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**DEVELOPING LOCAL RESOURCES FOR THE SAFE TRANSPORTATION
OF THE ELDERLY DRIVER**

Final Report
for the
Governor's Highway Safety Program

90-06-LE-304-07

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and
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Highway Safety Research Center

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The opinions and findings contained in this report are solely those of the authors and are not necessarily those of the project sponsor.

FINAL REPORT
DEVELOPING LOCAL RESOURCES FOR THE SAFE TRANSPORTATION OF THE
ELDERLY DRIVER

A. INTRODUCTION

Mobility is very important to the overall well-being of older citizens. For most of us, the driver's license is a symbol of this mobility and provides us with a sense of self-sufficiency and independence. Its loss becomes synonymous with the fears that many of us have concerning becoming an 'old' person. Thus, being mobile may have a direct effect on how we perceive ourselves and directly affect our feelings of well-being. Perhaps with the exception of older people living in urban areas, the loss or restriction of the driving privilege can have a profound effect on our lives.

The United States population is aging. Projections for 2030 indicate that older drivers will make up approximately 21 percent of the driving population. Moreover, today's older persons are considerably different from those of the past. A substantial number of them live in suburbs rather than in the inner city, where public transportation may provide an alternative means of transportation. Many of them are 'young-olds' with considerably more financial resources available to them for travel and leisure pursuits and, of course, more of them own automobiles to make this travel possible. The older driving population of the future may be different because many of them may work well into their seventies, and most of them will have been accustomed to a personal vehicle for transportation.

North Carolina's driving population is expected to experience the same or even greater increases in the proportion of older people in its driving population because the State has become such a popular retirement area. This shift in the

proportion of older people and also in the proportion of older people driving has already been reported upon by Stutts, Waller and Martell, (1989) who showed that older drivers aged 65-74, have increased their representation in the driving population by 186%, and those over 74 have increased theirs by a whopping 810% during the time period 1974 to 1986. These changes affect the lives of all North Carolinians because older drivers have different driving patterns than their younger counterparts and they also require a "friendlier" driving environment than their younger counterparts.

Driving Patterns. Older drivers have different driving habits than those of their younger counterparts. Most of the roadway systems in the United States were designed for 25 year old drivers with good vision and quick reflexes. Many older drivers, aware of both the demands of the driving task and their declining physical abilities, limit their driving to times and places that present less risk to them. In general, they drive about half as many miles as their younger counterparts.

Just as driving patterns differ, so do the violation and crash patterns of older persons. Campbell (1966) examined the relationship of driver age and sex to crash type and found older drivers to be underrepresented in rollover and single vehicle crashes and overrepresented in multivehicle and daytime crashes. Waller, House and Stewart (1977) analyzed crash characteristics and violations with respect to driver age and sex. They found that older drivers had significantly different crash patterns than those of the general driving population. Their results indicated that older drivers were more apt to be involved in crashes involving two or more vehicles, their crashes were more likely to occur during daylight hours, on weekdays, at intersections and at lower speeds. Older drivers were more likely to be convicted of failures to stop or yield and safe movement violations. Malleck and Hummer (1987) studied crashes on major highways in Michigan and reported overrepresentation in turning crashes, head-on collisions, and backing and parking

crashes.

Crash Risk.

There are two ways to assess the crash risk of the older driver. One way focuses on the proportional risk of crash involvement based on the number of licensed drivers. When considered in this fashion, older drivers appear to be at less risk than their counterparts in the driving population because they experience fewer crashes per licensed driver. Another way of assessing crash risk focuses on driving exposure or miles driven. On a mileage basis, the crash risk of the older driver is substantially higher. Thus, even though older drivers are changing their driving patterns and reducing their driving exposure, they are still experiencing increases in crashes.

Driver Injury. In studying the involvement of older people in crashes it is important to differentiate between crash risk and risk of injury when involved in a crash. When involved in a crash, older drivers are more vulnerable to injury. MacKay (1988) reports that once involved in a crash, those over 65 have a higher risk of being seriously injured or killed. This underscores the fact that the changes brought about by the aging process can result in a lowered tolerance to injury in the event of a crash. This differential in risk of injury appears even in relatively minor crashes.

Determining Crash Risk. Not all older people age at the same rate. Many continue to enjoy the driving task well into their eighties. For others, functional losses may begin much earlier. The major determining factor in permitting individuals to drive is being capable of performing the driving task so that they present little risk to themselves or others. Little information exists regarding the effect of decline in functional driving ability and actual driving performance. Yee (1985) describes the self-reported driving difficulties of older drivers, these include

reading traffic signs, seeing while driving at night, turning the head while backing, reading the instrument panel, reaching the seat belt, and merging and exiting in high-speed traffic. Older drivers showed evidence of less shoulder flexibility, torso and neck rotation, and greater reaction time due to slower processing of information.

While many of the declines mentioned above are associated with the aging process, age alone may not be the best predictor of driving ability. Work by Stewart suggests that differences in crash rates are mileage-related in that older drivers who reported high mileage had crash rates comparable to those of other age-sex groups with similar mileage; thus indicating that the higher mileage crash rates among this segment of the population may be associated with a portion of this older driver population who drive less often, perhaps as a result of declining functional ability.

Reducing Crash Risk. Some problems that older drivers experience may be remedial. For example, technological compensation for losses in range of motion may be made through the use of a larger convex mirror, difficulties in reading the instrument panel has already been significantly improved in many newer cars. Other improvements can be made through driver retraining -- attendance at AARP sponsored 55 Alive or other specialized courses designed to familiarize older drivers with current rules of the road and improved driving techniques. Licensing authorities are increasingly limiting the driving times and distances of those older people in an attempt to permit some mobility. Unfortunately, even with all of these improvements, for most of us there is a day when we are no longer able to drive a car safely.

Identifying the High Risk Driver.

Identifying the high risk driver is a difficult problem for licensing authorities who must wrestle with the decision to restrict or remove the driver's license from

some of these drivers. The license examiner must have skill in detecting potential medical or psychological problems that may impede driving performance. Little empirical information exists regarding the crash risk of this older cohort of drivers and most of the information used by licensing authorities to determine licensing status is based on the judgment of a panel of physicians who have little empirical data upon which to base their decision. At the present time few screening instruments are available to assist in the determination of functional driving ability. Such information would be of great utility to license examiners. The examiner has a limited amount of time in which to assess the older person's ability to drive, and, in those instances in which the driving privilege is to be removed, little time to help the older person through the shock of license removal.

Restricting or Removing the Driving Privilege. The objective of most Departments of Motor Vehicles is to permit all drivers, regardless of age, to drive as long as they do not present a substantial risk to themselves and/or the general public. In order to keep older people on the road as long as possible, restrictions of time and place are frequently placed on them. The thrust of these restrictions is to gradually reduce the driving of those people who are experiencing physical decline so that they have ample time to plan for the time when they no longer have a car. Clearly, this cannot always happen, and license removal does effect the perception of self-sufficiency.

A study to examine ways to assist older people after they had experienced license restriction or removal was undertaken by the Highway Safety Research Center with the interest, cooperation, and support of the Governor's Highway Safety Program. The primary objectives of the study were to determine what the needs of these people were and how local resources could be utilized to assist these drivers in making the transition from self-sufficiency to a role of increased dependence. As part of the study, a survey was made of other states to determine what they were doing to assist those about to lose their driving privilege and a

search was made of both the highway safety and medical literature to determine if other studies such as this were occurring.

Within North Carolina, local interest in developing local resources to meet the transportation needs of older people was sought. Two counties, Forsyth and Surry, expressed such an interest and received funding from GHSP to pursue this issue more fully. While both counties had a larger proportion of older people, they were relatively dichotomous groups. Forsyth county contains a very large urban center, Winston-Salem, and has a substantial amount of public transportation available to meet the needs of its older population. Surry County, adjacent to Forsyth, is a rural county with small municipalities scattered in the corners of the county and a more limited number of existing transportation resources. The results of this study are presented in the sections that follow.

B. ACTIVITIES

Oversight and Guidance

It was the first task of the HSRC project staff to provide oversight and guidance to the two counties in the preparation of project applications and reports, work plans for the project and project materials. Work on this task continued throughout the year in the form of attendance at advisory group meetings, telephone support, information and reference lists provided and continued contact with other counties and State departments and agencies when appropriate. Information about the counties' activities is contained in a later section of this report.

One method of providing guidance and oversight to the two counties has been to monitor meetings of their local advisory groups. Meetings of the Surry County Advisory Group were held on October 27, 1989, January 26, 1990, May 4, 1990 and July 20, 1990, and were attended by HSRC project staff. Meetings of the Forsyth County Advisory Group were held on January 18, 1990, April 19, 1990 and August 16, 1990, and were also attended by HSRC project staff. Meetings with the representatives of the two counties were held in conjunction with their Advisory Group meetings on January 18 and January 26. Additional Advisory meetings were held on February 16 and September 26, which included representatives from the two counties as well as members of this project's advisory committee.

HSRC project staff has served as a resource for the counties by assisting in the collection of information and specific statistics about older drivers, state activities in the area of transportation, activities in other states, counties. Carol Popkin and

Chris Little presented the information about older drivers that had been collected during the course of this year's project at the Surry County Advisory Group meeting on July 20, 1990 and at the Forsyth County Advisory Group meeting on August 16, 1990.

In addition, project staff has served as liaison between counties and State departments and agencies where necessary and appropriate. In an effort to obtain information and maintain contact with various State agencies, Chris Little, HSRC research assistant, attended the following two workshops, which included current information about the elderly and driving:

NC PSA Lifesavers Conference - April 23, Wrightsville Beach, N.C.

ITE Human Factors Workshop - June 22, Wilmington, N.C.

Development of a Database

Another goal of the HSRC project staff has been to develop a database of individuals and agencies in North Carolina with an interest and expertise in the area of aging. This, too, has been an ongoing task throughout the year. A current listing of the database is included in Section E of this report. Copies of this database will be provided to the two counties as part of the year-end activities of this project.

Dissemination of Information

Information about the status of this project and other information about older drivers and transportation needs and resources has been provided to the individuals contained in the database. As stated previously, a meeting of the project advisory group, the members of which are contained in the database, was held on February 16. At that meeting, progress reports from both participating counties and from this project were presented. In addition, a general discussion of the problems and challenges facing this group was begun. A continuation of this discussion was

held on April 9, 1990. Summaries of this final report will be provided to the individuals in the database. An Advisory Committee meeting was held during September, 1990 at which time the recommendations of this report were reviewed. In addition, the cover of a brochure, to be made available to counties, was developed and printed.

Survey of National Activity

A mail and telephone survey of the appropriate agencies in the fifty states and the District of Columbia was conducted. A description of the completion of these tasks is contained in Section D of this report.

C. THE COUNTIES

Forsyth Agency: Forsyth County Health Department
Project Staff: Virginia Bradsher - Project Coordinator
 Katrina Hamilton - Volunteer Service Coordinator
 Dallice Joyner - Project Supervisor

The Forsyth County project began by forming a local advisory group consisting of 33 individuals and agency representatives in the local community who work with the older adult population. County agencies and transportation providers were also represented. Needs and resource assessments were conducted by interviewing professionals who work with the older population and citizens from that target population. The project staff met with advisory group members, representatives from the Department of Motor Vehicles, the city/county planning department and the Winston-Salem Transit Authority. Early in the project, the staff established a cooperative working relationship with Sgt. Wayne Purgason the local supervisor of DMV driver license examiners. Sgt. Purgason serves on the local advisory group.

The population needs assessment was accomplished by staff and volunteers by interviewing older adults using the buses for transportation and in the local driver license examiners' office, and by conducting focus groups in various retirement homes and meal provision sites. Questions about availability of transportation alternatives and about driving ability and license revocation were included in the interviewing and focus group discussions.

A brochure (see attached) entitled "Safe Transportation Choices for Older Adults" was developed by the project staff and the Division of Motor Vehicles. The brochure contains information about the older driver and a list of agencies that can

driver license examiners' offices and the health department and senior centers. The brochure includes information about and tips for the older driver and a list of transportation resources, including area served, eligibility requirements, a schedule of operation, cost and telephone numbers.

In recent months, the project staff has been working with a local church, advising them and helping to evaluate their transportation ministry. It is hoped that these efforts will provide a transportation ministry model to be used by other area churches.

There are many similarities in the ways in which these two counties addressed the problem of developing local resources for safe transportation of the elderly. They include 1.) establishing a group of advisors who are familiar with the problem and the resources available and who will be able to help in establishing solutions; 2.) conducting a needs assessment; 3.) conducting an assessment of existing transportation resources; 4.) developing and distributing a brochure that contains useful information about transportation and transportation resources; 5.) advising and encouraging area churches who might be able to provide transportation services where such does not already exist.

The differences in the approaches of the two projects seem to be most related to the characteristics of the area being served. Forsyth County is a much more urban area, with more extensive systems of public transportation and social service agencies already in place. A large portion of the needs assessment involved interviews conducted on the busses in Winston-Salem, while in Surry County, a more rural county with the population distributed over a large area, the project staff had to rely more on the gathering places of the older persons. The counties' brochures differed in that the Surry county brochure includes a schedule of operation and costs.

D. THE SURVEY

To learn what, if anything, other states are doing to address the problem of providing transportation alternatives or information about transportation alternatives to those elderly drivers whose licenses have been severely restricted or removed, and to establish a contact within each state with whom we could discuss these issues if we needed to, it was decided that the HSRC project staff would develop an Older Drivers Questionnaire to be used to survey the 50 states and the District of Columbia .

We discussed the survey with Donald G. Fowles, a demographer/statistician with the U.S. Department of Health and Human Services Administration on Aging, who indicated that he knew of no such information having already been collected. Mr. Fowles provided us with the Directory of State Agencies on Aging, a mailing list of all states and territories Offices on Aging. A subset of this list, including the fifty states and the District of Columbia, provided the mailing list that was used for the preliminary mail survey. (See Appendix A.)

A preliminary mail survey was conducted to determine 1.) if any programs exist or are being planned in the state, and 2.) the name(s) of the appropriate person(s) to interview. A copy of the survey is included in Appendix B. The surveys were mailed February 7, 1990.

Of the 43 states that returned the questionnaire, only 6 answered "yes" to the first question, which asks if the state has specific programs that assist the older driver when the license is removed or restricted. They are: Florida, Illinois, Iowa,

Massachusetts, North Carolina and Utah. However, many other respondents attempted to supplement their response by describing their state's efforts on behalf of the older driver in letters and by including other materials. Telephone conversations with nine of the states' agencies responding to the questionnaire have been completed.

Examination of the returned questionnaires indicate that several states have transportation programs for the elderly, but that they are not focused specifically on the newly unlicensed or restricted driver. Of the six states that have such programs, three (Florida, Illinois and Massachusetts) consider their programs to be actively assisting the non-driver in planning alternative transportation. The states' Departments of Motor Vehicles participate in at least an information clearinghouse capacity in four of the six states (Florida, Illinois, Iowa and Massachusetts). (Note: Florida answered "no" to that question but indicated that the DMV disseminates information. We are therefore counting that among the "yes" responses.) Three (Florida, Illinois and Utah) are state funded and one (Massachusetts) is proposing state funding but has experienced recent budget setbacks and has placed the program on "hold". Four of the six (Illinois, Iowa, Massachusetts and North Carolina) consider driver re-education an important part of the program and have either included a senior driver course as part of this program or refer seniors to the 55-ALIVE Mature Driving program. Several other states who did not answer "yes" to the first question did mention driver re-education in comments on the survey or in separate correspondence.

Several of the respondents included additional information when they returned the survey, indicating that they had at least thought about some of the issues, whether or not they answered "yes" to the first question:

California - The DMV has a Mature Driver Program for persons 55 years of age and over. Referrals for the course are made by the insurance carrier. The client pays a fee, not to exceed \$21, for an eight hour classroom course.

Connecticut - They are aware of AARP's 55-ALIVE program and have a strong and active association with AARP.

Kentucky - There are no maximum age restrictions or competency tests.

Nebraska - The DMV does not assist the elderly with the test. However, they will send a supervisor to the applicant's residence if the applicant has failed several times at the exam station.

New Jersey - The Division on Aging, the Office of Highway Traffic Safety and the Division of Alcoholism and Drug Abuse of the Department of Health is developing a community-based educational program for older adults to decrease auto, pedestrian and cyclist accidents among this population. Initial efforts of this program have been conducted in Ocean County. Seven and a half percent of the monies from the New Jersey Casino Revenue Fund go to the Senior Citizen and Disabled Resident Transportation Assistance Program. Of that, 75% goes to counties for "para transit" services for seniors and disabled residents to access employment, shopping, medical and social needs. The remaining 25% goes to New Jersey Transit to make the state's fixed route transportation system accessible.

Rhode Island - They are reviewing the overall problem and held a conference in September, 1989, at which time an inter agency task force was created.

Three other states, Georgia, Missouri and West Virginia, expressed an interest in the results of our study, some indicating that our initial contact initiated an interest to further study the issues in their states:

To date, we have had telephone contact with nine of the states:

Florida - We spoke with Ms. Tillie Simpson, the Assistant Bureau Chief of the Bureau of Driver Improvement. Florida has had a five-county pilot program to assist the older population with testing problems. This program included examiner

training and allowed the examiner to give individual attention to drivers whose ability had been questioned, whether related to age or not. Ms. Simpson was very positive about the program but regretted that it was discontinued in the Spring because of "employee overload". The examiners involved in the program had too many other responsibilities and there is no funding for additional personnel. The individuals already started in the program will be continued, but no new cases will be started.

Illinois - We spoke with John D. Sanders, of the Senior Citizens, Human Resources and Veterans Department of the State of Illinois. Illinois provides free 2-hour Rules of the Road Classes, which often include individual counseling by volunteers and trainers. A state wide directory of alternative transportation is available in every driver license examiner office.

The State of Illinois recently has changed its testing requirements for the older driver, a change that sparked some discussion at this project's advisory group's meeting in April. According to the new law, there is an automatic road test at age 75, retesting every 2 years at ages 81 through 86, and every year from age 87. In the past, Illinois retested every 4 years starting at age 69. It was felt that recent studies indicate that there is no justification for testing between the ages of 69 and 74.

We asked Mr. Sanders about this new law and about how his state was finding the resources to pay for its programs for the older driver. According to Mr. Sanders, the age restriction bill was sponsored by a Republican and a Democrat, which aided in its passage. The sponsors and the bill's supporters spent a lot of time with AARP and had the support (not endorsement) of that organization. Just as the bill came up for a vote, an 80-year old woman drove through a drivers license examiner's office, killing herself and three employees, a tragic event which certainly emphasized the importance of at least considering the bill. Mr. Sanders further indicated that their programs are supported through the regular budget of the

Secretary of State of Illinois and do not come from the lottery.

Iowa - We spoke with Ron Beams, of the Iowa Department of Elder Affairs. A Governor's Workshop on Transportation was held in November, 1989, which led to the formation of a Transportation Task Force. This task force, which meets monthly and is not limited to consideration of the elderly's transportation issues. The task force hopes to develop resolutions, a final report being planned for February, 1991.

Following a strategic planning model used by all Iowa task forces, this group has identified the following "critical issues":

- Coordination of agencies
- Funding
- Insurance (liability for volunteers)
- Vehicles (design)
- Service delivery
- Contracting issues (related to state laws)
- Regulations)

The group is currently identifying the root causes of these issues and will then develop all long-term strategies. Mr. Beams pointed out that an important element in this process has been to include the supervisors of the drivers license examiners .

Mr. Beams also informed us that there are brochure racks at all examiner offices for the dissemination of information and that their Department of Transportation encourages the marketing of transportation services on a regional basis and has monies included in its budget for this purpose. There are 16 regions and 99 counties in Iowa.

Massachusetts - We spoke with George F. McCray of the Executive Office of Elder Affairs for the Commonwealth of Massachusetts. Meetings at the state level have taken place in Massachusetts with the goal of exploring ways to develop a nondiscriminatory method of identifying and assisting the older person who has

lost or is in danger of losing the driving privilege and to develop an elder driver reeducation program. These meetings have included Mr. McCray, representatives from the Registry of Motor Vehicles, AARP and the Councils on Aging. It is hoped that legislation changes will be made to provide for more sensitivity in the revocation process, including notification of agencies and family members who can assist the individual. Because of budgetary constraints, more activity in this area has not occurred in Massachusetts.

There are 351 towns and cities in Massachusetts, 340 of which have Councils on Aging. These are the agencies most active in coordinating services for the older person and through which information about alternative transportation can be obtained. Mr. McCray believes these Councils have been aggressive and sensitive to the needs of the elderly and most residents of the state know to contact the local Council on Aging for help or information.

In Massachusetts, public transportation is provided by both Municipal Transportation Authorities (urban bus systems, etc.) and Regional Transportation Authorities (vehicle purchases funded by UMTA). Mr. McCray has created a Transportation Directory, organized both by city/town and by Home Care Districts (a regionalized division of the state for service provision). The directory provides information about all transportation available, including hours of operation, costs, eligibility, and can be used as a foundation upon which to build a comprehensive transportation program. Appropriate pages of the directory are distributed to the Councils on Aging. Mr. McCray also sits on an inter agency task force that includes representatives from the Executive Office of Transportation and Construction, and has a Memorandum of Understanding with that office for planning purposes.

Missouri - We spoke with Linda Yeager, Assistant Director of OATS, Incorporated (Organized Alternative Transit System), a private, not-for-profit corporation that provides alternative transportation in 88 Missouri counties. OATS has been in operation since 1971 and obtains funding from all levels of government and from contributions. Most of the operating monies are government funds in the

form of contracts with various agencies to provide essential transportation services (medical appointments, nutrition sites, etc.) for the elderly and handicapped. The transportation provided is not limited to contracted trips, however. To a large extent, the work of this organization is performed by volunteers, who provide a contact person in every telephone exchange in the areas served. Ms. Yeager indicated that typically, the volunteers are the users. There are county committees that meet regularly to establish schedules and there is training provided for the volunteers.

We also spoke with Jim Ludy, an Aging Program Specialist for the State of Missouri, Department of Social Services, Division of Aging. Mr. Ludy told us that there were some concerns that OATS, Incorporated was not really meeting the needs of all the people in need, that there was some inflexibility in scheduling and that there was not as competitive a setting for the contract funds as the state would like. The state legislature is considering a bill to mandate the coordination of transportation providers.

New York - We spoke with Phillip LePore, of the New York State Office for the Aging. This agency is most interested in keeping the older driver licensed and safely driving for as long as possible. They would like to see developed a driver self-assessment, are asking the New York DMV to look at Oregon's reevaluation program in which special examiners are used, and are asking DMV to consider more restricted licenses. Mr. LePore believes a public information campaign is most important. The Office for the Aging has "review and comment privileges" regarding legislation.

The governor of New York has directed the DMV and the Aging Office to "examine measures that will help aging drivers without imposing any additional burdens." The result of this directive has been the establishment of an inter agency task force on the older driver with the DMV, the Aging Office, the Departments of Transportation and Education and the Coalition for Safety Belt Use participating. The goal of the task force is to develop recommendations that would help older

drivers keep their independence and continue to drive safely for as long as possible, help reduce highway deaths and injuries to all drivers, the older driver in particular and not impose additional burdens on older drivers. The task force concentrated on opportunities for education and training and changing the driving environment. A final report was not available at the time of the telephone interview.

Oregon - We spoke with Robin Bower, of the Motor Vehicles Division of the Department of Transportation. According to Ms. Bower, it is state wide practice to use a variety of restrictions, such as "daylight hours only", "special routes", etc. It is also state wide practice to make referrals to the local senior citizens program or transportation resources. There are many 55-Alive classes, and these are often funded by industry. The MVD provides a Driver Information Series of brochures that are distributed at driver license examiner sites. One brochure in this series is "Driving Tips for older adults", which includes helpful information about driving, phone numbers of agencies and departments, and which devotes a page to "alternatives".

The State of Oregon has developed a voluntary alternative to the routine re-examination (written, vision and behind-the-wheel tests and, at times, medical evaluation) known as the Re-examination Evaluation Program. The program provides highly trained counselors, private evaluation, counseling and assistance in preparation for test, a discussion of findings and recommendations, including alternative transportation methods. Ms. Bower believes this program is working.

Ms. Bower also indicated that she thinks even more can be done. One suggestion, which we have also heard in one of our meetings with the counties and the project advisors, is to inform the public about the cost of buying and maintaining an automobile.

Utah. - We spoke with Susan Amman of the Bear River Area Agency on Aging in Logan, Utah. Utah is divided into twelve areas served by AAAs, each of which have identified and attempt to address local needs. Ms. Amman believes that

the 12 Area Agencies operate differently according to needs and resources. Some are all volunteer; some have obtained UMTA funds for the purchase of vehicles and are encouraging inter agency coordination for the maximum use of those vehicles.

In the Bear River Area, where Ms. Amman is employed, the agency has linked with the local AARP chapters for 55-Alive classes and individual advocacy. Education about available transportation is made via brochures and fliers through Senior Centers, health fairs, etc. A booklet of resources has been prepared and is distributed to the hospital discharge offices and home health care offices. There is also a program of volunteer recruitment to provide transportation on an individual basis. In part of one county in this area, there is a system of inter agency coordination of transportation in place. In addition, attempts are being made to bring a system of public transportation to the area, but is meeting with some voter resistance.

Washington, D.C. - We spoke with Roland Green of the Washington Elderly and Handicapped Program and Call and Ride Program. Although Washington answered "yes" to our question one, Mr. Green indicated that there are no direct referrals to the two transportation programs with which he is associated. Individuals must contact lead agencies or the transportation program itself. There is no information provided by the driver license examiner, but, Mr. Green believes, the individuals in need of transportation are already aware of public transportation available and other appropriate agencies to contact when necessary. The District of Columbia Office on Aging provides funding for transportation services for the elderly and handicapped.

We feel we have gained insight into a variety of approaches toward the problems of the older driver by corresponding and conversing with representatives of Aging and Transportation agencies in these states. Time permitting, we would like to continue the telephone interviews and follow-up on some on-going activities among the states we have had contact with.

E. NETWORK (Mailing List Database)

Throughout the year the HSRC project staff has been developing a database containing the names, addresses and phone numbers of individuals and agencies in North Carolina who have expertise or an interest in the issues of the aging. Copies of this database are provided to the project counties. A copy of the current database follows.

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G. CONCLUSIONS AND RECOMMENDATIONS

It is anticipated that by 2020, approximately 20 percent of North Carolina's driving population will be 65 or older. For this reason it is extremely important that North Carolina plan to meet the needs of its changing driving population. The professionals in the many areas of transportation that are affected by this change must begin to make preparations to meet the challenge that this presents. Specifically, the areas in North Carolina that should anticipate these changes are public transportation, private transportation, highway engineering, highway safety, and driver licensing.

At the national level, vehicle modification plans have already started. Many exciting modifications are being planned that will enable technological 'fixes' for some of the vehicular problems reported by today's older people such as their inability to turn their heads, difficulties with the instrument panel, problems with seat belts. A 'smart' car that can alert the driver to the proximity of oncoming vehicles and, in general, help the driver stay on the road safely is being developed.

Just as the vehicle can be improved to better accommodate the needs of older people, our highways can be better designed to meet the needs of older drivers. The highways being used now were designed to meet the needs of a 25 year old male with quick reaction time. In the highway design area, modifications to the placement of signs as well as their size and reflectability can be made. Drivers can be exposed to symbols that may be visible from greater distance and more readily recognized and reacted to. Furthermore, highways, side markings and existing signs can be better maintained and enhanced.

HUMAN FACTORS

In addition to the highway and vehicular factors that can be changed, human factors may be the most important area to change. These are the focus of this study.

Education. Some of the driving problems attributed to older people may be improved through education to improve driving skills. Many older persons have never had any type of driver education course. These people often report that they have been driving for fifty years. Experience is a valuable teacher, but gaining a good understanding of the rules of the road and the skills necessary to participate in an increasingly demanding driving environment is also useful. Many courses are taught in North Carolina at junior colleges and through 55 Alive sponsored by AARP. Unfortunately many of these are provided at night, at times when older people tend to restrict their driving. Driving skills of older people may be greatly enhanced through attendance at such courses. It is recommended that insurance incentives also be given for attendance at such courses.

Modifying Attitudes Regarding Car Ownership and Public Transportation. As mentioned earlier, many older people equate a driver's license with independence. Owning a car and driving can be both stressful and costly. Estimates are that it costs approximately \$4000 a year to own and maintain an automobile. This involves cost of purchase, insurance, maintenance and gasoline. Diverting these resources spent on owning automobiles may provide enough money to meet most transportation needs in ways other than driving.

Very few positive attitudes are conveyed to Americans about the use of public transportation or ride sharing. Since one of the frequently mentioned fears about retirement and growing old is isolation, an emphasis on the positive aspects of shared transportation would be useful.

Driver Licensing. North Carolina depends on licensing agencies to remove incompetent and dangerous drivers from the roads. This is difficult because little is known about the competencies necessary to be a good driver. Clearly the ability to process incoming data and make quick and appropriate driving decisions is central to good driving. Yet the question remains how to measure this. While the road test is a valid means for assessing vehicle control skills, it does not measure perceptual and cognitive skills. Assessing driving competency is a difficult issue in licensing all drivers. It is a more difficult process for the license examiner when judgments about the precise declines in competency in physical and mental health which may impair the driving ability of older people are involved.

The Graduated Driver License for Older Drivers with Obvious Declines in Driver Competency. All drivers with the exception of provisional licensees are treated similarly in North Carolina. Those with no apparent driving problems, that is, no moving violations on their driving records for the past four years, are not required to take a written test. Unfortunately there is much in the literature that addresses the rapidity of physical decline that accompanies certain conditions. A four year licensure period may be too long for some drivers especially some who are experiencing numerous diseases. It may be that in the near future drivers over a set age will be required to come in for more frequent testing. This is frightening to all of us. It might be made less frightening if people believed that they might experience more driving restrictions and still be permitted to retain some driving privileges. Many licenses are now being issued in North Carolina that contain such restrictions.

Current licensing procedures in North Carolina require retesting of those renewal applicants who have had a moving violation during the past 4 years. This at least increases the likelihood of identification of the higher risk drivers in this group.

As we become more aware of some measurable competencies necessary to be a good driver, license examiners should be trained to look for these abilities or the lack thereof. Given the absence of adequate tests to determine driver competencies, North Carolina license examiners do a good job of screening drivers. Increasingly the licenses of older people are being restricted rather than completely removed.

Alternative Transportation for Older Driver

Each year a large number of people in North Carolina have their driver's license removed or restricted for medical or mental conditions that are believed to impair their ability to operate a motor vehicle. Many of these people who experience license restriction or removal are older (greater than 65 years of age). The driver license examiner is the person responsible for actually informing the individual that the license is to be removed. These examiners have a limited amount of time to counsel people suffering this loss.

This project was undertaken to explore the possibility of organizing people at the county level to develop transportation alternatives for older people. Two counties agreed to participate in a pilot study and, as described more fully above, each had its own particular method for dealing with the problem. In conjunction with this project the Highway Safety Research Center conducted a survey of all 50 states and the District of Columbia to find out what other states were doing to deal with this problem. It is hoped that other counties will find it feasible to adopt some of the recommendations which we make and will establish programs for planning for transportation alternatives for older people.

Two Sites in North Carolina

In North Carolina, two counties expressed an interest in participating in the research project. One of the counties was rural the other urban. Both were provided with GHSP small grants to hire an employee to work on the project and pay expenses. Each county took a different approach to handling the problem. In Forsyth, the urban county, researchers rode public transportation and interviewed older people about their needs and the problems they had encountered with already existing transportation resources. In Surry County, older people were surveyed at pharmacies, at senior citizen groups, and at recreation centers. In both counties a brochure was developed for distribution at driver license stations and at other areas around the county. Basically, the brochures pointed out some tips for helping older persons drive better and contained useful information about alternative transportation resources available, including cost per ride and eligibility requirements. In both counties, project personnel have acted as advocates for older people. Survey results indicate a problem for older people that cuts across all socioeconomic segments of the older community. Many people complain that they do not want to travel in a van. Many associate this with being on welfare. Often the inconvenience of long waiting periods are mentioned. and the difficulties of depending on friends and relatives for rides. Many transportation systems, in rural areas in particular, shut down after 6 p.m. This places burdens on those older people who can still drive but may drive only during daylight hours.

Innovative Ideas from Other States

Our survey of other states revealed that many driver licensing authorities perceive license restriction or removal for this segment of the population to be a concern, but very few have implemented programs to deal with the issue. Only six states responded positively to our mail survey. These were subsequently contacted by phone in order to obtain as complete a picture as possible of some of the varied

solutions available to those about to experience license removal.

Basically, Florida, Illinois, North Carolina and Oregon have established programs for assisting older people. Oregon has developed a voluntary re-examination evaluation program that provides counseling for older people to help them feel more secure about taking their license examination and also to help assist them in making this transition. In Utah, transportation services are provided in a decentralized manner. The state is divided into twelve areas, each of which has identified and attempted to address local needs. A private, non-profit organization in Missouri is serving 88 counties, providing transportation for those who need it, funded by a variety of sources and operated for the most part by volunteers who are also the users of the service.

Immediate Ideas for the Future

In order to incorporate ideas from the pilot counties and make them available to other areas in North Carolina, we have developed the cover for a brochure and a small booklet telling individual counties how they might be able to replicate in their own counties some of the work done in the two pilot counties. It is hoped that such brochures, as they become available, will be distributed at the driver license examiners offices and in public area such as restaurants, libraries, etc. These brochures or the art work for them will be available through GHSP. HSRC plans to work with the Council on Aging to attend state wide and regional meetings to talk about the project. In addition, letters describing the project will be sent to all health departments and individual councils on aging.

Ideas for the Future that Might Require Legislation

Other suggestions we have heard from our Advisory Group include the following:

- Revenues from license renewal should go back into the program.
- Restrict the number of times an individual can take the test.
- Test the young (ages 16-24) and the old (>65) and those drivers with points and renew the rest by mail.
- Include some cognitive testing .

Summary

We need to change peoples' perceptions about alternative transportation resources. As was mentioned in the introduction, the driver license represents mobility and corresponding independence to most people. The first point to make in assisting older people is to change their perceptions that the loss of the license means isolation and lack of self-sufficiency. This can be accomplished through focusing on some of the positive aspects of relinquishing car ownership. A positive focus could emphasize shifting the money usually spent for car ownership to the use of these resources to pay for hired transportation. Since fear of isolation is great, an emphasis on the making of new friends through the use of public transportation or car pooling with other friends or church members will help to alleviate this anxiety. Another positive aspect to be emphasized is the sense of relief of not driving when the driving task is difficult.

Each of us needs to be familiar with alternative transportation choices. Older people should try out the public transportation available to them before they need it so that it is less of a surprise to them. All people should examine ways to improve the transportation available to all those without cars. In many instances, churches and community groups may provide the best solutions. It would be useful to set up

a network of families of older people who might be able to car pool one day every two weeks to meet the needs of their parents. There are many options available. However, in order to develop a dependable system at the county level, the county commissioners should be approached. Without some type of support at the county level, many programs may be short-lived. Such factors as insurance costs for volunteers, etc must be considered.

For those older people who wish to continue to drive with or without restriction, attendance at driver improvement courses should be encouraged. Participation especially should be encouraged for all people who have either never had driver's education or who had it over twenty years previously to go in for a refresher course. The State of North Carolina should sponsor the development of a video that could be checked out of local libraries. Such a video could emphasize rules of the road and provide information to help older people become better drivers. Fifty-five Alive and similar courses should be actively promoted. Older people should work with licensing authorities to help determine realistic restrictions for older drivers.

We strongly urge health departments in every county to meet with their county transportation coordinator to find out about state and federal support for the transportation of the elderly. Furthermore, the characteristics of the older population in each county should be ascertained in order to understand the needs of the people being served. Every effort should be made at the county level, probably through active dialogue with county commissioners, to determine if this is a recognized problem and if it is, to establish a task force. This task force might be responsible for contacting the media with information of interest particularly to older people including, but not limited to, problems, resources, positive information about alternative transportation, and special driving course for older people. This kind of active involvement at the county level should also be carried on in individual municipalities.

It is easy to recommend that counties take this initiative. It is unfortunately a fact that in many counties, resources are extremely limited and staffs are over worked. This is a problem that affects the quality of life for both older people and their families. How well it is dealt with has consequences for all of us.

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APPENDIX A

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APPENDIX B

Older Drivers Questionnaire

1.) Are there any programs in your state that focus on assisting the older driver when his/her driver license is removed or driving is significantly restricted?

yes _____ no _____

If yes, do these programs assist these older persons in making the transition from driver to non-driver by actively assisting them in planning alternative transportation, so as to keep them mobile?

yes _____ no _____

2.) Is this a state-wide program? _____ (Check all that apply)
Are they regional in scope? _____
Are they county-wide? _____
Are they municipal programs? _____

3.) Are the programs financed _____ (Check all that apply)
at the federal level? _____
at the state level? _____
at the county/local level _____
by volunteer funds _____

4.) Does your state's Department of Motor Vehicles participate in this program?

yes _____ no _____

How? _____

5.) Please provide names of persons within your state who may have additional information about this subject.

Name: _____ Address: _____ Phone: _____

Name: _____ Address: _____ Phone: _____

Thank you for your help in completing this questionnaire.

APPENDIX C

Annotated Bibliography: Transportation of Older Adults

This bibliography provides the names and brief descriptions of books, articles, and other publications that may be of interest to public and private agencies involved with the transportation of older adults. The entries are arranged by subject matter. Some entries appear under more than one subject heading.

Aging and Driving

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Cerrelli, E. (1989). **Older drivers: The Age Factor in Traffic Safety** (Report No. DOT-HS-807-402). Washington, DC: National Center for Statistics and Analysis, Mathematical Analysis Division.

Summary of crash involvement rates, crash characteristics, and injury consequences.

Godwin, S.R. (1989). **Driving at 66 - and Up.** *Traffic Safety*, 89(3), 6-9.

Overview of elderly drivers; includes problems and recommendations for: roadways, signs, roadway markings, pedestrian crossings, left-turn lanes, crash protection, driver screening and specialized transportation.

Lerner, Neil D., Morrison, Melanie L., Ratte', Donna J. Comsis Corporation. (1990). **Older Drivers' Perceptions of Problems in Freeway Use.** Washington, DC: AAA Foundation for Traffic Safety.

Report of a focus-group style discussions with older adults about freeway driving.

Malfetti, J.L. & Winter, D.J. (1988). **Drivers 55 plus: Test Your Own Performance.** Falls Church, VA: AAA Foundation for Traffic Safety.

A self-rating form of questions, facts and suggestions for safe driving.

Malfetti, J.L., & Winter, D.J. (1987). **Safe and Unsafe Performance of Older Drivers: A Descriptive Study.** Falls Church, VA: AAA Foundation for Traffic Safety.

Report of a study of the safe and unsafe behaviors of older drivers from the perspectives of older drivers themselves, licensing examiners, AARP instructors, enforcement officials, experts, and carrier drivers. Includes references.

Mortimer, R.G. & Fell, J.C. (1989). **Older Drivers: Their Night Fatal Crash Involvement and Risk.** *Accident Analysis and Prevention*, 21, 273-282 (June 1989).

National Highway Traffic Safety Administration. (1989). **Conference on Research and Development Needed to Improve Safety and Mobility of Older Drivers.** Washington, DC: National Highway Traffic Safety Administration.

A discussion of the issues of research concern regarding the older driver, including a listing of researchable issues.

National Highway Traffic Safety Administration. (1988). **The National Highway Traffic Safety Administration's Traffic Safety Plan for Older Persons** (Report No. DOT-HS-807-316). Washington, DC: National Highway Traffic Safety Administration.

Overview of the research and publication activities of the NHTSA in the area of improving the traffic safety of older persons.

North Carolina Department of Transportation, Division of Motor Vehicles, Collision Reports Section. (1987). **North Carolina Traffic Accident Facts.** Raleigh, NC: North Carolina Department of Transportation, Division of Motor Vehicles.

An illustrated analysis of NC traffic accident statistics for 1987, including age-related information.

Road Transport Research. (1985). **Traffic Safety of Elderly Road Users.** Report prepared for Organization for Economic Cooperation and Development, and the World Health Organization, Paris.

Society of Automotive Engineers, Inc. (1988). *Effects of Aging on Driver Performance*. Warrendale, PA: Society of Automotive Engineers, Inc.

Collection of articles presented at the Passenger Car Meeting and Exposition, Dearborn, MI, 1988; papers address: accident experience of older AAA drivers in Michigan; NHTSA's traffic safety plan for older persons; older drivers' perceptions of risk; vehicle design considerations for older drivers; the elderly and vehicle-related injury.

Transportation Research Board, Committee for the Study of Improving Mobility and Safety for Older Persons. (1988). *Transportation in an Aging Society: Improving Mobility and Safety for Older Persons* vols. 1 and 2.

Complete treatment of mobility and safety issues in transportation of older adults; summary report (vol. 1) and specialized papers (vol. 2).

TR News. (1989). *Safety and the Older Driver*. Washington, DC: Transportation Research Board.

Brief article in TR News, TRB magazine, on the study of the safety and mobility needs of older persons. January-February 1989.

U.S. Department of Health and Human Services. (1986). *Health Promotion and Aging: A National Directory of Selected Programs*. Washington, DC: U.S. Department of Health and Human Services.

Description of lead state agency projects selected for diversity based on the following criteria: topic areas, nature of the program, program setting, nature of primary sponsoring agency, sources of funding, geographic and demographic setting, and organizational sponsorship.

Wachs, M. (1988). *The Role of Transportation in the Social Integration of the Aged, The Social and Built Environment in an Older Society*, Institute of Medicine, National Academy Press, Washington D.C.

West Virginia University, Department of Safety and Health Studies, Department of Sport and Exercise Studies. (1988). *Physical Fitness and the Aging Driver Phase I*. Washington, DC: AAA Foundation of Traffic Safety.

A report detailing research project that studied the relationship between physical fitness and older driver performance.

Coordination of Transportation Services

Beadle, C.R. & Edner, S.M. (Eds.). (1988). *The Eighth National Conference on Rural Public Transportation: Final report* (DOT-T-88-16). Washington, DC: Technology Sharing Program, U.S. Department of Transportation.

Report includes proceedings of meetings on: coordination; federal perspectives and initiatives; insurance; local funding initiatives; state program administrator's round table; and state funding initiatives.

Burkhardt, J.E. (1980). *Coordination and Consolidation of Agency Transportation*. *Transportation Research Record 784* (pp. 1-6). Washington, DC: Transportation Research Board.

Examines preliminary results from coordinated transportation demonstration projects, ways in which barriers were overcome in these projects, and types of situations which can benefit most from coordinated transportation.

Dueker, K.J. & Davis, J.S. (1988). *Integrating Social Service Client Transportation and Special Needs Transportation Systems: The Portland Experience*. *Transportation Research Record 1170* (pp. 81-86). Washington, DC: Transportation Research Board.

Describes the characteristics and problems of the Portland system and then compares it to social service client transportation services in seven other West Coast cities.

Hutchinson, J. (1987). *1987 Annual Report of the Coordinating Council on the Transportation Disadvantaged*. Tallahassee, FL: Coordinating Council on the Transportation Disadvantaged.

Annual report on Florida's transportation coordination program for the transportation disadvantaged which include elderly, handicapped and low-income persons. This program includes the use of school buses during the day and on weekends.

McKnight, C.E., Pagano, A.M., Robins, L., & Johnson, C. (1982). *Economies of Scale in Transportation for the Elderly and the Handicapped*. *Transportation Research Record 850* (p. 18-25). Washington, DC: Transportation Research Board.

Analyzes costs of 36 transportation services for the elderly and handicapped. Also considers effects of coordinated or consolidated services.

U.S. Department of Health and Human Services. (1989). *Best Practices in Specialized and Human Services Transportation Coordination*. Washington, DC: U.S. Department of Health and Human Services.

Case studies of comendable systems of coordinated transportation services from both the private and public sectors.

U.S. Department of Transportation, Technology Sharing Program Office. (1978). *Transportation for the Elderly and Handicapped: Programs and Problems 2*. Washington, DC: U.S. Department of Transportation, Technology Sharing Program Office.

Similar to the previous volume, but focuses more on ongoing programs. Includes efforts at coordination and includes insurance issues.

U.S. Department of Transportation, U.S. Department of Health and Human Services. (1980). *Implementation Guidelines for Coordinated Agency Transportation Services*. Washington, DC: US Department of Transportation.

Describes the process by which a plan for a coordinated agency transportation, approved at the local level, is actualized. This includes focus on level of effort requirements, organizational and management arrangements, system design components, budget preparation and financial planning, regulations, and insurance.

Directories of Programs

Rodano, E.M. (1989). *Technical Assistance and Safety Programs: Fiscal year 1988 Project Directory* (Report No. UMTA-UTS-22-89-1). Washington, DC: Urban Mass Transit Administration.

Contains brief descriptions of Technical Assistance and Safety Projects initiated during FY 1988 by the Office of Technical Assistance and Safety, UMTA. The directory's purpose is to give information on the nature and scope of work underway to assist State and local agencies in improving services and reducing the cost of public transportation. It also can be used to access information on specific projects that it describes.

Rural America. (1986). *A Directory of Rural and Specialized Transit Operators* (Vols. 1-3) (U.S. GPO No. 1986-491-810/40031). Washington, DC: U.S. Government Printing Office.

A comprehensive effort to identify UMTA-funded Section 18 and 16 (b)(2) transit agencies and describe the major characteristics of those systems.

U.S. Dept of Transportation. (1987). *An Overview of State Mass Transit Assistance Programs: Financing and Distribution Mechanisms* (GPO: 1988-516-018/80366). Washington, DC: U.S. Government Printing Office.

Overview of state mass transit assistance programs, with an emphasis on Wisconsin's ranking among them.

Handicapped Access

Batelle Columbus Division & ATE Management and Service Co. (1986). *National Workshop on Bus-Wheelchair Accessibility: Guideline Specifications for Active Wheelchair Lifts, Passive Wheelchair Lifts, Wheelchair Ramps, Wheelchair Securement Devices* (Report No. UMTA-IT06-0322-87). Columbus, OH: Batelle Columbus Division.

Guidelines for specifications for wheelchair accessibility on buses.

Englischer, L.S., & Wexler, A.L. (1983). *Accessible Bus Service in Palm Beach County, Florida* (Report No. UMTA-MA-06-0049-83-1). Washington, DC: Urban Mass Transit Association, Office of Service and Management Demonstration.

Evaluation of a project that made all fixed-route bus services fully accessible to wheelchairs.

Englischer, L.S. & Wexler, A.L. (1983). *Accessible Bus Service in the Washington, DC, Metropolitan Area* (Report No. UMTA-DC-06-0239-83-1). Washington, DC: Urban Mass Transit Administration, Office of Technical Assistance.

Evaluation of a project that made part of the fixed-route bus services fully accessible to wheelchairs. Includes results of user and non-user surveys.

Liability and Insurance

Beadle, C.R. & Edner, S.M. (Eds.). (1988). *The Eighth National Conference on Rural Public Transportation: Final report* (DOT-T-88-16). Washington, DC: Technology Sharing Program, U.S. Department of Transportation.

Report includes proceedings of meetings on: federal perspectives and initiatives; insurance; legal issues;

round table of local transportation providers; state program administrator's round table; safety planning; state funding initiatives; substance abuse; and transportation on Indian reservations.

Davis, F.W., Jr., Cunningham, L.F., Burkhalter, D.A., II, & Le May, S. (1982). **Human Service Transportation at the Crossroads**. *Transportation Research Record 850* (pp. 1-7). Washington, DC: Transportation Research Board.

Describes the legal trends in human service transportation, including liability, insurance and other issues.

Model Transportation Programs

Automotive Transportation Center, Institute for Interdisciplinary Engineering Studies. (1987). **Evaluation of the Specialized, Volunteer Program of the Area IV Agency on Aging and Community Service** (DOT-T-88-01). Washington, DC: Technology Sharing Program, U.S. Department of Transportation.

Evaluation of a specialized transportation program run by volunteers in part of rural Indiana. Evaluation focuses on the organizational framework of the operating boards and the performance and impact of these transportation services.

Brown, M. (1984). **Funding of Demand-Responsive Transportation for the Elderly in Pennsylvania with State Lottery Funds**. *Transportation Research Record 973* (pp. 22-27). Washington, DC: Transportation Research Board.

Describes how this funding source provided stable revenue for transportation services in Pennsylvania. Funds help human service agencies coordinate transportation as well as give older adults access to transportation at a low cost. Also contains a ridership and cost summary.

Englischer, L.S., & Wexler, A.L. (1983). **Accessible Bus Service in Palm Beach County, Florida** (Report No. UMTA-MA-06-0049-83-1). Washington, DC: Urban Mass Transit Association, Office of Service and Management Demonstration.

Evaluation of a project that made all fixed-route bus services fully accessible to wheelchairs.

Englischer, L.S. & Wexler, A.L. (1983). **Accessible Bus Service in the Washington, DC, Metropolitan Area** (Report No. UMTA-DC-06-0239-83-1). Washington, DC: Urban Mass Transit Administration, Office of Technical Assistance.

Evaluation of a project that made part of the fixed-route bus services fully accessible to wheelchairs. Includes results of user and non-user surveys.

Forstall, K., Roszner, E.S., & Letky, T.V. (1980). **Impacts of Allegheny County's Access Program**. *Transportation Research Record 784* (pp. 34-38). Washington, DC: Transportation Research Board.

Discusses the Access program, a countywide door-to-door transportation system using contract carriers that is partly a coordination system for social service agencies. The article analyzes effectiveness, impact and costs.

Hutchinson, J. (1987). **1987 Annual Report of the Coordinating Council on the Transportation Disadvantaged**. Tallahassee, FL: Coordinating Council on the Transportation Disadvantaged.

Annual report on Florida's transportation coordination program for the transportation disadvantaged which include elderly, handicapped and low-income persons. This program includes the use of school buses during the day and on weekends.

Kendall, D. (1980). **Comparison of Findings from Projects that Employ User-Side Subsidies for Taxi and Bus Travel**. *Transportation Research Record 784* (pp. 45-52). Washington, DC: Transportation Research Board.

User-side subsidies are those where the provider accepts vouchers or tickets from the user and redeems them from the subsidizing agency for a value established in advance. Five demonstration projects and four locally-initiated user-side subsidy programs are analyzed to find out who participates, trade-offs among alternative administrative policies, costs, and benefits.

Lauritzen, T. (1988). **A One-Year Review of Performance Measures for the Chicago Transit Authority's Special Services Contracted Service for the Elderly and Handicapped**. *Transportation Research Record 1170* (pp. 1-9). Washington, DC: Transportation Research Board.

Evaluates the services which had been contracted among four carriers. Also compares the contracted services with the in-house services which had operated previously.

McKelvey, F.X., Lyles, R.W., Lighthizer, D.R., & Hardy, D.K. (1988). **Evaluation of a Demonstration Small Bus Program for the Elderly and Handicapped**. *Transportation Research Record 1170* (pp. 1-9). Washington, DC: Transportation Research Board.

tion Research Record 1170 (pp. 10-18). Washington, DC: Transportation Research Board.

This project gave state subsidies to local agencies to help them develop their own transportation programs for the elderly and handicapped in their communities in the city of Detroit.

Merrimack Valley Planning. (1987). *Elderly and Disabled Transportation Plan for the Merrimack Valley* (DOT-T-88-13). Washington, DC: Technology Sharing, U.S. Department of Transportation.

Model transportation plan; explores approaches to meeting transportation needs of elderly and disabled people in a number of communities north of Boston, MA. Analyzes demographics and available transportation services both public and private and conducts a community-by-community review of the potential demand for services.

U.S. Department of Transportation, Technical Assistance and Safety Office. (April 1988). *Technical Assistance and Safety Programs*. Washington, DC: U.S. Department of Transportation, Office of Technical Assistance and Safety.

Brief description and listing of contact persons for nine programs designed to improve mobility in U.S. through the provision of more efficient, safe and responsive transportation services.

U.S. Department of Transportation, Technology Sharing Program Office. (1978). *Transportation for the Elderly and Handicapped: Programs and Problems*. Washington, DC: U.S. Department of Transportation, Technology Sharing Program Office.

Overview of federal policies as well as examples of local programs for transportation for the elderly and handicapped.

U.S. Department of Transportation, Technology Sharing Program Office. (1978). *Transportation for the Elderly and Handicapped: Programs and Problems 2*. Washington, DC: U.S. Department of Transportation, Technology Sharing Program Office.

Similar to the previous volume, but focuses more on ongoing programs. Includes efforts at coordination and insurance issues.

Wallace, J. (1983). *Transportation of the Elderly and the Handicapped in Rural Areas: The Manitoba Experience*. *Transportation Research Record* 934 (pp. 51-55). Washington, DC: Transportation Research Board.

Description of a transportation service in rural Manitoba. It outlines the development of the program and gives informal analysis of the effectiveness of various areas.

Policy and Legislation

Beadle, C.R. & Edner, S.M. (Eds.). (1988). *The Eighth National Conference on Rural Public Transportation: Final report* (DOT-T-88-16). Washington, DC: Technology Sharing Program, U.S. Department of Transportation.

Report includes proceedings of meetings on: federal perspectives and initiatives; insurance; legal issues; round table of local transportation providers; state program administrator's round table; safety planning; state funding initiatives; substance abuse; and transportation on Indian reservations.

Bell, W.G. & Revis, J.S. (1984). *Trends and Changing Priorities in Specialized Transportation: Elements of a Policy Agenda for the Eighties*. *Transportation Research Record* 973 (pp. 1-9). Washington, DC: Transportation Research Board.

Analyzes social and demographic changes relevant to the elderly and to transportation and applies those changes to the transportation network for the rest of the decade.

Binstock, R. H. (1987). *Title III of the Older Americans Act: An Analysis and Proposal for the 1987 Reauthorization*. *The Gerontologist*, 27, 259-265.

Overview of Older Americans Act Title III network; proposal of a nationwide Network of Aging Resource Centers for Help (ARCHs).

Carroll, Carol L., Lacey, John H. (1980). *A Description of the North Carolina Driver Medical Evaluation System*. Chapel Hill, NC. UNC Highway Safety Research Center.

Cyra, D.J., Mulroy, M.J., & Jans, R. (1988). *An Inventory of 12 Paratransit Service Delivery Experiences*. *Transportation Research Record* 1170 (pp. 69-80). Washington, DC: Transportation Board.

Compares 12 urban paratransit systems based on the six criteria of Section 504 of the Rehabilitation Act of 1973, as amended. Also analyzes Section 504 requirements and relevant legal issues.

Davis, F.W., Jr., Cunningham, L.F., Burkhalter, D.A., II, & Le May, S. (1982). *Human Service Transportation at the Crossroads*. *Transportation Research Record* 850

(pp. 1-7). Washington, DC: Transportation Research Board.

Describes the legal trends in human service transportation, including liability, insurance and other issues.

Malfetti, J.L., Winter, D.J., & Schwendimann, F.C. (1988). *Older Drivers in the United States and Canada: Regulations and Programs of State and Provincial Motor Vehicle Agencies*. Falls Church, VA: American Association of Motor Vehicle Administrators & AAA Foundation for Traffic Safety.

Results of a survey given to Departments of Motor Vehicles on the programs they run for older drivers: relicensing, examining, etc.

North Carolina Department of Human Resources. (1987). *Aging Policy Plan for North Carolina*. Raleigh, NC: North Carolina Department of Human Resources.

The plan presented by the NC Department of Human Resources that focuses on people 65 and older. Addresses income, employment, retirement, housing, transportation, and sources of health care.

North Carolina Governor's Conference on Aging. (1988). *Getting There: Transportation for Older Adults*. North Carolina Governor's Conference on Aging.

Position Paper, issues affecting the mobility of the elderly, the elderly driver, human services, transportation, and volunteer-provided transportation are discussed. Includes recommendations.

Society of Automotive Engineers, Inc. (1988). *Effects of Aging on Driver Performance*. Warrendale, PA: Society of Automotive Engineers, Inc.

Collection of articles presented at the Passenger Car Meeting and Exposition, Dearborn, MI, 10/31-11/3/88. Papers include NHTSA's traffic safety plan for older persons, and vehicle design considerations for older drivers.

U.S. Department of Transportation, Technology Sharing Program Office. (1978). *Transportation for the Elderly and Handicapped: Programs and Problems*. Washington, DC: U.S. Department of Transportation, Technology Sharing Program Office.

Overview of federal policies as well as examples of local programs for transportation for the elderly and handicapped.

U.S. Department of Transportation, Technology Sharing Program Office. (1978). *Transportation for the*

Elderly and Handicapped: Programs and Problems 2. Washington, DC: U.S. Department of Transportation, Technology Sharing Program Office.

Similar to the above volume, but focuses more on ongoing programs. Also includes efforts at coordination and addresses insurance issues.

U.S. Department of Transportation, Urban Mass Transit Administration. (1988). "Section 16 (b)(2) Capital Assistance Program Guidance" (Circular UMTA C 9070.1B). Washington, DC: Urban Mass Transit Administration, Office of Grants Management.

Offers guidance on the administration of the capital assistance program for nonprofit organizations under Section 16 (b)(2) of the UMTA Act of 1964, as amended, and guidance for the preparation of grant applications by designated State agencies.

U.S. Department of Transportation, Urban Mass Transit Administration. (1981). *Supplementary Transportation for Elderly and Handicapped Persons*. Washington, DC: Urban Mass Transit Administration.

Description of UMTA granting, including an excerpt from the Urban Mass Transportation Act of 1914, and lists of state contacts.

U.S. Senate Special Committee on Aging. (1982). *Developments in Aging* vol.1, Chapter 15.

Overview of the Older Americans Act, including its history and current (1982) framework.

Private Providers

Carter-Goble Associates, Inc. & LRS Associates, Inc. (1987). *Expanding the Use of Private Sector Providers in Rural, Small Urban and Suburban Areas* (DOT-T-88-17). Washington, DC: Technology Sharing Program, U.S. Department of Transportation.

Gives eight case studies of examples that have been successful in utilizing private transportation companies, reducing government intervention, and reducing or minimizing their reliance on UMTA funding. Also gives overall findings and conclusions.

Forstall, K., Roszner, E.S., & Letky, T.V. (1980). *Impacts of Alleghany County's Access Program*. *Transportation Research Record 784* (pp. 34-38). Washington, DC: Transportation Research Board.

Discusses Access Program, a countywide door-to-door transportation system using contract carriers that is partly a coordination system for social service

agencies. The article analyzes effectiveness, impact and costs.

Kendall, D. (1980). **Comparison of Findings from Projects that employ User-Side Subsidies for Taxi and Bus Travel.** *Transportation Research Record 784* (pp. 45-52). Washington, DC: Transportation Research Board.

User-side subsidies are those where the provider accepts vouchers or tickets from the user and redeems them from the subsidizing agency for a value established in advance. Five demonstration projects and four locally-initiated user-side subsidy programs are analyzed to find out who participates, trade-offs among alternative administrative policies, costs, and benefits.

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Evaluates the services which had been contracted among four carriers. Also compares the contracted services with the in-house services which had operated previously.

McKnight, C.E. & Pagano, A.M. (1984). **Effect of Size and Type of Organization on Quality of Special Transportation Services.** *Transportation Research Record 973* (pp. 39-44). Washington, DC: Transportation Research Board.

This study gives evidence that larger service agencies generally give better service than small agencies and private agencies generally give better service than public agencies.

Pio, A. (1980). **Cost and Productivity of Transportation for the Elderly and Handicapped: A Comparison of Alternative Provision Systems.** *Transportation Research Record 784* (pp. 27-34). Washington, DC: Transportation Research Board.

Compares social service agencies, contract providers and transit-managed systems and differentiates actual and perceived costs.

Rosenbloom, S. (1988). **Role of the Private Sector in the Delivery of Transportation Services to the Elderly and Handicapped in the United States.** *Transportation Research Record 1170* (pp. 39-45). Washington, DC: Transportation Research Board.

Overview of the structure and process of using the private sector. Includes the benefits and problems involved, and ways to promote better use of the private sector.

Spear, B.D. (1982). **User-Side Subsidies: Delivering Special-Needs Transportation Through Private Providers.** *Transportation Research Record 850* (pp. 13-18). Washington, DC: Transportation Research Board.

User-side subsidies are those where the provider accepts vouchers or tickets from the user and redeems them from the subsidizing agency for a value established in advance. This summarizes and compares the major evaluation findings of three projects of the Service and Methods Demonstration Program of the Urban Mass Transportation Administration and makes general statements about the applicability of user-side subsidies in other situations.

Program Planning and Implementation

Beadle, C.R. & Edner, S.M. (Eds.). (1988). **The Eighth National Conference on Rural Public Transportation: Final report** (DOT-T-88-16). Washington, DC: Technology Sharing Program, U.S. Department of Transportation.

Report includes proceedings of meetings on: changes in the intercity bus industry; computers contracting process; contracting services; cost allocation; employee orientation and training; local funding initiatives; marketing; round table of local transportation providers; state program administrator's round table; safety planning; state funding initiatives; transportation on Indian reservations; and volunteers.

Bell, W.G. (1988). **Mobility and Specialized Transportation for Elderly and for Disabled Persons: A View from Four Selected Countries.** *Transportation Research Record 1170* (pp. 60-68). Washington, DC: Transportation Research Board.

Compares and contrasts the policies and practices in Canada, Sweden, the United Kingdom, and the United States.

Cyra, D.J., Mulroy, M.J., & Jans, R. (1988). **An Inventory of Twelve Paratransit Service Delivery Experiences.** *Transportation Research Record 1170* (pp. 69-80). Washington, DC: Transportation Board.

Compares 12 urban paratransit systems based on the six criteria of Section 504 of the Rehabilitation Act of 1973, as amended. Analyzes Section 504 requirements and relevant legal issues.

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Describes the characteristics and problems of the Portland system and then compares it to social service client transportation services in seven other West Coast cities.

Knapp, S.F., & Lago, A.M. (1983). **Results of a Parametric Cost Analysis of Differences Between Urban and Rural Transportation Services for Transportation-Disadvantaged Persons.** *Transportation Research Record 934* (pp. 1-8). Washington, DC: Transportation Research Board.

Provides information on what the cost of services should be or will be.

Knapp, S.E., Wozny, M.C., & Burkhardt, J.E. (1985). **Estimating the Cost of Providing Transportation Services to Elderly Clients.** *Transportation Research Record 1018* (pp. 22-23). Washington, DC: Transportation Research Board.

Presents the "parametric cost estimation methodology" and explains how to use it to construct and analyze the true cost of operating transportation services.

McKnight, C.E. & Pagano, A.M. (1984). **Effect of Size and Type of Organization on Quality of Special Transportation Services.** *Transportation Research Record 973* (pp. 39-44). Washington, DC: Transportation Research Board.

This study gives evidence that larger service agencies generally give better service than small agencies and private agencies generally give better service than public agencies.

McKnight, C.E., Pagano, A.M., Robins, L., & Johnson, C. (1982). **Economies of Scale in Transportation for the Elderly and the Handicapped.** *Transportation Research Record 850* (p. 18-25). Washington, DC: Transportation Research Board.

Analyzes costs of 36 transportation services for the elderly and handicapped. Also considers effects of coordinated or consolidated services.

New York City Department for the Aging, Health Promotions Services. (1988). **Stay Well: A Health Promotion Program for Older Adults.** New York City Department for the Aging, New York, New York.

A guide to establishing and conducting health promotion programs for older adults.

Pagano, A.M. & McKnight, C.E. (1983). **Quality of Service in Special Service Paratransit: The Users' Perspective.** *Transportation Research Record 934* (pp. 14-23). Washington, DC: Transportation Research Board.

This study was designed to develop measures of quality of service. It found that not all groups place the same importance on various characteristics of special service paratransit. Users younger than 65 years old place greater emphasis on service reliability and extent of service, wheelchair users place emphasis on satisfactory vehicle access, and users older than 65 years old put primary emphasis on safety.

Parolin, B.P. (1988). **Travel Mode Choice Behavior and Physical Barrier Constraints Among the Elderly and Handicapped: An Examination of Travel Mode Preferences.** *Transportation Research Record 1170* (pp. 19-28). Washington, DC: Transportation Research Board.

Examines the travel mode preferences by type and severity of disability. The findings are discussed in terms of their policy implications.

Pio, A. (1980). **Cost and Productivity of Transportation for the Elderly and Handicapped: A Comparison of Alternative Provision Systems.** *Transportation Research Record 784* (pp. 27-34). Washington, DC: Transportation Research Board.

Compares social service agencies, contract providers and transit-managed systems. Differentiates actual and perceived costs.

Rosenbloom, S. (1988). **Role of the Private Sector in the Delivery of Transportation Services to the Elderly and Handicapped in the United States.** *Transportation Research Record 1170* (pp. 39-45). Washington, DC: Transportation Research Board.

Overview of the structure and process of using the private sector, the benefits and problems involved, and ways to promote better use of the private sector.

Saltzman, A. (1984). **Marketing Functions in Human Service Agency Transportation.** *Transportation Research Record 973* (pp. 9-14). Washington, DC: Transportation Research Board.

Describes human service agency transportation, why marketing is needed and how it can be done.

Spear, B.D. (1982). **User-Side Subsidies: Delivering Special-Needs Transportation Through Private Providers.** *Transportation Research Record 850* (pp. 13-18). Washington, DC: Transportation Research Board.

User-side subsidies are those where the provider accepts vouchers or tickets from the user and redeems them from the subsidizing agency for a value established in advance. Summarizes and compares the major evaluation findings of three projects of the Service and Methods Demonstration Program of the Urban Mass Transportation Administration. Makes general statements about the applicability of user-side subsidies in other situations.

U.S. Department of Transportation, Urban Mass Transit Administration. (1988). "**Section 16 (b)(2) Capital Assistance Program Guidance**" (Circular UMTA C 9070.1B). Washington, DC: Urban Mass Transit Administration, Office of Grants Management.

Offers guidance on the administration of the capital assistance program for nonprofit organizations under Section 16 (b)(2) of the UMTA Act of 1964, as amended, and guidance for the preparation of grant applications by designated State agencies.

U.S. Dept of Transportation & U.S. Dept of Health and Human Services. (1980). **Planning Guidelines for Coordinated Agency Transportation Services** (Contract No. HEW-105-76-7402). Boston, MA: Applied Resource Integration, Ltd.

First volume of a 2-part set; describes the concept of coordination, its potential benefits to the human service agency network and the community and its applications in a variety of community settings.

U.S. Dept of Transportation & U.S. Dept of Health and Human Services. (1980). **Implementation Guidelines for Coordinated Agency Transportation Services** (Contract No. HEW-105-76-7402). Boston, MA: Applied Resource Integration, Ltd.

Second volume of a 2-part set; describes the process by which the conceptual plan developed through the first volume is turned into an operating system; the implementation process ends with the first day of operations.

Urban Systems, Inc. (1988). **Cost Saving Methods for Special Transportation Programs** (DOT-T-89-09). Washington, DC: Technology Sharing Program, U.S. Department of Transportation.

Based on a demonstration project in Louisiana aimed at reducing capital and operating expenses for Section 16 (b)(2) operators.

Witkowski, J.M. & Buick, T.R. (1985). **Travel Behavior of Residents of Retirement Communities.** *Transportation Research Record 1018* (pp. 13-22). Washington, DC: Transportation Research Board.

Retirement communities, as a unique type of life style, are analyzed to find their travel behavior and the reasons behind this behavior. May aid in planning alternative transportation systems in areas where retirement communities exist.

Rural Transportation

Beadle, C.R. & Edner, S.M. (Eds.). (1988). **The Eighth National Conference on Rural Public Transportation: Final Report** (DOT-T-88-16). Washington, DC: Technology Sharing Program, U.S. Department of Transportation.

Report includes proceedings of meetings on: changes in the intercity bus industry; computers; contracting process; contracting services; coordination; cost allocation; employee orientation and training; federal perspectives and initiatives; insurance; international rural transportation; legal issues; local funding initiatives; marketing; round table of local transportation providers; state program administrator's round table; safety planning; state funding initiatives; substance abuse; transportation on Indian reservations; and volunteers.

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