EVALUATION OF COMMUNITY TRAFFIC SAFETY PROGRAMS

FINAL REPORT

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CHAPTER 1. INTRODUCTION

In recent years the development of community traffic safety programs (CTSPs) has proliferated. These programs have been promoted by the National Highway Traffic Safety Administration (NHTSA), which has been offering a course entitled "Community Traffic Safety Program" at the US DOT Transportation Safety Institute in Oklahoma City, Oklahoma (U.S. DOT, 1991). The course fosters the idea that CTSPs should be broad-based and recommends project elements such as problem identification, planning, and evaluation; legislation and regulation; community outreach; school programs; publicity; law enforcement and adjudication; and emergency medical services.

North Carolina has participated in the development of CTSPs, primarily through funding provided by the Governor's Highway Safety Program (GHSP). The University of North Carolina Highway Safety Research Center (HSRC) was asked by the North Carolina GHSP to evaluate three North Carolina community programs. The programs were located in Charlotte, Greenville, and Greensboro. The Charlotte and Greenville programs were hospital-based and are referred to as Traffic Injury Prevention Programs (TIPPs). The Greensboro program was managed by the Police Department and referred to as the Greensboro Traffic Safety Program. Following the recommended NHTSA model, the Charlotte and Greenville TIPPs contained a variety of project elements, while the Greensboro police program was a bit more narrowly focused on enforcement and public information and education.

HSRC's approach was to become familiar with the programs through site visits and interviews with key personnel, as well as reading annual, quarterly progress, and other project reports that were available. We examined process and impact evaluation data where available from the programs, and also conducted separate analyses utilizing other NC statewide data or data we specifically gathered.

This report is organized into various chapters. Chapters 2-4 contain multi-year descriptions of the three programs primarily utilizing annual and quarterly progress report information. Within each chapter then follows HSRC's evaluation of

several important elements. Chapter 5 is impact evaluation oriented and examines seat belt and child safety seat use and serious and fatal injury trends within each program. Chapter 6 is a discussion of findings.

CHAPTER 2. TRAFFIC INJURY PREVENTION PROGRAM OF CAROLINAS MEDICAL CENTER

Charlotte, North Carolina

INTRODUCTION

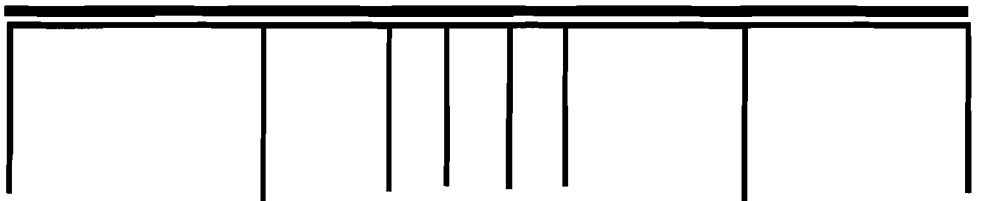
Mecklenburg County is the center of North Carolina's largest population base and the site of major business activity in the Southwestern Piedmont of the state. Statistics for the city of Charlotte and Mecklenburg County reflect a good deal of traffic-related serious injury and trauma. Within North Carolina, the county had the highest rate of both crashes and injuries per 1,000 population for 1989. The three prior years also showed a steady increase in the frequency of crashes and injuries. In 1989, the county accounted for 12 percent of North Carolina's total motor vehicle crashes and 11 percent of the total motor-vehicle-related injuries, compared with eight percent of the state's total population. The economic impact of Class A injuries in Mecklenburg County was estimated to be $272 million in 1989.

In 1988, the Charlotte TIPP planning process was undertaken to create a broad-based, comprehensive traffic injury prevention program that could be used and adapted to any community. The Carolinas Medical Center, the Level I regional trauma center, and its affiliate, Charlotte Institute for Rehabilitation, had developed an interest over a period of years in reaching beyond traditional parameters of the health delivery system to address multiple community traffic and other injury-related problems. In addition, the Hemby Pediatric Trauma Institute at the Carolinas Medical Center had as one of its primary objectives the prevention of childhood injuries.

The TIPP intervention program is primarily structured around educational training and informational programs and focuses on five major areas (Figure 2.1). These include: Substance Abuse, Enforcement Agency Support, Youth Programs, the support of a Community Resource Center, and Occupant Protection. Youth

Traffic Injury Prevention Program of Carolinas Medical Center

Charlotte, North Carolina



Substance Abuse
- ENCARE presentations
- Designated Driver Programs

Youth Programs

Occupant Protection
(in planning phase)

Child Restraint Safety
(Ages Birth to 4 years)
- Special Needs Seat Program
- Hospital Car Seat Program
- Safety Checks

Enforcement Agency Support
- Speed Trailers
- Brochure
- Crime Prevention Unit Safety Presentations

Community Resource Center
- Highway Safety Library Collection

Preschool Education
(Ages 3 to 5 years)
- Kid Tips Curriculum

Child and Adolescent Safety
(Ages 6 to 12 years)
- Traffic Safety School Curriculum
- Bike Rodeos/Helmet Distribution
- Bike Hang Tags
- Safety Town

Brain and Spinal Cord Injury Program (High School)
- Think First

Associate Agencies

American Automobile Association
Charlotte Mecklenburg Schools
Charlotte Police Department
Charlotte Rehabilitation Hospital
Hemby Pediatric Trauma Institute
Huntersville Oaks Nursing Home
Injury Prevention Research Center
Mecklenburg County Health Department
Motorcycle Safety Instructors
National Safety Council
North Carolina Highway Patrol
Royal Insurance Company
Safe Drive
Safe Kids
University of NC - Charlotte

Figure 2.1. Structure of the Charlotte program.

Programs, the most comprehensive and ambitious, are further divided into components including: Child Restraint Safety, Preschool Education, Child and Adolescent Safety, and Brain and Spinal Cord Injury Prevention. Groups of six to 10 volunteers from throughout the community who are either personally or professionally concerned about traffic-related and other trauma injury served on committees to help define various subtopics. The TIPP network encompasses representatives from business, education, government, civic interests, broadcast and print media, and the health field. TIPP provided the committees with statistical information, reference material, program information, and professional staff support as decisions were made about directions for the program.

The program has received recognition, both within and outside of the state. Director Richard Gentsch makes presentations in which he discusses the TIPP model with health care providers. Following such presentations, other hospitals contact the Medical Center and are provided information on how to become involved in injury prevention activities.

A school safety curriculum specialist was hired in the Health Education Department in October 1989. This person, initially funded by TIPP and later funded through the public school budget, facilitated implementation of the safety programs in the schools. The Charlotte-Mecklenburg school Safety Curriculum was promoted regionally beginning in June 1991 through area school systems, at the National Lifesavers Conference, and through regional health care providers. The integrated safety curriculum was made available to other cities and states as requested.

PROGRAM COMPONENTS

Substance Abuse

The TIPP Substance Abuse Emphasis aims at two major target groups: the Adolescent/Adult, and the Pre-Adolescent. This substance abuse emphasis was the result of input from two separate groups of volunteers. The pre-adolescent areas

were addressed by Mothers Against Drunk Driving (MADD) and Students Against Drunk Driving (SADD) organizations. The young adult areas were addressed by emergency department staff from Carolinas Medical Center, Presbyterian Hospital and Mercy Hospital.

The Adolescent/Adult component is led by Emergency Nurses Cancel Alcohol Related Emergencies (ENCARE), an organization of emergency room nurses from Carolinas Medical Center and University Hospital. The nationally promoted ENCARE program is designed to increase awareness of the effects of alcohol among those of high school age. Prepared presentations are augmented by personal experiences of nurses in the emergency room.

Beginning in the first quarter of 1989, nurse volunteers from three emergency departments in Mecklenburg County made presentations throughout the community. Program scheduling for ENCARE was coordinated through TIPP, and 25 nurses were trained and provided necessary equipment and materials. ENCARE was made available to individual teachers and student groups, and also was identified in the school safety resource guide for senior high schools. Following its initial introduction, the ENCARE program was promoted community wide through a direct mailing to more than 600 community and church youth organizations, which resulted in presentations being made to counseling services, Kiwanis clubs, high school drivers education classes, a high school SADD group, and to a group of Girl Scouts. From January through March 1992, more than 600 community members attended ENCARE presentations. In all, the ENCARE program has been presented to more than 1,200 adults and youth.

TIPP also joined with the National Safety Council and the Charlotte-Mecklenburg School System to bring the DWI message to high school students during National Drunk and Drugged Driving Week during the fall of 1990. Vince and Larry were used at three area schools to distribute drunk driving information during lunch periods, and they also appeared at one local high school for its annual SADD-sponsored "Dead Day," a day-long focus on drunk driving. The event culminated in the presentation of the ENCARE program to the entire student body

of 900.

TIPP joined with the Palladium at Carowinds, a local theme park and concert facility, to support a designated driver program at all concert events that serve alcohol. For each of the 19 shows of the 1991 concert season, TIPP and Carolinas Medical Center elicited the support of four volunteers to operate a booth and sign up designated drivers. The program was co-sponsored by cable television's Music Television (MTV). Two drunk driving PSAs were produced with approximately 40 per week being aired on MTV, as well as on Video Hits One (VH-1). The Designated Driver Program was also carried out during the 1992 concert season.

In a similar effort, TIPP joined the National Basketball Association Charlotte Hornets and the Charlotte Coliseum in establishing a Designated Driver program at the team's home games for the 1991-1992 season. Designated drivers who signed a pledge card received a coupon for a free soft drink. At the end of the 42-home game season, a total of 2,500 fans had signed pledge forms for an average response of 60 pledges per game. Expenses totaled just over $400, including the cost of signage, pledge card and soft drink coupon printing. Program expenses were divided between the Charlotte Hornets and TIPP. Two volunteers per game from Carolinas Medical Center staffed a booth through half-time of each game. In total, approximately 55 people from Carolinas Medical Center volunteered to work the booth during the season. The volunteers were given tickets to see the second half of the game at which they worked and two tickets donated by the Charlotte Hornets for another game during the season.

The second substance abuse area focuses on Pre-Adolescents. TIPP secured the commitment of the board of education of the Charlotte-Mecklenburg Schools to work together to make traffic safety issues and programs a regular part of the school curriculum. This effort is accomplished by the coordination of educational programs for these school systems and by the distribution of materials for use in enhancing early education in substance abuse awareness and refusal skills. Injury prevention topics have been incorporated into a revised curriculum in Health Education areas with the distribution of a School Safety Packet. Teachers from each

grade level critiqued the curriculum for their grade level beginning in March 1991, and their response was positive. Utilization of the K-6 Safety Curriculum began at the start of the 1990-91 school year.

Starting at the fourth-grade level, the schools utilize the "Free For Life" and "Friends Keep Friends Alive" programs developed by MADD. "Friends Keep Friends Alive" consists of an interactive comic book used to create early awareness and refusal skills in elementary school students. The comic book can be used in conjunction with the "Free For Life" program. That program targets students in fourth through ninth grades in all 81 Charlotte-Mecklenburg elementary schools serving those grade levels and attempts to teach students to resist and reject the social pressures related to the use of alcohol and drugs. The program utilizes peer education to enhance the quality of the students' learning experiences, which should result in increased participation.

TIPP also worked with the Charlotte-Mecklenburg Schools to create an eight-minute informational video on school safety programs. The video explains briefly the goals of the TIPP/Charlotte-Mecklenburg Schools safety program and curriculum and features a description of both the Safety Town program for kindergarten students and the Think First program for high school students. The video was broadcast on local television in 1990.

Enforcement Agency Support

The TIPP Enforcement Agency Support Plan is the result of efforts of volunteers from the Charlotte Police Department, Mecklenburg County Police Department, the North Carolina Highway Patrol and Carolinas Medical Center. The area of Enforcement Agency Support addresses such issues as speeding, the development and distribution of a safety issues brochure, and Crime Prevention Unit Safety Presentations.

Factors that were identified by TIPP and law enforcement participants as major contributors to motor vehicle crashes and injuries included speed, DWI, and

improper use of safety restraints. A brochure titled "Think Safety" was developed that provided information on these three issues for handouts by police officers when issuing warnings to motorists. Since Law Enforcement Week in May 1990, the Charlotte Police Department, the Mecklenburg County Police Department and the North Carolina State Highway Patrol have continually handed out copies of this brochure.

TIPP also facilitated the purchase of two mobile traffic zone radar trailers, the first of which was acquired in 1989, that have been used by both the Charlotte Police Department and Mecklenburg County Police Department to make motorists aware of their speed and encourage voluntary compliance with speed laws. TIPP also coordinated with GHSP to distribute an airbag information brochure for first responders to local law enforcement and EMS providers.

To obtain more accurate and complete information during the initial investigation of motor vehicle crashes, TIPP sponsored in-service training of patrol officers and the training of two instructors from the Charlotte Police Academy. A total of nineteen 40-hour, in-service training sessions were held for patrol personnel of all departments at the Charlotte Police Academy. The trained instructors are available for training new recruits and patrol officers in all local departments.

Youth Programs

Child Restraint Promotion. Statistics collected by the Carolinas Medical Center Trauma Registry between September 1987 and October 1988 indicated that 26 percent of all trauma admissions to the medical center for children less than five years were due to motor-vehicle-related injuries. The purpose of the Child Restraint Safety area was to combat the high number of injuries suffered by children in motor vehicle accidents by means of educating the public in the need for and proper use of child restraints. Specific components included special needs seat programs, hospital car seat programs, and safety checks with an emphasis on restraints for children from birth through four years.

The Charlotte-Mecklenburg Hospital Authority Car Seat Program, which distributed more than 16,000 car seats through the Medical Center and through University Hospital from its inception in 1986 through 1990, provided a base for the planning and implementation of the TIPP Child Restraint Safety emphasis. In conjunction with the Mecklenburg County Health Department, TIPP established a car seat loaner program that became operational in May 1990. The health department was provided with convertible car seats which were then rented to community members on a sliding fee scale basis. Car seats were issued to parents of all newborn children who either requested or needed the seats at University Hospital and Carolinas Medical Center.

TIPP has held car seat clinics since 1990, in partnership with the health department. The program features an in-car inspection on proper restraint use. Child restraint literature is also distributed at these functions, including "Buckle Bear" material and video from Shinn and Associates, "Safe Kids" literature, and "Growing Up Buckled Up" brochures from the North Carolina Governor's Highway Safety Program. The health department's prenatal education classes also utilize "Growing Up Buckled Up" material to teach child restraint use.

TIPP-sponsored child restraint training workshops have been conducted to enhance the expertise of personnel involved in child restraint issues. The initial focus was for pre-school teachers through regional Head Start organizations. These workshops typically have included a child restraint check-up at local day care centers. As of the end of 1991, training had been provided to more than 70 teachers from counties in both North and South Carolina, who then passed that information to more than 400 students.

Within the Charlotte-Mecklenburg School system, Safety Town displays were set up to teach students the importance of occupant restraint and other safety habits. Safety Town is a national program designed to teach entering kindergarten students and their parents about traffic, pedestrian, school bus, personal, and fire safety. The program involves the participation of the fire department, police department, school staff, and PTA volunteers. A portable child-sized town is used to teach traffic

safety to the children. In 1991, 15 Safety Town programs were attended by approximately 1,650 children. In the first three months of 1992, 21 schools were involved with demonstrations, reaching 2,500 students.

In the beginning months of 1992, the Buckle Bear Puppet show was prepared for use in several elementary schools. Volunteers made the props and puppets for the shows. During Child Passenger Safety Week, "Buckle Up!" badges and Teenage Mutant Ninja Turtle "Buckle Up!" coloring pages were distributed to kindergarten through third-grade students. Teachers were asked to incorporate these materials into a seat belt safety lesson.

In regard to other miscellaneous activities, TIPP also helped to sponsor a Safety Town event at University Hospital in the spring of 1990 for children associated with a large, commercial day care provider in Mecklenburg County. During Child Passenger Safety Week in 1992, informational displays were set up in the hospital cafeteria, and Vince and Larry (the crash test dummies) visited patients on the pediatric floor. Also during the week, TIPP joined with the Charlotte Police Department, the North Carolina Highway Patrol, and the Safety and Health Council of North Carolina in organizing a display at a local mall, at which materials were distributed and a car seat was displayed. TIPP also participated in planning and implementing University Hospital's Summer Smartstart program in June 1991. This event featured a variety of health-related activities including a bicycle rodeo, at which approximately 300 children participated with their parents and received complimentary bicycle helmets.

Preschool Education. The Preschool Safety Program is a written resource for community day care centers, private and public pre-schools, and various other entities providing pre-school care and/or education designed to address and combat early childhood injuries. The program planning process identified the need for an Early Childhood Injury Prevention Specialist to communicate preschool safety to children, teachers, care givers, and civic and community concerns. TIPP, in partnership with the Charlotte Mecklenburg Hospital Authority Foundation,

provided this specialist in the first quarter of 1989 to develop and implement a curriculum and to serve as a community resource and catalyst in the promotion of pre-school injury prevention.

The program's goals were accomplished through the use of the KIDTIPS curriculum, which was developed by the Hemby Pediatric Trauma Institute of Carolinas Medical Center and targets children ages three to five years. The KIDTIPS program encompasses issues of restraint use, pedestrian safety, burns, drownings, falls, and poisons. The program was featured on a local television program in the beginning of 1990. KIDTIPS is utilized by community day care centers, private and public pre-schools, and various other entities providing pre-school care and/or education. Training sessions for the Pre-school Safety Program have involved some 750 teachers, reaching more than 3,800 pre-schoolers. In addition, KIDTIPS workshops have been presented to extension homemakers, Catawba County Child Lecture Series, and to the North Carolina Voice for Child Care. High school students who wished to work in day care centers, as well as home day care providers, have also given training in the KIDTIPS program. A presentation was also made in July 1991 at a school set up for physically and emotionally handicapped students. Eight teachers, representing 30 children, attended the presentation.

Child and Adolescent Safety. Of all the pediatric trauma victims admitted to the Carolinas Medical Center between September 1987 and October 1988, 48 percent were injured in traffic-related incidents. The TIPP Child and Adolescent Safety Emphasis plan is the result of the efforts of The Hemby Pediatric Trauma Institute, the Charlotte-Mecklenburg Hospital Authority Foundation, and the Medical Center's Pediatric Department. Its goal is the support of a three-fold program of interventions targeting the under 16 population. The Child and Adolescent Safety Program encompasses the major areas of Bicycle Safety, Pediatric Trauma, and Safe Kids.

The Bicycle and Skateboard Safety area is designed to educate children in the proper use of bicycles and skateboards. Service organizations and other community

groups provided programs on safe riding practices and techniques for bicycle use and bicycle safety inspection programs. The promotion of bicycle safety equipment has been encouraged through the use of bicycle rodeos and helmet distribution programs. Bicycle hang tags, featuring the message that "This Bicycle is Missing One Part -- A Helmet," used by all private bike shops as well as local department stores, were prepared to remind parents of the importance of purchasing helmets in addition to bicycles. These tags were also placed on all bikes sold at police auctions. Along with the Optimist Club, TIPP has supported helmet distribution in the annual Christmas bike give-away. In addition, TIPP has supported the loan of the Safety Camp video and Safe Kids bike safety magazines for after-school bike safety programs.

TIPP also worked with the Salvation Army to develop a Bicycle Safety Program with the Boys and Girls Clubs of Union and Mecklenburg Counties. Within the school system, emphasis was given to proper utilization techniques and promotion of safety equipment for bicycles and skateboards. The program also supported a bicycle helmet sale drive at a local elementary school. The helmet sale was conducted through the PTA prior to Christmas 1990 in preparation for a March 1991 bicycle rodeo. In all, 120 helmets were ordered by students.

The first bicycle rodeo was held in October of 1989 and was attended by approximately 50 children, each of whom was fitted with a complimentary Bell Streetrider Bicycle Helmet. The rodeo featured a check-off of required parts, a bicycle safety class and bicycle inspection, helmet fitting, and a bicycle skills riding course. A second rodeo was held in May 1990, during which 200 helmets were distributed to participants. Another rodeo in September 1990 in downtown Charlotte was a four-hour event in the parking lot of a local merchandise mart. Approximately 700 six-to-10-year olds and their parents attended. All 700 received helmets. The event was promoted through the largest local newspaper, beginning four weeks before the event. In addition, 7,500 fliers were printed and distributed to all third-grade students in the Charlotte-Mecklenburg School System, and 3,000 fliers were distributed through local pediatrician offices. Pre-registration of participants was

handled by TIPP with the support of the Charlotte-Mecklenburg Hospital Authority. Duties for the event were divided between law enforcement and civilian volunteers.

In order to increase community awareness of childhood injury risks, national "Safe Kids" promotional concepts were developed for use through the media, special events, and by the distribution of safety material on transport-related injury prevention throughout the area. TIPP supported the efforts of the local coalition of "Safe Kids" by providing the booklet "How to Protect Your Child from Injury" for parental audiences and "Safe Kids Magazine for Kids" for the child audience. These booklets were distributed through schools, PTAs, community groups, church groups, and at special events. Safety programs were conducted for kindergarten classes, after-school programs were provided, and representatives gave television interviews on holiday safety.

In the community, safety literature was distributed to Parks and Recreation departments and churches, as well as through Carolinas Medical Center, University Hospital, pediatricians' offices, obstetricians' offices, day care centers, elementary schools, and retail stores. At various events, raffles were held for those who signed seat belt pledge cards. These people also got an "I Pledged" sticker to wear. Along with the Children's Miracle Network Telethon and McGuffy's Restaurant in Matthews, NC, TIPP helped to present a community safety event in the restaurant's parking lot. Topics of the event included bike safety and helmet use, seat belts, child restraints, DWI and bus safety.

TIPP has participated in a number of county health fairs and assisted in the development and implementation of a two-day safety fair sponsored by Electronic Data Services in the University of North Carolina-Charlotte area. The fairs have featured presentations on fire safety, Safety Town, and Vince and Larry activities. Approximately 600 children from pre-school to sixth grade attended the fairs.

Building upon the work of the Hemby Pediatric Trauma Institute, the Pediatric Trauma portion of the program was designed to enhance existing community awareness and media sensitivities to the care given to young injury

victims. EMS personnel were provided with the most recent information and techniques in the care of young trauma victims, including the EMS training manual, "Pediatric Trauma Management for EMS." TIPP supported the production and distribution of the manual, and over a two-year period, 3,500 copies of this manual were distributed free of charge throughout the state of North Carolina.

Brain and Spinal Cord Injury Program. The purpose of the Brain and Spinal Cord Injury Prevention Program is to increase awareness of neurological injuries and to develop prevention programs with this focus. TIPP has utilized the "Harm's Way" Program from the American College of Neurological Surgeons, targeted at grades 7 through 12, to educate young people in the prevention of head and spinal cord injury. The utilization of both education and audience participation has been found to be a very effective means of promoting an awareness of the risks of brain and spinal cord injury. The 20-minute "Harm's Way" film on risk-taking behavior illustrates the after-effects of the resultant brain and spinal cord injuries. A wheelchair obstacle course for participants is part of the presentation. It involves a portable unit constructed by TIPP that features ramps, a storm grate, a gravel pit, a door that swings out, and a wall-mounted telephone.

The "Harm's Way" program was introduced in a community presentation in November 1989. The Charlotte-Mecklenburg Schools employed the program during the 1989-1990 school year through an auditorium-style presentation. The program was performed for approximately 8,500 students between November 1989 and March 1990 in 13 public and two private schools. The "Harm's Way" title eventually shifted to "Think First," and the presentation is becoming a more regular part of the tenth-grade curriculum in areas of health matters and drivers' education. From October through December 1991, nine "Think First" presentations were made to more than 2,500 audience members.

The TIPP program eventually became certified by the National Brain and Spinal Cord Injury Prevention Program as a regional training center for North and South Carolina. Instructors at the centers are volunteer nursing staff from the

Hemby Pediatric Trauma Institute, Trauma ICU and Neurosurgical ICU. Promotion of the program was carried out through the national organization, the Medical Auxiliary, and paramedic groups. This promotion has extended through North Carolina, South Carolina, and Virginia. Training sessions have been presented to trainees from both North and South Carolina.

In an effort to broaden the scope of the program, TIPP supported the presentation of "Think First" programs in the community as well as in the local schools. One community program featured NASCAR driver Ricky Rudd.

Community Resource Center

One problem recognized by TIPP was that obtaining access to current traffic safety information had been frequently difficult for the general public. Thus, it was decided that a centralized distribution point for traffic safety and other community program information should be created to enhance community education and involvement.

The Community Safety Resource Center opened in February 1991 and has been housed and maintained in the new main library of Charlotte and Mecklenburg County ever since. Through the support of a $11,500 grant provided by TIPP, the Public Library initiated the purchase of resource materials on traffic safety and injury prevention. Both print and audiovisual titles were secured, including books, research papers, periodicals, catalogues, videos, films, program guides and brochures. Access to the collection is provided through the computer system to 18 branch libraries as well as the media centers in the public school system. One year following the implementation of the center, 70 of the center's 103 books had circulated at least one time for three weeks. The center's 19 videos had circulated an average of 31 times each. Due to the success and the positive public reception of the resource center, it will remain part of the library's permanent collection.

Occupant Protection

Based on data collected by staff from the Highway Safety Research Center from several sites that are part of an on-going statewide program to assess safety belt use, Mecklenburg County obtained a belt use rate of 68 percent as of June 1988. The rate was slightly greater than the overall rate of 64 percent for the State of North Carolina. However, the percentage was still below the National Highway and Traffic Safety Administration's 70 percent compliance goal. The purpose of the Occupant Protection component of TIPP is to increase public awareness of the proper usage of occupant restraint systems and the importance of compliance with the North Carolina Seat Belt Law. Critical elements that have been identified and targeted for intervention are restraint system awareness and user compliance.

TIPP worked with North Carolina Seat Belts For Safety and the North Carolina Automobile Dealers Association on the design and the creation of the "Safety First" program. This program trains new car sales personnel on how to use automobile safety features and automatic restraint systems as a positive tool. Through this coalition effort, "Safety First" has been designed and approved by the Executive Council of the North Carolina Automobile Dealers Association. Further effort by TIPP has resulted in the support of Mecklenburg County MEDIC (Mecklenburg EMS provider) in presenting "Safety First" to area sales personnel and the introduction of the program to the 63-member Mecklenburg County Automobile Dealers Association. This program utilizes "The Winning Combination" video produced by NHTSA, the "Usage Guide" brochure provided by North Carolina Seat Belts For Safety, and a rear view mirror hang tag to promote safety discussion with sales personnel. The TIPP office plans to coordinate the dealer training sessions, and paramedics will serve as instructors for the sales staff. Although well conceived, this program has yet to be implemented to much of an extent.

The TIPP Corporate Seat Belt Emphasis plan is the result of the efforts of personnel from Carolinas Medical Center, Charlotte Institute for Rehabilitation, and University Hospital. Through the joint effort, a corporate seat belt program was

produced for use in the local area by 45 local companies with 500 or more employees. Again, implementation has been slow to develop.

Motorcycle Safety

Nationally, the risk of injury occurrence to motorcyclists in crashes from 1986 to 1988 was between 91 and 96 percent, with the risk of death in motorcycle crashes between five to 24 times greater for motorcyclists as compared to automobile operators. Based on such figures, an early program component was motorcycle safety.

The TIPP Motorcycle Emphasis plan has been the result of the efforts of volunteers from Charlotte Honda, Charlotte Institute for Rehabilitation, and the Central Piedmont Community College Motorcycle Safety Course. The purpose of the Motorcycle Safety Program has been to educate and instruct the public in proper motorcycle safety techniques. TIPP joined with the coalition of motorcycle dealers and motorcycle safety instructors to develop and distribute a motorcycle safe driving handlebars tag for point-of-purchase promotion. The tags, distributed at the end of 1991, contained a safety equipment checklist and advice on safe riding practices and safety equipment. TIPP also promoted motorcycle safety issues through PSAs and the local media.

Adult Pedestrian Safety

The TIPP Adult Pedestrian Safety emphasis plan is the result of the efforts of volunteers from Hunterville Oaks Nursing Home. The focus of the Adult Pedestrian Safety area has been to change the behavior and/or environment of senior age groups identified as having potential for over-representation in pedestrian accidents. This has been attempted through awareness programs targeted at both the driving and pedestrian public, including a community-wide pedestrian safety week encompassing activities promoting pedestrian safety.

TIPP assembled programs such as the "Safe Rides For Long Lives" from NHTSA and the "Looking Ahead" program from the Florida Highway Patrol to address the needs of senior motorists and pedestrians. TIPP has loaned program materials to such organizations as the Mecklenburg County Health Department, Charlotte and Mecklenburg County Police Departments, and church group programs targeting senior citizens. These groups, in turn, have reached some 450 community members. Pedestrian safety materials have also been distributed through selected community outlets including mall events, and material support was provided to community and church-affiliated events.

Injury Data Bases

A number of injury surveillance data bases are available to the Charlotte TIPP. These include their hospital-based trauma registry, a pediatric trauma registry, and an emergency department surveillance system. Each of these is briefly described below, along with research and evaluation activities related to the TIPP program.

CMC Trauma Registry. The Carolinas Medical Center Trauma Registry had its beginnings in late 1987, although 1989 is the first year that the file is considered complete for analysis purposes. As with the other trauma registries in the State, the CMC registry captures information on all patients admitted to the hospital for a period of 24 hours or longer and those dying in the emergency department prior to admittance who have an ICDA diagnosis code of 800-899. Approximately 2100 cases are added to the file each year, and about 40 percent involve motor vehicle trauma.

The CMC Trauma Registry has served primarily as an administrative and research tool for the Medical Center, and has not been used to evaluate specific TIPP programs. Reports are published annually, tracking trends in the types of injuries presenting for treatment and documenting use of hospital resources. For example, in 1989, 42 percent of patients were seen for motor vehicle-related trauma, including six percent injured as pedestrians. Corresponding percentages in 1990 were 33

percent and four percent.

Pediatric Trauma Registry. The Pediatric Trauma Registry was initiated in January 1988 under the auspices of the Hemby Pediatric Trauma Institute. The Registry utilizes a special software package (Trauma I) to capture more detailed information on pediatric trauma cases ages 16 and below admitted to the CMC, following patients through post-hospitalization and rehabilitation. Coordinator Arlene Jacobs has provided the TIPP program with a number of reports based on the data base, focusing on bicycle-related injuries and restraint use by children in motor vehicle crashes.

Emergency Department Data. Charlotte's emergency department surveillance system was begun in October 1989. It was a joint project effort, designed to serve the needs of the TIPP program as well as other administrative and research purposes. Beth Ribbick has served as the overall project coordinator.

The surveillance system is designed to provide cause of injury data only. Triage nurses complete a standard emergency room form modified to include a check list of 62 frequently occurring injuries. A retrospective evaluation of the accuracy of the approach showed that 98 percent of the assigned E-codes were correct (Ribbeck et al., 1992). The system is designed to be readily adaptable to large volume emergency departments without adding to existing workloads. More than 20,000 cases of acute injury are recorded each year, only 13 percent of which are admitted for further treatment.

The Carolinas Medical Center's emergency room surveillance system has been set up so that the data is accessible to persons working outside the emergency department and can be readily linked to other hospital data bases.

HSRC'S EVALUATION OF PROGRAMS

The Charlotte TIPP was hospital-based and had a wide array of program elements. Much activity pertained to youth, and this is an area that HSRC explored in more depth, including the "Think First" program and bicycle safety events. Other components evaluated by HSRC were substance abuse activities. These are covered in the text that follows.

Youth Programs - General

In the Charlotte area there are more than 100 schools serving almost 80,000 children and young adults. Given that this total amounts to about 20 percent of Charlotte's population, the TIPP program targeted this group in their early planning. Emphasis areas included promotion of child safety seats, Safety Town, the KIDTIPS curriculum development, K-12 Safety Education Curriculum for the Charlotte-Mecklenburg schools, bicycle safety, and the "Think First" program.

An important step taken near the beginning of the TIPP program was to link with a curriculum development specialist employed by the local school system. TIPP contributed to the specialist's salary. Operating in this fashion facilitated consideration of safety concepts throughout all grade levels, as well as bypassing bureaucratic obstacles that would be routinely encountered with a hospital-based program seeking ways of entry into school curricula.

Over time, the system has worked well, with Safety Town, KIDTIPS, K-12 Safety Education Curriculum, and the "Think First" program becoming regular parts of school activities. In general, the schools determine the schedule of programs, and TIPP operates as the facilitator. Thus, TIPP aids in different ways, such as providing various materials to teachers, helping to find speakers for special topics, arranging for set up of Safety Town, and scheduling "Think First."

"Think First" is the main element of the brain/spinal cord injury prevention activity. It was chosen from the various youth programs for a more comprehensive evaluation, which follows.

"Think First"

"Think First" is an outgrowth of "Harm's Way," a program developed by the American College of Neurological Surgeons (see Brain and Spinal Cord Injury Program for more detail). This presentation (along with the ENCARE presentation) was demonstrated to an audience at a Charlotte hotel in 1989, and the response was quite positive. TIPP then began a process of incorporating the presentation into the tenth-grade curriculum at public and private schools. Although not fully institutionalized, "Think First" has become more of a regular part of the tenth-grade curriculum.

An impact evaluation of the program was not possible. Therefore, we chose to personally view a presentation for quality, content, and retention value by students.

Two HSRC staff attended a "Think First" presentation for tenth-grade students at Olympic High School in Charlotte on September 29, 1992. The presentation was typical and included the film, follow-up comments by a trauma nurse, a testimonial by a crash victim, a demonstration of the paramedic technique for head and neck-injured crash survivors, and the wheelchair obstacle course. These will be briefly described.

The film was interesting and seemed to capture the attention of the full auditorium of students. There were good visuals of a variety of "risky" activities, including white water rafting, skiing, and hang gliding. There were stories about the injured that drew an emotional response.

The trauma nurse followed with many facts -- for example, 3,500 brain/spinal cord injuries in Mecklenburg County each year, 15-24 year olds a high-risk group, mechanisms for injury (motor vehicle accidents, falls, violence, sports), and tips about "thinking first" before acting. This part of the presentation was good but probably the least interesting because of all the factual information.

The testimonial by a survivor was very effective. He described a trail riding crash in a jeep that left him permanently paralyzed, a condition that he stated could

have easily been avoided had he been wearing a seat belt. The devastation of being paralyzed, of not being able to do things he had always done, of losing friends, etc. was effectively presented and grasped by the audience. Because the presentation started late, the survivor had little time to answer questions, which likely would have been productive in further conveying the message.

Paramedics then described and demonstrated their procedure when encountering a person with a neck injury. They obtained a volunteer from the audience and attached a cervical collar, transferred to a backboard, and immobilized except for fingers and toes. Although somewhat humorous because the situation was not real, the demonstration appeared to be quite effective.

The final event was a wheelchair obstacle course that contained a pothole, a door that opened towards the wheelchair, and a storm drain. Several volunteers had difficulty trying to proceed through the course.

Besides witnessing the presentation, the HSRC staff members assembled two focus groups of students to question about their impression of the activities. The first group was tenth graders who had just heard the presentation. These were selected by one of the teachers and seemed to be very good students. Overall comments included:

- liked all aspects, would eliminate nothing
- film scared them, but the good kind of "scared" that made them think
- would make them think before doing things
- enabled a better understanding of the disabled
- liked the testimonial the best - he had "been there" and was believable
- felt only 25 percent of the student body used seat belts
- said more students now using designated driver concept than in the past
- felt ninth graders would benefit from seeing the presentation but not seniors, who would be perhaps "too set in their ways"
- felt it was ok to turn your friends down if they wanted you to do something too risky, that your life would still go on

A second group of eleventh graders who had witnessed the presentation one year earlier was also questioned to get a feel for their retention of the subject matter. This group was a better cross-section of the student body and appeared to represent more of a risk-taking group than the first. Their overall comments included:

- testimonial the best part
- felt all high school grades should see the presentation
- said that the concept of "thinking first" still had meaning, even though their presentation was one year earlier
- presentation had resulted in a kinder attitude toward the disabled
- remembered a lot about the presentation, with a good many fine details
- felt about 20 percent of the student body used seat belts

The HSRC staff thought the "Think First" presentation was excellent. The ingredients provided an interesting mix of subject matter, and the use of the testimonial and paramedic procedure added credibility. Because motor vehicle crashes are a frequent source of injury for this age group, the presentation could emphasize this a bit more strongly. Ensuring time for questions and answers from the crash survivor would also be beneficial.

It appears a bonus benefit of this type of presentation may be a better understanding and kinder attitude toward the disabled. Programs that place the audience into simulated situations such as maneuvering a wheelchair may produce more focus in preventing injuries as well as compassion for those struggling with disabilities.

Substance Abuse Activities

ENCARE Program. The concept of the ENCARE program is an excellent one --credible persons (emergency room nurses) speaking, in part from their own experience, to the age group most at risk of being involved in a fatal crash. The Charlotte area ENCARE Program has reached over 1,200 youth and adults since

1989. This has been accomplished largely by volunteers who received no compensation.

The Charlotte TIPP program provided ENCARE volunteers necessary equipment and materials to conduct programs to increase awareness of the effects of alcohol among high school age motorists. Publicizing the availability of these presentations and scheduling of appearances were handled by TIPP and the Carolinas Medical Center.

The impact of programs such as this are difficult to measure in terms of behavioral change such as identifying an increase in decisions by youth not to drink and drive or to refuse to ride with someone who had been drinking. Therefore, this review will focus primarily on presentation content, ability to reach the best audience, and the collaborative nature of the program.

ENCARE volunteers attend a training session in which they are provided a script and slides for the overall presentation. Each volunteer is encouraged to include personal experiences, and prompts for these are included in the scripts. The suggestion is made to bring a survivor to the presentation to speak from his/her perspective.

Each presentation begins with an explanation of the ENCARE Program, which leads into a description of how events in the emergency room underline the consequences of drinking and driving. Information specifically about youth crash statistics is provided along with a general explanation of how alcohol is absorbed by the body. This is followed by a series of case examples provided by both the script and from personal experiences. Next the dynamics of a crash are explained and injuries are described in medical terms such as "lacerated liver" and "ruptured aorta," supported by graphic slides showing such injuries. The program then covers the need to use seat belts and examples of belted and unbelted drivers in crashes are presented. Examples include serious injuries that require long rehabilitation, such as paralyzing injuries to the spine, as well as deaths.

Students are encouraged to join or form a Students Against Drunk Driving (SADD) chapter, and Dial-A-Ride cards are distributed. The cards have space for

three phone numbers. The students are instructed to use the first two spaces for the numbers of trusted persons that can be called when that student feels unsafe. The third slot is for a taxi company. When the presentation is being made to adults, the designated driver concept and responsible hosting are covered as well. The program concludes with the reading of an Ann Landers column titled *"Dead at Seventeen"* that addresses the denial often expressed by teenagers that anything bad can happen to them.

Clearly this is a presentation based largely on exposing youth to the graphic consequences of drinking and driving and failure to use seat belts. Some believe that young people "tune out" to images too difficult to deal with. However, since this presentation is given from the perspective of an emergency room nurse, the chances of having an impact should be increased. The information contained in the script is accurate and gives an overview of several aspects of the problem. The suggestions for activities for students to conduct at their schools is a valuable component. The activities empower students to have some control and be part of the solution for the drinking driving problem among youth.

As part of each presentation, the audience is asked to complete an evaluation survey of the program. These evaluations are sent to the regional or state chapters for review. The state chapter president was interviewed regarding the survey results to determine the overall perception of the program. She indicated that, in general, the survey responses consistently have been positive. Typical comments were that the program "really opened my eyes," and that they appreciated that the message was coming from real experiences rather than some administrative-type person lecturing them. The most commonly expressed behavior changes were to wear seat belts and avoid riding with a driver who has been drinking.

The primary audiences for this presentation are teenagers and the adults who work with teens. Offers to make presentations are mailed to community youth groups, SADD programs, high school principals, and service groups. ENCARE averages between 15 and 20 presentations per year in the Charlotte area, and it is estimated that seventy-five percent of these presentations are for youth groups.

The ENCARE Program was coordinated by a trauma nurse, whose services were provided by Carolinas Medical Center. The TIPP program provided the printed materials for the program, and the emergency room nurses volunteered their time to make the presentations. This collaboration is ideal for a community program with limited resources that is trying to reach as many people as possible.

Designated Driver Program. The objective of designated driver programs is to encourage individuals within groups that will be drinking and driving to agree not to drink any alcohol and be the sober drivers that transport the others home. Often a free soft drink is offered as an incentive.

TIPP joined with the Palladium at Carowinds, a local theme park and concert facility, to conduct designated driver programs at all concert events that served alcohol. TIPP also joined the National Basketball Association Charlotte Hornets in promoting a designated driver program at the team's home games.

As was the case in evaluating the ENCARE presentation, this program is essentially impossible to measure in terms of behavioral change such as a reduction in alcohol-related crashes or incidence of driving after drinking on game or concert nights. With an average sign-up of 60 pledges per basketball game (among an attendance of 15,000-20,000+), the numbers of persons affected by the program on any given night are too small to be able to detect a change in these measures. Also, it appears that some of those signing up were couples or persons who were not going to be in positions to make a drinking driving intervention. The result of both situations is a smaller number of persons that are intercepted from drinking and driving.

Both designated driver programs required minimum operating costs. Both were conducted with volunteer manpower and support from the theme park and the basketball franchise. The total cost for a 42-home game basketball season was just over $400, and these expenses were divided between the TIPP and the Charlotte Hornets.

The programs were held in ideal locations to reach high-risk target audiences

and intercept drinking driving behavior. Most people use personal transportation to and from both facilities. Alcohol is served and consumed in some quantity. Both the concert and athletic events attract young males, a target group that is disproportionately involved in alcohol-related crashes.

Each program generated other publicity that cannot be measured. Cable television's Music Television co-sponsored the concert program and produced public service announcements that were given good exposure. The designated driver banner was viewed by thousands of people at each home basketball game.

Although the designated driver programs were held in ideal locations in terms of target audience and need for intervention, the programs did not reach most of those who would become drinking drivers at the end of the event. A free soft drink may not be a sufficient incentive for someone who prefers to drink alcohol. If, in fact, the majority of persons who sign up are non-drinkers, then the pitch might be modified to be directed to non-drinkers in terms of how they can acceptably intervene with drinking friends. Other than the perception of an enforcement presence, little is known about what could prod participation that would result in an intervention in a drinking driving act. We hardly need point out that this attempt to offset the risks of drinking in such a setting is dwarfed by the tide of influences promoting drinking at these events. Expanding to include designated driver programs in bar settings with personal intervention by the alcohol server may produce greater participation.

It may be that there is a critical mass of exposure to a health message that is needed to create change. The true value of efforts such as the ENCARE and designated driver programs may be their contribution to reaching that critical mass.

Bicycle Safety Rodeo and Helmet Giveaway

The TIPP program was actively involved in promoting bicycle safety, primarily through the conduct of bicycle safety rodeos and helmet giveaways. For this evaluation, HSRC chose one rodeo/helmet giveaway event to examine. Registrations from this event were used to survey participants about the rodeo, their

own helmet use, and crash involvement.

A bicycle safety rodeo and helmet giveaway held on May 30, 1992 at University Hospital was part of the TIPP Summer Smartstart program and was cosponsored by the Charlotte Observer, Charlotte-Mecklenburg Hospital Authority foundation, Carolinas Medical Center, and University Hospital. A flyer announced the event and pre-registration was conducted through a mail-in portion of the flyer or through phone-in. While only 160 children were pre-registered, 263 actually participated, representing 159 households. Twenty-one percent of participants were age 0-5, 65 percent age 6-9, 12 percent age 10-14, and 2 percent age unknown.

Using addresses from the pre-registration forms, a six-question bicycle safety survey, with a self-addressed, stamped return envelope, was mailed to all 159 households representing the 263 child participants. Additional surveys, one for each child, were included for multiple-child households. One hundred thirty-three surveys (51 percent response rate) were returned from 86 households (54 percent response rate).

Responses to question number one, "How would you rate the usefulness of the information presented to you as a parent in the bicycle safety program?" were as follows: 55 (41 percent) responded *very useful*; 62 (47 percent) responded *useful*; 3 (2 percent) responded *little use*; 3 (2 percent) responded *not useful*; and 10 (8 percent) did not answer the question.

Responses to question number two, "How would you rate the usefulness of the information presented to your child?" were as follows: 56 (42 percent) responded *very useful*; 60 (45 percent) responded *useful*; 5 (4 percent) responded *little use*; 3 (2 percent) responded *not useful*; and 9 (7 percent) did not answer the question.

As expected, since the program was a helmet giveaway, all 133 responses were *yes* to question number three, "Did your child receive a bicycle helmet?"

Question number four, "Does your child wear the helmet he/she received?", received the following responses: 45 (34 percent) *always*; 45 (34 percent) *almost always*; 21 (16 percent) *sometimes*; 16 (12 percent) *rarely*; and 6 (5 percent) *never*. Those who gave a response other than *always* were asked to answer why their child

does not always wear the helmet. Of these, 43 responded *forgets*, 18 responded *too hot or heavy*, 14 responded *just doesn't want to*, 10 responded *inconvenient*, 4 responded *unattractive*, 14 gave *other* responses, and 4 did not answer the question. Many respondents gave multiple answers.

Thirty-two (24 percent) answered *yes* to question number five, "Has your child had an accident or fallen from his or her bicycle since receiving the helmet?" Ninety-four (71 percent) answered *no* and seven (5 percent) did not answer the question. Of the 32 children who had accidents, 20 had the injuries treated at home, 11 did not require treatment, and 1 was treated at a doctor's office. Any injuries were also briefly described by the respondent. The only serious injury was one which required stitches.

Of the 32 children who had an accident, 27 (84 percent) were wearing a helmet at the time of the accident and 6 were not (one respondent answered both yes and no indicating multiple accidents). Of the 27 who were wearing a helmet, 19 (70 percent) of the respondents answered *yes* to the question, "In your opinion did the helmet help prevent a head injury?"

It is probable that most of these 19 respondents may have misinterpreted the question, perhaps understanding it to read "In your opinion <u>does a helmet</u> help prevent a head injury." However, there is compelling evidence in the narrative of four respondents that suggests that the helmet may indeed have prevented a more serious injury. The four are quoted below:

> *"The first week he received the helmet he fell badly, scraping (his) elbow and scratching his helmet. I believe we may have visited the emergency room had it not been for the helmet."*

> *"No injuries due to wearing the helmet. Her head hit the black top twice."*

> *"Severe laceration under the chin where he hit the sidewalk. Required*

14 stitches."

"Ran into mailbox and hit head."

Question number six was open-ended, asking "How could this bicycle safety program be improved?" Responses were condensed into the following categories:

*Stronger/more formally presented safety message- 24

*Use larger area with more people- 10

*More publicity- 5

*On-bicycle skills instruction/demonstration- 6

*Extend to older/younger children- 6

*Hold event more often- 4

*Have rain date- 2

*Use peers, talk "kid" language- 1

Because it rained the day of the event, the event itself and thus the nature of the responses to question number six were affected. Many responses to question six mentioned that rain hampered or altered the event. Moreover, referring to questions number one and two, several respondents noted that no safety information was offered. Twenty five respondents offered favorable comments or indicated that the program was excellent or didn't need improvement.

Seventy-three households representing 130 participants did not respond to

the mail survey. In order to compare these nonrespondents with respondents, a random sample of 20 nonrespondent households was interviewed by telephone. These 20 households represented 30 participants. Responses from the phone interview were found to closely parallel those of the mail survey.

Of some significance is that two additional cases were reported in which, in the opinion of the parent, the received helmet prevented a head injury. In both cases this was evidenced by the presence of scratches on the helmet after a fall.

Overall, bicycle helmet rodeos and giveaways like this are beneficial. A sizable number of children receive helmets who otherwise might not have this protective equipment. It also appears that several serious head injuries were prevented by use of the helmets. More information on actual helmet use in areas of the community targeted by these programs would be a valuable follow-up step.

SUMMARY

The Charlotte program was hospital-based and contained a variety of elements. The strength of the program was on activities for youth, from child restraint promotions for infants and toddlers to a brain and spinal cord program for high school students. Having a part-time staff person connected with the school system was an excellent strategy for getting programs for students into portions of the school curricula.

CHAPTER 3. TRAFFIC INJURY PREVENTION PROGRAM OF PITT COUNTY MEMORIAL HOSPITAL

Greenville, North Carolina

INTRODUCTION

Located in eastern North Carolina in Pitt County, Greenville has a population of just over 35,000, not including the student population from East Carolina University. Pitt County is at the hub of Health Service Area VI, which is comprised of 29 counties and is geographically the largest of the state's six HSA's, encompassing about one-third of the state. The area is characterized by a low socioeconomic status, indicated by low level occupational status, income, housing, and educational levels, coupled with a higher than average unemployment rate and a higher percentage of the population below the poverty line as compared to the rest of the state.

Distinctly rural, with 60 percent of its inhabitants living outside of urbanized areas (population 2,500 or more), HSA VI is sparsely concentrated, with just 75.4 people per square mile as compared to the state's average population density of 120.4. Many of the problems encountered in eastern North Carolina are assumed to be related to the rural nature of the district.

The number of motor vehicle accidents and injuries for the area has increased within Pitt County and within the state during the four-year period from 1986 to 1989. Pitt County witnessed an increase of almost 34 percent, while the state's accident and injury frequencies increased by only 12 percent. Moreover, while the number of motor vehicle fatalities decreased at the state level, Pitt County experienced a 67 percent increase from 1986 to 1989.

Greenville is the site of Pitt County Memorial Hospital, and the 29 counties which make up HSA VI comprise the regional referral area for this Level I trauma center. Staff at Pitt County Memorial Hospital, accutely aware of the death,

disability, and injury resulting from traffic-related accidents, took an interest in educating the public in methods of injury prevention. Recognizing the need for a coordinated, multidisciplinary response to the increased risk of mortality and morbidity from traffic accidents, the hospital applied for a grant from the Governor's Highway Safety Program in 1989. The grant provided support for the development and implementation of a traffic injury prevention program for Pitt County, with possible later expansion into the regional referral area (HSA VI).

The hospital undertook a multidisciplinary approach in setting up committees for its community TIPP. The intention was to structure TIPP for a one-year planning phase and a three-year implementation phase. Headed by Project Director Joy Rogers, the Injury Prevention Advisory Council includes representatives from various health and human services areas throughout Pitt County. Members include educators, legislators, lawyers, law enforcement personnel, city and county government officials, business and industry representatives, health professionals, and media representatives. These individuals provide advice and guidance to the development of the program. The advisory council first met in February 1990.

An essential feature of Greenville's TIPP program is the formation of five subcommittees charged with developing and implementing various injury countermeasures. The five committees are: Law Enforcement, Pediatric Injury, Occupant Protection, Injury Surveillance, and Alcohol/Drug Abuse (see Figure 3.1). Each committee met quarterly beginning in March 1990 to review data pertinent to its mission and to develop information and education strategies designed to increase public awareness. Many local traffic injury prevention programs are represented on the advisory council and subcommittees, and the measures undertaken illustrate TIPP's commitment to working with the county's existing traffic injury prevention programs. The following is a summary of the primary activities of each subcommittee.

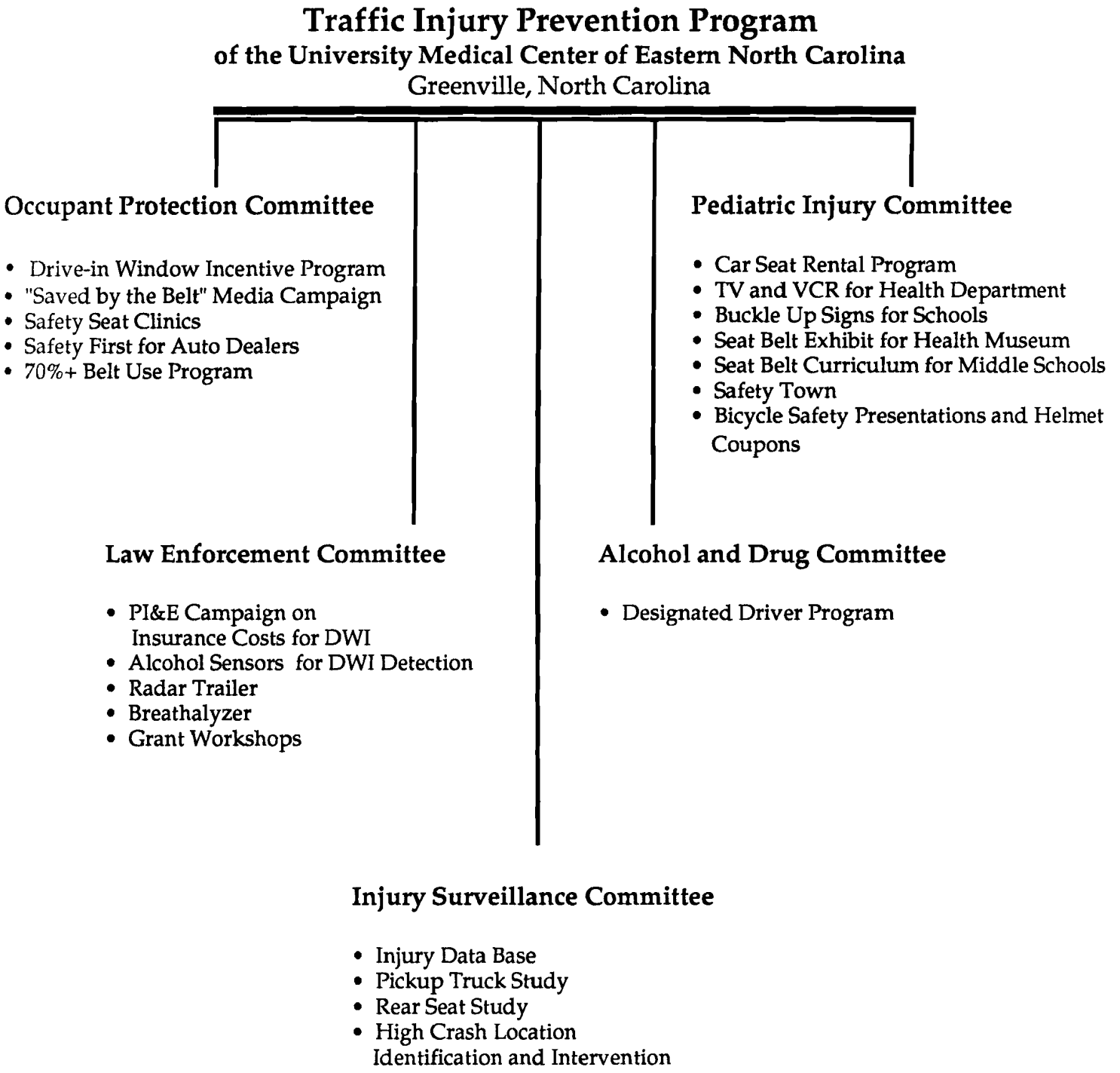


Figure 3.1. Structure of the Greenville program.

PROGRAM COMPONENTS

Alcohol and Drug Abuse

From the North Carolina Division of Motor Vehicles (DMV) data, it was found that a total of 1,699 DUI arrests were made in Pitt County in 1988. However, the proportion of DUI arrests among those age 20 to 25 was significantly higher than for the same age group across the state, possibly attributable to the large university population in the area. The Alcohol and Drug Abuse subcommittee concentrated its efforts through the following countermeasures:

Designated Driver Program. In December 1990, TIPP held a kick-off program to introduce its year-round Designated Driver Program involving cooperation of local bars and restaurants. A 12-member task force included representatives from city, county, and university law enforcement; local television and radio stations; the Chamber of Commerce; the Pitt County Council on Substance Abuse; a local beer and wine distributor; and the Pitt County Downtown Bar and Restaurant Association. The task force was instrumental in soliciting cooperation of businesses. The committee obtained a positive response to its requests and, in turn, provided the collaborating establishments with table tents, buttons, stickers and door decals promoting the "Don't Drink and Drive" message. The message was also carried through PSAs aired on a local radio station and the university's radio station. The Pitt-Greenville Chamber of Commerce and Greenville City Employees each ran newsletter articles emphasizing the importance of business support for the concept when hosting holiday parties.

ENCARE. ENCARE (Emergency Nurses Cancel Alcohol-Related Emergencies) is a national non-profit organization with a primary goal of educating students and parents about the consequences of drinking and driving. TIPP helped extend ENCARE's many presentations at local civic organizations to PTAs and churches by sending out letters promoting ENCARE to PTA/PTO presidents, school counselors,

churches, and county managers. TIPP also purchased brochures and printed additional evaluation forms for use by ENCARE and helped train additional emergency nurses to do the ENCARE presentation. This is an on-going effort.

Harm's Way. Harm's Way is a program from the American College of Neurological Surgeons that seeks to educate young people in the prevention of head and spinal cord injury. The target audience is grades 7 through 12, although some presentations have been made to university freshmen. TIPP supported Harm's Way in terms of honorarium fees for speakers, obstacle course moving fees, and funding for safety incentives. This is an on-going effort.

Project Graduation. With the support of the Pitt County Council on Substance Abuse, MADD, Greenville Jaycees, and Pitt County Schools, TIPP was a major sponsor of Project Graduation in June 1991, an alcohol-free party for approximately 1,000 to 2,000 high school juniors and seniors. The program's donation helped rent a building for the event.

Drunk Driving Simulator. TIPP and East Carolina Auto and Truck Center shared the cost of the rental of a drunk driving simulator stationed in Greenville during March 9-10, 1992. The simulator, a vehicle that allows students to have an experience similar to drunk driving without actually consuming alcohol, was witnessed by more than 150 students from area high schools. Media attention was obtained in the form of radio and television broadcasts and a newspaper article.

Occupant Protection

This committee was formed in view of the proven benefits of belts and the fact that belt usage in the region was lower than in other parts of the state. The injury surveillance group at Pitt County Memorial Hospital closely examines police accident reports and other hospital and coroner information to determine whether

belts were used in motor vehicle fatal crashes. A study of all Pitt County motor vehicle fatalities during a four-year period indicated that 64 percent of the fatalities were unrestrained in 1988, 64 percent in 1989, 66 percent in 1990, and 94 percent in 1991.

Drive-through Window Incentive Program. TIPP collaborated with local banks and fast food restaurants to reward buckled up customers who used drive-through windows during Child Passenger Safety Awareness and Buckle Up America weeks in both 1991 and 1992. TIPP was able to enlist the support of 10 banks, Hardee's, Burger King, Taco Bell, and Kentucky Fried Chicken outlets. These places participated by handing out brochures on the importance of wearing seat belts and by giving out safety incentives. Buckled up customers received both brochures and incentives; unbuckled customers received only brochures.

"Saved by the Belt" Campaign. Using Pitt County statistics and stories of local people "Saved by the Belt" (similar to the national "Saved by the Belt" public information campaign) featured local information and local residents. The campaign spotlighted local residents who volunteered their time for the campaign -- one teenager, one mother and child, and one older adult -- whose lives are believed to have been saved through proper belt use. Beginning in February of 1992, each individual was featured for a four-month interval. Television PSAs and billboard and newspaper advertisements were produced by the East Carolina University School of Medicine's Center for Health Services Communications.

Safety Seat Clinics. Safety seat clinics were offered at various locations in 1991. During Child Passenger Safety Awareness Week, a clinic was offered to guests of the hospital. A clinic for participants of the Pitt County Health Department's Pediatric Clinic offered a chance of winning a free toddler and booster seat through a drawing, and mall patrons were able to visit a display during Buckle Up America Week.

"Safety First" for Auto Dealers. Working with nurses from the hospital's Rehabilitation Department to introduce the program, TIPP provided training in January 1991 to auto salespersons designed to increase their awareness and knowledge of passive restraint systems in new automobiles. Salespersons at approximately 12 auto dealerships were trained in the importance of emphasizing seat belts and other auto safety features to customers and were provided with door decals, mirror hang tags, and seat belt brochures to insert in new car packages.

70%+ Belt Use Program. Costumes were purchased for "Vince and Larry," the seat belt car crash dummies, for use with the 70%+ Honor Roll program. Planning and implementing the program in area businesses and industries, city and county government, and schools led to networking with approximately 20 area businesses and industries with 100 or more employees. TIPP guided presentations to inform business leaders about the cost of an injury in terms of workers' compensation, sick leave, long-term disability and decreased productivity. This is an on-going program, and through the end of 1992, 11 organizations, including two local high schools, had received awards.

Bucklebear. TIPP purchased a Bucklebear costume for use in encouraging seat belt or child safety seat use among young children and their parents and has had the figure participate in various celebrations, including a National Guard Family Picnic, a Winterville Watermelon Festival and in three Christmas parades. Bucklebear has also appeared at Procter & Gamble, Pitt County Mayor's Meeting, and in many schools and daycares.

Community Festivals and Fairs. TIPP has exhibited traffic safety displays in numerous community festivals and fairs both in and around Pitt County, and has also participated in Greenville's Boy Scouts bicycle rodeo.

Videos for Pediatricians and OB/GYNs. In 1990, the committee selected the HSRC video "Growing Up Buckled Up" as the best available for the target group and contacted area physicians to inform them of the availability of the tape. The video received a good bit of use.

Michael Jordan's Seat Belt PSA. TIPP obtained the Michael Jordan PSA on seat belts to run during his 1990 visit to Greenville for the Celebrity Golf Tournament. The PSA aired during the one week period prior to the event.

Court Watch Program. Members of the committee met with the Pitt County district attorney in 1990 and received approval to begin a court monitoring program, the purpose of which has been to observe the sentences the judges hand out on the different cases. A group of volunteers from an ECU honors health class was trained.

Pamphlets and Brochures. TIPP provided the local DMV and license plate agency with seat belt pamphlets and brochures for customer distribution.

Law Enforcement

From 1986 to 1989, Pitt County traffic accidents increased by 35 percent, injuries by 28 percent, and traffic fatalities by 67 percent. During 1989, unsafe movement accounted for 35 percent of all violations causing accidents, compared to 22 percent for speeding. In 1990, 36 percent of accidents were attributed to unsafe movements while 21 percent were a result of speeding. DUI arrests accounted for a significant proportion of officers' time, considering the court time necessary for conviction. Efforts of the Law Enforcement Committee were designed in response to such statistics.

PI&E Campaign on Insurance Costs for DUI. To alert the public to the increased insurance costs associated with DUI's, TIPP received approval from the North

Carolina Insurance Commission and completed a public information campaign on insurance costs of traffic violations. Billboards were displayed at three locations; brochures were prepared, and a slide presentation stressed the costs of injuries resulting from motor vehicle crashes, including a review of trauma systems, the continuum of trauma care, and the consumer's role in reducing health care costs.

Alco-Sensors for DUI Detection. The purpose of an alco-sensor is to detect the presence of alcohol and determine if a breathalyzer test is necessary. Thus, alco-sensors save officer time by validating an increased blood alcohol content and, in turn, allowing law enforcers to return to the road more quickly. Using the number of DUI arrests per law enforcement agency, TIPP was able to determine how the devices would be allocated. From November 1991 through June 1992, 60 alco-sensors were purchased and distributed.

Radar Trailer. A radar trailer is a self-contained speed monitoring radar tool that combines an internal radar unit with a large external digital display to show oncoming motorists their speed. TIPP purchased a radar trailer to be shared among Pitt County law enforcement groups. The unit arrived in September 1991 and was officially presented one month later. The event received coverage from three local television stations. As a follow-up, a workshop for local law enforcement gave officers an opportunity to review details on reserving, transporting, and setting up the trailer.

Grant Workshops. In addition to funds provided by the Governor's Highway Safety Program and the National Highway Traffic Safety Administration, numerous grants are currently available from a variety of sources to assist local law enforcement. However, many Pitt County units do not utilize grants as an alternative source of funding for various reasons: they are unaware of their availability, they feel grants come with too many strings attached, or they feel that they do not have the "expertise" on staff to develop a proposal.

Grant education and development workshops were held in January and October of 1991 to educate law enforcement about grant availability, to apprise them of the benefits of grants, and to provide technical assistance for developing grant proposals. TIPP held two development workshops for area law enforcement personnel with about 40 participants at each session. An outgrowth of this training was the awarding of $900 grants by the TIPP program to the area police departments of Greenville, East Carolina University, Washington, Bethel, and Hookerton. The grants permitted additional seat belt law enforcement activity.

DARE. TIPP purchased traffic safety incentives for fifth grade DARE programs in Pitt County Schools in 1990. Cups with a seat belt safety message were purchased for participating schools.

Donation of "Buckle Up" Teddy Bears. The committee donated 25 teddy bears with a "Buckle Up" message to the Highway Patrol in Pitt County in 1990 to give to children involved in motor vehicle crashes.

Letter to County Mayors. In 1990 Pitt county mayors were contacted through letters requesting their encouragement of enforcement of the seat belt law. They were provided information on the effectiveness of seat belts in saving lives and data on the number of motor vehicle fatalities in Pitt County involving drivers and passengers who were not buckled up.

Pediatric Injury

During 1986 and 1987, motor vehicles ranked third as the cause of injuries to children age 0 to 5 in Eastern North Carolina. More children died from automobile injuries than any other cause. The goal of this committee was to decrease Pitt County's traffic fatalities and injuries within the pediatric population through community involvement and public education.

Car Seat Rental Program. The Pitt County Health Department and the Tar River Civitans had collaborated for several years to rent infant and toddler seats to any Pitt County resident in need of one. TIPP helped by purchasing 70 toddler car seats during the first months of 1991. During Child Passenger Safety Awareness Week in 1992, 51 car seats were provided, with the hospital's volunteer services distributing the seats and educating parents as to correct usage. Two television stations and the Greenville newspaper covered the event. The Department of Social Services was given 18 car seats to install in its county vehicles used to transport foster children.

TV and VCR for Health Department. Hundreds of Pitt County mothers and children are served through the county health department's prenatal, well child, and family planning clinics. To reach this captive audience, the department was presented a television and VCR educational system in 1991 to use in its waiting area. TIPP has given the health department several traffic safety tapes addressing car seat, seat belt, and bicycle and pedestrian safety.

Buckle Up Signs for Day Cares and Schools. During Child Passenger Safety Awareness Week in February 1991, 56 signs and 26 poles were purchased and distributed to day cares and schools for use in their parking lots. At the beginning of 1992, 30 "Buckle Up" signs and poles were put into place around the East Carolina University.

Seat Belt Safety Exhibit for Health Museum. Through its offering of exhibits, classes, and workshops, the Adventures in Health Museum serves as a teaching center for Pitt County children to learn good health practices. TIPP provided funding in 1991 for the development of a seat belt exhibit as a means of encouraging children to put their seat belts on immediately upon getting into the car. The display's message will be "Be the First to Buckle Up," and will be taught through a game including a wooden car with real seat belts and audio. The audio tells

children how to use the belts properly, explains the "Be First to Buckle-up" game, and encourages them to teach the game to their family and play it every time they get in their own cars. Winners will be reinforced with lights or bells. The exhibit is scheduled to be completed in spring of 1993 and should enjoy a high volume of attendance by school groups and the general public.

Seat Belt Curriculum for Middle Schools. This pediatric injury committee reviewed several curriculum packages on seat belt, bicycle, and pedestrian safety, and selected one developed by NHTSA for junior high school students called the "Car Club Program." Physical education teachers in the six area middle schools and driver education instructors in the area high school were sent curriculum packages during Child Passenger Safety Awareness Week of 1991.

Safe City Outdoor Exhibit. This program will be offered for two weeks every summer, beginning in 1993. Staff are seeking a location on hospital property that can be blocked off for the program for the necessary two weeks. It was decided that for the first year, Safe City will begin sometime in the late summer. It will be held during the morning hours, accommodate about 30 children, and will be open to children who have completed kindergarten.

Injury Surveillance

This committee was established in 1990 for the specific purpose of collecting and analyzing traffic injury data on a regular basis. Its goal was to develop an injury surveillance system to be used to evaluate the success of the Traffic Injury Prevention Program. Following is a description of that data system and some of the evaluation activities that have taken place.

Injury Data Base. Since 1987 Pitt County Memorial Hospital has maintained an active trauma registry under the direction of Trauma Nurse Registrar Bonnie Long

Snyder. The registry captures information on all trauma cases admitted to the hospital for a period of 24 hours or longer. Trauma cases are defined by an ICDA External Cause of Injury ("E-code") of 800-999, and include motor vehicle crashes as well as falls, gunshot wounds, cuts, and other forms of intentional and unintentional injury.

An initial goal of the Injury Surveillance Committee was to expand on this database to capture information on trauma cases treated and released without hospital admission, as well as information from the Medical Examiner's database on fatally injured trauma victims. Outpatient data including E-coding of all emergency room patients was added to the file starting in 1989, and Medical Examiner data starting January 1, 1990. As of December 31, 1992, approximately 35,000 cases were recorded on the combined files, referred to as the Central Injury Surveillance System (CISS). Information recorded includes demographic, financial, and cause of injury information on all patients.

In 1991 the Committee also arranged to begin receiving copies of traffic accident reports for all accidents occurring in Pitt County. This effort involves trained project personnel making weekly visits to the Greenville Police Department, monthly visits to the N.C. Highway Patrol headquarters, and quarterly visits to smaller local police departments. During 1991-1992, approximately 3,000 motor vehicle crashes occurred in the county requiring transport to a medical facility. A protocol was developed for linking these data to the CISS. Although an extremely labor-intensive effort, linkage has been completed through 1992 and into 1993.

The overall goals of Pitt County Memorial Hospital's injury surveillance activities are three-fold:

- To document all types of injuries resulting in either an emergency department visit, hospital admission, or death in Pitt County;

- To provide a system for linking, merging, and restructuring trauma

registry, emergency department, traffic accident, and Medical Examiner data files; and

• To provide a powerful, user-friendly, interactive data manipulation system for sorting, transforming, printing, graphing, summarizing, and mapping injury-related data.

In addition to the development of the CISS itself, other successes from this effort include improved cooperation from information systems and law enforcement in the Pitt County area, and an increased awareness regarding the magnitude of the injury problem.

Research Projects. A variety of analyses have been conducted utilizing the CISS. All studies must be approved by the Injury Surveillance Committee. Since the combined databases cover all types of trauma, not all research and evaluation activities using them have been relevant to the TIPP program and its focal areas of occupant restraints and alcohol; however, a number of studies have. An example is a study carried out to describe factors contributing to the frequency and severity of injuries to occupants of pickup trucks. It was found that pickup truck occupants sustained more ejections and used seat belts less frequently than motor vehicle occupants, contributing to higher mean injury severity scores. These findings were presented at the May 1991 National Lifesavers Conference in Charlotte.

Other studies using the CISS include:

- Highway fatality analysis for Pitt County
- Alcohol and drivers in motor vehicle crashes
- Single vehicle, single occupant motor vehicle crashes
- Motor vehicle crash, trauma drug data, and injury outcome
- Pickup truck study

- Bicycle injuries
- Penetrating neck trauma
- Migrant workers
- Alcohol and the trauma patient
- Chest trauma in the elderly
- Domestic violence
- Falls in the elderly
- Motor vehicle suicide
- E-coding study
- Patterns of injuries in children
- Intentional injuries
- Farm injuries

As the range of these studies indicate, the CISS represents and extremely valuable database for both traffic and non-traffic related injury research.

HSRC's EVALUATION OF PROGRAMS

Greenville's TIPP was a multifaceted hospital-based program. HSRC chose to closely examine law enforcement strategies, an intersection improvement that grew out of an examination of high accident locations, and a bicycle safety effort.

Law Enforcement Strategies

Alcohol Sensors for DWI Detection. One of the strategies selected by the Law Enforcement Committee was the purchase and distribution of hand-held alcohol sensor units. The purpose of an alcohol sensor is to detect the presence of alcohol and assist in the determination of whether a person should be arrested for driving while impaired and taken into the station for an evidentiary breathalyzer test. The units can serve to increase officer confidence in making DWI arrests by providing the officer an accurate indication of a person's BAC level at the site of the enforcement stop. From November 1991 through June 1992, the Greenville TIPP

distributed 60 alcohol sensor units to agencies involved in alcohol law enforcement or education in the Greenville area. The agencies receiving units and the number received are listed below:

Agency	Number of Units
Ayden Police Department	2
Bethel Police Department	2
Farmville Police Department	4
Greenville Police Department	10
Grifton Police Department	2
Hookerton Police Department	2
Winterville Police Department	2
State Highway Patrol	18
East Carolina University Campus Police	6
Pitt County Sheriff's Department	2
Pitt County Alcohol Law Enforcement	6
Pitt County Alcohol Beverage Control	2
Pitt County Mental Health Center	2

The units were distributed based, to a large extent, on the size of the agency and the estimated need. The Greenville Police Department, the largest city police agency in the area, and the highway patrol received the most units.

HSRC examined the effect of this equipment on the enforcement performance in detection, arrest, and conviction of DWI suspects as well as the increased perception of risk of DWI detection by the drinking driving population. To accomplish this, HSRC conducted telephone interviews with representatives of the agencies listed above.

Seven local police departments, a sheriff's office, and one university campus police department were among the agencies which received sensors. The units were distributed and used in several different manners. Some departments chose to keep units with patrol cars so that the sensors would be available for the next officers at

shift change. Others keep the units at the station, and one is brought out upon request by an officer with a suspected DWI. The Greenville Police department, the only department with a traffic division, assigned their sensors to the patrol division, and the units are checked out by officer request.

Most departments had little training in DWI detection other than the standardized field sobriety tests taught during basic law enforcement training. Most received only brief training in the operation of the alcohol sensor unit; however, all seemed to feel comfortable with its use. All departments agreed that the units have been easy to maintain.

Most departments stated that officers were using the units after they had established an opinion that the suspect was impaired, usually through the administration of the field sobriety tests, before placing the person under arrest. All felt the equipment had led to increased arrests. Comments included that the units "enhance probable cause," "eliminate false arrests," and "helps get the ones (DWIs) who don't show the effects (of drinking)." Several agencies indicated that use of the units had led to arrests at lower BAC levels (such as .10).

When asked about the effect on underage alcohol enforcement, several agencies indicated that the units were used for that purpose. One agency stated that the alcohol sensor is sufficient evidence for underage enforcement and can reduce the need for obtaining a breathalyzer reading. Another department indicated that the unit is used to test underage drinkers at local hangouts such as parking lots. The East Carolina University police estimated that officers had used the units during more than 700 encounters. They feel the units are a definite factor in increased DWI and underage consumption arrests on campus.

Three police agencies indicated that they had received publicity through newspaper articles about the sensors. Only the Greenville and the East Carolina University Police Departments had used the units as part of educational presentations. The campus police indicated that demonstrations of the effects of alcohol were very popular among campus groups, and many presentations had been conducted at residence halls. They believed that the alcohol sensors were helpful in

demonstrating that youthful drinkers could be impaired at lower levels than the students expected.

All but one police department felt that DWI was a problem in their communities. When asked what would help officers to reduce the problem, "more training" was the answer most often expressed. Also frequently mentioned were more equipment such as alcohol sensors, funds for overtime enforcement efforts, and more use of Operation Eagle, a multi-agency DWI enforcement blitz. Without exception, each department expressed the opinion that the Greenville TIPP had been supportive of their department.

The State Highway Patrol was the recipient of the largest number of units. The units were distributed to each trooper and sergeant in the district. The patrol indicated that the units are not used when suspects are obviously impaired, but that its primary purpose is to provide additional information when symptoms show impairment but the officer is not sure. The patrol felt that alcohol sensors have increased DWI arrests in general and indicated, as did one police department, that the unit is sufficient for testimony in court regarding underage consumption of alcohol. The patrol has used the sensors as part of presentations and believed that awareness of the technology was high. The comment was made that small departments cannot afford to waste time on processing someone who may not be impaired. The alcohol sensor saves time for both the arresting officer and the breathalyzer operator.

Alcohol sensor units also were distributed to state and county alcohol law enforcement officers. These agents' enforcement activities include underage purchase of alcohol, serving intoxicated persons, and illegal purchase or manufacture of liquor (moonshine). The units assisted these officers in determining sale to intoxicated persons and underage consumption arrests.

Based on the information provided by these interviews, it appears that the strategy to distribute alcohol sensors to agencies involved in alcohol law enforcement and education had several important benefits. By including all enforcement agencies, regardless of size, the Greenville TIPP created a good working

relationship with all departments. They all seemed appreciative of the assistance and appear to have enhanced their focus on drinking driver enforcement. The use, and therefore the effect, of the equipment can extend beyond the duration of the project. This is particularly valuable. Strategies such as this that are not tied to the continued existence of a TIPP program follow the model of seed money being used to start efforts that attain self-sufficiency.

It is not possible to evaluate the effect of this strategy on alcohol-related or nighttime crashes. The numbers are too small for any change to be identified as significant or related. However, the alcohol sensors did allow an enhanced focus on alcohol enforcement, and the departments felt the units helped to combat a serious problem in their communities.

Radar Trailer. The Law Enforcement Committee decided to purchase a radar trailer to assist local law enforcement agencies in reducing excessive speeds on area roads and streets. A radar trailer is a speed monitoring device that uses an internal radar unit to detect the speed of approaching vehicles and then displays that speed for the motorists to see as they pass by. The intent of the unit is to convince motorists who are speeding to slow down by informing them of their speeds. The unit is portable and can be transferred from department to department or site to site with relative ease.

The radar trailer has been in use since October 1991. The Greenville Police Department is in charge of the unit and handles the reservation process. The unit was officially introduced through an event that received excellent media coverage. A workshop for local law enforcement agencies was held to review details on reserving, transporting, and setting up the trailer.

The area law enforcement agencies were interviewed by HSRC staff to determine each department's use of the equipment and their overall impression of its value in speed deterrence. All but one of the representatives of the seven enforcement agencies interviewed were aware of the existence of the radar trailer. Three departments had used the trailer and two other departments indicated that

they had plans to use it in the near future.

The Greenville Police department indicated that the radar trailer is used regularly by their officers, about 10 to 15 times per month, mainly at complaint areas, school zones, and where known problems exist. The East Carolina University Campus Police indicated that they thought the unit was effective in reducing speed on their college campus. They use the unit along the main thoroughfares and known speeding areas on campus. Grifton, a small department with only four paid officers, used the trailer in their downtown area, primarily in 35 and 45 mph zones. All three departments said that they had no problems using the unit. All three also felt that the radar trailer was effective in reducing speeds.

To determine if the use of this unit resulted in speed reductions would have required speed measures taken prior to, during, and after implementation of the strategy. None of the agencies appear to have collected such data.

Although the radar trailer has been used by fewer agencies than the alcohol sensors, the benefits of both equipment appear to be similar. The radar trailers were made available to all departments. All departments participated in a training session, and there was publicity about the unit to generate public awareness. By having it housed within one department which serves as the booking agency for its use, the effect of this strategy can continue without any additional assistance from the TIPP program.

Intersection Improvement

Roadway and roadside safety improvements can often be done in a cost-effective manner. The TIPP program had an engineering committee in 1990, and this group examined various problem intersections within Greenville and Pitt County, using both accident frequency and severity index ratings. The Division Operation Engineer for the North Carolina Division of Highways (DOH) was a member of the committee. A recommendation was made to ask the DOH to undertake inexpensive improvements at the intersection of NC 11 and SR 1113 near Ayden. Over a three-year period from 1986-1989, this intersection had a severity

index rating of 27.35, where the North Carolina average at the time was 12. The severity index is based on a statewide North Carolina Department of Transportation formula which includes variables such as speed and sight distance, as well as injury data.

Where these roads intersect, NC 11 is a four-lane, divided highway, and the SR 1113 traffic is governed by stop signs. Crashes tend to occur when traffic from SR 1113 moves into the median of NC 11 and then fails to yield to oncoming traffic. To improve the intersection, double yellow center lines and 40-foot stop bars (designating where to stop) were painted in the median, and yield signs were installed. In addition, a "stop ahead" sign was added to one side of SR 1113 where sight distance is poor. The total cost was $500.

Accident data were examined by the DOH Division Office before and after the treatments. These periods were each of 29 month duration. The accident totals were:

	Before	After
Total fatal injuries	1	1
Total non-fatal injuries	14	10
Total property damage only	3	1

Total equivalent property damage costs were calculated using $500,000 for the cost of a fatal injury, $19,000 for the cost of a non-fatal injury, and $3,500 for a property damage only crash. Before costs amounted to $776,500 and after costs $693,500, resulting in a difference (benefit) of $83,000. For the $500 spent, this yielded a benefit-cost ratio of $166 dollars saved for each $1 cost. The dollar costs were not adjusted for inflation; thus, the true B/C ratio would be slightly smaller.

This simplified B/C analysis represents a tool for engineers and others to use to examine whether expenditures for improvements are beneficial. It is an example of the type of "bottom-line" evaluations that TIPP programs should try to do.

Bicycle Safety

One of the TIPP's focus areas pertains to Pediatric Injury. A Bicycle Committee is a component of the broader Pediatric Injury area.

Preceding any bicycle safety activity by the TIPP, the Office for Prevention in the North Carolina Department of Environment, Health, and Natural Resources received a Centers for Disease Control (CDC) grant of approximately $60,000 for the prevention of head and spinal cord disabilities. An effort to this end was to develop a model helmet promotion project in Pitt County.

The Pitt County Bicycle Helmet Promotion Project was a community-based intervention to prevent head injuries in children by increasing bicycle helmet use. A full-time director was hired through the Pitt County Health Department and the program ran from April 1989 through September 1990. This project was strictly helmet promotion and contained little, if any, of a broader bicycle safety component.

The Pitt County Bicycle Coalition was formed to provide guidance and support to the planning and implementation of the project. The diverse community coalition membership represented educational agencies, law enforcement, health professions, a trauma hospital, community agencies, youth groups, recreation specialties, bicycle shops, and the media. A four-pronged campaign targeting the media, the schools, the community, and health professionals was launched.

Summer intervention focused on community events such as a Bicycle Motorcross (BMX) show, health fairs, a 4th of July celebration, and park programs. School activities began in the fall with an emphasis on getting the message to parents of the importance of children's helmet use. In addition, displays were set up in pediatric and family medicine waiting rooms, as well as in the county "Adventures in Heath" center, an ongoing "hands-on" museum containing a helmet promotion exhibit. Billboard space was purchased through CDC funds and advertised "Protect Your Head" for more than a year. Other activities included development of a curriculum supplement and activity guide for school presentations, a poster contest, and helmet promotions and giveaways at local

swimming pools and the health department. In all, about 550 helmets were provided free to community children.

In cooperation with a local bicycle shop, discount coupons for helmets were distributed to day care centers, factories, medical and dental offices, and schools. During two four-month periods, more than 641 helmets were purchased. This was determined to be a cost-effective method to encourage purchase of helmets.

Hundreds of point-of-purchase hang tags stating "This bike is missing one part" were distributed to all bicycle retailers. Reports indicated that helmet sales increased as much as 35 percent when the tags were displayed on handlebars.

"Heads...You Win!," an audio-visual resource targeted at adults, was produced to provide information on the importance of bicycle helmets in preventing head injuries and how to choose a helmet.

As part of this project, the DEHNR Center for Health and Environmental Statistics was contracted to carry out a telephone survey. This comprised a simple random survey of families who had children in the Pitt County Schools between Kindergarten and the eighth grade. In a pre-project survey of six hundred households with school-age children thirty-six children (6.7 percent) reported having helmets; this figure was deemed misleading, however, because parents did not know the kind of helmet. The most common reason given for not wearing a helmet was forgetfulness.

A post-intervention survey conducted in the summer of 1990 showed that 16.3 percent of the children reported having bicycle helmets. More than one-third of the families interviewed mentioned hearing about the helmet promotion project. Many had purchased helmets using coupons that had been distributed in the community. The most common reason given for not wearing a helmet was that friends do not wear helmets (41 percent). The second most common reason was forgetfulness (15 percent).

Another survey question asked of those who reported owning a helmet was how many times out of the last ten bicycle rides was the helmet worn. For the pre-project survey, bicycle helmets were reported as being used on 5.2 out of ten trips.

The post-project survey result was 6.7 times out of ten trips, an increase of 29 percent.

In regard to parents' attitudes about helmets, 12 percent in the pre-project survey felt they would buy a helmet for their children within the next six months, and 83 percent indicated a helmet would be purchased if requested by their children. Reasons given for not purchasing a helmet were that the parent never thought about it (43 percent) and that it was unnecessary (35 percent).

In the post-project survey, 27 percent of the parents felt that they would buy a helmet for their children within the next six months, and 88 percent indicated a helmet would be purchased if requested by their children. The most frequent reason given for not purchasing a helmet was that the parent had not thought about it (37 percent). Seventeen percent thought a helmet was unnecessary.

Additional program impact evaluation was a chart review of emergency room visits by children in the target age group, five to fourteen. Data were collected on injuries resulting from bicycle crashes. The time period was May-October in 1989 and again in 1990, with comparison to a similar time period in 1987. Data were unavailable to determine impact of program-influenced helmet use on emergency department visits. There was a rise in physician chart documentation of helmet usage.

Funding for this CDC project, which was deemed as very successful, has ended. Continuing local efforts are now coordinated by the TIPP program.

The current TIPP bicycle safety promotion benefited greatly from the aforementioned CDC-funded bicycle helmet promotion project which was quite extensive in scope. Thus, the foundation was laid for continuance of efforts that the TIPP could follow. Continuity has been facilitated due to the efforts of several members of the former Pitt County Bicycle Coalition who are on the TIPP Pediatric Injury Committee.

While the CDC-funded project was very large and focused strictly on the development of a model helmet promotion initiative, the follow-on TIPP project has been necessarily smaller in scope due to lesser funding. This initiative has also

had a broader bicycle safety promotion emphasis.

Using 50 percent GHSP funds and 50 percent matching funds from Pitt County Memorial Hospital, 200 bicycle helmets were purchased and distributed at a children's community health fair in August 1992. This helmet distribution was tied to an educational component in that both children and parents signed "contracts" promising to wear the helmets. Trained volunteers were used to fit the helmets correctly. Bicycle rodeos and presentations in schools have also been conducted and are an ongoing feature of the TIPP.

A Safety Town with a bicycle safety component is planned for the regional trauma center and will target 6-9 year-old children. Another initiative in the early stages of conception is to supply the trauma center with helmets for distribution to youngsters who have already been in bicycle crashes.

SUMMARY

The Greenville program was hospital-based and multifaceted. All program elements were active, and the promotion of occupant restraints was visible in several elements. Staff at the University Medical Center have been active in utilizing the injury database and preparing papers for publication.

CHAPTER 4. TRAFFIC SAFETY PROGRAM OF THE GREENSBORO POLICE DEPARTMENT

Greensboro, North Carolina

INTRODUCTION

The city of Greensboro, NC, located in the central Piedmont of the state, is part of an urban area which has experienced much growth in recent years. With a population of approximately 196,000 in 1990, Greensboro expects that number to increase to well over 235,000 by the year 2000 if its growth continues at the 1980 to 1990 rate. During that 10-year period, the community added 19 square miles and realized a 17 percent increase in the number of registered vehicles. The growth had major effects on local traffic. From 1985 to 1987, Greensboro experienced a significant increase in overall traffic crashes and crashes with injuries and fatalities. During that time period, crashes increased more than 10 percent per year, fatal crashes increased more than 12 percent per year, and injury crashes more than three percent.

The traffic safety program (TSP) in Greensboro was conducted by the Greensboro Police Department. This law enforcement-based TIPP differs from the other two TIPP programs discussed in this report in that those programs were conducted through regional medical centers. The Greensboro Police Department maintains 550 full-time positions – 31 of which are devoted to traffic and parking-related duties. The department established a traffic division in April 1988 after an absence of 13 years. The division joined elements of traffic enforcement and traffic safety that had been scattered throughout the department, and shortly after the reformation, in June 1988, an initial request was submitted to GHSP for a one-year planning grant to aid in expanding its traffic division into an effective traffic safety program. The program's goal was to serve as a broad-based traffic management program aimed at reducing the loss of life and serious injury as a result of motor vehicle crashes. This goal was to be achieved through the use of education, enforcement, and engineering (see Figure 4.1). The enforcement programs were to

target DWI, speed, and seat belt use. It was thought that these measures would result in a decrease in alcohol-related crashes, greater seat belt compliance, and a reduction in average highway speeds, in turn leading to a reduction in overall crash -related deaths and injuries.

The grant provided for a planning period to determine how these problems could be addressed. During the first year of the contract, the department collected data to aid in determining the resources, programs, and actions needed for a comprehensive traffic safety program. In the beginning of 1989, a sergeant-level position was created and funded within the traffic division to develop the traffic safety program. The coordinator supervised traffic safety education programs along with the enforcement side of the traffic division and served as liaison to a community task force on traffic safety. The task force was comprised of individuals representing business organizations, medical professionals, community groups, news media, schools, and government offices.

During the first year, traffic studies were made, and an overall plan was devised for conducting the traffic safety program. Seat belt usage and speed enforcement were targeted for emphasis in the subsequent 1989 contract. In order to provide additional enforcement as well as expanded educational programs, additional traffic enforcement officers and a traffic safety education officer were funded in 1989. In 1990 the traffic safety emphasis was expanded to include the high number of traffic collisions and fatalities that were occurring during the evening hours. In addition, educational programs were expanded beyond speed and seat belts to include the problems of older adult pedestrians and bicycle safety. Twenty-five percent of fatalities in 1989 were to pedestrians, primarily to older adults. Eight percent of the fatalities that year were to bicyclists. Thus, 1990 was a year of growth for the educational component of the traffic safety program, and efforts were made to provide instruction and educational materials in almost every area of traffic safety.

During the intensive PI&E and enforcement programs, serious injury accidents and fatalities in Greensboro decreased. The seat belt usage rate climbed to 75.4 percent (based on shopping center data), and speed on the highways decreased from

Traffic Safety Program
of the Greensboro Police Department
Greensboro, North Carolina

ENFORCEMENT

Speed Enforcement
- Interstate Citations
- Hazardous Location
- VASCAR
- RADAR
- Saturation Patrols

Belt Enforcement
- High # of Citations
- License/Belt Use Checkpoints

Drunk Driving
- Directed Patrol
- Hazardous Location
- Operation Eagle

Select Traffic Enforcement
- Hazardous Intersections
- High Incidence Location

EDUCATION

Pedestrian Safety
- Workshops for Day Care Providers
- Workshops for Elderly
- Safety Town
- School Crossing Guard Program
- School Bus Safety

Drunk Driving
- Seasonal Radio PSAs
- College /High School Demonstrations

Occupant Restraints
- Safety Seat Loaner Programs
- Workshops for Day Care Providers
- 70%+ Awards Program
- Seat Belt Demonstrator
- Rollover Simulator
- Observational Belt Use Surveys
- Seasonal PSAs

Speed
- Radar Trailer

Bicycle Safety
- Bicycle Rodeos
- Helmet Giveaways

Figure 4.1. Structure of the Greensboro program.

a pre-program average of 67 mph to 57.3 mph. In 1990, the North Carolina Governors Highway Safety Program recognized the department's traffic division for its outstanding performance in speed, seat belt, and overall traffic enforcement aimed at the reduction of traffic injury and death. In early 1991, the Governor's Task Force on Injury Prevention and Control presented the department with the "Award of Excellence" in recognition of meeting the challenge of injury prevention and control.

The following sections discuss the two major components of Greensboro's Traffic Safety Program – enforcement and education – and the actions taken in each.

PROGRAM COMPONENTS

Enforcement

The Greensboro Police Department's enforcement plan was focused on strategies to reduce speeding and drunk driving and to increase the use of seat belts. These strategies were implemented to a large extent at hazardous traffic sites such as locations with a high incidence of violations or a high crash rate. The "Top 25" high accident locations (HALs) were used by the Traffic Division to allocate patrol surveillance activity. By directing efforts toward groups and locations most likely to experience crashes, the department felt that the goal of maximum safety with minimal public inconvenience and resentment could be achieved. Enforcement was not limited to punitive measures based on citations and arrests, but also included non-punitive measures such as highly visible and active patrol and the use of verbal and written warnings.

The 1989 contract provided for the addition of two traffic enforcement officers. The Traffic Enforcement Section of the Traffic Division, along with uniformed patrol officers, were the cornerstone of the department's enforcement activities.

The department established a Selective Traffic Enforcement Program (S.T.E.P.) which emphasized enforcement directed at high-accident locations and high-speed interstate highways. It also addressed the necessity of making seat belt and child

restraint enforcement a priority within the department in an effort to further reduce serious injury accidents and fatalities. More than 2,000 hours of traffic enforcement were directed toward a comprehensive traffic program, with training taking place prior to each enforcement activity. The areas of concentration are outlined below.

Highway Speed Detection Program. A major focus of the police department's efforts, speed enforcement was its most comprehensive strategy. Data collected during 1983-1987, prior to program implementation, showed that interstate highways and state roads, which constituted just 5.5 percent of the city's mileage, accounted for 18.6 percent of fatalities. The department focused its efforts on the city's top 25 high accident locations (HALs), determined by the city department of transportation. At the HALs, the department implemented saturation patrols of five officers on weekend nights.

Beginning in the fall of 1988, radar and Vascar were used to collect data on speed in the HAL 55 mph highway speed zones as well as to enforce speed limits. The average speeds in 1989 on the selected sites were 67 mph and the number of speed citations averaged in the range of 800 to 1,000 per month. Officers used the traffic stops as a trigger for DWI and belt use enforcement as well. By the fall of 1990, average speeds in such zones had dropped to 57 mph -- a 10 mile per hour decrease from the 1989 level at program inception.

Seat Belt Enforcement Program. Citizens of Greensboro were using their seat belts slightly more than the state average but much less than total compliance. To increase belt use the department began gathering quarterly seat belt counts at various times and from standard shopping center locations throughout the city. The belt usage enforcement efforts were expanded past the purview of the traffic enforcement unit to all officers. Both the traffic patrol unit and regular officers issued citations. Most of the belt enforcement was done by officers on patrol, although driver license/seat belt checkpoints were used to some extent.

Greensboro crash data indicated that certain problems remained at the end of the program's first year, and these problem areas were targeted for attention in 1990. A significant number of traffic collisions and fatalities were still occurring during the evening hours when no directed traffic enforcement was in place. In the summer of 1990, two traffic law enforcement squads were established. Each squad consisted of five officers who worked eight-hour shifts, ensuring highway coverage from 7 a.m. to 11:30 p.m. each weekday. The efforts were primarily directed at seat belt enforcement and speed.

Six to seven hundred traffic citations were issued per month, with some drop-off as belt use rates increased. Seat belt usage steadily increased during the course of the contract from a 69.4 percent compliance rate at the end of 1990 to a 75.4 percent usage rate in September 1991, based on the shopping center data mentioned above.

Driving While Impaired (DWI) Program. The main strategies of the DWI enforcement component were saturation or directed patrols at high incidence locations. These patrols consisted of five vehicles which patrol areas determined to be at high risk for DWI activity. The patrols were primarily conducted on weekend evenings, the time when the incidence of drinking and driving is usually highest. The 10 officers in the Traffic Unit were trained in DWI detection, including use of Gaze Nystagmus, a field sobriety test that measures eye movement to indicate general impairment levels. In the summer of 1990, "Operation Eagle," a DWI multi-agency enforcement blitz that includes local police, highway patrol and alcohol law enforcement, was conducted in Greensboro. In June 1991, license checkpoints for DWI and seat belt use were implemented on two separate nights.

Selective Traffic Enforcement Program. In 1989, 276 stop-and-go lights at Greensboro intersections were identified as a major source of traffic accidents. The most hazardous intersections were derived from both the number of accidents and the severity of accidents at intersections throughout the city. Data collected at these sites aided officials in determining the best measures to take to prevent these

violations. Intersections where major violations tended to occur were targeted with a total of 2400 hours directed toward complaint and high accident areas.

Educational Programs

The safety program included public education and information activities tailored for every age group from infants and toddlers to the elderly. Traffic safety information was presented at day care centers, schools, businesses, and industry. The involvement of the media and community organizations was pursued. In the beginning of 1989, a traffic safety education officer and assistant traffic safety coordinator were appointed, and the officer was sent to a five-day occupant restraint instruction school. With this additional position, the department was able to more aggressively pursue the establishment of an organized traffic safety initiative, involving programs on seat belts, child restraint, DWI, and pedestrian and bicycle safety. Educational programs offered through the Traffic Safety Section fell into two broad categories: pedestrian safety and driver/vehicular safety.

Pedestrian Safety. There were 24 traffic fatalities in Greensboro in 1989, with one-third being pedestrian and bicycle collisions. The department recognized the need for public education in pedestrian and bicycle safety and an awareness program for older adult pedestrians. A comprehensive pedestrian program covering age groups from pre-kindergarten children to senior citizens was developed. Through the Greensboro City School System, children were taught a variety of safe pedestrian practices. In 1990, the department conducted a series of five train-the-trainer workshops for pedestrian safety that targeted both the elderly and youth. Three workshops were conducted for day care providers and two training sessions were held for seniors, together reaching 87 people. There were also training sessions for Greensboro City Schools for pre-kindergarten teachers. These teachers received 14 training manuals and their programs reached 160 pre-kindergarten children. Additional train-the-trainer seminars were conducted in which the day care center professionals were introduced to the AAA program "Preschool Children in Traffic."

By the end of 1990, 113 persons from 28 day cares had participated and received in-service day care training credit.

Awareness programs for older adult pedestrians were in the form of presentations directed at groups of older adults in retirement communities, community centers, churches, and other locations. The programs focused on "Safe Rides for Long Lives." However, a lack of interest by the elderly population for pedestrian safety caused the department to shift its attention.

Safety Town. Safety Town is an early-childhood summer safety education program designed to introduce various types of safety practices to five-and six-year-old children. The Safety Town Program is sponsored by the Police Department and the Greensboro Jaycees.

Children attend two hours a day for two weeks and receive a graduation certificate. The 20-hour course covers the following areas: the police officer and his equipment; school bus, pedestrian, bicycle, and fire safety; the use of seat belts; safety precautions around the home; and how to react when confronted with strangers. The children attending Safety Town are taught by a uniformed police officer and teenage volunteer instructors.

In the summer of 1990, the department assisted Goodyear Tire and Rubber, Inc. with plans for a corporate safety town project and conducted a two-week session of Safety Town for 117 five- and six-year-olds.

School Crossing Guards. The Greensboro Police Department developed a school crossing guard program because of the large number of children who were walking to school and needed protection while crossing heavily traveled streets.

School Bus Safety. The school bus program is taught to elementary schools at the beginning of the year by police officers. The program is used in conjunction with an existing school program called "Gus the Bus" to remind children to use safe bus procedures.

Driving While Impaired (DWI) Awareness. It was the goal of the department to reduce the number of impaired drivers through an awareness program. Demonstrations were conducted to make college students aware of the role that alcohol plays in traffic accidents. In November 1990, the department expanded its program into five high school driver's education classes. By 1991, DWI films and literature were distributed to all driver's education programs. Copies of the DWI film, "The Aftermath," were given to all city high school driver's education teachers, the local MADD chapter, the State Highway Patrol, and the substance abuse coordinator for the city school system. More than 450 books to accompany the film were distributed.

Occupant Restraint Systems. In the beginning months of 1989, the department initiated a child safety seat loaner program. Contacts were made with a local hospital, and classes on child restraints were conducted within the hospital. As a service to their patients, the local Greensboro hospitals already offered a series of parenting work shops. Using the existing program, the traffic division was able to offer child safety seat training to new parents. In 1991, the department coordinated with Moses Cone Hospital to establish a child restraint education program. In addition, four child restraints were obtained and distributed within the police department for use in departmental vehicles for child transport.

Child restraint programs also were presented at area businesses and at area churches. Child restraint information packets were distributed to elementary schools and day care centers for Child Passenger Safety Month. The department worked with local restaurants to promote child passenger safety through the use of tray liners. In 1990, a seat belt demonstrator, an actual car seat equipped with the various types of belt systems, was built. The demonstrator was used to show proper use of adult restraint systems as well as child restraints. The demonstrator was utilized to acquaint children with correct seat belt usage. In October 1990, seat belt demonstrations were made to high schools and local companies. By the end of 1991, the seat belt demonstration had been used in a total of 193 seat belt safety

presentations and was highlighted on various television shows.

In July 1991, the department worked with a local SADD chapter and the NC State Highway Patrol to design and build a rollover demonstrator, a device that simulates the rollover of a vehicle to show the consequences for restrained and unrestrained occupants. The rollover demonstrator was used in 18 presentations during fall 1991.

70% Plus Seat Belt Use National Awards Program. The focal point of the seat belt campaign was the 70% Plus Honor Roll Award Program. The 70% Plus Program is designed to encourage companies, organizations, and schools to use seat belts by recognizing high belt use rates. If consecutive monthly on-site surveys show that 70 percent or more of the firm's employees or a school's students are wearing seat belts, the group qualifies for a plaque from the National Highway Traffic Safety Administration. By early 1991, Greensboro led North Carolina in the number of plaques awarded to organizations. The department used this program to introduce its overall public information and education programs to many local businesses and industry, including car dealers, city government employees, and local hospitals. Many major industries and all the city's major hospitals qualified for the award.

The Traffic Education Coordinator worked with school superintendents and other school representatives to introduce the campaign to the schools. The district's education center worked with the police department to create television public service announcements about the program that were shown at all city high schools in the beginning months of 1991. By March 1991, all four of the city's high schools had reached belt use rates around 90 percent, far exceeding the qualifications needed for a 70% award. Plaques were presented to the four high schools, and a local McDonald's fast food restaurant furnished 1650 meal cards for the students at the high school with the highest belt use. The competition that was promoted among schools contributed to the high belt use rates attained. Driver's education classes in the city's high schools were also provided with instructions and information about

seat belts. The classroom presentations, an outgrowth of the 70% Plus Honor Roll campaign, led to other classes on traffic safety issues, such as DWI.

Radar Trailer. In addition to enforcement, Greensboro's speed program included the use of a mobile traffic zone radar trailer to increase public awareness of speeding. The trailer is a self-contained radar and speed display unit that serves as an educational device by allowing drivers to check their vehicle speed with the posted roadway speed. The unit was used primarily in speed complaint areas. The trailer proved so popular that the city purchased four more of the units with city funds.

Bicycle Safety. With the cooperation of local businesses, the medical community, and the media, the department worked to promote bicycle safety within the community. In 1990, a bicycle safety campaign was aimed at both children (ages 5 to 14) and their parents. Public awareness and education in safe bicycle operation and maintenance and the use of bicycle helmets were part of the campaign that culminated with Bicycle Safety Month. The department presented bicycle safety programs for each class at one elementary school during a two-day presentation, and bicycle safety clinics were conducted at McDonald's restaurants.

Bicycle rodeos were held to allow bicyclists to demonstrate safety proficiency. A bicycle rodeo was held in cooperation with Cablevision of Greensboro with bicycle helmets being awarded as prizes. In 1991, bicycle rodeos were held in cooperation with hospitals, the Salvation Army and various recreation centers. By September 1991, eight bicycle rodeos had been conducted and attended by 506 children.

HSRC's EVALUATION OF PROGRAMS

Since the Greensboro TSP program was conducted by a law enforcement agency, this program logically was more oriented toward enforcement of safety laws than the other two TIPP programs. The Greensboro Police Department focused much of their enforcement activity on two strategies: (1) to reduce speeds on 55 mph highways, and (2) to reduce the number of crashes and incidence of driving violations such as speeding and drunk driving at intersections identified as major problem areas. Both of these strategies were chosen based on data such as speed measures, crash frequencies and crash severity indices. This information also can serve as before-treatment measures for gauging improvements during and after an intervention. And indeed, the police department did collect periodic data for that purpose. The HSRC evaluation of this program will examine these data over time to help determine the program's impact on speeds and crash frequency and severity.

The promotion of seat belt use also was a major priority for this program, and the police department collected periodic seat belt observational data. One seat belt activity centered around recognition for groups who reach 70 percent belt use. This also required the collection of observational belt use data. The seat belt activities and the survey results will be the third aspect of the Greensboro TSP that will be discussed.

The goal of the Greensboro TSP is to reduce loss of life and serious injury as a result of motor vehicle crashes. Greensboro death and injury rates, along with overall seat belt use and child restraint use, will be discussed in Chapter 5.

Speed Enforcement

As mentioned earlier, data collected prior to the initiation of the TSP program indicated that interstate highways and state roads, while representing only 5.5 percent of the city's mileage, accounted for 18.6 percent of fatalities. The Greensboro Police Department collected speed data on these roadways in late 1987 and January of 1988. At that time, the average highway speed was 67 miles per hour. In the fall of

1988 several initiatives were implemented to enhance speed enforcement:

- speed enforcement equipment including Vascar and moving and stationary radar was used to detect speeders on interstate highways;
- patrol units on interstate highways were increased from one unit for 16 hours per day to two units for 16 hours or a total of 32 man-hours per day; and
- saturation patrols were deployed at high crash locations with emphasis on speed detection.

This activity resulted in approximately 800 to 1,000 speeding citations issued per month. In September 1990, the department resumed highway speed counts, conducting them quarterly through 1992. These data, with the inclusion of the two surveys conducted in 1987 and 1988, are displayed in Figure 4.2. A decrease in

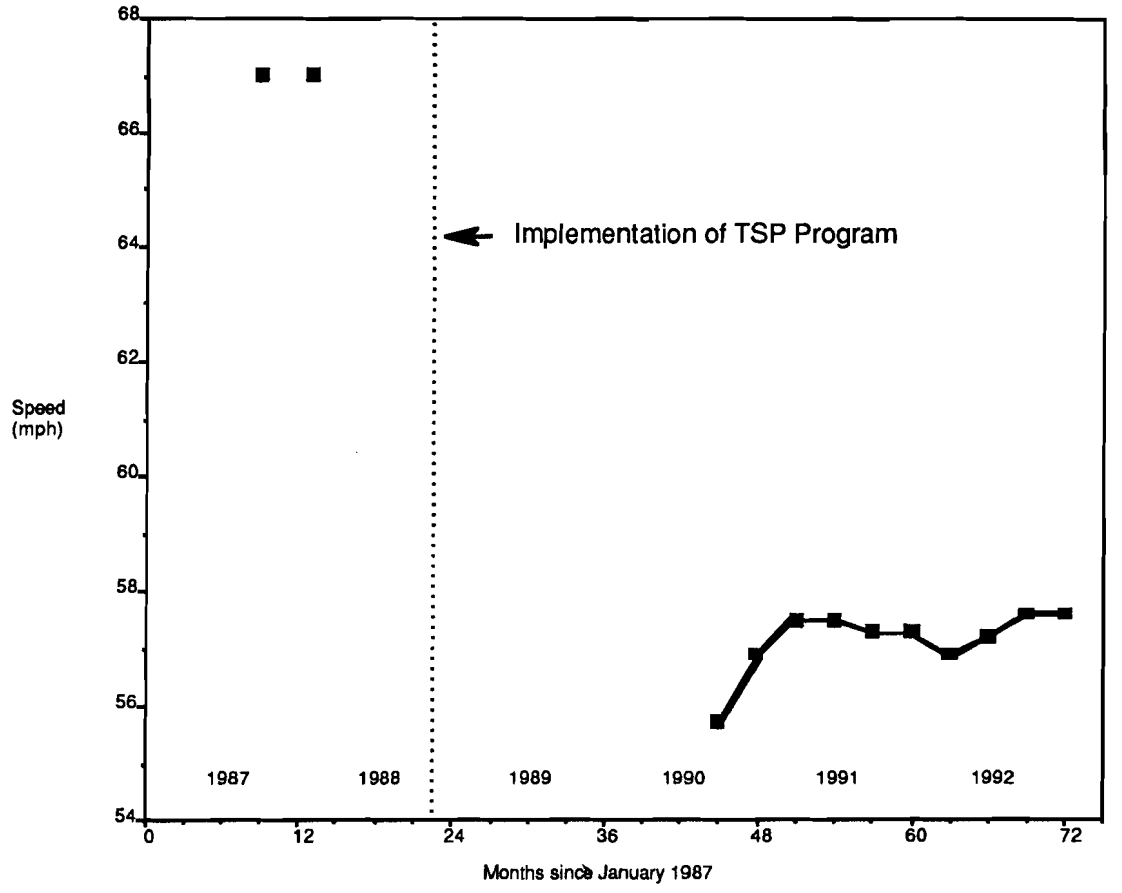


Figure 4.2 Greensboro Traffic Safety Division speed survey results.

average highway speed from the 1987-1988 counts to the September 1990 count was approximately 11 miles per hour, declining from 67.0 to 55.7 mph. This represented a sixteen percent decrease. The average speed increased slightly to the 57 mph range in 1991 and has remained stable since that time.

Collecting this data on a continuing basis enables the department to be able to determine changes in speed patterns quickly and adjust enforcement priorities in a timely manner. The Greensboro Police Department should be commended not only for the excellent improvement in average speeds that was achieved but also for the fact that the department used speed counts to quantify the problem as well as measure the results. This is an excellent example of how to include an evaluation component in the implementation of an intervention strategy.

Selective Traffic Enforcement of "Top 25" Intersections

Approximately once per year the Traffic Safety Division obtains from the City of Greensboro Department of Transportation a list of the "Top 25" most hazardous intersections, as determined by the number of crashes which occur at each location. The TSD sorts the "Top 25" into districts and provides lists of the most frequent violations at each location, along with the time of day and day of week that most crashes occur.

Selective traffic enforcement is then applied to these intersections. Generally two or more police cars are assigned to each location, including observers and chase vehicles if needed. Approximately 60-100 person hours are applied to each location per month. Officers are instructed to observe for "accident causing violations," such as traffic signal violations, failure to yield, improper turns, following too closely, and excessive speeds.

Table 4.1 shows the "Top 25" intersections identified in 1990-1991 to which selective enforcement was applied in 1991-1992. Included are numbers of crashes and the equivalent property damage only rate (EPDOR) for these time periods. These data were obtained from the city DOT. The EPDOR is calculated by multiplying the accident rate for each intersection (in millions of entering vehicles

Table 4.1. Selective enforcement results from "Top 25" Intersections.

	Number of Crashes		Increase/ Decrease	EPDOR		Increase/ Decrease
	1990-1991	1991 1992	in Crashes	1990-1991	1991-1992	in EPDOR
District I						
Wendover/Cridland	51	41	-10	13.76	9.77	-3.99
Wendover/Hill	33	39	+6	5.74	6.58	+0.84
Holden/Spring Garden	72	50	-22	14.03	8.74	-5.29
Battleground/Smith	14	15	+1	4.17	3.41	-0.76
Wendover/Lindsay	44	38	-6	8.79	9.02	+0.23
Fisher/Eugene	16	21	+5	30.21	45.22	+15.01
District II						
Randleman/Meadowview	35	31	-4	11.58	13.66	+2.08
Randleman/Vandalia	33	27	-6	20.12	13.21	-6.91
Elm-Eugene/Florida	38	41	+3	11.44	16.53	+5.09
District III						
Wendover/Edwardia	39	29	-10	10.90	5.43	-5.47
Vanstory/Pinecroft	36	31	-5	22.39	22.47	+0.08
High Point/Florida	45	N.A.				
High Point/Groomtown	48	N.A.				
High Point/Holden	78	75	-3	11.02	13.58	+2.56
High Point/Meadowview	59	37	-22	9.57	7.09	-2.48
High Point/Merritt	35	39	+4	6.13	6.25	+0.12
High Point/Patterson	76	N.A.				
High Point/Pinecroft	70	61	-9	11.98	14.24	+2.26
District IV						
Battleground/ David Caldwell	59	50	-9	7.66	10.32	+2.66
Battleground/New Garden	33	34	+1	7.66	7.22	-0.44
Battleground/Cone Blvd.	6	N.A.				
Battleground/Cornwallis	28	22	-6	6.05	3.77	-2.28
Lawndale/Cornwallis	31	26	-5	7.68	9.50	+1.82
Sixteenth/Yanceyville	15	14	-1	Unk.	10.12	
Market/English	39	36	-3	22.39	16.80	-5.59
Total	1,033	757*				
Average				12.16	12.04	

* Includes 4 locations where no accident totals given due to physical improvements made.

per year) times the intersection severity index. The severity index is developed by applying different weights to A+K accidents, B+C accidents, and property damage only crashes. Generally EPDORs greater than ten indicate a need for special attention by the Greensboro Department of Transportation.

Overall, Table 4.1 indicates there were 1,033 crashes before the enforcement and 757 after. The after total is low because four locations had physical improvements made, and for these no crashes were entered. (Removing these four locations from the "Top 25" would decrease the before frequency of crashes from 1,033 to 858.) Total number of crashes increased at six locations and decreased at 15. The EPDOR increased at 11 locations and decreased at nine. Average values of EPDOR were 12.16 before and 12.04 after. Thus, for these locations the total number of crashes decreased, and the EPDOR remained essentially unchanged after the selective enforcement.

No other comparison data were examined, because the highest ranked locations (the "Top 25") are the most likely to show an improvement (i.e., regress toward the mean) whether any enforcement is used or not. A better way of evaluating for the city would be to identify the "Top 50" intersections, randomly select 25 locations from the 50 for selective enforcement, and use the remaining 25 for comparison.

Selective traffic enforcement is clearly an efficient way to deploy manpower. Except for a reduction in total crashes, these data show little change. Without good evaluation design, the mathematical phenomenon of regression to the mean makes any kind of assessment difficult (Council et al., 1980).

Seat Belt Usage - 70% Plus Seat Belt Promotion

Two survey methods were used by the Greensboro TSP to measure gains in seat belt use. One form of seat belt data collection was part of the criteria for receiving a 70% Plus award. In order to qualify, a group of 100 or more had to exhibit a belt-wearing rate of 70 percent or greater for two consecutive surveys conducted at least one month apart. Greensboro led the state in the number of groups receiving awards with 25 businesses, government agencies, schools,

hospitals, and media outlets reaching belt use that ranged from 71 to 100 percent. The groups who received awards, the size of their group, and the final belt use rate attained are listed below.

Organization or Group	Population	% Belted
American Express Travel Services	2,500	79
Black Cadillac Oldsmobile Volkswagen	125	87
CIBA-GEIGY Corporation	1,200	83
City of Greensboro	183,521	75
Curtis Packing Company	110	70
Dudley High School	1,253	81
Greensboro Jaycees	1,100	83
Greensboro News & Record	500	83
Greensboro Police Department	549	72
Grimsley High School	1,481	92
Guilford County MADD	150	100
Guilford County Emergency Services	125	92
Kayser-Roth Corporation	425	83
Lorillard Inc.	2,200	77
Moses Cone Memorial Hospital	2,900	81
Page High School	1,665	95
Rolane Corporation	190	71
Smith High School	1,550	80
Southern Bell-Piedmont Division	398	91
Weaver Education Center	2,500	81
Wesley Long Community Hospital	1,124	85
WFMY-TV	131	93
Woman's Hospital of Greensboro	300	80
Wrangler-Church Court	300	81
Wrangler-Service Support Center	250	87

It is curious that one of the lowest award-winning belt use rates was posted by the Greensboro Police Department itself. Clearly the agency charged with enforcing the seat belt law should be expected to have full compliance among its officers and staff. However, the police department feels these data are artificially low because the observations were made as officers were in close proximity to headquarters, sometimes merely driving across the street from one building to another to pick up or return equipment. Overall, this is an impressive list of recipients that cover a wide range of the Greensboro population. However, the two surveys of belt use would need to be supported by additional surveys in order to determine whether these use rates are temporary or are, in fact, a long-term behavioral change.

Community Seat Belt Surveys

The department collected observational seat belt use data at three shopping centers in Greensboro on the same schedule that speed data were gathered. Belt use was observed for incoming traffic in one lane during daytime hours. Observations included cars and minivans, but not pickup trucks. Seat belt usage in the early surveys (Figure 4.3) conducted in late 1987 and January 1988 was 63 and 69 percent, respectively. Belt use remained in the 69 percent range until June of 1991, when it increased to 73 percent. Subsequent surveys showed steady increases which peaked with the last two surveys, when belt use reached 80 percent.

Caution should be used in assuming that these numbers represent the entire city of Greensboro. The fact that these data were gleaned weekdays during normal working hours at shopping centers probably reflects a disproportionate number of middle-class females, who traditionally have had high belt use rates. Since these numbers were collected consistently over time, however, there is a valid argument for claiming a significant increase in belt use among this sub-population during the program period. A suggestion for future seat belt data collection is to include a mix of sites, locations, and time of day and week to give a snapshot of a broader segment of the driving population.

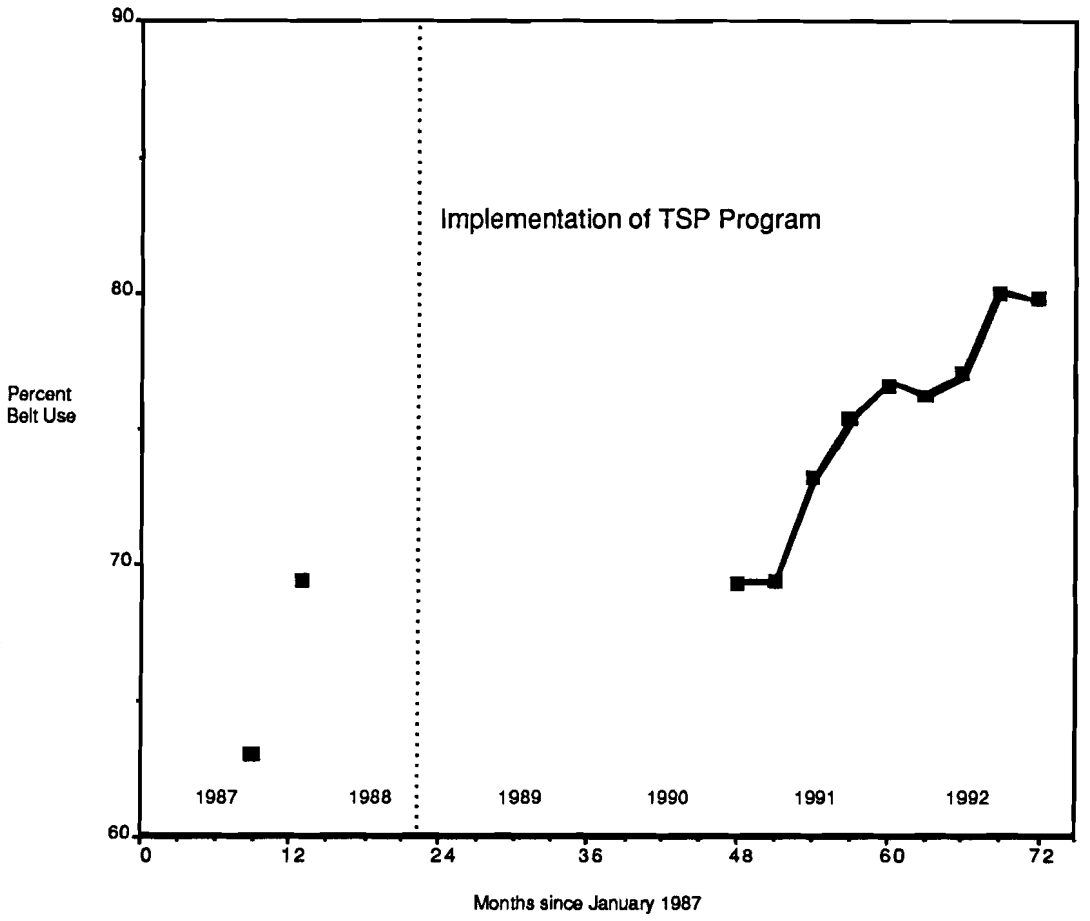


Figure 4.3 Greensboro Traffic Safety Division seat belt survey results.

SUMMARY

The Greensboro program was managed by the police department and focused on enforcement and education strategies. The Greensboro Police Department deserves much credit for their efforts to include data collection in the planning, implementation and evaluation stages of their program interventions. Data were collected as part of each of the strategies discussed in this section to determine average highway speeds, crash frequencies and severities at intersections, and seat

belt use rates. It is evident that the department conducted the community program with much thought given to an evaluation component.

CHAPTER 5. BELT USE, CHILD SAFETY SEAT USE, AND INJURY TRENDS FOR THE TIPP LOCATIONS

The preceding chapters have dealt both with process and impact measures, as first reflected in annual and quarterly progress reports generated by the TIPP cities, and then by HSRC staff in their assessment of various program elements. This chapter focuses on HSRC impact evaluation in the specific areas of belt use, child safety seat use, and injury trends for each program region.

BELT USE TRENDS

Background

Activities in each of the three TIPP cities included efforts designed to increase usage of safety belts -- a major focus in Greenville and Greensboro, and a moderate focus in Charlotte. Of the three projects, only Greensboro allocated specific effort to the measurement of local belt use, with data collected at a few shopping centers. (See Greensboro section for more detail.) Although done consistently, it is felt that these data would not be truly representative of citywide changes since they were routinely collected mid-morning at shopping center entrances and would reflect a large proportion of female drivers, whose belt use is considerably higher than that of male drivers.

Alternative data that tangentially address this matter are the result of HSRC's 72-site survey used to determine the statewide belt use rate for North Carolina. Although not designed to be able to measure specific interventions in specific cities, some of the TIPP cities did have a few regular statewide seat belt counting sites nearby. With considerable caution, we examined data from these statewide counting sites in light of belt promotion activities that were underway in the TIPP cities. As a background comparison point, Figure 5.1 shows the statewide belt usage trends during the time over which the TIPP city data are examined.

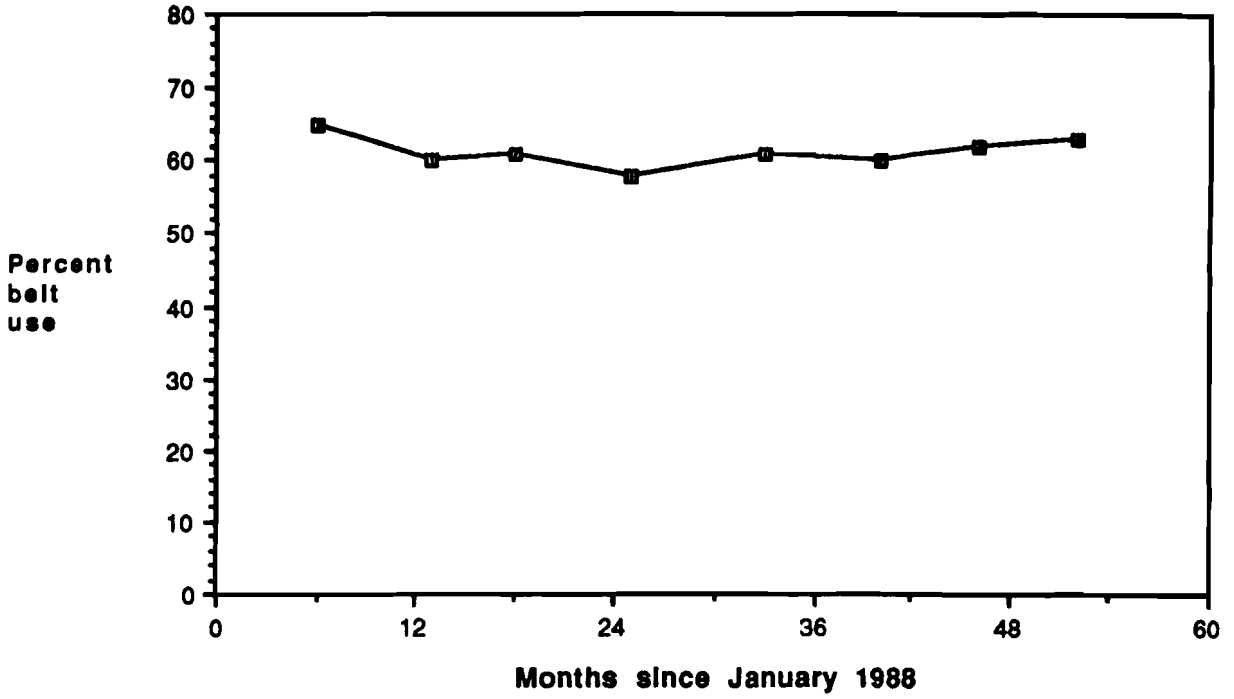


Figure 5.1. Statewide belt usage: 1988-1991.

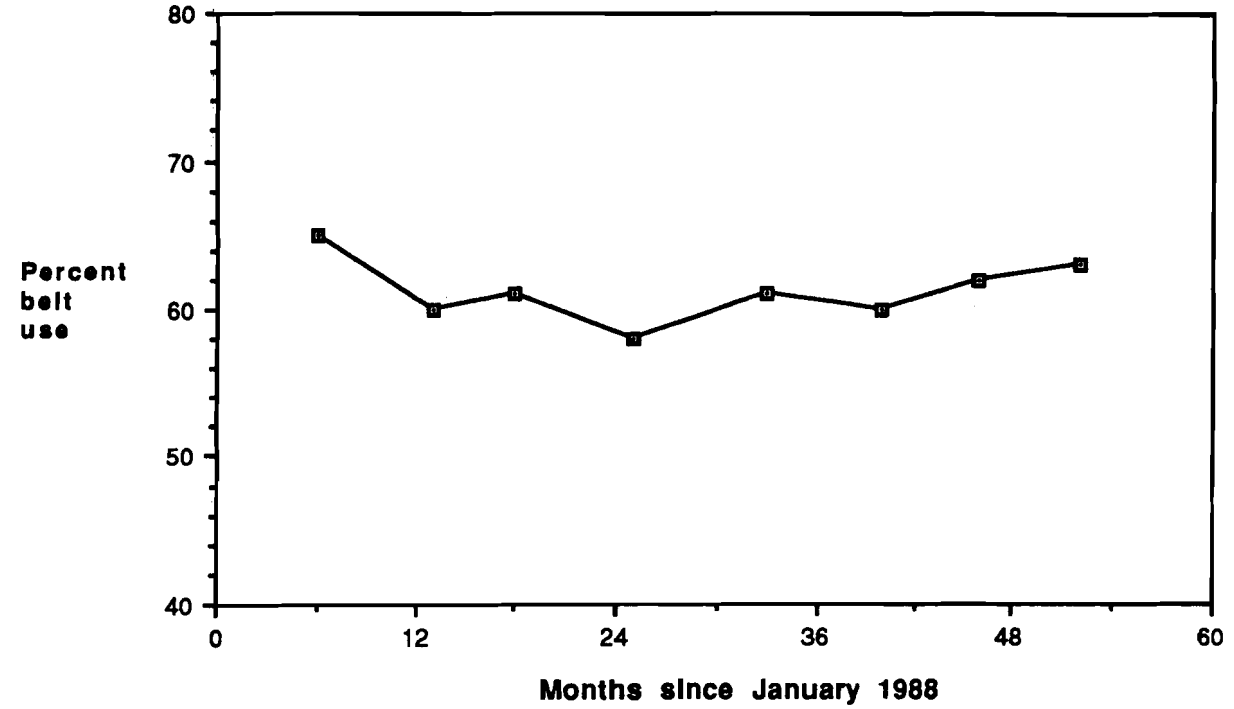


Figure 5.2. Statewide belt usage: 1988-1991.

Variation is not easily seen on the scale used for the graph, which shows recent belt usage relative to a vertical scale starting at zero. However, if the scale of the graph is changed to "spread" the data points, the relatively small changes become more discernible (Figure 5.2). As can now be more clearly seen, there was a general decline during the first four data collection periods followed by a general increase during the next four, such that the overall level of usage at the eighth collection period shown here was only two or three percentage points lower than the first. It is against this general trend (or lack of one) that any changes in the TIPP cities should, in part, be considered.

Belt Usage in the TIPP Cities Compared to Statewide Trends

As will be discussed in the final chapter, there are a number of reasons to be exceedingly cautious about interpreting these belt usage figures. First, the sampling units were not designed to measure changes in the individual cities but rather the state as a whole. Second, the location of the observation posts used here were not optimal for purposes of evaluating city changes. Third, it is not clear that the interventions to increase belt use happened at a single particular time, so that there was not a clear change from "before intervention" to "after intervention." With this in mind, Figure 5.3 shows belt usage in sampling areas near the three TIPP cities compared to trends for the remainder of the state.

Because of the clutter in the graph, it is difficult to see individual cities compared to the state; therefore, the trends will also be shown one city at a time compared to the state and also a separate graph for just the three cities (Figure 5.4). The point here, however, is to show that the whole graph (Figure 5.3) displays a certain consistency, in that there seems to be a general downward trend during the first four data collection periods and a general upward trend during the next four. Greenville lies outside the "envelope" of the other three, however, in that belt use there fell to a level quite a bit below the rest during the "bottoming out" portion of the period under consideration here.

In Figure 5.4, it can be seen that, to a greater or lesser extent, the curve for

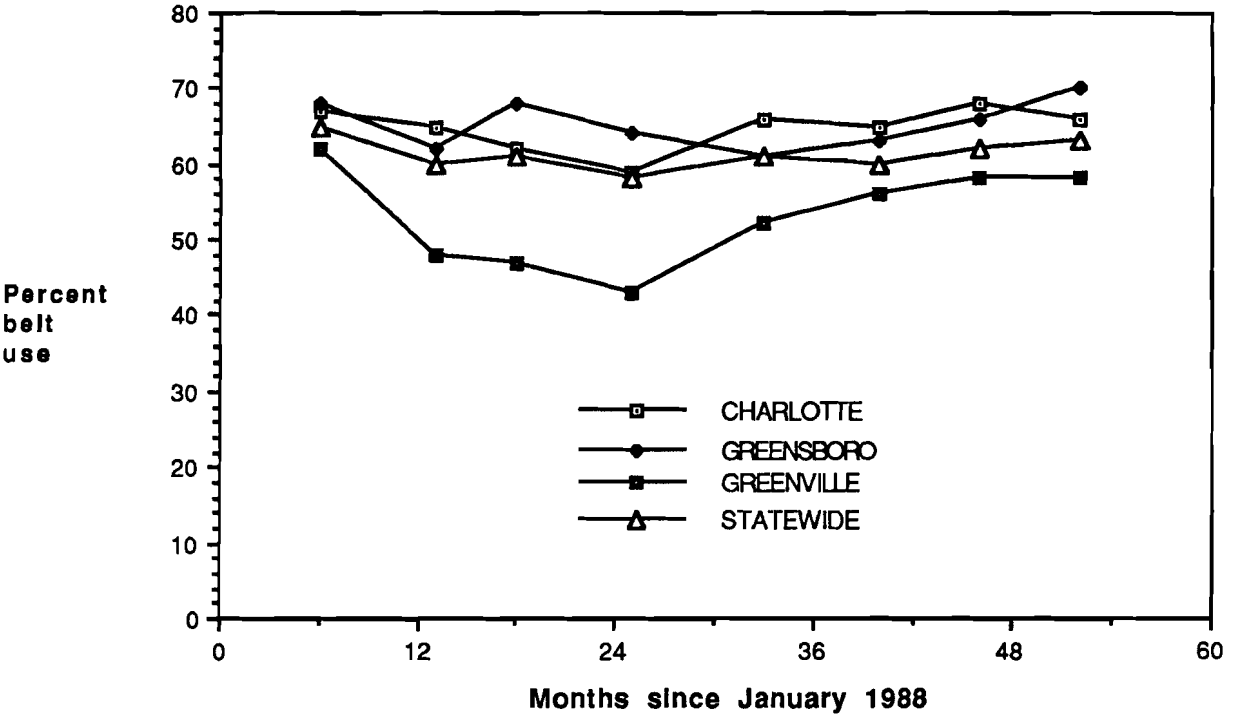


Figure 5.3. Belt usage; three TIPP cities and Statewide.

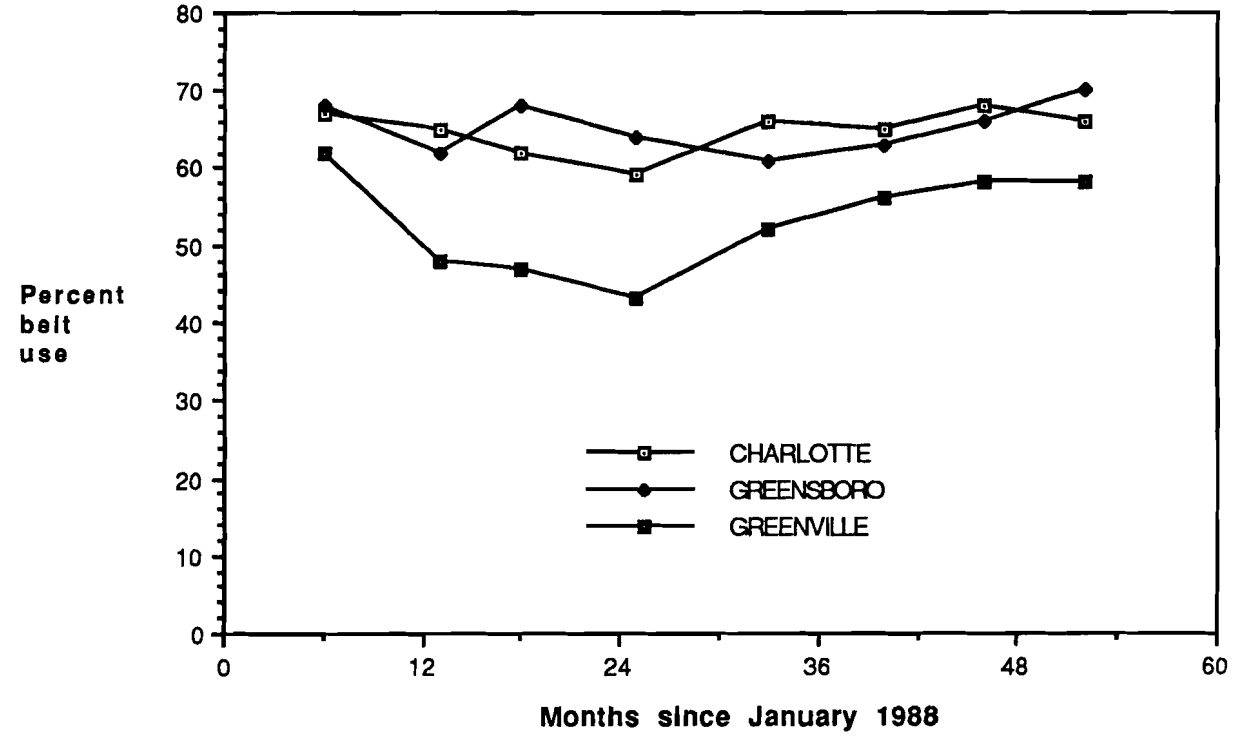


Figure 5.4. Belt usage in three TIPP cities.

each city has a sag toward the middle as did the data for the state as a whole. However, one needs to take into account the time at which the interventions were introduced to increase belt usage in the three cities. It is not totally clear how to identify exactly when these interventions took place (e.g., sometimes promotional activities were actually taking place during a planning phase), and that makes evaluation significantly more problematical.

Figure 5.5 shows the data taken from observation sites in and near Greenville. Figures 5.6 and 5.7 are similar depictions for Charlotte and Greensboro, respectively. Data for Greenville initially appear to support the idea that belt usage increased during the project implementation phase after a substantial decline before and during the planning stage. Still, the overall pattern of change is much like that of the state as a whole, though exaggerated in the areas around Greenville. Because of the marginal relevance of the belt observation sites to this particular application, it must be concluded that, while the Greenville interventions may have had a positive effect on belt usage, the current data are insufficient to provide a clear-cut indication that this is so.

Indications are even more uncertain for Charlotte and Greensboro. In the case of Charlotte, the increase in belt use came later during the implementation period, was consistent with statewide trends, and was not specifically associated with the timing of program activities in Charlotte. Figure 5.7 for Greensboro is likewise less than clear-cut. In fact, Greensboro shows rather slight overall change during the period.

We should say emphatically that these data do not in any sense <u>prove</u> that any of the local seat belt usage programs were without merit. Contrarily, to the extent that the interventions introduced in these TIPP cities were substantially similar to intervention schemes that have been demonstrated to succeed elsewhere, it seems likely that they would have succeeded in the TIPP cities as well. However, in the absence of belt usage data designed directly to measure the effects of the interventions, one must consider the question as unanswerable.

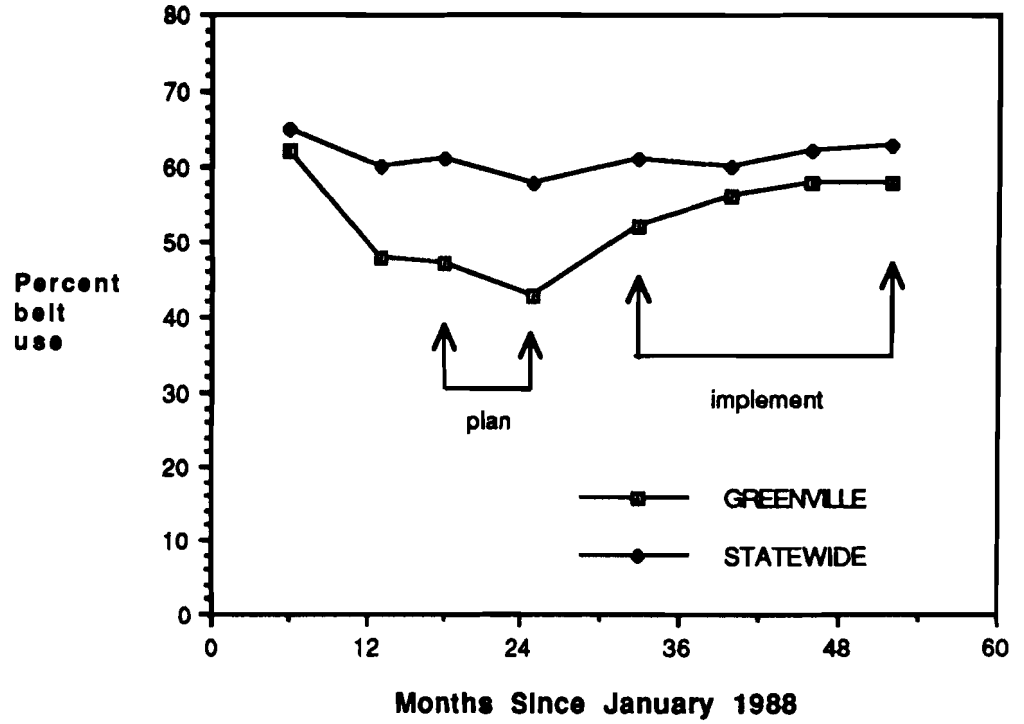


Figure 5.5. Belt usage; Greenville and Statewide.

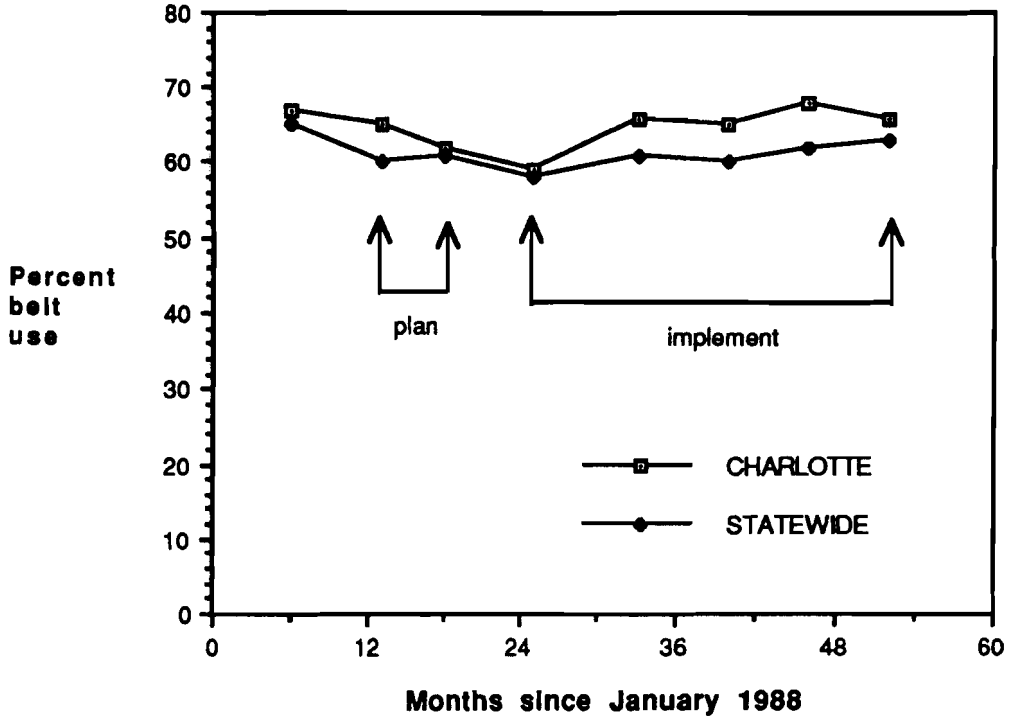


Figure 5.6. Belt usage; Charlotte and Statewide.

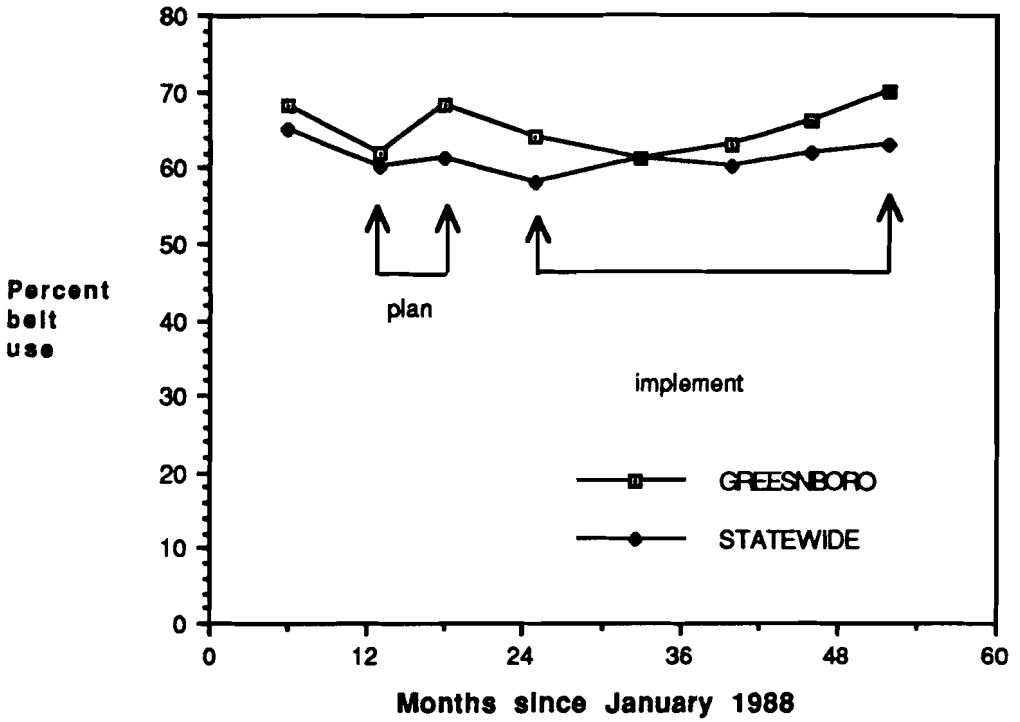


Figure 5.7. Belt usage; Greensboro and Statewide.

CHILD SAFETY SEAT USE TRENDS

Child safety seat observational surveys were conducted statewide by HSRC staff during the summer of 1992 in a separate project. These surveys included whether child restraint devices were being used correctly. Since the TIPP programs in Charlotte, Greenville, and Greensboro had special programs designed to increase child safety seat use, we used the statewide survey as an opportunity to more closely examine use rates in these TIPP cities.

Observational surveys were conducted in the eight North Carolina cities of Wilmington, Greenville, Fayetteville, Greensboro, Winston-Salem, Charlotte, North Wilkesboro, and Asheville. The normal protocol is to spend two days 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 times. Selection of shopping centers was based on such factors as traffic flow, the presence of a traffic 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's director. In addition, one day care center in each city was subsidized, that is, the fees for at least some of the children were subsidized for parents who need 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 was done in order to assure variation in socioeconomic status and to examine data in that light. In general, observations were conducted from 10:00 in the morning until 3:00 in the afternoon 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.

For purposes of this study, extra data were collected in the TIPP locations of Charlotte, Greensboro, and Greenville. Instead of a single shopping center and two day care centers, HSRC staff collected data at two shopping centers and four day care facilities in these targeted cities.

The observers, who were HSRC project staff trained 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 to observe children in cars that were preparing to pull out into traffic. At all locations, drivers who did not wish to participate were not questioned or observed further.

Once the observers approached a stopped car, the driver was asked to give the ages of the children in the car and how they were related to the driver. For each occupant, the observer noted and recorded their seating position, age, sex, race, their relationship to the driver (for children), and restraint status.

A total of 3,480 occupants in 1,354 cars were observed, with 1,312 of the occupants being less than six years of age. The sample can be further broken down as follows: 393 cars were observed in Greensboro, 261 in Charlotte, 242 in Greenville, and the remaining 450 observations were made in the other five cities. Data from the three TIPP (targeted) cities are compared to averaged results from the five non-TIPP (non-targeted) cities. Given the smaller numbers in some samples, one must be cautious in interpreting results. Clearly samples with a larger number of observations will be better for estimating usage.

Table 5.1 shows the observed restraint usage rates for children less than age six for the target cities as well as the five other non-target cities. It appears that those cities targeted with special restraint awareness programs fared better, on the average, than those to which no special efforts had been directed.

The summary table below (Table 5.2) is drawn from Table 5.1 and shows overall use of restraint, regardless of restraint type, for targeted and non-targeted cities.

Table 5.2. Percent restrained by targeted and non-targeted cities.

	Restraint Category	
	No	Yes
Target Cities	18.4%	81.6
Non-Target Cities	28.9	71.1

Table 5.1. Observed restraint usage rates for children by age.

Age	Non-targeted Cities None	Lap Belt	Lap & Shldr	Safety Seat	Total Col. %	Charlotte None	Lap Belt	Lap & Shldr	Safety Seat	Total Col. %
			Row %/(N)					Row %/(N)		
0	0.0	0.0	0.0	100.0	7.2	0.0	0.0	0.0	100.0	9.7
	(0)	(0)	(0)	(31)	(31)	(0)	(0)	(0)	(27)	(27)
1	7.7	1.9	1.9	88.5	12.0	7.9	2.6	0.0	89.5	13.7
	(4)	(1)	(1)	(46)	(52)	(3)	(1)	(0)	(34)	(38)
2	17.8	9.3	9.3	63.5	24.8	10.9	6.5	0.0	82.6	16.7
	(19)	(10)	(10)	(68)	(107)	(5)	(3)	(0)	(38)	(46)
3	45.0	10.0	16.2	28.8	18.5	16.2	19.1	20.6	44.1	24.5
	(36)	(8)	(13)	(23)	(80)	(11)	(13)	(14)	(30)	(68)
4	37.0	17.3	33.3	12.3	18.7	26.7	15.0	41.7	16.7	21.7
	(30)	(14)	(27)	(10)	(81)	(16)	(9)	(25)	(10)	(60)
5	44.4	21.0	32.1	2.5	18.7	18.4	42.1	34.2	5.3	13.7
	(36)	(17)	(26)	(2)	(81)	(7)	(16)	(13)	(2)	(38)
0-5	28.9	11.6	17.8	41.7	100.0	15.2	15.2	18.8	50.9	100.0
	(125)	(50)	(77)	(180)	(432)	(42)	(42)	(52)	(141)	(277)

Age	Greensboro None	Lap Belt	Lap & Shldr	Safety Seat	Total Col. %	Greenville None	Lap Belt	Lap & Shldr	Safety Seat	Total Col. %
			Row %/(N)					Row %/(N)		
0	3.0	0.0	0.0	97.0	9.2	3.9	3.9	0.0	92.3	11.6
	(1)	(0)	(0)	(32)	(33)	(1)	(1)	(0)	(24)	(26)
1	5.7	5.7	0.0	88.6	9.9	5.6	0.0	0.0	94.4	8.1
	(2)	(2)	(0	(31)	(35)	(1)	(0)	(0)	(17)	(18)
2	23.1	4.6	15.4	56.9	18.2	9.1	9.1	4.6	77.3	19.7
	(15)	(3)	(10)	(37)	(65)	(4)	(4)	(2)	(34)	(44)
3	32.1	16.7	19.0	32.1	23.5	15.2	16.9	18.6	49.1	26.4
	(27)	(14)	(16)	(27)	(84)	(9)	(10)	(11)	(29)	(59)
4	21.9	26.0	41.1	11.0	20.4	23.7	29.0	34.2	13.2	17.0
	(16)	(19)	(30)	(8)	(73)	(9)	(11)	(13)	(5)	(38)
5	34.3	17.9	43.3	4.5	18.8	21.0	18.4	57.9	2.6	17.0
	(23)	(12)	(29)	(3)	(67)	(8)	(7)	(22)	(1)	(38)
0-5	23.5	14.0	23.8	38.7	100.0	14.3	14.8	21.5	49.3	100.0
	(84)	(50)	(85)	(138)	(357)	(32)	(33)	(48)	(110)	(223)

The level of child restraint use in all these cities is even higher than the statewide figures for adult restraint use (which is about 60%), and that is encouraging. Restraint use is about 10 percentage points higher still in targeted TIPP cities than in the others. However, since no baseline data were collected before the interventions began, it is not possible to know whether these differences are associated with interventions specific to the project or pre-existed the interventions. Nevertheless, it is gratifying indeed to realize that more than four out of five children observed were using some form of safety restraint.

A second summary table (Table 5.3) combines targeted and non-targeted cities and displays type of restraint use according to age for all observations combined.

Table 5.3. Percent restrained by restraint class and age.

Age (years)	0	1	2	3	4	5
Restraint						
none	1.7%	6.9	16.4	28.5	28.2	33.0
belt	0.9	4.1	16.0	34.0	58.7	63.4
seat	97.4	89.0	67.6	37.5	13.1	3.6

Two major trends are evident. First is the decline in restraint use as the child gets older. Whereas the unrestrained total for infants (less than one year old) was less than 2 percent, that figure steadily increases with age to 33 percent unrestrained for five-year-olds.

The second major trend is the expected shift from the use of child seats to the use of seat belts as children get older. Among the youngest children, belts were the restraint mode of choice in only a few instances. By age four, however, more than half those exposed were restrained by belts rather than child safety seats.

Table 5.4 details observations as to survey location and illuminates possible socio-economic differences in restraint use. Previous research literature has shown that for both children and adults, restraint use is successively higher for groups that are successively higher in socio-economic status. Summary Table 5.5 is

Table 5.4. Observed restraint usage rates for children age <6 by survey location.

Location	Non-targeted Cities None	Lap Belt	Lap & Shldr	Safety Seat	Total Col. %	Charlotte None	Lap Belt	Lap & Shldr	Safety Seat	Total Col. %
		Row %/(N)					Row %/(N)			
Subsidized Day Care	39.4 (63)	11.2 (18)	16.2 (26)	33.1 (53)	37.0 (160)	42.4 (14)	18.2 (6)	18.2 (6)	21.2 (7)	11.9 (33)
Non-Subsidized Day Care	18.7 (25)	11.9 (16)	28.4 (38)	41.0 (55)	31.0 (134)	10.6 (18)	14.7 (25)	18.8 (32)	55.9 (95)	61.9 (170)
Shopping Center	26.8 (37)	11.6 (16)	9.4 (13)	52.2 (72)	31.9 (138)	13.5 (10)	14.9 (11)	18.9 (15)	52.7 (39)	27.0 (75)
Total	29.0 (125)	11.6 (50)	17.8 (177)	41.7 (180)	100.0 (432)	15.1 (42)	15.1 (42)	19.1 (53)	50.7 (141)	100.0 (278)

Location	Greensboro None	Lap Belt	Lap & Shldr	Safety Seat	Total Col. %	Greenville None	Lap Belt	Lap & Shldr	Safety Seat	Total Col. %
		Row %/(N)					Row %/(N)			
Subsidized Day Care	26.4 (19)	15.3 (11)	30.6 (22)	27.8 (20)	20.2 (72)	12.5 (9)	22.2 (16)	22.2 (16)	43.1 (31)	32.3 (72)
Non-Subsidized Day Care	20.4 (37)	13.2 (24)	26.5 (48)	39.8 (72)	50.7 (181)	13.9 (17)	9.0 (11)	23.8 (29)	53.3 (65)	54.7 (122)
Shopping Center	26.9 (28)	14.2 (15)	14.4 (15)	44.2 (46)	29.1 (104)	20.7 (6)	20.7 (6)	10.3 (3)	48.3 (14)	13.0 (29)
Total	23.5 (84)	14.0 (50)	23.8 (85)	38.6 (138)	100.0 (357)	14.3 (32)	14.8 (33)	21.5 (48)	49.3 (110)	100.0 (223)

condensed from Table 5.4 and shows overall restraint use for targeted and non-targeted cities.

Table 5.5. Percent restraint use by survey site in targeted and non-targeted Cities.

	Non-Targeted Cities Restraint		Targeted Cities Restraint	
	No	Yes	No	Yes
Subsidized Day Care	39.4%	60.6	23.7	76.3
Non-Subsidized Day Care	18.7	81.3	15.2	84.8
Shopping Mall Sites	26.8	73.2	21.1	78.9

Consistent with what was shown in the previous tables, belt use is higher in every category in the targeted cities when compared with the non-targeted cities. The margin of difference appears to be largest in the subsidized day care category. It is not known whether this was a pre-existing difference. Also, belt use is highest in both groups of cities for the non-subsidized day care category, another indication of the oft-seen higher level of restraint use among those who are in higher socio-economic classes (and assuming, of course, that attendance to a subsidized versus non-subsidized day care facility is some indication of socio-economic status).

Thus, the fact that Table 5.6 shows that restraint usage is lower among non-white children than white children is not surprising in view of the socio-economic situation. It should be noted however, that the socio-economic indicator does not always hold true in the case of restraint use -- nor need it be so. Belt use among non-white adult members of the population was significantly lower than among white members during the period before enactment of NC's belt law. However, it is noteworthy that in survey after survey since the law came into effect, the usage rate among non-white drivers and passengers has been consistently higher than that of white drivers and front seat passengers (Reinfurt, Stewart, Weaver and Green, 1991).

Table 5.6. Observed restraint use for children age <6 by race.

Race	Non-targeted Cities Yes	No	Total	Charlotte Yes	No	Total
	Row %/(N)		Col. %	Row %/(N)		Col. %
White	81.3 (244)	18.7 (56)	64.4 (300)	85.8 (212)	14.2 (35)	76.0 (247)
Non-White	52.2 (83)	47.8 (76)	34.6 (159)	66.7 (52)	33.3 (26)	24.0 (78)
Total	71.2 (327)	28.8 (132)	100.0 (459)	81.2 (264)	18.8 (61)	100.0 (325)

Race	Greensboro Yes	No	Total	Greenville Yes	No	Total
	Row %/(N)		Col. %	Row %/(N)		Col. %
White	80.8 (236)	19.2 (56)	65.3 (292)	87.3 (179)	12.7 (26)	75.9 (205)
Non-White	69.0 (107)	31.0 (48)	34.7 (155)	75.0 (52)	25.0 (13)	24.1 (65)
Total	76.7 (343)	23.3 (104)	100.0 (447)	85.5 (231)	14.4 (39)	100.0 (270)

Table 5.7 examines restraint use by relationship of the child to the driver (i.e., child, grandchild, other relative, non-relative). For categories other than child of driver, the percent restrained in Greenville tends to be a bit higher than the other target cities, but samples are so small that any conclusions are tenuous.

Table 5.8 is derived from Table 5.7 and shows the percent of children restrained as related to age of child and kinship to the driver for all of the cities (target and non-target). The bottom row of the table shows the percent of the children in each age group whose parent was driving at the time of the observation. Thus, at the bottom left, the parent was driving in 92 percent of the 109 cases in which the child was less than one year old (as would be expected).

Table 5.7. Observed restraint use for children age <6 by their relationship to driver.

Relationship to Driver	Non-targeted Cities			Charlotte		
	Yes	No	Total	Yes	No	Total
	Row %/(N)		Col. %	Row %/(N)		Col. %
Child	74.6 (252)	25.4 (86)	79.7 (338)	86.2 (207)	13.8 (33)	87.0 (240)
Grandchild	63.9 (23)	36.1 (13)	8.5 (36)	83.3 (14)	17.6 (3)	6.2 (17)
Other Relative	41.7 (10)	58.3 (14)	5.7 (24)	40.0 (2)	60.0 (3)	4.3 (5)
Non-Relative	65.4 (17)	34.6 (9)	6.1 (26)	75.0 (9)	25.0 (3)	2.5 (12)
Total	71.2 (302)	28.8 (122)	100.0 (424)	84.1 (232)	15.9 (42)	100.0 (274)

Relationship to Driver	Greensboro			Greenville		
	Yes	No	Total	Yes	No	Total
	Row %/(N)		Col. %	Row %/(N)		Col. %
Child	80.0 (236)	20.0 (59)	8.45 (295)	85.9 (152)	14.1 (25)	84.3 (177)
Grandchild	70.6 (24)	29.4 (10)	9.7 (34)	100.0 (11)	0.0 (0)	5.2 (11)
Other Relative	35.7 (5)	64.3 (9)	4.0 (14)	83.3 (5)	16.7 (1)	2.8 (16)
Non-Relative	33.3 (2)	66.7 (4)	1.7 (6)	75.0 (12)	25.0 (4)	7.6 (16)
Total	76.5 (267)	23.5 (82)	100.0 (349)	85.7 (180)	14.3 (30)	100.0 (210)

Table 5.8. Percent of children restrained by age of child and relationship to driver.

Kinship to Driver		Age (Years) 0	1	2	3	4	5
Parent	(% Restrained)	99%	96%	88%	72%	75%	67%
	(N)	100	124	212	240	206	177
Grandparent	(% Restrained)	100%	100%	87%	72%	64%	74%
	(N)	3	5	22	25	25	19
Other Relative	(% Restrained)	100%	50%	56%	54%	38%	14%
	(N)	2	4	9	13	13	7
Non-Relative	(% Restrained)	75%	70%	50%	60%	71%	75%
	(N)	4	10	12	10	7	16
	Total	109	143	255	288	251	219
% Children Riding with parent[1]	(% with Parent)	92%	87%	83%	83%	82%	81%

1 Row 1 (Parent) divided by Total.

For five-year-old children, a parent was driving in 81 percent of the 219 cases. Note the gradual decline from 92 percent for those less than one year old down to 81 percent for those five years old.

The next point of interest is the restraint use, presented in terms of the child's kinship relationship to the driver. When the parent is the driver, 99 percent of the infants under one year old were restrained. Reading across that same row, it appears that parents require restraints for the children successively less often as the children get older. The restraint percentage declines to 67 percent for the five-year-olds. Grandparents appear to impose about the same restraint use requirement for the children, although the sample size is small.

For other relatives, it appears that restraint use is somewhat lower than when parents or grandparents are driving, even for infants, but the sample size is even smaller here. The same is true of non-relatives. The latter two sets of sample sizes are too small to encourage interpretation of any apparent differences between the non-relative and other-relative categories.

Table 5.9 shows data on correctness of usage. Due to the nature of the survey procedures, the observers were able to make judgments on "gross misuse" only. With the short amount of time for each observation and with the observer positioned outside the vehicle where it was often difficult to see inside clearly, it was possible only to determine if the seat was facing in the proper direction, if there was a harness being used at all to hold the child in the seat, and if there was a seat belt being used at all to hold the seat within the vehicle. Other surveys done with more time allowed for closer inspection of seats in use have found much higher levels of misuse than were found with this method (Cynecki and Goryl, 1984).

The main point of this table is that so many of the restraints are being correctly used -- about 87% in both targeted and non-targeted cities. The most commonly observed usage error was failure to use a harness to hold the child in the seat. This represents a considerable improvement over what was observed during the early days of the child restraint movement, where a 50 percent correct use rate was more

Table 5.9. Proportion of safety seats observed to be correctly and incorrectly used.

Type of Use	Non-targeted Cities	Charlotte	Greensboro	Greenville	Total
	Col%/(N)	Col%/(N)	Col%/(N)	Col%/(N)	Col%[N]
Correct Use	87.8 (158)	88.7 (126)	86.2 (119)	85.7 (84)	87.3 (487)
Front/Rear Error	1.7 (3)	1.4 (2)	4.3 (6)	8.2 (8)	3.4 (19)
No Harness Used	9.4 (17)	7.7 (11)	8.0 (11)	5.1 (5)	7.9 (44)
F/R Error &No Harness	0.0 (0)	0.7 (1)	0.0 (0)	0.0 (0)	0.2 (1)
No Seat Belt Used	1.1 (2)	1.4 (2)	1.4 (2)	1.0 (1)	1.2 (7)
Total	32.3 (180)	125.4 (142)	24.7 (138)	17.6 (98)	17.6 (558)

the norm. Some of the improvement is likely due to the fact that the child seat and belt designs have improved so that they are easier to use (this would seem to be true of the child seats in particular). However, some of the improvement is perhaps due to a more informed public growing out of the years of attention to this matter. Not much difference is evident here between the targeted and non-targeted cities, however. Both groups show correct use in over 85 percent of the cases.

FATALITY DATA

Greensboro stated in a project report that the decrease in city motor vehicle fatalities was related to the TIPP activities. Their level of effort relating to speed and seat belt law enforcement, along with results that indicated a sizable decrease in mean speed on high speed roadways and increases in belt use, lend credence to the possibility of a cause and effect relationship. However, no comparison data were examined, either from a nearby city or from statewide trends. We thought it would be instructive to examine not only Greensboro but also the Charlotte and

Greenville areas insofar as how the frequency of both fatal and class A plus fatal (A+K) injuries changed relative to statewide frequencies.

During the period covered by activities in the three TIPP cities, statewide fatalities changed substantially. Figure 5.8 shows the statewide trend. From 1982 through 1986 fatality raw numbers increased, and then in 1987 a decline began which continued through 1992. It is against this trend that one should consider, in part, the noted changes in the three TIPP cities.

Figure 5.9 shows fatalities in the three TIPP cities during the same time period. The trend lines are rather chaotic, as is typically seen for fatality data drawn from relatively small populations, because the year to year variance is rather large in such populations simply because of the low probability "chance" nature of fatal events. Pitt county shows more or less of a growth in fatals throughout the period as perhaps reflects the growth in the area. The fact that the number of fatals for Pitt County is roughly equivalent to the number for Greensboro reflects the rural nature of the county, with considerable exposure on higher speed rural roads. Charlotte figures are erratic, and only Greensboro seems roughly to parallel the statewide trend of an increase and then a decrease. These trend lines underscore the essential futility of trying to measure the effects of a safety intervention in terms of fatalities in a city or even a region, whether plotted as raw number of fatals, fatals per population, fatals per registered vehicles, etc.

Figure 5.10 further highlights the similarity of trend between Greensboro and the state. Here, the raw fatality scores are converted to z-scores, where z is the difference between the raw number of fatalities in a given year and the mean number of fatalities over the period 1982-1991, divided by the standard deviation, or $(x - x)/s$. These z-scores show the variation of each year's fatalities from the respective state and city average of all the years considered. With zero indicating the average value, the fatalities went from below average to above average and then back down below average. The z-score is used to equalize the large difference in numbers of fatalities between state and city totals. Each plotting point shows the departure of that year's value from the respective averages of all years shown.

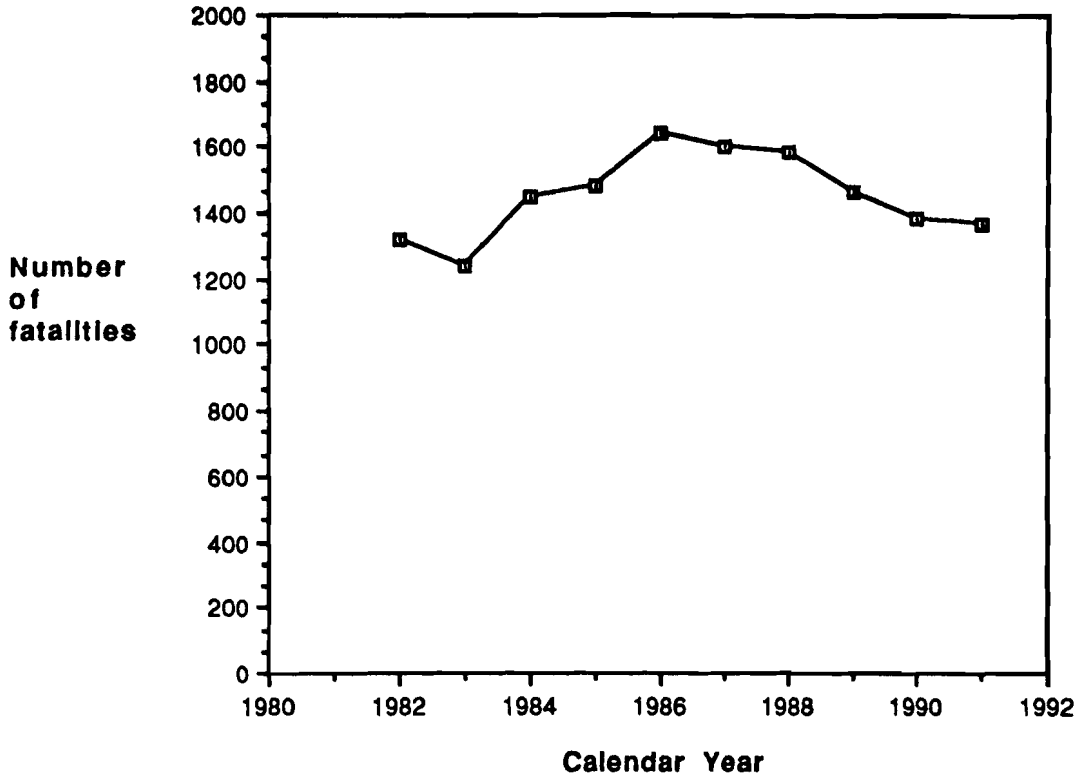


Figure 5.8. Statewide fatalities: 1982-1991.

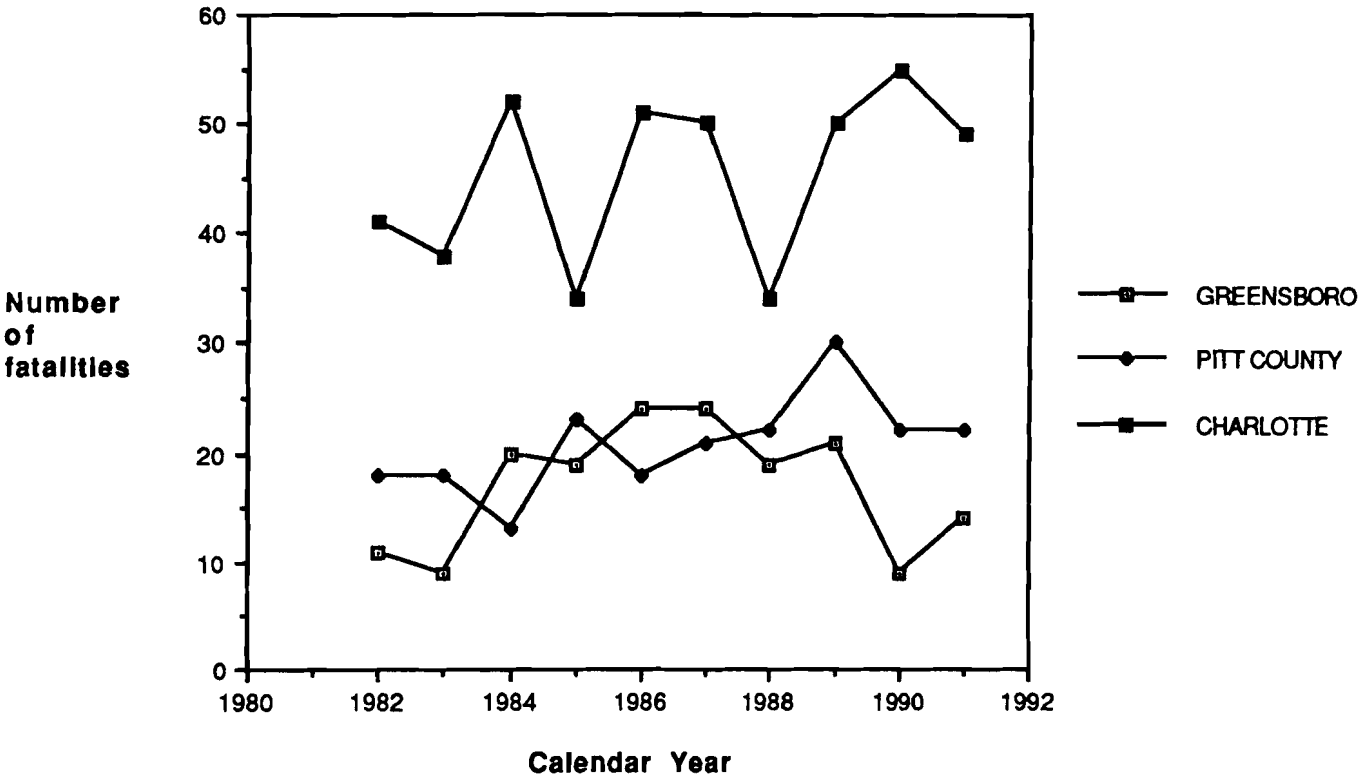


Figure 5.9. Fatalities for three TIPP cities: 1982-1991.

Experience in Greensboro was proportionately quite close to the behavior in the state as a whole. It is not evident that the fatality trend is related to the specific interventions in Greensboro.

Figures 5.11 and 5.12 show the same kind of z-scores for Pitt County and Charlotte. Little relationship is seen in either case. Finally, Figure 5.13 shows, in one graph, the z-scores of all three TIPP cities. The scores appear rather erratic and no particular similarities are evident among the three.

INJURY PLUS FATAL DATA

As is obvious, it is difficult to make much sense out of fatality data alone since the rare-event mathematical characteristics of such data make them highly variable. Accordingly, some further analysis is presented here in which fatal injuries are combined with the much more frequent class A (serious) injuries reported by police. This gives more numerical stability to the data.

Figure 5.14 shows statewide totals of this sum of class A plus fatal injuries (A+K) for the ten-year period from 1982 through 1991. This is frequency data and not rate data, and one can see a growth in the numbers for the first five years. Such growth has been characteristic in the USA throughout most of its history since the 1920's, as the process of motorization has proceeded. In Figure 5.14 there is a five-year downturn at the end, which is actually historic in nature for North Carolina. The downturn in actual frequencies occurred despite population (and therefore exposure) growth. The downturn may be because (1) the rate of exposure growth has slowed nationally in recent years compared to earlier decades, (2) compliance with the NC seat belt law has been shown to reduce casualties, and (3) the economic slow down -- recession -- has also reduced exposure. It is against this statewide pattern that we can contemplate changes in the three cities in question.

Figure 5.15 shows the same A+K injury frequencies for the three cities. Charlotte appears to show a general downward shift throughout the period, thus differing from the state in the sense of the absence of the growth during the first five years of the period shown. Greensboro appears to show the same pattern as the state. The

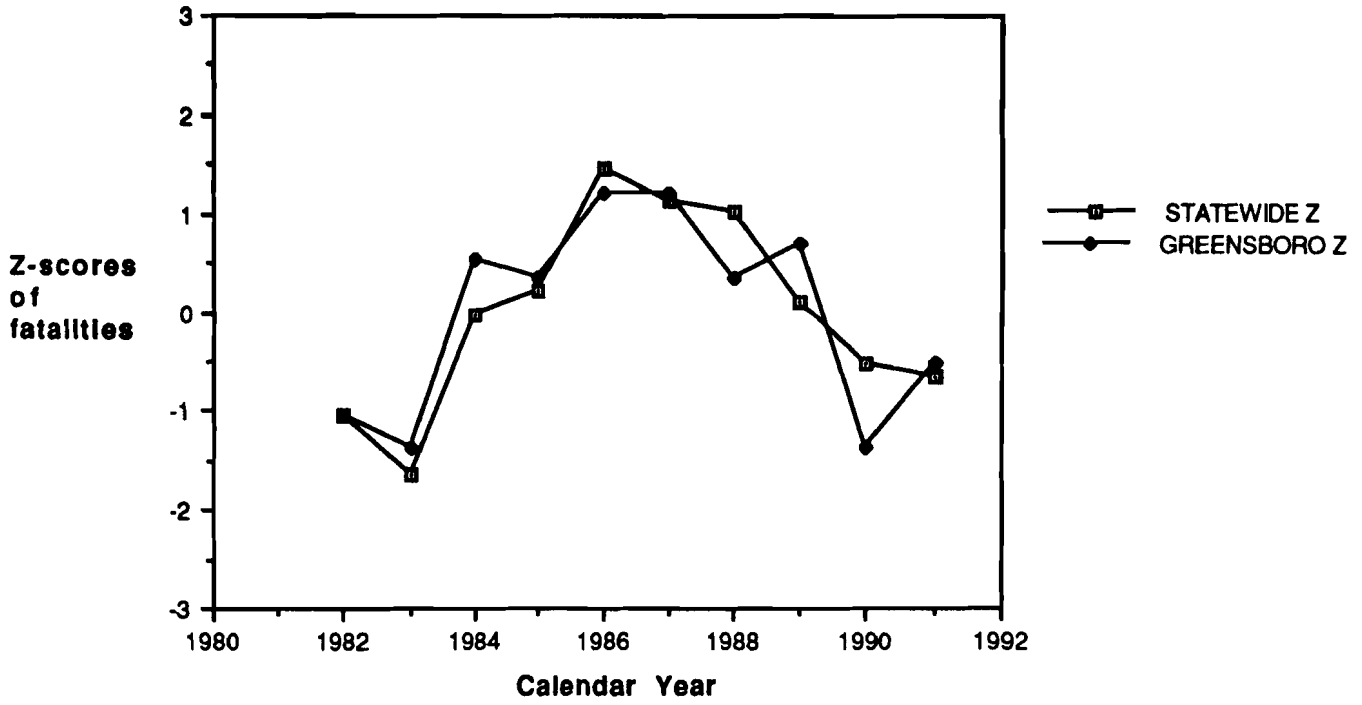


Figure 5.10. Z-scores of fatalities: Statewide and Greensboro, 1982-1991.

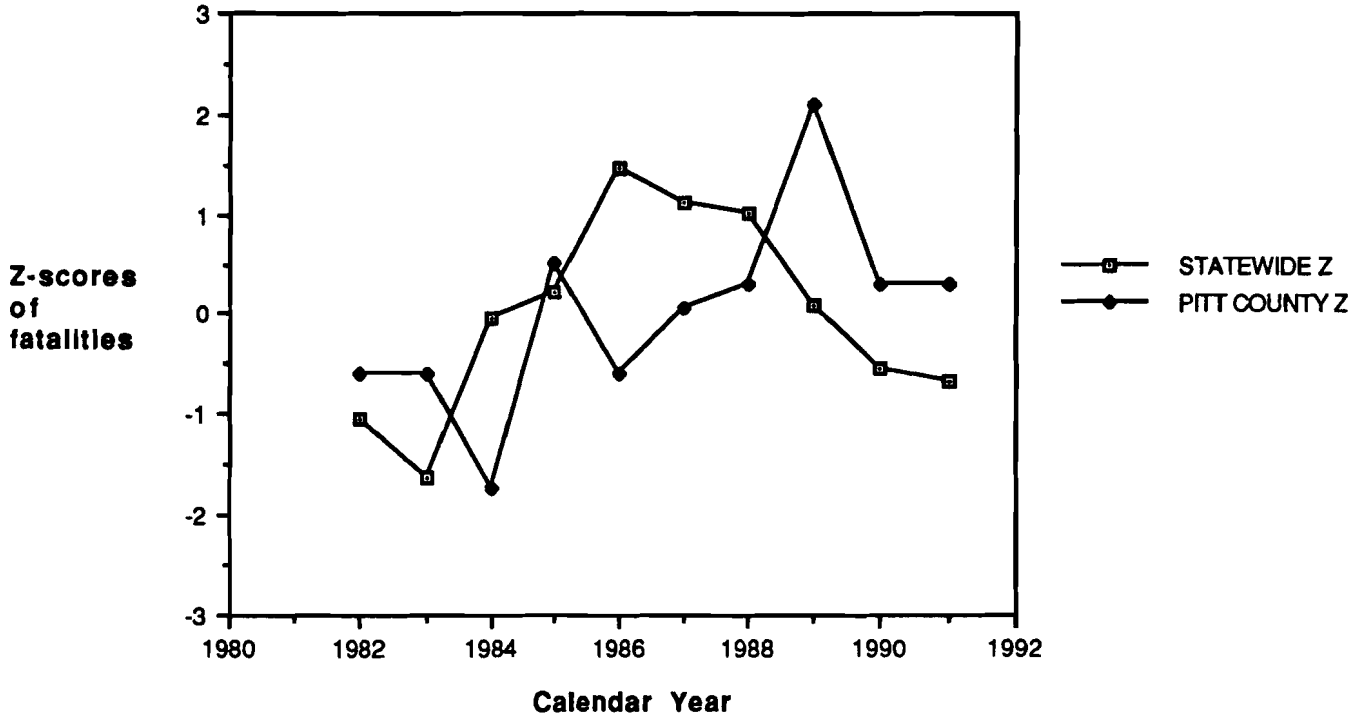


Figure 5.11. Z scores of fatalities: Statewide and Pitt County, 1982-1991.

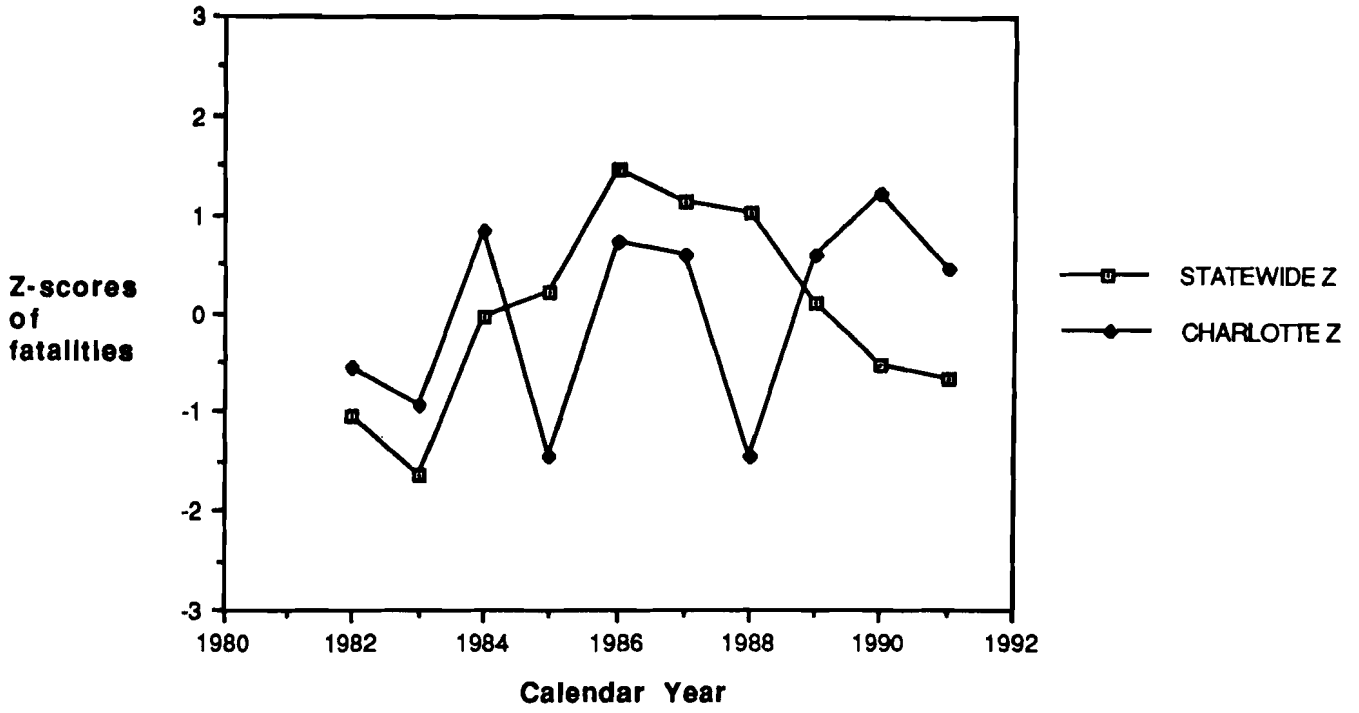


Figure 5.12. Z-scores of fatalities: Statewide and Charlotte, 1982-1991.

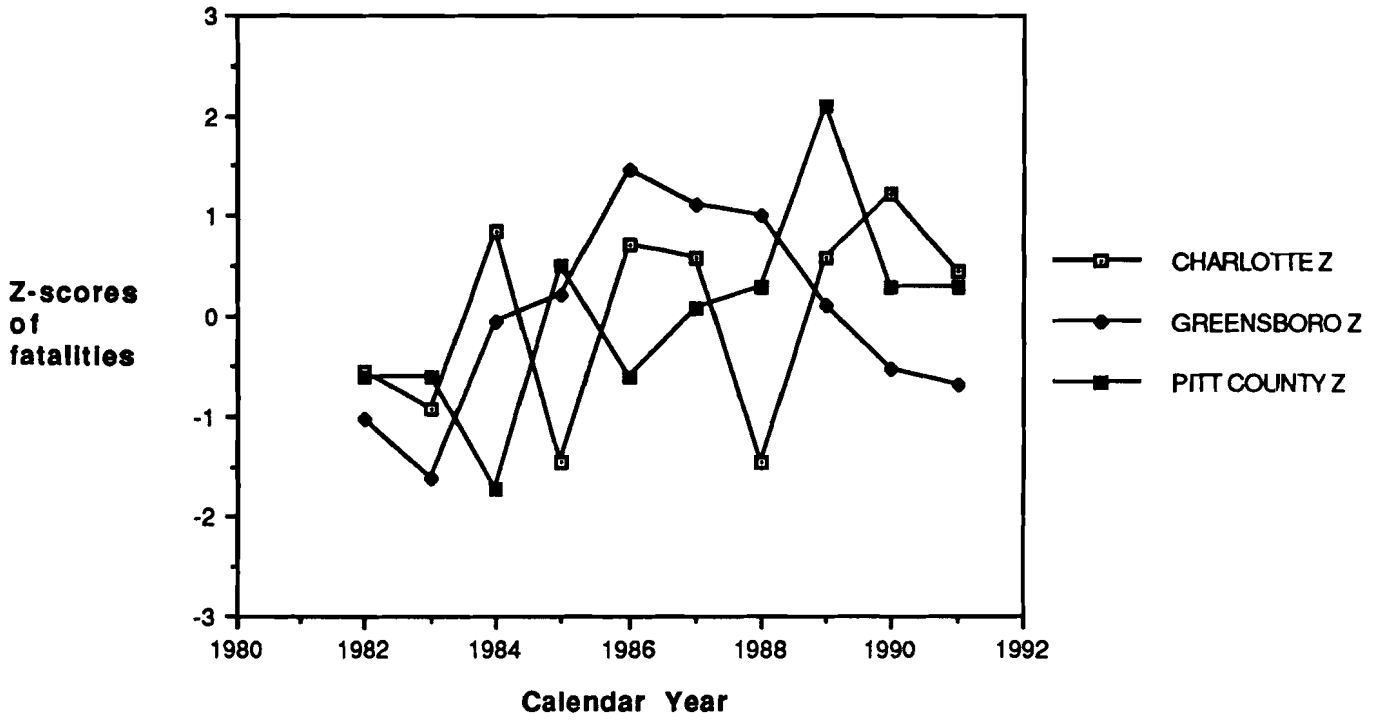


Figure 5.13. Z-scores of fatalities for three TIPP cities: 1982-1991.

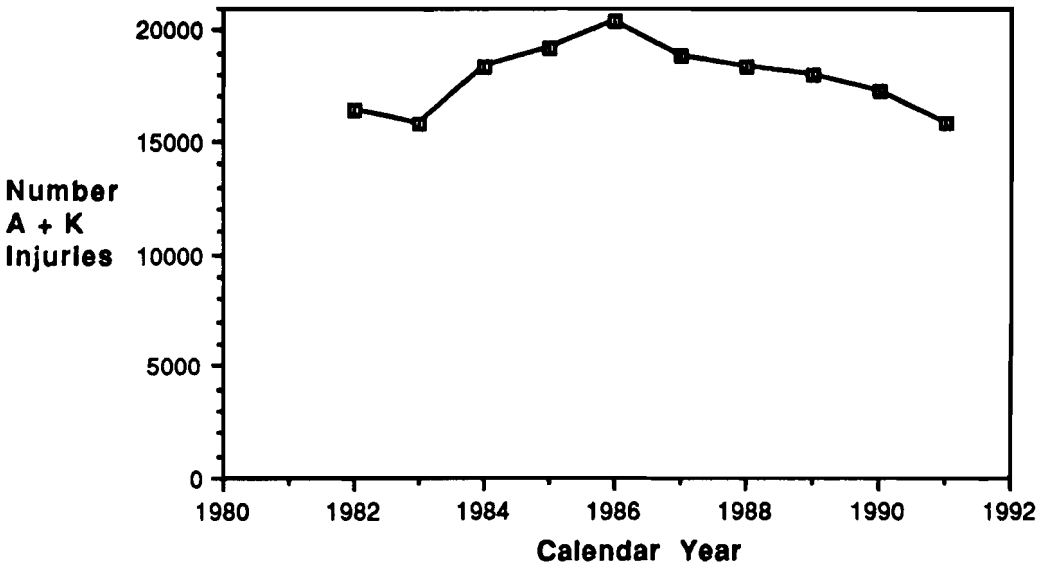


Figure 5.14. Statewide A Injury Plus Fatal: 1982-1991.

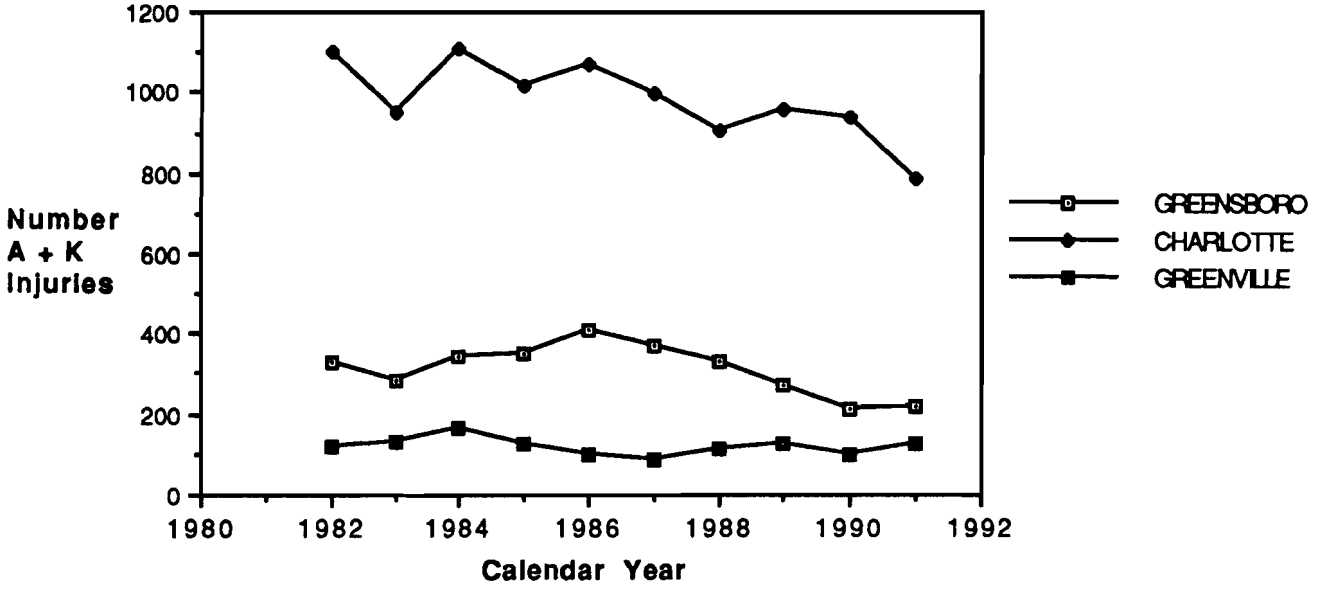


Figure 5.15. A + K Injuries for three TIPP Cities: 1982-1991.

Greenville area numbers appear to be relatively flat during the period.

As another way of showing changes in the three cities relative to the state, A+K casualties in each city are shown as a proportion of the statewide total in Figures 5.16-5.18. Greensboro shows about the same relationship to the state during the first five years (Figure 5.16), and then declines relative to the state in the next five years. Charlotte declines relative to the state in the first five years and then is relatively flat in the second five years (Figure 5.17). The Greenville area shows a rather erratic series of changes, first growing relative to the state, then declining, then growing again (Figure 5.18). The variability is presumably a function of the small numbers in the sample.

The above three figures are rather unsatisfactory to show both the statewide trend and the trend of the cities relative to the statewide activity. If a given city were to have had the same relationship to the state, year after year, the line would be flat, and would therefore completely disguise the fact that substantial statewide changes were under way.

Perhaps a more illustrative way of presenting the data would be to show the actual frequencies statewide, as well as for the three cities (Figure 5.19). However, this produces impractical results due to the magnitude of the frequencies (e.g., about 150 or less A+K's per year for Greenville compared to 15,000 - 20,000 for the state). Thus, showing them on the same graph in that form is rather hopeless. An alternative is to adjust the frequencies of the cities and to show how the changes in the cities behave relative to the state if the injury frequencies in the cities were as frequent as for statewide. This makes it possible to show each on the same scale, while preserving the "shape" of the trends from year to year. To make this adjustment, we multiplied each year value for a city by a constant -- said constant being of such a value as to raise the city figures to the scale of the state figures. Thus, in the adjusted figures, the relative year-to-year pattern of change is the point of interest.

Figure 5.20 shows that the growth in Charlotte was approximately flat (though erratic) in the first five years, but then closely followed the statewide pattern during

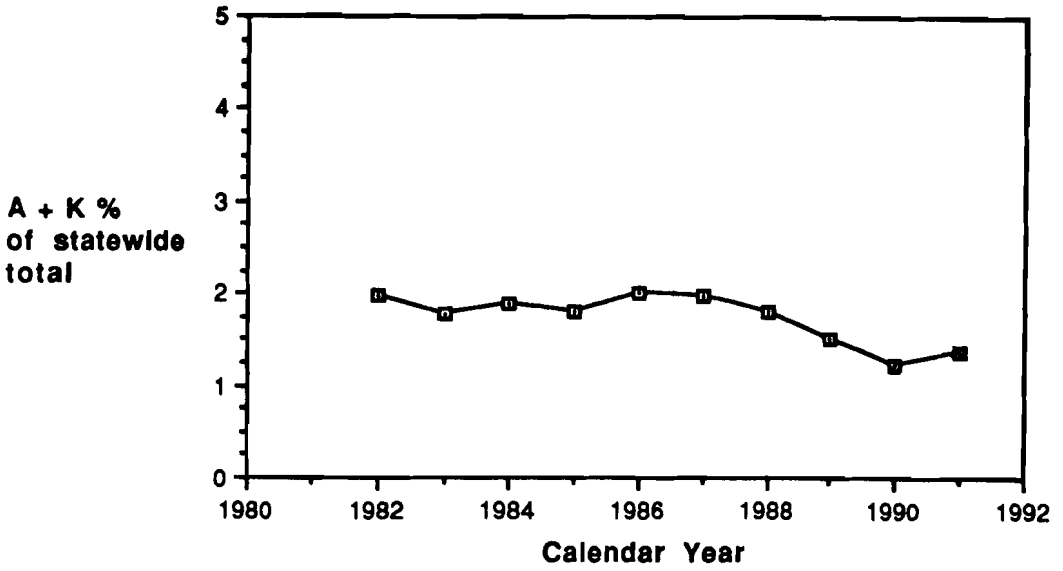


Figure 5.16. Greensboro A + K as percent of Statewide: 1982-1991.

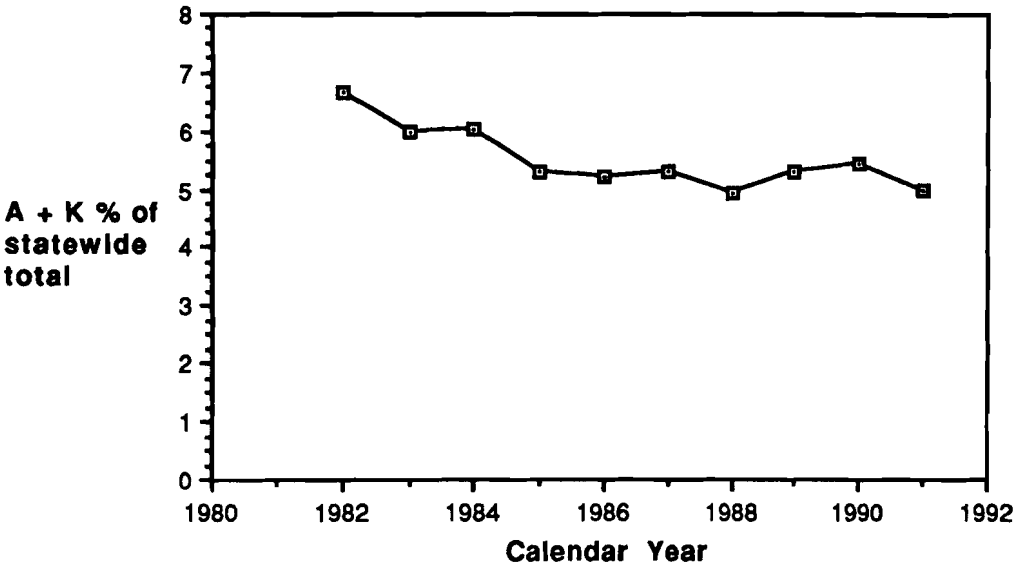


Figure 5.17. Charlotte A + K as percent of Statewide: 1982-1991.

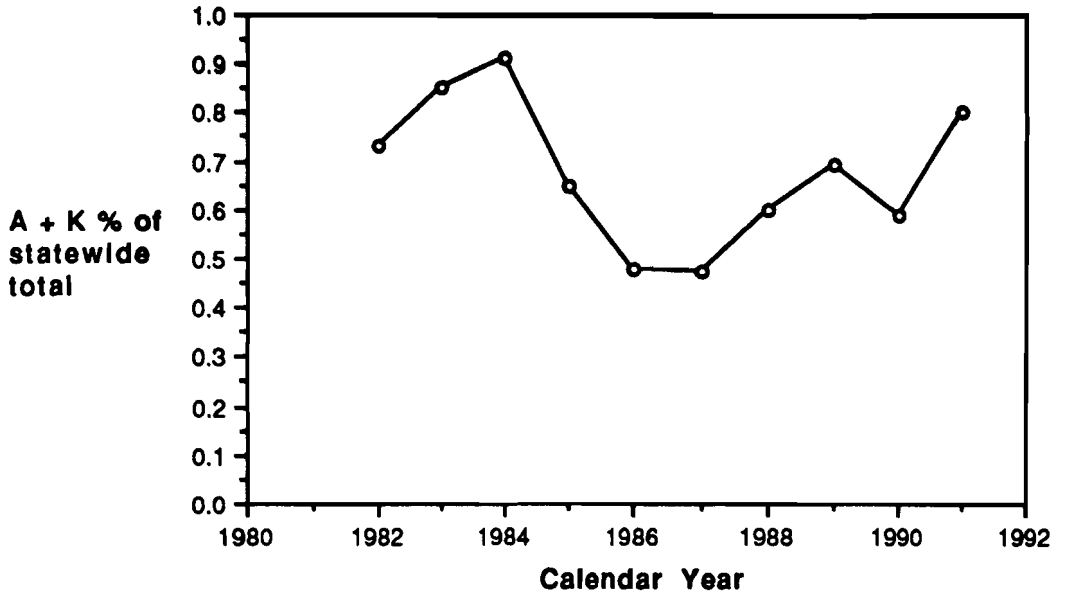


Figure 5.18. Greenville A + K as percent of Statewide: 1982-1991.

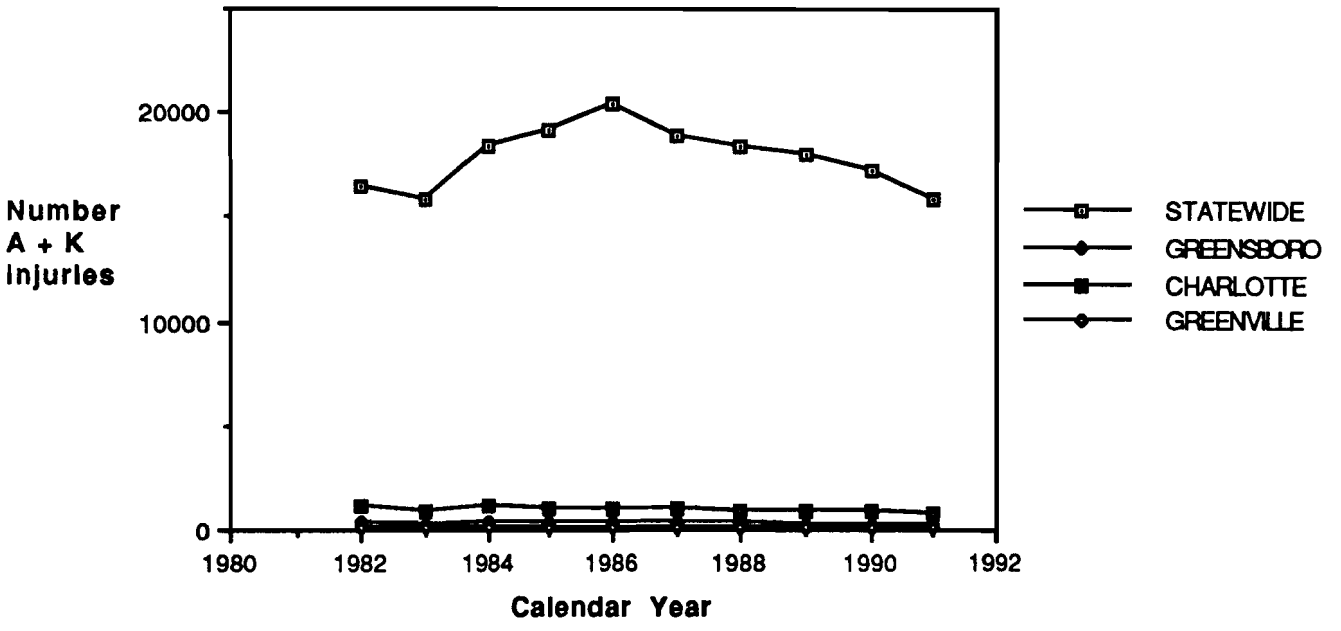


Figure 5.19. A + K injuries, Statewide and three TIPP cities: 1982-1991.

the next five years. Greensboro casualties (Figure 5.21) mostly rose for the first five years as did the state, and then declined relative to the state during the next five years. Figure 5.22 underlines the fact that the Greenville area did not really behave like the state or the other two cities.

CONCLUSIONS

The central fact is that none of the three TIPP cities collected data that was adequate for evaluating the effects of the interventions introduced. All three cities introduced some activities designed to promote belt use, but only Greensboro made any formal attempt to collect citywide belt use data. The Greensboro data, while done consistently, were felt by HSRC staff not to accurately portray citywide use. Therefore, any attempt at an impact evaluation must necessarily depend on already available data. The preceding section showed that using nearby sites chosen as part of the statewide belt use survey is inadequate. Greensboro also tracked motor vehicle fatality and injury data within their jurisdiction in a before and after approach, but the lack of any comparison data limits the usefulness of these data for impact evaluation as well. Thus, what can be concluded?

1. The fact that marginally relevant data do not show an effect of the interventions does not, of course, mean that the interventions truly had no effect. If the interventions were faithful copies of interventions that have been proven effective elsewhere, then there is a basis for a presumption that the same interventions were effective in the TIPP cities.

2. It is also not a foregone conclusion that the interventions <u>were</u> a success in these three cities. This is especially so for any interventions that have not been demonstrated to succeed elsewhere, or for interventions that have previously been evaluated with indications of lack of success. Under such circumstances one might argue that it is desirable, even necessary, that data be collected so that a more clear-cut means can be provided to evaluate the interventions. This, of course, requires that some project funds be allocated to data collection and evaluation.

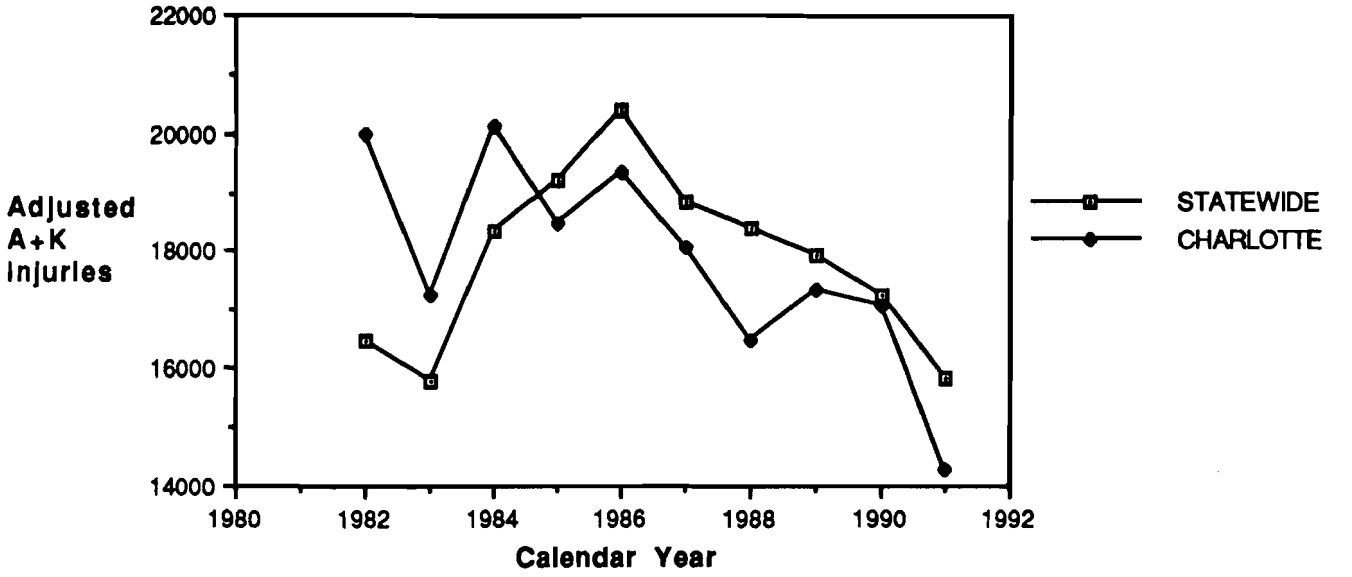


Figure 5.20. A + K Charlotte vs. Statewide: Adjusted injury frequencies.

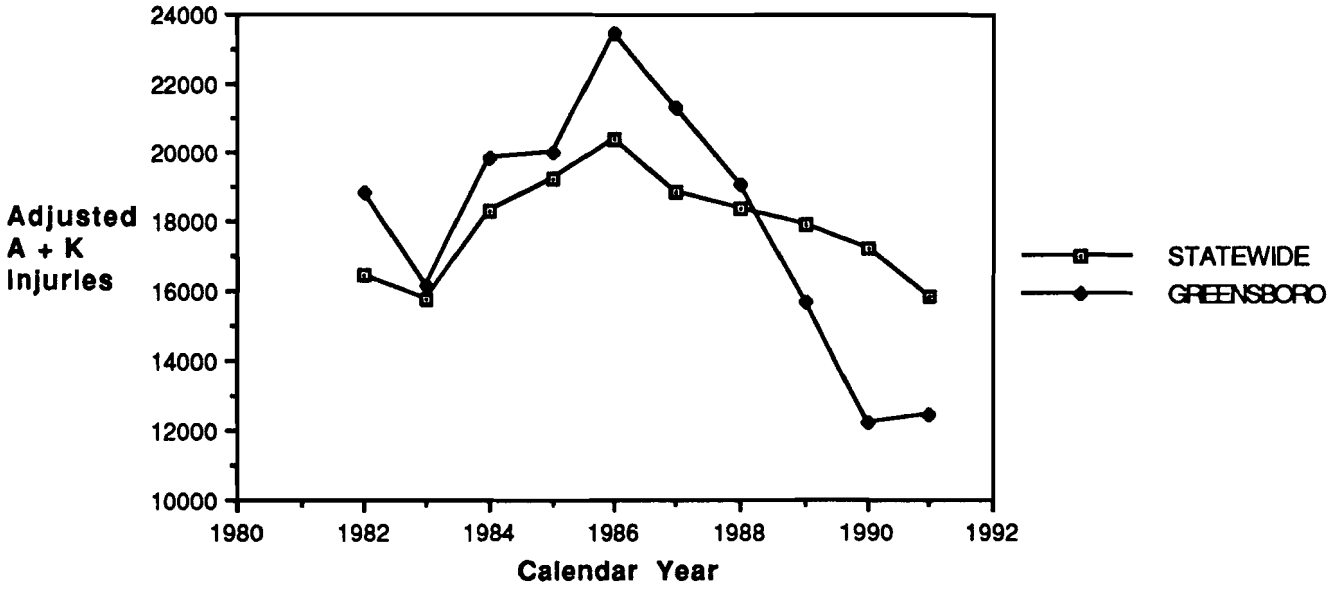


Figure 5.21. A + K Greensboro vs. Statewide: Adjusted injury frequencies.

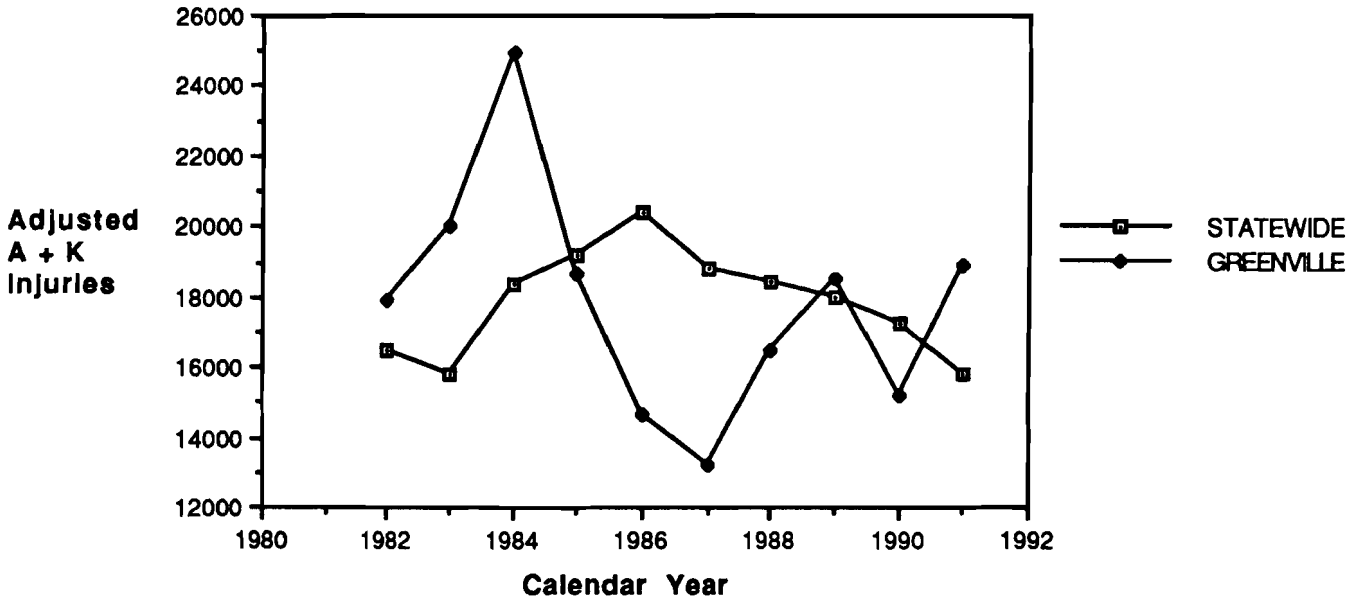


Figure 5.22. A + K Greenville vs. Statewide: Adjusted injury frequencies.

3. The probability of demonstrable success in a TIPP city is almost certainly less when the project funds are allocated among many small activities. Previous successes have usually required a substantial amount of intervention effort. Since TIPP projects are not necessarily very large, it might be useful to target the available resources toward a single activity with some substantial focus rather than funding many small scale activities -- each of which individually will have little chance of producing a measurable benefit.

4. Activities of TIPP cities should focus on interventions that have been developed and proven to work. This is particularly important if it is determined that there will be no evaluation. If resources preclude a technically sound evaluation, then GHSP perhaps should insist that the TIPP interventions be confined to the few "tried and true" interventions that have been technically evaluated and found to be effective. If the TIPP cities are resolved, however, to try new and unproven interventions, then it is incumbent upon them to include a technically acceptable evaluation, including, of course, collection of the necessary data according to a sound study design and sampling plan and comparisons to control cities and/or statewide data.

CHAPTER 6. DISCUSSION

Community traffic safety programs have become widespread in recent years. The tendency has been for administrators of such programs to make the programs multifaceted -- that is, to cover a variety of project elements such as occupant restraints, substance abuse, youth programs, enforcement, pedestrian and bicycle safety, etc. Using this approach typically results in having only small resources available for certain things, with larger amounts of funds used for the more *important* activities. This is basically the situation for the three North Carolina programs evaluated in this study, with emphasis areas varying slightly among the three. What follows are points of discussion that pertain to this approach.

- **Seat belt activities are an emphasis point, and are likely to be emphasized in future TIPP projects.**

Activities designed to increase seat belt use have been a key part of many TIPP projects up to now, and for good reason. Based on extensive research, seat belt use is known to be one of the most cost-effective ways to reduce traffic injuries. Further, a sufficient amount is now known about techniques to increase belt use in various populations such that there is a good chance for success in these project undertakings provided that project officials follow the established guidelines. NHTSA has long emphasized seat belts as an important area for 402 expenditures, since such activities can enhance the effectiveness of seat belt use laws now in effect in most states. For these same reasons we may expect to see a continuation of future TIPP activities designed to increase belt use. Thus, it is important to analyze the existing activities so that future programs will be able to utilize the knowledge gained in the earlier efforts.

- **Ways of increasing belt use have been demonstrated.**

Many approaches to increasing seat belt use have been demonstrated and evaluated, so that knowledge exists as to what will work and what will not. It is important that future TIPP programs capitalize on this knowledge in selecting their program options rather than simply beginning a series of activities that may sound good, but in fact have little chance of measurable success. As an example, mere use of slogans and advertisement cannot be expected to produce any measurable increase in belt use in the absence of other supporting program elements that have been proven to work. Technical reports and how-to manuals are available that describe successful incentive programs in whole communities or smaller efforts targeted at particular populations such as schools or factories (Campbell et al., 1982; Campbell et al., 1984; Hunter et al., 1991; Marchetti et al., 1992). Copies of these reports are available from GHSP or HSRC. Other successful programs involving non-enforcement police activities have been demonstrated. Police programs that combine high levels of seat belt enforcement with extensive use of publicity and promotions have produced the most impressive results. This approach achieved belt use in the 80 percent range in several U.S. communities (Williams et al., 1986; Hall et al., 1993) and pushed belt use to the 90 percent range in the Canadian province of Quebec (Dussault et al., 1991). In formulating a TIPP program, local officials and GHSP should coordinate to see that local officials have access to detailed information on the elements of a successful program.

- **Evaluation specific to the TIPP belt activities is necessary.**

It is necessary that TIPP programs in the seat belt area have a specific evaluation component designed to demonstrate actual changes in belt use. This can only be done by surveys involving observers stationed along the road to record belt users in passing traffic. Why is such evaluation necessary?

  - **NHTSA expects 402 programs to be evaluated.**

The very nature of the NHTSA 402 grant program, authorized by Congress in 1968, requires that projects carried out under this statutory authority be evaluated for their effectiveness. Even if that were not the specific, explicit case, it would be good politics to evaluate such project efforts in these times of scarce resources and careful scrutiny of government programs by the public. It is good practice indeed to be able to cite programs that are a success, or if the activities do not measure up, to be able to say that the program will be suspended or modified such that it *can* succeed.

- **Statewide survey results will not suffice.**

In some of the present TIPP activities little or no effort was allocated to measurement of changes in belt use, and partly that was because TIPP officials hoped that data from the ongoing NC statewide belt use survey would reflect the success in a given community. There are reasons why this is not likely to be so, and we recommend that specific belt use data be collected to support and evaluate TIPP seat belt activities in a given community.

The statewide seat belt use survey was designed in 1985 to do exactly what the name implies -- to monitor changes in *statewide* belt use trends. Observations are taken at the same 72 sites, year after year (for consistency), so that changes in observed belt use can reasonably be attributed to actual population shifts in belt wearing.

It is quite possible that some TIPP sites would not be near any of the 72 official observations sites at all. In other cases, one or more sites included in the statewide survey might be reasonably near the TIPP locale, but those sites might be on roads that bear a great deal of through-traffic from other parts of the state. Therefore, that traffic would include many people who would have no knowledge of the local program, and so could not be influenced thereby.

Further, the statewide sample is based on a sampling technique called a cluster probability sample. In this design, the 72 sites taken as a whole can

reasonably be considered to be representative of the state as a whole. However, any smaller group of sites would not necessarily, by themselves, be representative of either the area from which they were drawn or the state. Thus, the three sites in Greensboro, for example, contribute their appropriate part in making the statewide sample representative, but these three sites are not necessarily representative of Greensboro as a whole, and in fact they almost certainly are not.

A further difficulty is that the particular activity in a given TIPP area may target some sub-groups rather than the entire population of the area. For example, a belt use project in Bertie county targeted high school students and employees at one of the major plants in the area. The only reasonable way to evaluate that intervention activity is to measure belt use at or near the high school and the plant gates. It is extraordinarily unlikely that even a highly successful program in the high school could have enough effect to be detectable at some counting site in the general area, since traffic from the high school would constitute only a negligible portion of the total traffic at the particular observation site.

- **Measurement and reporting of results can be a useful part of the intervention.**

Another important reason for assembling relevant data on changes and improvements in belt use in the community area is the fact that the process of feedback to the community can, in fact, become an important part of the intervention activity itself. It may well be that feedback about improvement is a truly important facilitative component of the overall program. It is an elementary principle of learning and habit formation that if one wants to change behavior or to improve performance, then feedback regarding progress-to-date is an important feature of accomplishing the progress.

- **It is good to have an *evaluation mentality* among TIPP program leaders.**

Still another reason for incorporating seat belt observations into the TIPP program itself and making evaluation an integral part of the project is the larger goal of fostering among TIPP leaders a belief in the importance of evaluation as a part of highway safety programming. With so few resources available to combat the problems of traffic crashes and injuries, none can afford the luxury of allocating funds to programs that do not work effectively enough to produce measurable benefits.

- **There is ready information available as to how to conduct such surveys.**

Local TIPP officials may have no prior experience, nor any formal knowledge of how to conduct observational surveys. Indeed, it is certainly not necessary to try to make researchers of the TIPP directors and staff. However, conducting a seat belt observational survey is not difficult, and ample written information is available from GHSP and HSRC as to how to do it. Further, HSRC can provide training in all phases of a belt use survey -- from the design of data forms, to setting up a sample, how to record the data, and how to analyze and interpret it.

- **TIPP fund allocation**

We frequently see in government programs that there is a tendency to divide available funds into as many parts as possible, so as to make some funds available to as many projects as possible. The 402 program itself is based on this idea, for the national budget of 402 dollars is allocated to the states according to a population formula so that each state gets funds.

In turn, GHSP programs then allocate money to many relatively small projects -- partly dictated by the federal requirement that at least 40 percent of the funds for each state go to the local level. It is perhaps no different at the TIPP level,

where there may be strong pressure to allocate the modest grant among many recipients within the city. This is presumably politically useful in that more of the interested parties can be accommodated, and perhaps the program achieves more political support in the community thereby. Further, it would seem that such a policy is consonant with NHTSA policy and wishes (despite their requirement for evaluation). On the other hand, this practice means that individual components of the project may be funded at so modest a level as to be virtually guaranteed that either the effort will have no effectiveness at all, or even if the effort is effective in bringing about slight change, the effect will be so small as not to be discernible in any reasonable evaluation, thus leaving the impression of no effectiveness.

Here we are speaking of something that might be illustrated by the concept of a dose-response curve in medicine. It is consistent with common sense to assume that there is some sort of relationship between the amount of medication that is applied related to the beneficial effect that is obtained. If one has a simple headache, two pain killer tablets may suffice to blunt the headache, but one would not think of diluting a single tablet into 100 parts and then taking only one hundredth of a tablet. To do so would not cure the headache. However, this would also not disprove the effectiveness of the pills. Too often in highway safety, there may be programs which are executed at so low a "dose" level that they have no realistic chance of showing measurable success. When evaluated they do not show a benefit. The interpretation is often that the program is a failure and, because of that label, the program's continued support may be jeopardized, when the effort might have proved acceptable had the program been implemented at a level of intensity (funding) such as to have a reasonable chance to work well enough and extensively enough to show a measurable result.

In view of the emphasis on *measurable successes*, we offer the thought that TIPP programs might fare better by doing fewer things, thereby allocating a larger share of funds to a fewer number of recipients or program areas, and perhaps have a better chance to show results. Again, it is important for TIPP officials to know what outcomes have been shown from past evaluation and research on various project

efforts. Some ideas simply have little chance of success having demonstrably failed time and again in the past.

- **There is a difference between whether an intervention truly works versus whether one can *demonstrate* that it works.**

A rejoinder to the foregoing might be to defend the idea of implementing interventions on the hope that they might work even if one cannot *demonstrate* that this is so. Thus, one might believe that handing out safety-theme key chains to 100 shoppers in a mall might have some educational benefit in favor of highway safety. And while one might concede that it would be impossible to demonstrate a benefit (or to prove a non-benefit for that matter), one might still want to pursue this type of expenditure of funds.

However, such an intervention would certainly have an infinitesimal effect if it had one at all. Since only limited funds are available and since other interventions can be introduced that have a good chance of producing a measurable difference (if evaluated properly), one is hard pressed to argue the virtue of putting money into programs that could not possibly have more than a trivial, undetectable benefit. Government appears to function most efficiently when innovative ideas are implemented as demonstration projects that are carefully evaluated. Then, successful programs can be promoted for implementation in other communities or states.

- **It is wrong to fund on the hope that it *might* work, or the fantasy that it might "save just one life".**

Every few years there seems to be a fresh outbreak of sayings in defense of some highway safety initiative or other on the grounds that "if it saves just one life" it will be worth the cost -- or sometimes someone says "it will be worth ***any*** cost." This well meaning philosophy, however, can actually lead to the loss of lives rather

than the saving of "just one life." Since only very limited resources are available in the traffic safety field, and since the crash problem is very large, professionals in the field cannot afford to give uncritical support to programs, in the hope that they might "save just one life," when the same dollars could be allocated to other programs, of proven benefit, which could save multiple lives.

In conclusion, we feel that TIPP programs, or CTSPs, should be more bottom-line oriented, that is, to place resources in activities that can be evaluated. Directors can then be more accountable to their administrators. If innovative activities are undertaken, evaluation is even more important.

CTSPs can certainly exist in various forms. Two of the programs evaluated in this study were hospital based, and the third was based in a police agency. All showed the ability to take on various kinds of safety efforts, from speed enforcement to youth programs to occupant restraint promotion.

Administrators who fund CTSPs are faced with a difficult decision -- should the programs be multifaceted, or should they concentrate efforts in fewer areas? The former approach leads perhaps to raising the consciousness of the community or area in regard to safety issues. This may be an important step, such that seat belt legislation and tougher DWI laws can be enacted and more easily accepted by the public. The latter approach, however, can result in interventions that lead directly to crash and/or injury reduction.

Perhaps a combination of proven and innovative programs along with strategies that pull together community support can take advantage of the best of both approaches. Main strategies would be the interventions that have been proven to work and promising innovative strategies. Both would include a well designed evaluation component. Smaller programs could include ancillary activities, such as "Saved by the Belt" promotions with local media coverage or designated driver booths manned by community volunteers interested in combating drunk driving. These efforts use only limited resources with effects that cannot be determined through evaluation, but they may indeed add to the critical mass needed to set the stage for change.

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