the adult and the child. For restraint use further down the column, you would then circle the appropriate code for the restraint status for the adult and circle "2 (ON LAP)" for the restraint status of the child.

AGE

Ask the driver of the car for the ages of the children in the car, through about age 15. For the driver and other occupants, your best guess is sufficient. If a child is less than age 1, also ask for the child's weight so that you can make a judgement about correctness of front/rear facing seat.

SEX

Circle the appropriate code for either male or female.

RACE

Circle the appropriate code for either white, black, or other.

RELATION

We want to know the relation of the child(ren) in the car to the driver, even if the driver is not the child's parent and the parent is in the car. Ask for this relationship at the same time you ask for ages. Note the appropriate relationship as being either the child, grandchild, other relative or nonrelative of the driver. This information is not needed for children older than fifteen. Leave blank for older children and adults.

RESTRAINT

Of primary importance is to check the restraint status of the occupants. While there are 13 different restraint codes, they are really in three basic groupings -- no restraint, seat belt, or child safety seat. For none, they can be totally unrestrained or being held on someone's lap. For seat belts, they can have either a shoulder belt only, a lap belt only, or a lap and shoulder combination. There are three different categories for lap/shoulder combinations. If the person is wearing a lap and shoulder combination, note if the shoulder portion is being correctly worn across the shoulders and chest, if it is slipped completely behind the person's back or if it is tucked under his/her arm.

You will also need to determine the type of seat belt system that the vehicle has, either manual or automatic. If it is an automatic system, you need to note if it is a three-point lap/shoulder (General Motors), motorized shoulder or non-motorized shoulder with manual lap belt, or shoulder only. Otherwise, treat an automatic system as if it were a manual system for coding. For instance, if the driver has a motorized shoulder belt, check "Motorized" for type of system and then circle "3 (SHOULDER ONLY)" if he/she is not wearing the manual lap belt or "5, 6, or 7(lap/shoulder modes)" if he/she is wearing the lap belt.

CHILD RESTRAINT

If the child is in a safety seat, note what type it is. A few seats in use will be non-crash-tested models. There are five categories for type of safety seat. First, you will have to decide if the seat is designed for infants only, if it is a convertible seat, or if it is a booster seat. For the convertible and booster seats, you will need to determine if they are harness only models or if they have shields. If the booster is one designed only for household or restaurant use, it should be recorded as non-crash-tested.

HOW CHILD RESTRAINT USED

If a child is in a safety seat, we need to know if it is being used correctly. While there are many degrees and types of misuse, we will only be looking for gross errors. These are if the seat is facing in the wrong direction (primarily infants riding front facing), if no harness or shield is being used to secure the child, or if there is no seat belt securing the safety seat. Many booster seats that require a harness will be used with just a lap belt over the child (a lap and shoulder belt is correct usage). If a harness type booster seat does not have the harness being used but the lap belt is used, mark it as "No Harness". If neither harness or belt are being used, mark it "No Belt." If you see a seat with multiple misuse modes, circle all that apply.

ASK ALL DRIVERS

Unless you are terribly pressed for time and creating a traffic jam, ask the driver the three questions listed. For the distance to the next stop, approximate guesses are sufficient.

STATE OF CAR LICENSE and LICENSE

As the car is leaving, record the State and license number for the vehicle. These will be used only to obtain the Vehicle Identification Number to verify the type of restraint system that the vehicle is equipped with.

GIVE THE DRIVER A MAIL-BACK SURVEY

Give the driver an envelope containing a mail-back survey as you are finishing up with the interview and encourage him or her to fill out and return it.

THANK YOU FOR TAKING THE TIME TO TALK WITH US

This survey is being done by the University of North Carolina Highway Safety Research Center. Answering these questions is voluntary, but we hope that you will choose to answer them for us. Responses to these questions will be strictly confidential. The driver of the car that was stopped should answer the questions and fill out and return the survey as soon as possible in the stamped envelope provided. Please be honest in your answers; we want to find out how you feel about seat belts and safety seats and when you use them. If you have any questions, call us toll-free in North Carolina at 1-800-672-4527 between 8:00-5:00 Monday-Friday. Also, you can write us at: UNC Highway Safety Research Center, CB# 3430, Chapel Hill, NC, 27599. If you have further questions or concerns about your rights as a participant, write the UNC Academic Affairs Institutional Review Board, Office of Research Services, CB# 4100, Chapel Hill, NC, 27599 or call 919-966-0646.

Please circle your answers or fill in the blanks for the following questions.

1) Are you the driver of the car that was stopped by a data collector at the shopping center or day care center? **Yes** **No**

2) Were the children, less than age 16, in the car related to you or children of friends? (Circle all that apply)

1. My child(ren)	3. Niece/Nephew	5. Other Relative
2. Grandchild(ren)	4. Brother/Sister	6. Neighbor/Friend

3) How old is your youngest child? _____ years _____ months No children

4) Are you aware that North Carolina has a law that requires children to be buckled up?

No **Yes**

a) What age children are covered by the law?
1. Under age 2 2. Under age 4 3. Under age 6 4. Don't know

b) At what age can seat belts be used in place of a safety seat?
1. 1 year old 2. 3 years old 3. 6 years old 4. Don't know

c) Which drivers does the law affect?
1. All drivers 2. Just parents 3. Parents and relatives 4. Don't know

d) What are the penalties? (Circle all that apply)
1. Warning ticket
2. 1 insurance point
3. 2 driver's license points
4. $10 fine
5. $25 fine
6. Don't know

5) Are you aware that North Carolina has a law that requires adults to be buckled up?

No **Yes**

a) Who is covered by the adult seat belt law?
1. Drivers only
2. Drivers and front seat occupants
3. All occupants
4. Don't know

b) Which vehicles are <u>not</u> covered by the law? (Circle all that apply)
1. Cars made without seat belts
2. Cars with seat belts removed
3. Cars used for short trips
4. Pickup trucks
5. Some delivery trucks
6. Don't know

c) What are the penalties? (Circle all that apply)
1. Warning ticket
2. 1 insurance point
3. 2 driver's license points
4. $10 fine
5. $25 fine
6. Don't know

6) In your community, who has been active in getting people to use seat belts and child safety seats? (Circle all that apply)

1. Radio	6. Highway Patrol
2. TV	7. Hospital
3. Newspaper	8. Health Department
4. Police Department	9. Other _____
5. Sheriff's Department	10. No One

Please go to second page

Please circle your answers or fill in the blanks for the following questions.

7) How often do you use car safety seats or seat belts for children in your car?

1. All of the time 2. Most of the time 3. About half of the time 4. Some of the time 5. Never

a) What are your reasons for not using safety seats or seat belts for child(ren) all the time?

_____

_____

b) When are you most likely to buckle up child(ren)?

_____

_____

8) How often do you use your own seat belt?

1. All of the time 2. Most of the time 3. About half of the time 4. Some of the time 5. Never

a) What are your reasons for not using your seat belt all the time?

_____

_____

b) When are you most likely to use your own seat belt?

_____

_____

9) Do you now or have you ever used a safety seat for children in your car?

No Yes

a) How did you get the seat(s)?

1. Bought new
2. Bought used
3. Gift from friend/relative
4. Gift from _____ (Fill in name) hospital
5. Rented from _____ (Fill in name)
6. Other = _____

b) Do (did) you have instructions for the seat(s)?

1. Yes, complete
2. Yes, a label on the seat only
3. No, lost or thrown away
4. No, never had them

c) Do (did) you use the safety seat(s) just like the instructions say to?

1. Yes 2. No 3. Don't know

d) If not, what do (did) you do differently? _____

_____

e) Why do (did) you use the safety seat differently? _____

_____

The following questions are for research purposes only. Remember that all answers are confidential.

10) What is your age? _____ years

11) What is your sex? 1. Male 2. Female

12) What is your race? 1. White 2. Black 3. Other = _____

13) What is the last grade of school you completed? (Please circle one)

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20+

14) What is your total family income? 1. Less than $10,000 2. $10,000 - 25,000 3. $25,000 - 40,000 4. More than $40,000

15) What state and county do you live in? State = _____ County = _____

Thank you very much for your help. Please return your completed questionnaire in the envelope provided. You do not need to put a stamp on this envelope. If you need to use another envelope, please send it to the address listed for the Highway Safety Research Center on the first page.

UNC Highway Safety Research Center

1992 CR Observational Surveys

Mail-back Survey Protocol

Mail-back surveys will be given out to drivers of vehicles stopped and included in the 1989 Child Restraint observational surveys. The purpose of these mail-back surveys is to obtain more information from the drivers than is possible during the encounter in the parking lot.

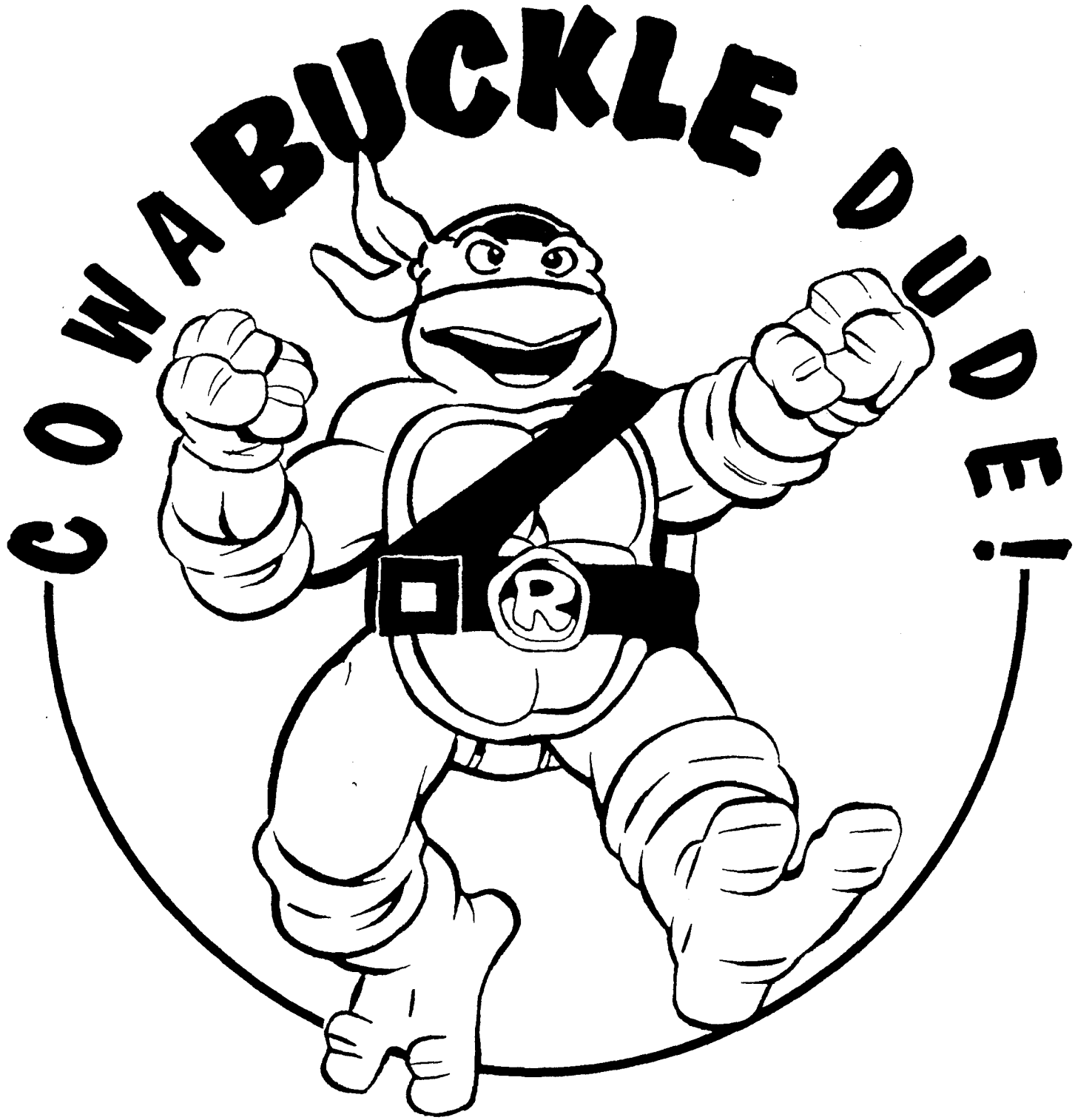
Limit the distribution within each city to about 250 unless you have some left over from a previous city.

The distribution of the mail-back surveys will be relatively simple. Every driver who is interviewed for the observational survey should receive an envelope containing the mail-back questionnaire.

Please encourage the drivers to take the questionnaire home, fill it out, and return it. We have provided a postage paid envelope for the return and be sure to tell them that they will have a chance to win $100 if they do so.

Appendix E.

"Cowa-Buckle-Dude" Coloring Sheet



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