

Elderly Mobility and Safety — The Michigan Approach

Final Plan of Action

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Abstract

Recognizing the need to plan now for expected changes in Michigan's population, the Michigan State Safety Commission requested that SEMCOG, the Southeast Michigan Council of Governments, conduct an elderly mobility and safety assessment and develop a statewide plan of action designed to guide state policy. In February 1998, SEMCOG, with funding from the Michigan Office of Highway Safety Planning, convened a statewide, interdisciplinary Elderly Mobility & Safety Task Force. In the course of studying the underlying issues, the Task Force came to realize mobility and safety issues affect our entire society, not just the elderly. By striving to meet the needs of the elderly, therefore, we improve quality of life for everyone. In keeping with that philosophy, the Task Force has developed a *Final Plan of Action* for consideration by the Michigan State Safety Commission.

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Executive Summary

Introduction

Representing nine percent of Michigan's total population in 1970, the elderly population is forecasted to grow to 17 percent by the year 2020. As the number of older people continues to increase, important issues affecting this population segment need to be addressed. One such issue is preserving the mobility and enhancing the safety of seniors. Many factors relating to safety and mobility take into account only the needs of a younger population. For example, the design of the roadway infrastructure is based on a younger driver mix. Further, the transportation system offers few options for people who choose not to drive. Complicating the issues are current land use development patterns premised on automobile travel, neglect of the varying elderly housing requirements and lack of funding resources for programs serving the needs of the elderly.

Recognizing the need to plan now for expected changes in Michigan's population, the Michigan State Safety Commission requested that SEMCOG, the Southeast Michigan Council of Governments, conduct an elderly mobility and safety assessment and develop a statewide plan of action designed to guide state policy. In February 1998, SEMCOG, with funding from the Michigan Office of Highway Safety Planning, convened a statewide, interdisciplinary Elderly Mobility & Safety Task Force. In the course of studying the underlying issues, the Task Force came to realize mobility and safety issues affect our entire society, not just the elderly. By striving to meet the needs of the elderly, therefore, we improve quality of life for everyone. In keeping with that philosophy, the Task Force has developed this plan of action for consideration by the Michigan State Safety Commission.

Task Force Activities

The activities leading up to this *Final Plan of Action* are as follows:

- Ⓒ public involvement strategy,
- Ⓒ analysis of elderly population trends, travel patterns and crash characteristics as detailed in *Background Paper #1 — Elderly Population, Travel Pattern and Crash Characteristic Analysis, State of Michigan*,
- Ⓒ literature review and research as detailed in *Background Paper #2 — Literature Review and Resource Inventory*,
- Ⓒ Elderly Mobility & Safety Forum as detailed in the *Forum Proceedings*,
- Ⓒ focus group research sessions as detailed in the *Focus Group Research Summary* and

- C *Final Plan of Action* including background information, description of issues and needs, recommendations for implementation and model programs/key resources in the following areas:
 - N Traffic Engineering,
 - N Alternative Transportation,
 - N Housing & Land Use,
 - N Health and Medicine,
 - N Licensing and
 - N Education & Awareness.

Recommendations

The following recommendations are submitted to the Michigan State Safety Commission for consideration.

Traffic Engineering

In an effort to maintain a safe and efficient transportation infrastructure, the following recommendations are offered, with the Michigan Department of Transportation and Office of Highway Safety Planning as lead agencies:

- C Coordinate with the Michigan Municipal League, Michigan Association of Counties and County Road Association of Michigan to examine, compile and publish a best practices manual for engineers, planners and traffic safety personnel detailing successful implementation of “elderly-friendly” traffic engineering practices.
- C Coordinate with and distribute the manual to local communities.
- C Coordinate with the American Association of State Highway and Transportation Officials (AASHTO) and Federal Highway Administration (FHWA) to facilitate appropriate changes in traffic engineering standards.
- C Coordinate with Michigan ITS to seek intelligent transportation system (ITS) solutions to the specific issue of elderly mobility.
- C Coordinate with the Institute of Traffic Engineers, Michigan ITS and local universities to host an annual statewide summit focusing on mature driver issues.
- C Fund additional traffic engineering services at the local level that will also focus on elderly issues.

Alternative Transportation

In an effort to provide reliable, convenient and sufficient modes of alternative transportation, the following recommendations are offered, with the Michigan Department of Transportation as lead agency:

- C Establish core/baseline alternative transportation service in every Michigan county, where at least a minimum level of service is supported by public dollars and administered through public and/or private organizations.
- C Seek additional and long-term funding for urban and rural baseline alternative transportation services.
- C Develop and support centralized resource centers at the regional level to disseminate information and generate coordinated resources. Refer to the Education & Awareness section for additional information on the statewide mature mobility resource center.
- C Seek to remove legislative and programmatic barriers to cross-jurisdictional service provision.

Housing & Land Use

In an effort to develop and maintain communities that accommodate all forms of travel and lifestyle needs, the following recommendations are offered, with the Michigan Department of Transportation as lead agency:

- C Examine, develop and publish checklists of desirable characteristics for “elderly-friendly” housing developments addressing the following issues:
 - N congregate housing,
 - N aging in place and
 - N accessible community, medical and retail development.
- C Coordinate with and distribute the checklists to local planning, zoning, engineering and transit agencies.
- C Coordinate with the Michigan Society of Planning Officials, Michigan Chapter of the Institute of Transportation Engineers and Michigan Chapter of the American Planning Association to educate transportation engineers and community planners on issues pertaining to elderly housing and land use, including walkable community concepts.
- C Based upon the recommendations outlined in the checklists coordinate with the Michigan Municipal League, Michigan Association of Counties and Michigan Township Association to propose and lobby for necessary changes in legislation, zoning ordinances, development review processes, etc.

Health & Medicine

In order to keep people driving longer without compromising safety, the following recommendations are offered, with the Michigan Department of State, Office of Highway Safety Planning and Michigan State Medical Society as lead agencies:

- C Further develop guidelines for physicians and other health care providers for identifying and evaluating driving impairments.
- C Develop and disseminate referral guidelines to assist health care providers in meeting the mobility needs of their patients.
- C Develop educational materials for the elderly, their families and care givers as well as professionals (e.g., traffic engineers and alternative transportation providers) to assist in understanding the implications of aging on mobility.
- C Initiate physician immunity legislation.

Licensing

Recognizing limitations of available screening and assessment tools for drivers, the following recommendations are offered, with the Michigan Department of State and Office of Highway Safety Planning as lead agencies:

- C Support efforts to develop effective screening tools including:
 - N continued review of studies and pilot programs in other states,
 - N funding for continued university-based research in developing cognitive function tests that adequately predict crash risk,
 - N coordination with the National Highway Traffic Safety Administration to develop a more consistent means for measuring effectiveness of screening tools and
 - N coordination among all applicable state agencies to develop a consistent approach to data collection pertaining to the maturing population, stipulating that data be maintained by one-year cohorts starting at age 55.
- C Develop and disseminate educational materials to assist the legal community (law enforcement officers, attorneys, judges) in identifying driving impairments and referring impaired individuals to the proper resources.

- C Improve linkages between Secretary of State branch offices and local community resources and support a centralized resource for information and referral. Refer to the Education & Awareness section for additional information on the statewide mature mobility resource center.
- C Develop educational materials, with Secretary of State coordinating with other agencies, identifying elderly service options for distribution at branch offices.

Education & Awareness

In an effort to meet the varying needs of the elderly, their families and care givers and those who serve the elderly population, the following recommendations are offered, with the Michigan Department of State, Office of Services to the Aging and Office of Highway Safety Planning as lead agencies:

- C Establish a statewide mature mobility resource center offering the elderly, their families and care givers services including:
 - N skill evaluation, rehabilitation and improvement,
 - N education, support, counseling and referral and
 - N alternative transportation resources and training.
- C Educate the various professional groups dealing with the issues of elderly mobility and safety by distributing this *Plan of Action*.
- C Educate the general public about the importance of lifelong mobility planning and techniques/resources needed to accomplish this, much as one would plan financially for retirement.
- C Host periodic statewide mature mobility summits to increase awareness of the current issues and solutions.

Summary

The recommendations contained in this plan of action represent a comprehensive assessment of mobility and safety issues conducted by SEMCOG and the Elderly Mobility & Safety Task Force. It should be noted that, while the initial goal was to address specific issues related to the elderly population, it has become evident that the same issues and concerns apply to the general population. Furthermore, solutions believed to be beneficial for the elderly benefit the rest of the population as well. By improving society for the elderly population, we improve it for everyone.

Because the issues and needs presented here are believed to affect everyone, the recommendations must become part of a systematic approach carried out in all community planning, design and policy decisions. This plan of action represents only the first vital step toward developing this systematic approach. The goal now is to implement the recommendations made and realize positive change for Michigan citizens.

Background

Introduction

In 1970, the elderly represented nine percent of the total population in the State of Michigan; by the year 2020 this proportion is expected to nearly double to 17 percent. As the population of the state continues to age, the challenge becomes preserving the mobility and enhancing the safety of an increasingly larger elderly population. Simply because people grow older does not mean that their mobility needs disappear. They may, however, change and because people age differently, all mobility issues cannot be met in the same manner. Various transportation, land use and service options are, therefore, needed to meet the identified needs of the elderly.

Numerous organizations throughout Michigan are attempting to meet the mobility needs of the elderly. The issues being addressed include driver rehabilitation and retraining, alternative transportation services, re-examination of industry standards and legislative reform. The Michigan State Safety Commission has requested that SEMCOG, the Southeast Michigan Council of Governments, conduct an elderly mobility and safety assessment. The goal is developing a comprehensive and strategic plan of action designed to guide state policy. The assessment is funded by the Michigan Office of Highway Safety Planning.

Development of the plan of action was initiated in February 1998. The activities leading up to this *Final Plan of Action* are as follows:

- Elderly Mobility & Safety Task Force — A statewide, interdisciplinary task force was developed to provide project oversight and direction. (A listing of task force members is included in Appendix A.)
- Public involvement strategy — A “Project Fact Sheet” and the Elderly Mobility & Safety Web site provides information to the public and solicits public participation. A slide presentation is used by task force members as they routinely deal with other key stakeholders. Media relations are consistently promoted and maintained.
- Analysis of elderly population trends, travel patterns and crash characteristics — *Background Paper #1 — Elderly Population, Travel Pattern and Crash Characteristic Analysis, State of Michigan* details the nature of our aging society and identifies the underlying issues defining the need for this assessment.
- Literature review and research — *Background Paper #2 — Literature Review and Resource Inventory* details the literature reviews and key stakeholder input used to identify the key components of elderly mobility and safety. Also detailed are the identification of issues, barriers and innovative approaches to overcoming those barriers.

- Elderly Mobility & Safety Forum — Co-hosted by the Elderly Mobility & Safety Task Force, SEMCOG, National Highway Administration, Federal Highway Administration and Federal Transit Administration, with funding from the Michigan Office of Highway Safety Planning, the forum presented both national and statewide perspectives on elderly mobility and safety and created open dialogue on the issues of highway design, alternative transportation and safe mobility. Input gathered from forum workshops is detailed in the *Forum Proceedings* and was used to enhance and revise the draft recommendations.
- Focus Group Research — Focus group research sessions were conducted with elderly citizens and their care givers as well as with professionals involved in elderly mobility and safety issues. The input gathered is detailed in the *Focus Group Research Summary* and was used to validate and, where necessary, revise the draft recommendations.
- Development of the *Final Plan of Action* — Based on the information gathered, a plan of action was developed for each component of elderly mobility and safety:
 - “ background information,
 - “ description of issues and needs,
 - “ recommendations for implementation and
 - “ model programs and key resources identifying successful programs and activities that can be implemented on a broader basis or adapted to address specific needs of the elderly.
- Long-term institutional change — Ultimately, the process of addressing elderly mobility and safety issues in a systematic and consistent manner must be institutionalized into all planning and policy decisions. As the Baby-Boom generation continues to age, the problems associated with providing safe mobility will only continue to be exacerbated. The *Final Plan of Action* for the State of Michigan is a vital resource for raising awareness and creating a public policy agenda that consistently and effectively plans for the mobility and safety needs of all citizens.

Data Analysis

In order to successfully shape this plan of action, it is first necessary to understand more fully the nature of our aging society. *Background Paper # 1 — Population, Travel Pattern and Crash Characteristic Analysis, State of Michigan* was prepared to provide that understanding. It examines current and projected trends in population growth, travel patterns and crash characteristics of both the elderly and the total population. The highlights of the study are outlined below.

Elderly population trends

As stated previously, the elderly population in the State of Michigan is rapidly increasing. As this segment of the population grows, we will be faced with increasing numbers of citizens who live alone and below the poverty level, have age-related health issues, live in low-density suburban areas, have developed a dependency on the automobile and have specific mobility needs that may not be fully met by existing systems.

The percentage of elderly persons living in the State of Michigan will increase to nearly 17 percent by the year 2020. More than 50 percent of the elderly will be women and a large proportion of these women will be widows. Although the vast majority of elderly persons will continue to live with family members (spouses, adult children or other relatives), a growing proportion will live alone.

Michigan will also continue to experience the national phenomenon commonly referred to as “aging in place.” Those elderly who moved to less dense suburban and rural areas in their earlier years will, in large part, continue to live there. In many cases, the communities were built for automobile accessibility and, therefore, the reliance on the automobile will continue. This fact is evident when the percent increase in the number of elderly licensed drivers is examined. Between 1987 and 1996, the percent change in the total number of licensed drivers in the state was 5.4 percent; for drivers between ages 70 and 74 it was 19.9 percent and for drivers age 75 and older it was 51.8 percent. There is also a clear distinction between increases in licensing between men and women; women in the elderly subsets experience the greatest increases.

We recognize the need to plan for the future today and address the identified needs of our elderly citizens. We must analyze current transportation systems, including the roadway network, the public transit system and service provisions and determine if they will adequately meet the needs of our aging population.

Elderly travel patterns

Data from the 1994 SEMCOG Household-Based Person Trip Survey are used to analyze travel behaviors of the elderly population and make comparisons between the elderly and the total population. Differences among the elderly based on gender, area type (urban, rural and suburban) and trip purpose are also analyzed. Three subsets of the elderly population are analyzed — the 55-64 age group, the 65-74 age group and the 75 and over age group. Again, the results of these analyses provide important background information used in developing recommendations that will positively impact the mobility needs of the state’s elderly population.

Based on these analyses, the following trends become evident:

- The majority of all person trips involve the home as the destination. Not surprisingly, the percentage of work trips decreases dramatically across the elderly subsets while the percentage of shopping, social activity and personal business trips increases.
- The private automobile is the predominate travel mode across all age groups — between 90 and 95 percent of all elderly trips are made by private automobile. However, the elderly tend to take more automobile trips as passenger rather than driver. The percentage of passenger trips increases from 12 percent in the 55-64 age group to 20 percent and 29 percent in the 65-74 age group and the 75 and over age group, respectively.
- The elderly in the older two subsets are more likely to use non-automobile travel modes, such as walking and transit when there is no vehicle available for the trip rather than using them as a matter of choice, i.e., even if there is a vehicle available. The proportion of non-automobile trips taken when no vehicle is available increases from 36 percent in the 55-64 age group and to 56 percent in both the 65-74 and 75 and over age groups.
- While the percentage of pedestrian trips is relatively small, the elderly demonstrate an increasing reliance on walking, making this mode of travel extremely important. The percentage of walking trips increases across elderly subsets from 3.9 percent in the 55-64 age group to 4.8 percent in the 65-74 age group and to 6.4 percent in the 75 and over age group.
- Overall, the elderly in the older two subsets travel during different time periods than the total population. They make the majority of trips during the late morning to early afternoon hours (9:00 a.m. - 3:00 p.m.) and appear to avoid the typical morning work peak (6:00 a.m. - 9:00 a.m.). However, they make approximately the same percentage of trips during the afternoon peak period (3:00 p.m. - 6:00 p.m.) as the total population.
- The average trip rate for the total population is 3.7 trips per person, per day. The trip rate increases in the 55-64 age group to 3.9 and then decreases to 3.5 and 2.3 trips per person in the 65-74 age group and the 75 and over age group, respectively.
- Although the average trip length for each of the elderly subsets is greater than the total population (5.8 miles), the value does decrease across the subsets from 6.6 miles in the 55-64 age group to 6.15 miles in the 65-74 age group and 5.8 miles in the 75 and over age group.

- There are some variations in travel patterns by gender, particularly in the older elderly subsets. As they age, females appear to make fewer automobile trips, fewer driver trips and more walking and transit trips as a percentage of the total. Elderly females are less likely than males to have a vehicle available for trips. The person trip rates and the driver trip rates for older females are significantly less than for males. The average trip length for females is less than for males with the exception of females in the 65-74 age group.
- In general, there are few differences in trip making characteristics between the elderly living in urban, suburban and rural areas with the exception of travel mode. The elderly in suburban and rural areas are more likely than their urban counterparts to make automobile trips and this is likely due, in part, to increased availability of automobiles for trips in those areas and a greater accessibility to transit and pedestrian routes in urban areas.
- With respect to trip purpose (shopping, social activities and personal business), the elderly in the 75 and over age group appear to make more shopping and personal trips via walking and transit than the general population or the other elderly subsets.

Our society is built on the concept of personal mobility and any recommended policies or practices must be sensitive to that fact. The elderly continue to make their fair share of trips although the purpose of those trips and the time periods during which they are taken are different than the total population. The elderly continue to make the majority of their trips via the private automobile, but there is an increased reliance on alternative transportation options ranging from shared rides (as passenger instead of driver) to non-automobile modes such as walking and transit. There is an obvious need to consider the increasing reliance on non-automobile travel modes when planning for the provision of services to the elderly. At the same time, it is vital we understand the extent of the elderly population's reliance on the private automobile both as a source of mobility and as a sign of independence.

Elderly crash characteristics

State-wide crash data, collected and maintained by the Michigan Department of State Police, Office of Highway Safety Planning, are used to analyze crash trends of the total population as well as for the three elderly subsets (55-64 age group, 65-74 age group and 75 and over age group.) Raw crash data for 1994, 1995 and 1996 are used to generate annual averages for a number of characteristics. Unless otherwise noted, an elderly crash is defined as any crash involving an elderly driver, pedestrian or bicyclist.

These analyses lead to the following observations:

- Traffic crashes involving an elderly driver or pedestrian tend to be more severe. While only 0.32 percent of total crashes involve a fatality, when a driver or pedestrian between the ages of 65 and 74 is involved, the percentage increases to 0.46 percent. When a driver or pedestrian age 75 or older is involved, the percentage of fatal crashes increases to 0.8 percent.
- The time of day distribution of elderly traffic crashes corresponds to the time of day travel patterns of the elderly. The percentage of traffic crashes involving an elderly driver or pedestrian during each time period is approximately the same as the percentage of elderly trips taken during the same time period. One notable exception is the afternoon peak period from 3:00 p.m. to 6:00 p.m., when the 75 and over age group is over-represented in crash involvement.
- The elderly are involved in more crashes (as a percentage of the total) at intersections with traffic controls. They are cited more often for failing to yield and disregarding traffic controls. They also tend to be involved in angle and left-turn traffic crashes more often, which usually result in more serious injuries.
- The majority of elderly traffic crashes occur during daylight hours (approximately 80 percent) when the weather is clear (approximately 50 percent) and the pavement is dry (approximately 70 percent). This would appear to indicate the elderly also travel more under similar circumstances, i.e., the elderly are self-regulating their travel by avoiding the more hazardous situations such as nighttime driving and driving in inclement conditions.
- On average, while the elderly drive less, they are more at risk of being involved in traffic crashes, particularly fatal crashes, where risk exposure is defined as a function of annual vehicle miles traveled (VMT) and crash involvement. Elderly drivers are under-represented in terms of VMT but are over-represented in total traffic crashes and fatal crashes. In contrast, non-elderly drivers are over-represented in terms of VMT and under-represented in terms of traffic crashes.

The elderly are more susceptible to serious injury and death in traffic crashes, and elderly traffic crashes demonstrate some unique characteristics. These facts support the need to recognize the impact of our transportation infrastructure and operation on this population. If we continue to maintain the transportation system in its current condition, we can only expect problems encountered by elderly drivers and pedestrians will be exacerbated. Rather, we should begin to examine and implement initiatives that will address identified deficiencies and help reduce the frequency and severity of all traffic crashes.

The elderly pedestrian

As stated previously, there appears to be an increased reliance on walking among the elderly, and walking trips appear to be taken more for necessity than for leisure. Elderly pedestrians are also much more likely to be seriously injured or killed in traffic crashes. Because walking appears to be an important mode of travel, but one that is much more hazardous for the elderly, special emphasis is placed on analyzing the travel patterns and crash characteristics of the elderly pedestrian.

Both the 1994 SEMCOG Household-Based Person Trip Survey and a smaller survey of the residents of Dearborn, Michigan (conducted for a Senior Pedestrian Safety Study in Dearborn) are used to analyze when, where and why the elderly walk. The reasons why the elderly don't walk more often, or at all, are also explored.

Based on these analyses, the following observations are evident:

- While the percentage of pedestrian trips is small compared to total trips, it appears that pedestrian trips are vital to many elderly people, particularly in the two older subsets. While only 28 percent of pedestrian trips in the 55-64 age group are taken when no vehicle is available for the trip, that percentage increases to 46 percent in the 65-74 age group and to 64 percent in the 75 and over age group. Obviously, many elderly people are relying on walking to meet their basic needs because there is no vehicle available for the trip.
- While the majority of those surveyed in Dearborn indicated they were satisfied with their walking environment, there are some obvious actions that can be taken to enhance the walkability of the community. Those include providing safe, continuous walking corridors to common points of interest with adequate lighting and appropriate street furniture. Providing ample time for elderly pedestrians to cross at signalized intersections is also important
- While it appears that elderly pedestrians do self-regulate their trips (making the majority of trips during the day when the weather is clear and the conditions are dry), they continue to be disproportionately involved in serious injury and fatal traffic crashes, perhaps due to the conditions of the walking environment. Providing safe walking conditions will help reduce the frequency and severity of pedestrian crashes.

The need to address the special issues associated with elderly pedestrians is clear. The reliance on walking as a necessary mode of travel increases with age as does the likelihood of serious injury or death in pedestrian/vehicle crashes. It is essential, therefore, that the planning and design of pedestrian facilities accommodate the needs of elderly users.

Literature Review and Resource Inventory

The next step in developing this plan of action was, conducting a comprehensive review of the literature in order to better understand the issues affecting elderly mobility and safety, the reasons for current gaps in service provision and the success of innovative programs, activities and research. *Background Paper #2 — Literature Review and Resource Inventory* summarizes the research conducted.

First, in order to thoroughly address the issues of elderly mobility and safety in the state, a number of broad “components” were identified by the Elderly Mobility & Safety Task Force. The components consider not only the social aspects of mobility and safety but technical, educational and environmental aspects as well.

Next, extensive information was gathered through literature reviews and interviews with key professional groups to identify current gaps in services and examine the underlying reasons for those gaps. Finally, this research was used to identify successful programs, services and research being conducted in each of the component areas. The knowledge gained through this research was carried through the assessment process and assisted the Task Force in developing this plan of action.

Elderly Mobility & Safety Forum

In order to gather additional input from professionals involved, either directly or indirectly, with the elderly, the Elderly Mobility & Safety Task Force conducted the Elderly Mobility & Safety Forum in April 1999. The forum was co-hosted by SEMCOG, the Southeast Michigan Council of Governments, U.S. Department of Transportation, National Highway Traffic Safety Administration, Federal Highway Administration and Federal Transit Administration. The goals of the forum included:

- presenting the national perspective on elderly mobility and safety including national policy and program resources,
- explaining the Michigan approach to elderly mobility and safety including the *Draft Plan of Action* and
- exploring and evaluating state and local implications on issues such as highway design, alternative transportation and elderly service provision.

A total of 124 people attended the forum, representing academia, business and industry, hospital/rehabilitation programs, elderly service agencies, alternative transportation agencies, traffic safety organizations, law enforcement, local, state and federal government and the elderly.

The general session included presentations by federal government representatives, the Elderly Mobility & Safety Task Force and the automobile industry on issues such as the national and state perspective on elderly mobility and safety issues, highway design initiatives, alternative transportation, national policy issues and the role of the automobile industry in elderly mobility and safety.

Three concurrent workshops were also conducted, providing attendees more detailed information from local experts and providers. Workshop attendees were asked, based upon their professional experience, to identify issues affecting elderly mobility and safety, barriers to addressing those issues and specific recommendations for overcoming those barriers. The recommendations generated from those workshops are outlined below.

Workshop I — Exploring New Highway Design Initiatives

- Create and distribute a checklist of issues/factors that should be considered during the design/redesign process and educate professionals on the relevance of those issues and factors.
- Increase the legibility, comprehensibility and conspicuousness of signs and pavement markings.
- Increase signal visibility through a proactive approach to design.
- Address the community context of highway design.

Workshop II — Enhancing Alternative Transportation Options

- Increase funding for transit.
- Implement a statewide campaign of education on public transit.
- Seek transit coordination at the regional level.
- Promote the statewide purchase of low-floor vehicles.
- Encourage sustainable/livable community concepts through local land use policies.

Workshop III — Enhancing Safe Mobility

- Develop a task force of legislators and transit representatives to seek sufficient allocation of funds for elderly programs and services.
- Develop and maintain a central clearinghouse for information.

- Develop multiple forms of assessment, evaluation and referral.
- Develop a massive publicity campaign to educate all drivers.
- Promote corporate participation incentives.

Again, the results of the forum workshops were considered by the Elderly Mobility & Safety Task Force in developing the *Final Plan of Action*. A full description of the forum activities is contained in the *Forum Proceedings*.

Focus Group Research

In order to gather additional input from the elderly and professionals involved in elderly mobility and safety issues, a focus group research project was implemented. Four focus group sessions were conducted by MORPACE International, Inc., a marketing research and consulting firm. Session participants included traffic engineers and planners, service providers, alternative transportation providers and older adults. The sessions generated valuable input. While each of the groups offered some unique insights, many of the comments were similar, indicating a consensus on some important issues.

The goals of the focus group research are:

- Develop a comprehensive list of mobility and safety challenges facing the elderly as expressed by elderly service providers, transportation planners and engineers, alternative transportation providers and the elderly themselves.
- Discuss the real and perceived barriers to addressing those challenges.
- Develop a resource list of the activities and programs that currently work well and should serve as models for programs elsewhere.
- Develop a set of specific recommendations for overcoming the identified challenges and barriers.

The recommendations generated are categorized by driving and alternative transportation issues and outlined below.

Driving issues:

- Generate awareness of elderly mobility and safety issues among legislators, traffic engineers and land use planners.

- Revise engineering design standards to better accommodate the elderly driver and pedestrian; educate traffic engineers and planners about elderly driver and pedestrian issues. Increase the size and brightness of road signs.
- Increase enforcement on freeways to curb speeding and road rage.
- Influence automotive manufacturers to improve in-vehicle safety features for the elderly.
- Expand availability of elderly driver education programs.

Alternative transportation issues:

- Increase funding for alternative transportation and facilitate coordination of funding and information through a centralized clearinghouse.
- Improve the level of alternative transportation services to better accommodate the needs of elderly riders.
- Implement policy changes necessary to remove jurisdictional boundaries on alternative transportation services.
- Improve Michigan Department of Transportation procurement procedures to facilitate the wide-spread purchase of low-floor buses.
- Facilitate education and awareness of available alternative transportation options for the elderly as well as their families and care givers.
- Educate society about the importance of lifelong mobility planning.

These results, detailed in the *Focus Group Research Summary*, assisted the Task Force in developing its plan of action.

Traffic Engineering

While elderly drivers and pedestrians are involved in only a small proportion of traffic crashes, they are at greater risk of serious injury and death in those crashes. According to statewide traffic crash statistics, approximately 11 percent of total crashes involve a driver or pedestrian age 65 and older. However, nearly 13 percent of injury crashes and 21 percent of fatal crashes involve the elderly.

Furthermore, crashes involving elderly drivers often demonstrate unique locational and circumstantial characteristics. Compared to total traffic crashes, crashes involving the elderly are more likely to occur at intersections governed by traffic controls. Crashes involving the elderly are also more likely to be angle or left-turn crashes which tend to be more severe. Finally, elderly drivers are more likely to be cited for failure to yield and for disregarding traffic controls.

Given the nature of elderly traffic crashes, it is desirable to examine and implement engineering countermeasures. This, in turn, will reduce the frequency and severity of traffic crashes involving the elderly by making the transportation system more conducive to elderly driving limitations. The fact is, many current engineering design standards and practices are based upon research conducted on younger drivers. However, current research identifies engineering countermeasures that take into account the physical, cognitive and visual characteristics of the elderly. These countermeasures must be routinely considered during the design of new roadway facilities and redesign of existing infrastructure.

Issues and Needs

The present day transportation system was constructed, in large part, using design standards based upon performance characteristics of an average driver. However, yesterday's average driver no longer represents today's driver mix. Design standards are based on assumptions regarding visual, cognitive and physical performance levels which many of today's elderly drivers are unable to meet. The elderly represent the fastest growing group of licensed drivers. In fact, while the total driving population in the State of Michigan increased 5.2 percent from 1987 to 1996, drivers in the 75 and over age group increased 34.1 percent. It is imperative, therefore, that highway design and operations standards be re-examined and refined based upon the needs of the current driver population mix.

Signs

Traffic signs serve a valuable purpose when warranted and applied according to the standards set forth in the *Manual of Uniform Traffic Control Devices (MUTCD)*. The most effective signs are those that are standardized in design (shape, color, legends and illumination), application and placement. The following recommendations were identified as potentially useful for elderly drivers.

General sign standards

- Sign clustering — Avoid or reduce excessive sign clustering, particularly at intersections where critical decisions are made. Where applicable, place signs well in advance of the critical decision-making point.
- Sign consistency — Maintain consistency in sign application, design and placement to foster maximum awareness and understanding of sign messages. Where applicable, utilize sign symbols that are simplistic and clear in meaning.
- Sign placement — Where feasible, mount signs (street signs, lane-use control signs, etc.) above the roadway for maximum visibility.
- Sign illumination — Where feasible, install internally illuminated signs to increase visibility.
- Sign maintenance — Develop a consistent approach to adequate sign maintenance to ensure signs are, at all times, legible and visible.

Street signs

- Increase the letter size of street name signs to a minimum of six inches for upper-case letters, 4.5 inches for lower-case letters and three inches for street abbreviations or city sections as outlined in *MUTCD*¹. Start with high-priority corridors in areas of high-density elderly populations and areas with an above-average frequency of elderly traffic crashes.
- Install supplemental advance street signs (identifying the name of the upcoming cross street) in advance of major intersections, particularly signalized intersections. Develop a consistent policy on supplemental street sign placement.
- Utilize reflectorized street signs to show the same shape and color by day and night. (Current revisions proposed in *MUTCD*, June 11, 1998, would require minimum reflectorization of all guide signs, including street signs, and would include minimum reflectivity guidelines.²)

Stop/yield signs

- Utilize standard signs in terms of size (30 inches x 30 inches minimum) and retroreflectivity.
- Where warranted by crash experience, traffic/geometric conditions (e.g., restricted sight distance) or conversion from 4-way to 2-way stop control, install supplemental warning sign panels, e.g., CROSS TRAFFIC DOES NOT STOP.
- Where warranted by crash experience or traffic/geometric conditions (e.g., restricted sight distance), install advance warning signs, e.g., STOP AHEAD.

Pavement markings

Pavement markings perform many functions such as delineating traffic flows and edge of pavement, conveying or implementing traffic regulations and channelizing traffic flows. Pavement markings, in order to be most useful, must be standardized in use, colors, placement and maintenance.

¹ 23 CFR 655, vol. 62, No. 6, National Standards for Traffic Control Devices. *Revision of the Manual on Uniform Traffic Control Devices*. Final Rule. January 9, 1997. pp. 1363-1373.

² 23 CFR Part 655, vol. 63, No. 112. *Revision of the Manual on Uniform Traffic Control Devices*. Part II — Signs. June 11, 1998. pp. 31950-31957.

Pavement marking standards

- Longitudinal lines
 - “ Increase normal width of longitudinal lines (edge lines, lanes lines, etc.) from four inches to six inches.
 - “ Where feasible, utilize raised reflective pavement markers in accordance with *MUTCD* to increase night time and inclement weather visibility.
 - “ At a minimum, longitudinal lines must be placed at locations required by *MUTCD*. However, where feasible, place longitudinal lines (e.g., edgelines) along high-priority corridors in areas with high-density elderly populations or above-average frequency of elderly traffic crashes and in unlighted areas.
- Stop lines — Increase stop line width from 12 to 24 inches for maximum visibility.
- Crosswalks — Consider alternate pavement markings for crosswalks such as zebra, ladder and solid markings to increase visibility for approaching drivers.
- Edge treatments and delineation of obstacles — Delineate all curb and raised median faces at intersections. Provide cross-hatched pavement markings in advance of raised obstructions as provided in *MUTCD*.
- Pavement marking maintenance — Develop a consistent approach to adequate pavement marking maintenance to ensure markings are visible at all times.

Intersection signalization

As indicated, elderly drivers are more at risk of traffic crashes at signalized intersections than the general public. Therefore, it is desirable to consider the limitations of elderly drivers when designing or redesigning signalized controls at intersections.

Signal hardware

- Increase the size of signal lenses from eight inches to 12 inches to increase visibility.
- Provide consistent signal lense intensity.
- Provide a signal backplate to increase signal visibility.
- Place signal heads over roadway lanes along with applicable, illuminated street and lane-use signs.

- Provide street lighting at signalized intersections, particularly where sight-distance or other geometric considerations increase traffic crash potential and at locations with high pedestrian volumes.
- Provide consistent and routine maintenance of all signal hardware.

Advanced signal warning

- Where deemed necessary due to poor visibility, high approach speeds or complex intersection configuration, provide advance signal warnings as defined in *MUTCD*.
- Provide adequate advance warning of lane-use configuration/restrictions in the form of pole-mounted signs placed on the side of the road or in the median and applicable pavement markings. Where feasible, supplement traditional lane-use regulations with overhead, illuminated lane-use signs.

Signal operations

- Left-turn phasing
 - “ Where feasible and warranted by crash experience, provide a protected left-turn signal phase to accommodate identified difficulties the elderly experience in maneuvering left turns.
 - “ Provide a separate signal head for the left-turn lane to avoid confusion.
 - “ Where warranted, provide traffic-signal signs to supplement understanding of the proper signal function.
 - “ Provide advance-warning signs (preferably overhead and illuminated) regarding upcoming signal operations.
- Zone of indecision — Provide an all-red clearance interval based on increased perception-reaction times of elderly drivers.
- Right turn on red (RTOR) (U.S. Department of Transportation, Federal Highway Administration, 1998, pp. 9-10.)
 - “ Prohibit RTOR at skewed intersections with an intersecting angle less than 75 degrees or more than 105 degrees.

- Where RTOR is prohibited, provide applicable NO TURN ON RED signs both overhead (preferably illuminated) as well as on the opposite corner of the intersection.
- Traffic signal warrants — Routinely examine traffic operations at existing signals as well as unsignalized intersections to ensure all intersections are functioning with proper traffic control devices.
- Traffic-actuated signals and signal coordination — Further examine the impact of traffic-actuated versus pre-timed traffic signals and signal coordination on elderly driving performance.

Access management

Access management is a comprehensive process to maintain reasonable access to adjacent development while preserving the safe and efficient flow of traffic. Effective access management has many benefits including increased traffic flow and associated decreases in delay, congestion and air pollution. Access management can also have a beneficial impact on traffic crashes and crash potential.

Access management standards

- Limit conflict points — Limit the number of conflict points associated with access points. Where feasible, use medians to create right-in, right-out driveway movements. Consolidate access points where possible.
- Separate conflict points — Prohibit driveway access within the functional boundary of intersections. Maintain proper spacing of adjacent and opposite access points where spacing is based on the speed of the roadway.
- Driveway design — Design driveways (width, length, slope, radii, etc.) based on the speed limit and traffic volume of the adjacent roadway and driveway.

Geometrics

At-grade intersection standards (U.S. Department of Transportation, Federal Highway Administration, 1998, pp. 6-9.)

- Intersecting angle (skew) — Where feasible, intersecting roadways should meet at a 90-degree angle. Where limited right-of-way prevents a 90-degree angle, intersecting roadways should meet at no less than a 75-degree angle.
- Receiving lane width — Where feasible, provide a receiving width for turn lanes of at least 12 feet and a shoulder of at least four feet.

- Channelization — Where feasible, provide raised channelization as opposed to painted channelization.
- Intersection sight distance — In all cases, utilize a minimum perception-reaction time of 2.5 seconds when calculating intersection sight distance.
- Opposite (single) left-turn lane geometry — Where feasible, provide unrestricted sight distance through positive offset of opposite left-turn lanes.
- Curb radius — Where feasible, provide a corner curb radius of at least 30 feet.

Pedestrian environment

Elderly pedestrian crashes demonstrate several unique characteristics, some of which may be addressed through application of standard engineering countermeasures. For example, elderly pedestrians appear to be more at risk than the general population at intersections with traffic controls, particularly when turning vehicles are present. Elderly pedestrians are also at greater risk of being struck by backing vehicles.

Signage

- Where right turns on red (RTOR) are prohibited, install NO TURN ON RED signs, preferably overhead and on the opposite corner of the intersection. Where right turns on red are permitted, install TURNING TRAFFIC MUST YIELD TO PEDESTRIANS signs, preferably overhead and on the opposite corner of the intersection. (U.S. Department of Transportation, Federal Highway Administration, 1998, pp. 9-10.)
- Where warranted, provide appropriate pedestrian regulatory and warning signs such as WATCH FOR TURNING VEHICLES.

Intersection signalization

- Retime traffic and pedestrian signals to provide adequate crossing times at intersections with high pedestrian volumes, utilizing an appropriate walking speed to determine signal timing. Signal timing at locations with a high number of elderly pedestrians should be timed for a slower walking speed than recommended in the *Manual of Uniform Traffic Control Devices* (4.0 feet/second). Various studies indicate typical walking speeds for elderly pedestrians ranging from 2.5 feet/second to 3.5 feet/second.
- Where feasible, install pedestrian signals to supplement existing traffic signals. Install pedestrian signal education signs to promote pedestrian understanding.

- Where warranted, utilize pedestrian-actuated signals, i.e., pedestrian push buttons, to provide additional signal timing for pedestrians.

Geometrics

- On very wide streets, construct raised pedestrian refuge islands with appropriate curb cuts and/or ramps to decrease the distance that must be crossed during each signal cycle. Provide pedestrian signals and push buttons on the island so as not to strand pedestrians.
- Reduce turning radii at intersections to decrease speed of turning vehicles.
- Where warranted by high turning volumes, install channelized turn lanes with appropriately designed islands.

Traffic calming

- Evaluate and implement appropriate traffic calming techniques that effectively calm vehicular traffic and promote pedestrian travel.

Identification of needs

Clearly, the implementation of all possible engineering countermeasures cannot be achieved immediately. State, county and local road agencies face many needs and challenges compounded by limited resources. Therefore, needs must be prioritized and guidelines developed for the most efficient and effective method of implementation.

- Identify priority intersections and corridors in areas with high-density elderly populations or in areas that experience above-average frequency and/or severity of traffic crashes involving elderly drivers.
- Conduct an in-depth analysis of the selected locations including all applicable factors such as traffic crash history, travel patterns and physical inventory of signs, pavement markings, geometrics, signalization and access patterns.
- Identify appropriate countermeasures for implementation that may reduce the frequency and/or severity of traffic crashes at those locations.
- Implement the countermeasures identified.
- Evaluate the impact of the implemented countermeasures to define any positive or negative impact on travel patterns/perceptions and on crash activity.

- Develop a benefit/cost analysis of implementation based upon the benefits in reduced crash activity and cost of implementation and maintenance of recommendations.
- Use the results of the implementation and review to most effectively and efficiently apply countermeasures in other high-priority areas.

Recommendations

In an effort to provide reliable, convenient and sufficient modes of alternative transportation, the following recommendations are offered, with the Michigan Department of Transportation and Office of Highway Safety Planning as lead agencies:

- Coordinate with the Michigan Municipal League, Michigan Association of Counties and County Road Association of Michigan to examine, compile and publish a best practices manual for engineers, planners and traffic safety personnel detailing successful implementation of “elderly-friendly” traffic engineering practices.
- Coordinate with and distribute the manual to local communities.
- Coordinate with the American Association of State Highway and Transportation Officials (AASHTO) and Federal Highway Administration (FHWA) to facilitate appropriate changes in traffic engineering standards.
- Coordinate with Michigan ITS to seek intelligent transportation system (ITS) solutions to the specific issue of elderly mobility.
- Coordinate with the Institute of Traffic Engineers, Michigan ITS and local universities to host an annual statewide summit focusing on mature driver issues.
- Fund additional traffic engineering services at the local level that will also focus on elderly issues.

Model Programs and Key Resources

City of Rochester Hills, MI — Recognizing that current guide sign standards are not based upon today’s older driver mix, the City of Rochester Hills instituted a routine sign maintenance program to upgrade the size and retroreflectivity of city guide signs (street name signs, parking signs, etc.). Street signs standards, for example, are currently set at six-inch minimum letter size on neighborhood streets, nine-inch minimum letter size on mainline and high-speed streets and high-grade intensity or retroreflectivity on all signs. The city has recently completed its first 10-year cycle to replace all city guide signs (the average life cycle of signs is 10 years) and is currently proposing that the next cycle of replacements utilize an even higher grade

intensity to increase brightness. While no specific crash analyses have been performed to test the program's effectiveness, the city's average crash rate remains lower than county and statewide rates, and positive anecdotal evidence indicates widespread community support for the program.

Evaluating Traffic Impact Studies: A Recommended Practice for Michigan Communities — This handbook, sponsored by the Tri-County Regional Planning Commission, SEMCOG, the Southeast Michigan Council of Governments and the Michigan Department of Transportation, presents uniform practices and procedures designed to assist local communities in the planning and development process. A similar handbook pertaining to traffic engineering studies could be developed based on local community case studies.

Federal Highway Administration offers a workshop on its *Older Driver Highway Design Handbook* including background information on the need for older driver highway design guidelines, in-depth examination of handbook recommendations and local case studies. A workshop in Michigan would provide a valuable learning experience for practicing engineers and traffic safety personnel.

Michigan State University, Department of Civil & Environmental Engineering conducts a series of specialty classes on traffic safety and engineering. This forum could be used to present current research and design standards to practicing engineers, planners and other traffic safety personnel and to encourage the consideration of elderly drivers and pedestrians in the planning and design processes.

Michigan Traffic Safety Management System (MTSMS) — MTSMS is a coordinated public/private effort comprised of individual action teams. The mission of the Traffic Engineering/Enforcement Coordinating Committee (TEECC) is promoting appropriate engineering, planning and enforcement practices through education, data analysis and safety programs in an effort to reduce the frequency and severity of traffic crashes. TEECC could be an influential force in enhancing elderly mobility and safety through education, development of practical engineering guidelines and tools and identification of applicable funding resources.

SEMCOG, the Southeast Michigan Council of Governments conducts traffic engineering studies for its member communities under a Traffic Engineering Assistance Grant from the Office of Highway Safety Planning. The goal in each community is to identify safety deficiencies, conduct in-depth engineering studies on a selected location, develop a set of recommendations for implementation and conduct follow-up analyses after implementation. A program similar to this could be used to provide assistance to communities with identified deficiencies that contribute to elderly traffic crashes.

Senior Pedestrian Safety Study, City of Dearborn — In FY 1996, SEMCOG, the Southeast Michigan Council of Governments, with funding from the Michigan Office of Highway Safety

Planning, conducted a community-based study to identify and address elderly pedestrian issues. The final report outlines the overall procedures performed in the project, describes in detail the methods and techniques used for data collection and analysis and summarizes proposed pedestrian countermeasures. This guide could be used to assist other communities conducting elderly pedestrian safety studies.

AAA Foundation for Traffic Safety. "The Older and Wiser Driver." 1997. (Pamphlet)

Abdel-Aty, Mohamed A., Chien L. Chen, A. Essam Radwan, et. al. "Analysis of Crash-Involvement Trends by Drivers' Age in Florida." *ITS Journal on the Web*. February 1999. pp. 69-74.

Abdulsattar, Husham N., Ph.D. and Patrick T. McCoy, Ph.D. "Effect of Drivers' Age on the Comprehension of a Pedestrian Right-of-Way Warning Sign." 1999.

Aizenberg, Rhonda and Debbie M. McKenzie. *Teen and Senior Drivers*. California Department of Motor Vehicles, Beverly Foundation. 1997.

Dissanayake, Sunanda, J. John Lu, Ph.D., P.E. and Xuehao Chu, Ph.D. "A Simplified Approach to Forecast the Highway Crash Rates of Some Selected Special Population Subsets." University of South Florida. 1999.

Dissanayake, Sunanda, J. John Lu, Ph.D., P.E., Xuehao Chu, Ph.D., et. al. "Use of Multi-Criteria Decision Making to Identify the Critical Highway Safety Needs of Special Population Groups." University of South Florida. 1999.

Florida Department of Transportation. "The Older Road-User Program." 1991.

Greene, Frances A., Rodger J. Koppa, Katherine Rodriguez, et. al. *Positive Guidance and Older Motorists — Guidelines for Maintenance Supervisors*. Southwest Region University Transportation Center, Texas Transportation Institute, The Texas A&M University System. 1996.

Greene, Frances A., Rodger J. Koppa, Ronald D. Zellner, et. al. *Field and Laboratory Studies of Warning Symbol Sign Legibility Distance*. Southwest Region University Transportation Center, Texas Transportation Institute, The Texas A&M University System. 1995.

Hu, Patricia S., Jennifer R. Young and An Lu. "Highway Crash Rates and Age-Related Driver Limitations: Literature Review and Evaluation of Data Bases." Oak Ridge National Laboratory, National Highway Traffic Safety Administration. 1993.
http://www.ornl.gov/ORNL/EINS_Reports/tm12456/tm12456.html

Humstone, Elizabeth and Julie Campoli. "Roadway Access Management Guide." *Planners Web: Planning Commission Journal* (Issue 29). Winter 1998. <http://www.plannersweb.com/access.html>

Jensen, Søren Underlien. "Pedestrian Safety in Denmark." 1999.

Kim, Karl, Ph.D. and Kathryn Ortega, MURP. "Modeling the Relationships Between Pedestrian Accidents and Census Block Group Characteristics in Hawaii." University of Hawaii at Manoa. 1999.

Koppa, Rodger J. (Ed.), R. Quinn Brackett, Frances A. Greene, et. al. *Aging Driver Needs for Mobility in an Automobile Oriented Region: 5 Research Studies*. Southwest Region University Transportation Center, Texas Transportation Institute, The Texas A&M University System. 1992.

McCoy, Patrick T., Mohammed S. Tarawneh, Ramaratnam R. Bishu, et. al. "Evaluation of Countermeasures for Improving Driving Performance of Older Drivers." *Transportation Research Record*. pp. 72-80.

McKelvey, Francis X. and Nikiforos Stamatiadis "Highway Accident Patterns in Michigan Related to Older Drivers." *Transportation Research Record 1210*. pp. 53-57.

McKnight, James A. and A. Scott McKnight. "Multivariate Analysis of Age-Related Driver Ability and Performance Deficits." National Public Service Research Institute.

Mercier, Cletus R., Mack C. Shelley, II, Geneva H. Adkins, et. al. "Age and Gender as Predictors of Injury Severity in Broadside and Angle Vehicular Collisions." Iowa State University. 1999.

Michigan Department of Transportation. *Evaluating Traffic Impact Studies: A Recommended Practice for Michigan Communities*. 1994.

Michigan Department of Transportation. *Improving Driveway & Access Management in Michigan*.

Michigan Department of Transportation. "Traffic and Safety Division Note: MDOT Guidelines for Access Spacing on State Highways." 1996.

Michigan Department of Transportation and Michigan Department of State Police. *Michigan Manual of Uniform Traffic Control Devices*. 1994.

Perry, A. Thompson, Jacqueline C. Wheeler and Kathy Schiflett. *Aging Driver Needs for Mobility in an Automobile Oriented Region: A Literature Review*. Southwest Region University Transportation Center, Texas Transportation Institute, The Texas A&M University System. 1992.

Perry, A. Thompson, II, Rodger J. Koppa, R. Dale Hutchinson, et. al. *Brief Field of View and Elderly Drivers: A Research Study*. Southwest Region University Transportation Center, Texas Transportation Institute, The Texas A&M University System. 1993.

SEMCOG, the Southeast Michigan Council of Governments. *Background Paper #1 — Population, Travel Pattern and Crash Characteristic Analysis, State of Michigan*. 1996.

SEMCOG, the Southeast Michigan Council of Governments. *Elderly Pedestrian and Driver Study, Southeast Michigan*. 1999.

SEMCOG, the Southeast Michigan Council of Governments. *Pedestrian Safety Study, City of Hamtramck*. 1998.

SEMCOG, the Southeast Michigan Council of Governments. *Regional Traffic Safety Policies for Southeast Michigan*. 1991.

SEMCOG, the Southeast Michigan Council of Governments. *Senior Pedestrian Safety Study, City of Dearborn*. 1998.

Sisiopiku, Virginia P., Ph.D. and Darcin Akin. "Pedestrian Perceptions Toward Various Pedestrian Treatments." Michigan State University. 1999.

Smith, Emily. "Making streets safer for seniors on foot." *Pedestrian Safety Roadshow* <http://www.ota.fhwa.dot.gov/walk/facts/spotlight/streets.html>

Stutts, Jane C., J. Richard Stewart and Carol Martell. "Cognitive Test Performance and Crash Risk in an Older Driver Population." *Accident Analysis and Prevention* (vol. 30, no. 3). 1998. pp. 337-346.

Talking Roads. "New Guide on Road Design to Aid Older Drivers." <http://talkingroads.org/index1.html>

U.S. Department of Transportation. *The Older Road User: Measures for Reducing the Number of Casualties among Older People on our Roads*.

U.S. Department of Transportation, Federal Highway Administration. 23 CFR 655, vol. 62, no. 6, National Standards for Traffic Control Devices. *Revision of the Manual on Uniform Traffic Control Devices*. Final Rule. January 9, 1997. pp. 1363-1373. <http://ohs.fhwa.dot.gov/devices/mutcd.html>

U.S. Department of Transportation, Federal Highway Administration. 23 CFR Part 655, vol. 63, no. 112. *Revision of the Manual on Uniform Traffic Control Devices*. Part II — Signs. June 11, 1998. pp. 31950-31957. <http://ohs.fhwa.dot.gov/devices/mutcd.html>

U.S. Department of Transportation, Federal Highway Administration. “Accident Analysis of Older Drivers at Intersections.” *Highway Safety Information System Summary Report*. 1994. <http://www.tfhr.gov/hsis/94-021.htm>

U.S. Department of Transportation, Federal Highway Administration. “Analysis of Older Drivers on Freeways.” *Highway Safety Information System Summary Report*. 1996. <http://www.tfhr.gov/safety/humanfac/rd96-035/rd96-035.htm>

U.S. Department of Transportation, Federal Highway Administration. “An Investigation of Older Driver Freeway Needs and Capabilities.” *Human Factors Summary Report*. 1998.

U.S. Department of Transportation, Federal Highway Administration. *Older Driver Highway Design Handbook: Recommendations and Guidelines*. 1998.

U.S. Department of Transportation, Federal Highway Administration. “Improvements in Symbol Sign Design to Aid Older Drivers.” *Symbol Signing for Older Drivers*. 1994. <http://www.tfhr.gov/humanfac/rd95129.htm>

U.S. Department of Transportation, National Highway Traffic Safety Administration. “Traffic Safety Facts 1997: Older Population.”

U.S. Roads. “Designing Traffic Signals to Accommodate Pedestrian Travel.” *Road Engineering Journal*. 1997. <http://www.usroads.com/journals/p/rej9710/re971002.htm>

U.S. Roads. “Researchers Study the Walking Speeds of Older Pedestrians.” *Road Management & Engineering Journal*. 1997. <http://www.usroads.com/journals/rej9704/re970404.htm>

U.S. Roads. “Study Compares Older and Younger Pedestrian Walking Speeds.” *Road Engineering Journal*. 1997. <http://www.usroads.com/journals/p/rej9710/re971001.htm>

Alternative Transportation

Not surprisingly, the vast majority of elderly trips are made via the private automobile. However, the percentage of automobile trips taken as the passenger — as opposed to the driver — increases dramatically among the elderly, particularly those in the age 75 and older group.

While transit trips constitute a very small percentage of trips made by the elderly, transit represents an important travel mode. This is particularly true for the transit-dependent, i.e., those who depend upon alternative transportation because they have no vehicle available for trip-making.

Alternative transportation can take many forms, including informal agreements with family and friends, taxis, paratransit or demand responsive systems, community based nonprofit and for-profit transportation programs and public mass transit.

Despite the presence of these various forms of alternative transportation, many common difficulties exist. Public transit services are often perceived as inconvenient, inaccessible or intimidating, particularly for those who have little or no prior experience with them. Community-based services may have restrictions in service area, operating hours or eligibility and are often not adequately coordinated to provide comprehensive services that meet the wide-ranging needs of the elderly. Ultimately, the most effective system of alternative transportation represents a coordinated effort between public, private and community-based services.

Issues and Needs

In order to provide effective and efficient service to the elderly, all aspects of alternative transportation must be examined including the following:

- Line-haul, fixed-route service — Defined as a service provided on a repetitive, fixed-schedule basis along a specified route with vehicles stopping to pick up and deliver passengers to specific locations, with each route serving the same origins and destinations.
- Paratransit, demand responsive service — Defined as a transportation system characterized by flexible routing and scheduling of relatively small vehicles, including taxi cabs, to provide door-to-door, curb-to-curb or point-to-point transportation at the user's demand.
- Private, volunteer resources — Defined as a transportation system utilizing a variety of vehicles, including private automobiles, operated by private resources or volunteer drivers.

In addition, these services must be effectively coordinated, maximizing both service and quality.

Line-haul, fixed-route service

Perhaps the most commonly identified form of public transportation — the line-haul, fixed-route service — provides reliable and relatively inexpensive service for the elderly. However, there are well-identified barriers to using this form of transit including inaccessibility of pick-up/drop-off points, particularly for those with physical impairments; inflexibility of services along a pre-determined route and time schedule and personal safety concerns while traveling to and from the bus stop, waiting at the bus stop and in-transit. The following suggestions address those barriers:

- Identify high-priority corridors/routes in areas of high-density elderly populations or with a concentration of elderly attractions or amenities (such as senior centers, grocery stores, pharmacies and dental/medical services) and evaluate the need for service alternatives as necessary.
- Where warranted, increase service frequency along identified high-priority corridors/routes, particularly during off-peak periods (late morning to early afternoon) when the majority of elderly trips are made.

- Where feasible and warranted, implement selective route and/or schedule deviation along high-priority corridors/routes to provide more direct service to elderly attractions and amenities such as residential areas, senior centers, health care facilities and shopping centers.
- Examine service amenities along high-priority corridors/routes that service high concentrations of elderly passengers. If necessary, make improvements to increase safety, accessibility and comfort.
 - “ Utilize low-floor vehicles to aid those who have difficulty walking and navigating stairs.
 - “ Provide adequate shelter and/or benches at bus stops to accommodate passengers with physical limitations.
 - “ Install street lighting and telephones at bus stops to increase safety.
 - “ Utilize information technologies to provide current and accurate information regarding service either through a central dispatch center or information kiosks at bus stops, e.g., service areas, route schedules and real-time operating updates.
 - “ Examine the location of transit stops to ensure accessibility and convenience for elderly passengers. For example, transit stops must be accessible via safe, continuous pedestrian paths that connect to high-use origins and destinations. Vehicle storage areas (where taxi cabs and cars can pull in to wait and drop off/pick up passengers) must also be strategically placed near transit stops to facilitate mode transfers.
 - “ Where warranted, utilize selective in-vehicle security measures along high-priority corridors/routes such as security guards and/or surveillance equipment.
- Provide transit training to current and potential elderly passengers. Perhaps one of the most difficult personal barriers to utilizing public transportation is fear. Many elderly citizens using public transportation are doing so for the very first time and even those who used public transportation previously may no longer be familiar or comfortable with available systems and routes. Many transportation agencies, both public and private, provide transit training services to assist the elderly in confidently using public transportation to access a wide variety of community services and resources.

Paratransit or demand responsive services

Many communities offer demand responsive services, either in lieu of or in conjunction with fixed-route, line-haul services. There are also many community-based for-profit and non-profit organizations providing demand responsive services either to the general public or for a specified clientele, e.g., those attending senior center activities, medical patients or residents of senior living facilities. The benefits of demand responsive services include, among other things, increased privacy and security through the use of smaller vehicles and increased convenience and flexibility through curb-to-curb or door-to-door service.

However, there can be high levels of variability in services, costs and availability between demand responsive services which may result in service gaps. Restrictions on cross-jurisdictional service can also limit flexibility and accessibility. Active coordination between providers of demand responsive services, including public transit authorities, public/governmental agencies and private non-profit and for-profit organizations, will provide seamless and reliable services that meet the varying needs of the community.

Private/volunteer resources

An additional option for meeting the transportation needs of the elderly is through private volunteer-based services. These services can include informal ride-sharing arrangements among family and friends and may involve a younger, more mobile elderly person providing rides to the less mobile elderly who may no longer have access to a private automobile. More formal volunteer programs can also be used to provide demand responsive rides to the elderly using private automobiles.

Rural transportation

Meeting the needs of transit-dependent individuals is one of the most significant challenges faced by alternative transportation providers. For most transit-dependent individuals, the option of using fixed-route transportation is unrealistic or impossible; many transit-dependent people require special support services without which their access to needed services is reduced. Programs and services designed to provide specialized services are offered by many types of organizations including public transit, human service organizations, faith-based organizations and volunteer groups, as well as hospitals and medical centers. However, these services work best in densely populated areas and often fail to address the needs of sparsely populated regions, especially rural areas located beyond the influence of major metropolitan centers.

In rural areas, unlike urban and suburban areas, the problems facing the transportation community are more critical. Currently, according to U.S. Census reports, there are a disproportionate number of transit-dependent persons living in rural communities. Specifically, over one third (36 percent) of the rural population is transportation-dependent compared to only 30 percent of the urban/suburban population. Further, the Federal Transit Administration (FTA) reports a 20 year trend of reduced transit service in rural areas during which bus service declined 53 percent and ridership dropped 80 percent. Consequently, 40 percent of rural communities have no public transit.

The spatial relationship between residences, medical facilities, retail, entertainment and family is also greater and presents an additional challenge. FTA estimates rural residents drive 33 percent more than their urban counterparts to complete everyday personal and family business. Adding to the complexity of rural service provision are factors such as low population density, lower average educational and income levels, concentrated elderly populations, weaker tax bases, greater proportion of residents receiving pensions and transfer payments and higher rates of unemployment. The confluence of these socio-economic factors and spatial dispersion makes developing services in rural areas difficult and relatively expensive.

Strategies for successful rural programs

Two problems — funding and spatial dispersion — continue to plague rural areas as they either maintain existing, or establish new, transportation services. Rural areas, in general, have smaller tax bases from which to raise public funds. Low density populations and scattered services require less centralized services. It is imperative, therefore, to develop solutions that seek to find additional revenues, reduce operating costs and maximize service.

Funding

Federal formulas that allocate funds to communities for local transit programs consider only two factors — population and population density — ignoring other factors such as the percent of persons who are elderly, disabled, living below the poverty level, unemployed, living in group homes, working in sheltered workshops and have no car available. All these factors contribute to the community's transit needs. Until the formula is modified, rural communities, where a disproportionate number of transit-dependent persons reside, will receive inadequate federal funds.

Another possible funding solution involves collaboration with hospitals, medical centers, shopping centers and human service agencies. These entities have a significant incentive to provide services and products to the elderly and others in need; without clients, they would potentially be unable to meet their performance goals. Communities should work with these entities to form community-based consortia to help fund the new or existing systems.

Operational efficiency

Making transit more efficient while providing the highest level of service to patrons is a challenge that can be met by using new technologies. Many communities are looking to a variety of technological solutions to make systems operate more efficiently. Specifically, some transit services are using GIS (geographic information systems) to locate vehicles, user locations and destinations. Using GIS, the transit provider can plan the best route and possibly include more than one rider on a trip. Other transit providers use automatic vehicle locators (AVL). AVL technologies allow the dispatcher to track and contact each vehicle, thereby facilitating more efficient service, transfers, etc. Another communication device — Intelligent Traveler — lets the driver know of real-time detours, traffic congestion and other road problems, thus reducing travel time.

Transit systems also make their programs more efficient by using a variety of transportation options such as door-to-door service, volunteer drivers, car pooling, taxi vouchers, car ownership programs and line-haul route deviation service. Designed to meet the unique need of the rider, these options fit the person and the situation to provide the most inexpensive and efficient service available.

Coordination and collaboration

One of the most obvious barriers to providing transportation services that adequately meet the wide-ranging needs of the elderly is lack of coordination and collaboration among transportation providers. Again, alternative transportation consists of many forms — from the more conventional fixed-route, line-haul services provided by public transit authorities to more flexible paratransit or demand responsive services provided by public transit authorities as well as community based for-profit and non-profit agencies to volunteer-based services. In some areas, particularly rural areas, a lack of service providers can be problematic. However, even in areas with ample providers, restrictions on service availability and accessibility can still leave some residents with no viable transportation alternatives.

Coordination and collaboration can take several forms. These forms include informal cooperation and information sharing, transportation coordination (i.e., resource sharing and interagency cooperative agreements) and consolidation of transportation services through centralization of transportation services. Methods of centralization include capital resources, operations, maintenance and funding into one system. The following suggestions promote coordination and collaboration:

- Encourage information sharing to develop an inventory of transportation resources available at the community-wide and region-wide level.
- Provide current and relevant information to transportation providers and social service agencies as well as to the elderly and their care givers through a centralized transportation information and referral service.
- Actively promote inter-agency collaboration at the regional level to generate additional support and funding for a variety of alternative transportation options.

Recommendations

In an effort to provide reliable, convenient and sufficient modes of alternative transportation, the following recommendations are offered, with the Michigan Department of Transportation as lead agency:

- Establish core/baseline alternative transportation service in every Michigan county where at least a minimum level of service is supported by public dollars and administered through public and/or private organizations.
- Seek additional and long-term funding for urban and rural baseline alternative transportation services.
- Develop and support centralized resource centers at the regional level to disseminate information and generate coordinated resources. (Refer to the Education & Awareness section for additional information on the statewide mature mobility resource center.)
- Seek to remove legislative and programmatic barriers to cross-jurisdictional service provision.

Model Programs and Key Resources

Ann Arbor Transit Authority (AATA) — AATA offers several transportation services to the elderly. Good as Gold provides subsidized, shared-ride taxi service to the elderly anywhere within the service area between 6:00 a.m. and 11:00 p.m. Monday through Friday and 6:00 a.m. to 6:30 p.m. Saturday and Sunday. Senior Ride provides group trips for the elderly in specified senior housing complexes to destinations such as grocery stores and local events. The elderly (age 65 and older) ride free on all fixed routes. Night Ride provides shared-ride taxi service for all passengers within the service area from 11:00 p.m. to 6:00 a.m. weekdays and 7:00 p.m. to 6:00 a.m. weekends.

Assisted Senior Transportation Volunteer Handbook, Wichita, KS — The Central Plains Area Agency on Aging trains volunteers performing three services for elderly passengers of the Wichita Metropolitan Transit Authority (WMTA). Greeters welcome elderly passengers at a transit hub located in the Boston Park Recreation Center and work with WMTA to coordinate and schedule fixed-route and paratransit services. Pilots provide transit training and accompany new users on the public bus system. Navigators escort elderly passengers who require regular assistance on public buses and specialized transportation vehicles.

County Coordination Committees — The Michigan Bureau of Urban and Public Transportation (UPTRAN) requires all public transit authorities to convene County Coordination Committees

including public and private transportation providers, regional transportation planning organizations, government officials and service agencies. The goal is to create a comprehensive, coordinated, cost-effective and non-duplicative transportation network that adequately meets the transportation needs of communities. All recipients of funding under the Specialized Services Operating Assistance Program are required to participate in a County Coordination Committee. Public transit authorities also convene Local Advisory Councils representing users of public transportation services. These councils assist the transit authority in monitoring the quality and responsiveness of transportation and making suggestions for increased service.

EZ Ride, Detroit, MI — *EZ Ride* is an innovative, community based van transportation system which uses a computer-based scheduling and dispatch system to provide coordinated transportation to the transit-dependent in the City of Detroit. *EZ Ride* also serves as a “feeder system,” linking to line-haul routes operated by the Detroit Department of Transportation (DDOT) and Suburban Mobility Authority for Regional Transportation (SMART). The Community Resource and Assistance Center serves as the *EZ Ride* “transportation coordinator,” managing the dispatch system and providing coordinated scheduling via a central call-in line. The main objective is to enhance community-based transportation by breaking through the eligibility requirements and restrictions that currently prevent inter-agency cooperation and resource sharing. The two-year pilot program utilizes five member agencies and 32 vehicles and is expected to provide 300,000 one-way trips.

Grand Rapids Area Transit Authority (GRATA) Travel Training Service — GRATA provides free, one-on-one or group transit training for the elderly to assist them in utilizing regular bus routes. The training includes information on routes, schedules and fares; personal safety, proper boarding and safe travel to and from the bus stop; and landmark identification. Training is provided until the trainee is comfortable traveling alone.

Greater Detroit Transit Geographic Information System (GIS) — A cooperative effort among SEMCOG, the Southeast Michigan Council of Governments, Detroit Department of Transportation, Suburban Mobility Authority for Regional Transit, Wayne State University Transit Center for Excellence and Michigan Department of Transportation, the Transit GIS project is designed to support an improved transit management system, enhance analytical capacity for transit and facilitate coordination between transit providers. Phase I resulted in regionwide base maps and GIS bus route coverages and GIS applications and tools. Phase II (in progress) includes local area transit and paratransit applications as well as regional network applications.

Independent Transportation Network (ITN), Portland, ME — ITN provides rides, via private automobiles, within a 15-mile radius of Portland to all persons age 65 and over. Services are provided 24 hours a day, seven days a week by volunteer drivers. Costs are based on the length of the trip. Trip vouchers can be purchased in advance, by family members for example, and can also be funded through the donation of a private automobile. Other funding

options include rides subsidized by participating merchants. ITN is currently developing a model program for centralized dispatch and billing services.

Sedgewick County, KS — Coordinated Transit District #12 operates an information brokerage model that coordinates among participating providers to maximize capacity and provide one-stop scheduling at a central coordinating center. Coordination efforts reduce duplicative services, maximize resources for vehicles and staff and increase service including extended operating hours. Innovative funding is received from Medicaid, Welfare-to-Work grants and private pay options.

SMART Transportation Resources Manual — The manual, prepared by the Area Agency on Aging 1-B with funding from the Michigan Department of Transportation, serves as a resource guide for community-based non-profit and for-profit transportation providers in the SMART (Suburban Mobility Authority for Regional Transportation) service area. Information is included on funding sources, transportation planning and SMART transportation activities.

Specialized Transportation Services Referral Manual — In 1989, SEMCOG, the Southeast Michigan Council of Governments, developed a Specialized Services Coordinated Plan in an effort to improve transportation services for the elderly. The plan included an inventory of existing services, an assessment of needs and recommendations for coordination. As a result of the plan, SEMCOG developed the *Specialized Transportation Services Referral Manual* in 1992 and updated it in 1996 and 1998. The manual includes transportation provider information describing service area, hours of operation, eligibility requirements, cost, etc. and is distributed to, and used by, many social/human service agencies.

Yates Dial-a-Ride, Idlewild, MI — In addition to its public transit system, Yates Dial-a-Ride has operated a successful volunteer driver program in Lake County for many years. Sixty percent of Lake County's population is elderly. Rides are provided by volunteers 24 hours a day, seven days a week. The program averages 15-20 drivers who provide an estimated 30 trips on a daily basis. In many instances, the costs of the trips are incurred by agencies referring the elderly who need transportation; however, transportation is provided to everyone for a reasonable fee. Many of the trips provided by volunteers are for medical trips outside the transit service area.

Ann Arbor Transportation Authority. <http://www.theride.org/>

Battle Creek Transit. "Rider's Guide Online". <http://www.battlecreektransit.com/teletransit.html>

Bay Area Metro Transit. "DART (Dial A Ride Transportation)." <http://www.baymetro.com/html/dart.htm>

Benjamin, Julian M. and Ryoichi Sakano. "An Equilibrium Model Based on a Micro-Foundation for Forecasting Dial-a-Ride Ridership." North Carolina A&T State University. 1999.

Cheng, Pei Pei, Rodger J. Koppa, R. Dale Hutchinson, et. al. *Design of Route Guidance Information for Elderly Bus Passengers: Research Study*. Southwest Region University Transportation Center, Texas Transportation Institute, The Texas A&M University System. 1992.

Grand Rapids Area Transit Authority. "Grata's Go!Bus Services." <http://www.iserv.net/~grata/offmain/gobus.htm>

Higgins, Laura L., Rodger J. Koppa, James K. Hennigan, et. al. *Route Guidance Information for Elderly Passengers: Route Naming Methods — A Research Study*. Southwest Region University Transportation Center, Texas Transportation Institute, The Texas A&M University System. 1993.

Knapp, Sue F., Fredric D. Fravel and Jon E. Burkhardt. *Specialized Services Coordinated Plan for Southeast Michigan*. Ecosometrics, Incorporated. 1990.

Mathias, Rosemary G. and Brent Stoffle. "Project Update: Institute on Aging Use of Neighborhood Electric Vehicles by Senior Citizens and Others as an Alternative to the Automobile." Center for Urban Transportation Research, University of South Florida. 1998.

McGuire, James and Barbara Spreitzer-Berent. *SMART Transportation Resources Manual*. Area Agency on Aging 1-B. 1998.

Metropolitan Affairs Coalition. "EZ Ride: Innovative Transportation for Detroit." 1999. http://www.semco.org/programservices/mac/mac_ride.html

Pushkarev, Boris S. and Jeffrey M. Zupan. *Public Transportation and Land Use Policy*. Indiana University Press. 1977.

SEMCOG, the Southeast Michigan Council of Governments. *2020 Regional Transportation Plan for Southeast Michigan Background Paper No. 6 Public Transportation Element*. March 1997.

SEMCOG, the Southeast Michigan Council of Governments. "Greater Detroit (Transit) GIS Project Phase II."

SEMCOG, the Southeast Michigan Council of Governments. *Specialized Transportation Services Referral Manual 1998*. 1998.

Storey, Kristin. "Homebound get a needed lift." *The Detroit News*. July 19, 1998.

U.S. Department of Transportation, National Highway Traffic Safety Administration. *Draft Safe Mobility for Older People Notebook*. 1999.

WalkBoston. *Improving Pedestrian Access to Transit: An Advocacy Handbook*. U.S. Department of Transportation, Federal Transit Administration. 1998.

Housing & Land Use

The State of Michigan has experienced significant growth in the elderly population during the 20th century and this trend is expected to continue. In 1930, the elderly (age 65 and older) represented only five percent of the total population; by 1990 that percentage grew to 12 percent and is expected to increase to 17 percent by 2020.

Aging Baby Boomers have significant impact on many aspects of society, including housing and land use development patterns. Contrary to popular belief, not all elderly people retire and move to warmer climates. A growing percentage of elderly persons continue to live in the communities and homes they located to when they were younger and have no intention of moving. This phenomenon is commonly referred to as “aging in place.”

As a result, demand for elderly housing, ranging from single family residences to condos, apartments, retirement centers and nursing homes, will increase as will the need for accessible community resources. Because everyone ages differently, a wide spectrum of housing and community resource options are needed. A community infrastructure designed to accommodate all forms of travel and lifestyle needs is also important.

Issues and Needs

While the majority of elderly continue to live in “family households” where one or more members are related to the head of household, the percentage decreases with age. Likewise, the percentage of elderly people living in “non-family households” increases across the elderly cohorts. Approximately 17 percent of elderly in the 60-64 age group live in “non-family households.” That percentage increases to 25 percent in the 65-74 age group and 40 percent in the age 75 and over group; the difference is due to the increased likelihood of living alone. Finally, while the percentage of elderly people living in nursing homes or group quarters is relatively small, the percentage increases dramatically with age, from one percent in the age 60-64 group to two percent in the age 65-74 group and 10 percent in the age 75 and over group. (Michigan Aging Services System, 1994.)

Clearly, there is a need for comprehensive housing and land use planning at the community level to provide a wide range of options for the elderly. As stated previously, many elderly prefer to age in place, remaining in their own home or at least their own community for as long as physically, psychologically and economically possible. Assistance with aging in place is accomplished through a number of means, from providing services to the elderly in their own homes to supporting alternative community-based housing options and promoting service accessibility through appropriate land use planning and zoning.

Housing

The elderly are not a homogeneous group and, therefore, require varying levels of housing, from independent home ownership to elderly community living and assisted living. Communities must provide for a comprehensive system of housing options to adequately meet those needs. The following represents the various housing types that may exist within a community.

Home ownership assistance

- Assistance programs enable elderly homeowners to remain in their own homes for as long as possible. Examples include:
 - “ Weatherization/home repair programs offering volunteer services or low-interest rate/deferred loans for purchasing such services.
 - “ Home-based assistance such as chore services, personal care supervision and meal programs.
 - “ Transportation programs to area senior centers, retail centers, health care facilities, etc.

- The Home and Community-Based Waiver Program allows elderly who are eligible for Medicaid-covered nursing home services to receive those services in their own home. Agencies administering waiver programs provide case management services arranging for eligible and appropriate in-care services.

Shared living

- Shared living arrangements assist the elderly by decreasing expenses and providing companionship and personal or household assistance. Shared housing can mean an elderly homeowner sharing his/her home with another or an elderly person sharing someone else's home. Examples of shared living include:
 - “ Accessory apartments — A complete, self-contained living unit created within an existing single-family home, usually with a separate entrance.
 - “ Shared housing — Two or more unrelated people sharing a dwelling unit with each person having a private sleeping space and sharing kitchen, living and dining areas. Shared housing takes two forms — private sharing of owner-occupied housing and the more traditional “group home” owned by a third (usually non-profit) party.
 - “ Elder Cottage Housing Opportunity (ECHO) — An alternative form of accessory apartments external to the primary residence. The most common ECHO is a mobile home placed on an occupied single-family lot.

Independent senior living

- A variety of senior communities and living arrangements catering to elderly residents provide an appropriate level of services while allowing the elderly to maintain independent living quarters. Examples of independent senior living include apartment complexes, condominium communities and mobile home parks. In some cases, congregate services such as meals, activities and transportation may also be provided.

Assisted senior living

- In some cases, the elderly require additional assistance not available through independent living situations. Examples of assisted living include:
 - “ Adult foster care — Provides room, board, 24-hour supervision and personal care assistance in a small group setting.

- “ Homes for the aged — Provides room, board, 24-hour supervision and personal care assistance in a larger group setting.
- “ Nursing homes — Provides professional, 24-hour medical and/or supportive services. Nursing homes provide skilled care, including licensed medical services for those requiring it and basic care, such as meals and personal care assistance.
- “ Continuing care retirement communities (CCRC) — Provides varying levels of housing and care, from independent living to assisted living and nursing home care all within a single location. Entry fees and monthly service fees guarantee that advanced levels of care are available as needed throughout the resident’s lifetime.
- “ Continuum of care residences — Provides varying levels of housing and care at a single location, similar to CCRCs. However, residents pay only monthly fees based on level of need and are not guaranteed availability of higher-level services.

Community services and accessibility

In order for elderly housing to be successful, it must be integrated into a system providing adequate services such as retail activity, social activities, social services and medical care. In order for services to be accessible, housing must be conveniently located near these services and connected via transit lines and pedestrian walkways. Following, are examples of issues and needs related to creating walkable environments. Refer to the section on Alternative Transportation for additional details on transit options.

Promote a safe, friendly and productive pedestrian environment

- Provide adequate, well-designed and continuous sidewalks and walkways, particularly in areas of high-density elderly population and travel. Provide curb cuts and curb ramps to facilitate safe travel for those with physical impairments.
- Provide properly placed and adequately marked crosswalks to channel pedestrian flows to safe crossing points and clearly mark the roadway for pedestrian use. Consider alternate pavement markings for crosswalks such as zebra, ladder and solid markings to increase visibility for approaching drivers. Restrict on-street parking within 50 feet of crosswalks to improve visibility for both pedestrians and approaching drivers.
- Provide appropriate and attractive street furniture such as benches, shelters and trash receptacles along high volume pedestrian corridors. Provide landscaping as appropriate for aesthetics and shelter, being careful not to create visual screens. Install street lighting along high volume pedestrian corridors and at all intersections to increase visibility and safety.

- Encourage clustering of amenities such as senior centers, grocery stores, drug stores, medical/dental offices and churches to facilitate productive pedestrian trip making. Provide safe and convenient pedestrian access from residential neighborhoods and elderly housing complexes to points of interest and transit links.

Zoning and development review

Many zoning ordinances do not make allowances for the unique characteristics of elderly housing options — varying parking allowances, density provisions, floor area requirements, occupancy regulations, safety features and ancillary facilities — making the provision of elderly housing difficult if not impossible. There is a clear need to examine and, where necessary, provide appropriate zoning provisions for elderly housing.

For example, zoning changes allowing for non-traditional housing options such as those mentioned here may be necessary. Zoning codes must also accommodate the location of amenities near housing such as retail establishments, senior centers and medical facilities within walking distance of elderly residential areas and on-site at appropriate independent and assisted living facilities.

Recommendations

In an effort to develop and maintain communities that accommodate all forms of travel and lifestyle needs, the following recommendations are offered, with the Michigan Department of Transportation as lead agency:

- Examine, develop and publish checklists of desirable characteristics for “elderly-friendly” housing developments addressing the following issues:
 - “ congregate housing,
 - “ aging in place and
 - “ accessible community, medical and retail development.
- Coordinate with and distribute the checklists to local planning, zoning, engineering and transit agencies.
- Coordinate with the Michigan Society of Planning Officials, Michigan Chapter of the Institute of Transportation Engineers and Michigan Chapter of the American Planning Association to educate transportation engineers and community planners on issues pertaining to elderly housing and land use, including walkable community concepts.

- Based upon the recommendations outlined in the checklists coordinate with the Michigan Municipal League, Michigan Association of Counties and Michigan Township Association to propose and lobby for necessary changes in legislation, zoning ordinances, development review processes, etc.

Model Programs and Key Resources

1995 Directory of Housing Resources for Older Adults — Area Agency on Aging 1-B developed a guideline of over 500 housing programs for the elderly to increase awareness of the programs that are currently available within their service area. Clearly, many such housing programs are available; the challenge is educating the elderly and their care givers about their options.

Eastside Senior Citizen Center & Kearsley Daly Villa, Flint, MI — The Eastside Senior Citizen Association developed an integrated housing and senior center. It is modeled after commercial independent living facilities; however, it operates as a self-sustaining, non-profit facility targeted toward low-to-moderate-income seniors. The Eastside Senior Citizen Association owns and operates both the senior center and attached 100-unit, HUD-subsidized housing facility. The center and housing are physically integrated so that residents can go from their apartments to the center without going outdoors. They are also operationally integrated — the rent collected on the apartments subsidizes the center operations. The center was designed with lots of recreation space, common areas for resident interaction, meeting space, media room and health screening/medical examination room.

Land Use Tools and Techniques: A Handbook for Local Communities — SEMCOG, the Southeast Michigan Council of Governments, developed this handbook to assist local governments with the identification and use of effective techniques for addressing local land use problems. Including local case examples, the handbook addresses growth on the urban fringe, enhancing older areas, maintaining open space, protecting agricultural and environmental resources and development review. An addendum expands the techniques to include unique issues related to manufactured housing. A similar format could be used to facilitate planning for elderly housing and service options.

Removing Regulatory Barriers to Housing Options for the Elderly — Cornell University/Cornell Cooperative Extension Housing Policy Program, with funding from the U.S. Administration on Aging, developed an education program geared toward municipal officials, planners, zoning officials and attorneys to define regulation of elderly housing options which could serve as an example for a locally-based program. (Pollack, 1992, pp. 17-19.)

Toward Walkable Communities in Southeast Michigan — In FY 1998, SEMCOG, the Southeast Michigan Council of Governments, AAA Michigan and the Traffic Safety Association of Michigan obtained funding from the Michigan Office of Highway Safety Planning to host a

two-day practitioner's workshop and several community "walkable audits." Additional audits will be conducted in FY 1999. Additional funding could be used to successfully implement walkable community strategies and designs at the local level.

Area Agency on Aging 1-B. *1995 Directory of Housing Resources for Older Adults*. 1995.

Armstrong, Melissa and Gail Oranchak. "Accessory Apartments, ECHO Housing, & Homesharing: Alternative Ways To Meet Emerging Housing Needs." *Planning & Zoning News*. July 1998. pp. 4-12.

Coughlin, Joseph F. and Roger W. Cobb. "Can You Get There from Here? Transportation Challenges for Aging in Place." *Aging in the Home and Community* (Issue 1). 1998.

Darga, Kenneth and Ching-Li Wang. *The Aging in Michigan: A Population Profile of the Elderly*. State of Michigan, Office of Services to the Aging. 1994. <http://www.mdch.state.mi.us/mass/DAIM/daimcvr.html>

Ficke, Robert C. and Susan G. Berkowitz. *Evaluation of the HOPE for Elderly Independence Demonstration: Final Report*. Office of Policy Development and Research, U.S. Department of Housing and Urban Development. 1999. <http://www.huduser.org/publications/suppsvcs/hopeval.html>

Knack, Ruth Eckdish. "Gray Is Good." *Planning*. August 1996. pp. 20-24.

Michigan Planner. "Planning Basics: Senior Housing." February 1999. pp. 3.

Northeast Michigan Community Services Agency/Area Agency on Aging. "Home and Community Based Waiver for the Elderly and Disabled." 1999. <http://www.nemcsa.org/>

O, Åhlund and Ståhl A. "Housing and transportation for the elderly in sparsely populated areas in Sweden: A holistic approach." University of Lund, Sweden.

Pollak, Patricia Baron. "Friendly Persuasion." *Planning*. October 1992. pp. 17-19.

Pollak, Patricia Baron and Alice Nudelman Gorman. *Community-Based Housing for the Elderly*. American Planning Association. Planning Advisory Service Report Number 420. 1989.

Pyen, Chong W. "Demographics shift affects services." *Ann Arbor News*. November 9, 1998.

SEMCOG, the Southeast Michigan Council of Governments. *Background Paper #1 — Population, Travel Pattern and Crash Characteristic Analysis, State of Michigan*. 1996. (Cross reference Miscellaneous, Traffic Engineering, Licensing & Assessment)

SEMCOG, the Southeast Michigan Council of Governments. *Land Use Tools and Techniques: A Handbook for Local Communities*. 1994.

SEMCOG, the Southeast Michigan Council of Governments. *The Past and Future Growth of Southeast Michigan: Population, Households, Jobs and Land Use, 1965 to 2025*. 1998.

Senior Resource. "Housing Choices." <http://www.seniorresource.com/>

Walkable Communities, Inc. and SEMCOG, the Southeast Michigan Council of Governments. *Walkable Communities: Designing for Pedestrians*. 1998.

WalkBoston. *Improving Pedestrian Access to Transit: An Advocacy Handbook*. U.S. Department of Transportation, Federal Transit Administration. 1998.

Health & Medicine

The medical profession plays an important role in the mobility and safety of the elderly. Clearly, there is a relationship between health and driving ability. Decreases in health and cognitive function (often associated with advancing age) have negative impacts on driving ability and, therefore, mobility. However, mobility can also impact health. Driving cessation and the associated decrease in overall mobility, particularly for those who have no access to alternative forms of transportation, can negatively impact health which can, in turn, exacerbate the decline in mobility for the elderly.

Clearly, there is a need to more fully understand both the impacts of mobility on health — medical, emotional and psychological — and the impact of health on mobility. The process of identification, evaluation and intervention of drivers with dementia, or other aging related functional limitations, needs to be improved. Intervention should include the provision of alternative modes of transportation who can no longer drive. There is also a need to create a comprehensive approach to providing health care access for all elderly citizens in order for safe mobility to be adequately maintained. Finally, there is a need to increase education and awareness for the medical profession, the elderly and society in general of the relationships between age, health and mobility.

Issues and Needs

A comprehensive approach to health issues requires an enhanced system of identifying, evaluating and supporting drivers with functional, physical or mental impairments. Also required is a coordinated system providing access to health care and a positive attitude toward quality of life issues.

Identification, evaluation and support

In 1997, Michigan State Medical Society (MSMS) Commission on Aging convened a one-day conference on driving and dementia. The result of the conference is a set of specific recommendations for identifying and evaluating drivers with dementia; enhancing relationships between physicians and Michigan Department of State officials; and reinforcing the provision of community support systems for those who can no longer drive.

While the MSMS recommendations deal specifically with dementia, they can be adapted to meet the needs of drivers with all forms of impairments; therefore, it is suggested these recommendations be used as guiding factors in addressing all driving impairments.

Identifying impaired drivers

Perhaps the most significant barriers to providing adequate health care to drivers are inadequate training in identification and diagnosis of impairments and understanding the impact of impairments on driving ability. Therefore, the following is recommended:

- Train physicians and health care workers to identify driving impairments in their patients and evaluate the impact of those impairments on driving ability.

Community support systems

Identification of a driving impairment can have significant impacts. Understanding and addressing those impacts is crucial to maintaining mobility.

- Develop and disseminate a physician's evaluation guideline to assess the impact of impairments on driving.
- Coordinate legislative changes necessary to allow for physician reporting of impaired drivers without violating doctor-patient confidentiality. This requires passage of a physician immunity law.
- Develop educational materials regarding driving impairments for the elderly and their families and care givers.
- Increase education of the public and encourage "mobility planning" for preparing in advance for the advent of non-driving status.

- Develop centralized access to transportation resources and information. Refer to the Education & Awareness section for additional information on the statewide mature mobility resource center.

Access to health care

Again, there is a relationship not only between health and mobility but an equally important relationship between mobility and access to health care. In fact, it is recognized that lack of mobility can have serious impacts on medical, emotional and psychological health. If alternative forms of transportation are not accessible to the non-driving elderly, the resulting lack of connectedness with the community can lead to loneliness, depression and eventually serious isolation and illness.

The provision of alternative transportation options is addressed in the section on Alternative Transportation. However, because access to medical treatment is so important, it is addressed here as well. Since there is a clear need to provide a systematic approach to accessible health care for all elderly citizens, the following recommendations are offered:

- Encourage medical house-calls for home-bound elderly and other forms of in-home assistance.
- Develop a coordinated and centralized system of alternative transportation that meets a variety of elderly needs including transport to and from medical appointments and pharmacies. Provide transit training, encouraging the elderly to utilize existing transportation services, where available. (Refer to the section on Alternative Transportation for further details.)
- Coordinate with local senior centers, Area Agencies on Aging and other social service organizations in rural areas and other areas under-served in terms of medical and transportation services to develop alternatives such as mobile medical clinics.
- Provide specialized services funding to hospitals and medical centers for provision of transportation to elderly patients. Allow for flexible routes to accommodate drug store stops and alternative destinations.

Maximizing quality of life

Again, recognizing the intricate relationship between health and mobility and vice versa, it is necessary to develop a positive and systematic approach to the aging process. Aging should be looked upon as a positive, not a negative. Aging is a natural process and can be managed in a productive manner, enhancing the positive impacts and decreasing the negative ones. Unfortunately, the lack of information and prevalence of misconceptions and fears can make this difficult.

- Coordinate with the Michigan State Medical Society and local medical schools and institutes of gerontology, the Michigan Office of Services to the Aging, local Area Agencies on Aging and other social service agencies to develop and disseminate educational materials and programs addressing the aging process, the impacts of aging and the steps that can be taken (diet, exercise, etc.) to prolong safe mobility.

Recommendations

In order to keep people driving longer without compromising safety, the following recommendations are offered, with the Michigan Department of State, Office of Highway Safety Planning and Michigan State Medical Society as lead agencies:

- Further develop guidelines for physicians and other health care providers for identifying and evaluating driving impairments.
- Develop and disseminate referral guidelines to assist health care providers in meeting the mobility needs of their patients.
- Develop educational materials for the elderly and their families and care givers as well as professionals (e.g., traffic engineers and alternative transportation providers) to assist in understanding the implications of aging on mobility.
- Initiate physician immunity legislation.

Model Programs and Key Resources

Lawhorne, Larry, MD and Christopher Colenda, MD. *Driving and Dementia: Report on the November 24, 1997 Conference Sponsored by the Committee on Aging of the Michigan State Medical Society*. Michigan State Medical Society. 1998.

Mobile Doctors. "Medical Doctors Who Make House Calls." (Pamphlet)

U.S. Department of Transportation, National Highway Traffic Safety Administration. *Draft Safe Mobility for Older People Notebook*. 1999. (Cross reference Alternative Transportation, Licensing & Testing, Education & Awareness)

U.S. Department of Transportation, Office of the Assistant Secretary for Transportation Policy. *Improving Transportation for a Maturing Society*. 1997. (Cross reference Education & Awareness)

Licensing

The automobile remains the primary mode of transportation for the elderly. Over 78 percent of households headed by a person age 65 and older own at least one automobile. Over 90 percent of trips are made via the private automobile although the percentage of auto trips taken as the passenger does increase within the elderly age groups.

In 1996, there were 6.7 million licensed drivers in the State of Michigan, 953,534 (or 14.2 percent) of whom were age 65 and older. From 1987 to 1996, the number of licensed drivers in the State of Michigan increased by 5.4 percent. For the same time period, the number of elderly licensed drivers increased 22.4 percent. Of the elderly licensed drivers, the most significant change was a 51.8 percent increase among drivers age 75 and older. While the total number of elderly licensed drivers may be small, the increasing proportion of elderly in the driver mix must continue to be addressed.

The large increase in the number of elderly licensed drivers highlights this population's dependence on the automobile. Because this trend is expected to continue, there is clearly a need to evaluate, and possibly enhance, licensing and assessment procedures. The ultimate goal is to keep the elderly driving as safely as possible, for as long as possible.

Issues and Needs

Driving ability is based on a number of factors including visual, cognitive and physical functioning. Although there is no established age at which these functions begin to decline or reach a point precluding safe driving, the aging process plays a significant role in declining function. The likelihood of diminished visual, cognitive and/or physical function does increase with age.

Assessment

Based on this understanding and lack of any other basis for predictive testing of increased crash risk, age-based testing is often concluded to be the best available course of action by state regulatory agencies charged with evaluating and restricting unsafe drivers. Some states currently implement age-based licensing and renewal requirements. For example, New Hampshire requires knowledge and road tests, in addition to standard vision testing, starting at age 75; New Mexico decreases the renewal period from four years to one starting at age 75; California disallows mail-in renewal starting at age 70; District of Columbia requires a physician certificate and reaction test starting at age 70; and Illinois decreases the renewal period from four years to two starting at age 81 and one year starting at age 87. (U.S. Department of Transportation, Office of the Assistant Secretary for Transportation Policy, 1997, pp. 12-13.) No states automatically restrict licensing based on chronological age.

Lack of solid research evidence

Despite the longevity of some of these programs, there is very little evidence available that age-based licensing and renewal requirements actually decrease elderly crash rates. Few states with age-based licensing requirements conducted research prior to implementing changes in licensing and renewal processes for the elderly; likewise, few have conducted any comparative studies of crash rates since implementation. (Anderson, Abdalla, Goldberg, et al, 1999, pp. iii.) In 1995, the State of Illinois conducted a study of the renewal changes implemented in 1989. The renewal period was decreased from four to two years starting at age 81 and one year starting at age 87 and the mandatory road test was eliminated for the age 69-74 group. Results indicated the elimination of the road test had no negative impact on crash rates and the decreased renewal period had no positive impact. (Rock, 1996, pp. 69.) Furthermore, comparison of existing results is difficult due to lack of consistent means for measuring effectiveness. Clearly, it is difficult to identify benefits of current age-based licensing and renewal requirements.

State of Michigan license renewal

Current Michigan Department of State licensing regulations stipulate license renewal every four years. Drivers with no traffic convictions or civil infractions in the previous four years may renew by mail, theoretically increasing the time between in-person renewal to eight years. In-person renewals require a vision test and knowledge test. License holders may be re-examined based on information regarding mental or physical conditions, crash involvement, driver license points or other violations of licensing requirements. Re-examination can include vision, knowledge and road testing and/or a physician's statement.

Recognizing the need for enhanced testing procedures for all drivers, not just the elderly, the Michigan Department of State routinely reviews current research and pilot programs in an effort to identify potential options for improvement. Ultimately, the most effective licensing procedure utilizes effective screening tools that adequately assess one's visual, mental, perceptual and cognitive functioning as it relates to safe driving. These tools must accurately identify the presence of conditions precluding safe driving and requiring corrective action (e.g., license restriction, suspension or revocation). Finally, these tools must be effectively administered in a branch office environment.

Recommendations

Recognizing limitations of available screening and assessment tools for drivers, the following recommendations are offered, with the Michigan Department of State and Office of Highway Safety Planning as lead agencies:

- Support efforts to develop effective screening tools including:
 - “ Continued review of studies and pilot programs in other states.
 - “ Funding for continued university-based research in developing cognitive function tests that adequately predict crash risk.
 - “ Coordination with the National Highway Traffic Safety Administration to develop a more consistent means for measuring effectiveness of screening tools.
 - “ Coordination among all applicable state agencies to develop a consistent approach to data collection pertaining to the maturing population, stipulating that data be maintained by one-year cohorts starting at age 55.
- Develop and disseminate educational materials to assist the legal community (law enforcement officers, attorneys, judges) in identifying driving impairments and referring impaired individuals to the proper resources.

- Improve linkages between Secretary of State branch offices and local community resources and support a centralized resource for information and referral. (Refer to the Education & Awareness section for additional information on the statewide mature mobility resource center.)
- Develop educational materials, with Secretary of State coordinating with other agencies, identifying elderly service options for distribution at branch offices.

Model Programs and Key Resources

Safe Mobility for Older People — National Highway Traffic Safety Administration has developed a model program to regulate and counsel high-risk older drivers as described in *Draft Safe Mobility for Older People Notebook*. The model program promotes regulatory evaluation integrated with community-based assessment and competency testing, driver education and awareness and case management activities. Pilot studies currently being conducted in the State of Maryland will be used to evaluate components of this model.

Michigan Traffic Safety Management System (MTSMS) — MTSMS is a coordinated public/private effort comprised of individual action teams. The mission of the Driver Education & Training Action Team includes developing recommendations for improving driver education, training and licensing in the State of Michigan. This Action Team could be an influential force in improving safety for elderly drivers.

Tips You Can Give to a Mature Driver — State of California, Department of Motor Vehicles (DMV) developed this booklet for family members and friends of elderly drivers. It provides tips for assessing driving ability, maintaining safe driving and transitioning to non-driving status. The booklet also explains the DMV's role in licensing issues.

Useful Field of View — The University of Alabama at Birmingham continues to research crash-predictive tests, such as the Useful Field of View (UFOV). The UFOV test was developed to assess cognitive function and predict crash risk. The test measures the ability of drivers to process information and the test score is correlated with crash risk. A rehabilitative component has also been developed to restore cognitive function losses.

Anderson, Ph.D., David, Amr Abdalla, LL.B, M.A., Claudia N. Goldberg, M.S., et al. *Study of Driver's License Options for Applicants Age 70 or Older in Virginia*. 1999.

Michigan Department of State. *What Every Driver Must Know*. 1999.

Rock, Steven M. "Impact from Changes in Illinois Drivers License Renewal Requirements for Older Drivers." 1996.

SEMCOG, the Southeast Michigan Council of Governments. *Background Paper #1 — Population, Travel Pattern and Crash Characteristics Analysis, State of Michigan*. 1999.

State of California Department of Motor Vehicles. "Tips You Can Give to a Mature Driver."

U.S. Department of Transportation, National Highway Traffic Safety Administration. *Draft Safe Mobility for Older People Notebook*. 1999.

U.S. Department of Transportation, Office of the Assistant Secretary for Transportation Policy. *Improving Transportation for a Maturing Society*. 1997.

Education & Awareness

Perhaps the most important component of elderly mobility and safety involves education and awareness. There is an overall need to educate those involved, either directly or indirectly, with the broad range of issues impacting elderly mobility and safety.

The elderly need to be aware of the implications of aging on their abilities to remain mobile and the resources available to prolong safe mobility. Education can help the elderly drive for as long, and as safely, as possible. It can also help the elderly recognize the need to restrict or cease driving, transition into non-driving and adapt to alternative forms of mobility.

There is also a clear need for educating lay care givers of the elderly such as family members, neighbors and friends. It is often difficult for family members or friends to identify deficiencies in safe driving skills and is even more difficult to intervene when such deficiencies exist. Care givers must be aware of the impacts of aging on mobility as well as resources available to assist the elderly in transitioning, when necessary, from driving to other forms of mobility.

Finally, professionals must be aware of elderly mobility and safety issues as they carry out duties that, either directly or indirectly, affect the elderly. For example, physicians and social service providers must be aware of how to deal with elderly mobility issues as they serve their clientele. Likewise, traffic and automotive engineers and community developers and planners must be aware of the impact transportation systems, vehicle design and community planning have on the elderly.

Issues and Needs

The effective enhancement of elderly mobility and safety requires education of the elderly, their families and care givers as well as those professionals who impact elderly mobility.

Educating the elderly

Mobility is a vital component of elderly independence. Mobility restrictions can impact all aspects of daily living from obtaining necessities to maintaining personal and community relationships and accessing medical and social services. Mobility decisions are, therefore, extremely important and should be based on knowledge of one's own limitations and assets and supported by an awareness of the alternative methods of transportation available within the community. The following components are essential to the full spectrum of elderly mobility services.

- Implement and promote programs providing the elderly with education, support counseling and referral services necessary to manage their own mobility options.
- Implement and promote programs providing driver assessment, rehabilitation and improvement opportunities enabling the elderly to continue driving for as long as safely possible.
- Implement and promote programs providing alternative transportation and training resources for those elderly who cannot or choose not to continue driving.
- Develop and implement a coordinated approach to implementing these components, facilitating awareness and identifying financial support to sustain and expand successful programs.

Educating the family unit and care givers

In 1997, the American Association of Motor Vehicle Administrators (AAMVA) compiled a catalog of public information materials concerning elderly mobility issues. It was found that relatively few resources are available for elderly care givers, family members and friends. Clearly, there is a need to rectify this resource gap. Family members and friends are often intimately involved in the mobility decisions of the elderly and, therefore, need to have access to information to assist them in recognizing when an elderly person should no longer drive. This can be done by accessing resources for alternative transportation and utilizing other community resources and services.

Educating professionals

Professionals dealing with the elderly and their families play an important role in preserving mobility and enhancing safety. It is necessary, therefore, that they be supported through education and awareness of their professional role in the goal of elderly mobility and safety.

- Develop a series of informational materials, videos and educational programs on the role of professionals in enhancing elderly mobility and safety. The materials should be geared toward the following professional groups:
 - “ Engineers and community planners — Coordinated through the Michigan Society of Planning Officials, Michigan Chapter of the Institute of Transportation Engineers (ITE), and Michigan Chapter of the American Planning Association, addressing issues related to transportation engineering, pedestrian safety and housing and land use.
 - “ Physicians — Coordinated through the Michigan State Medical Society, addressing the role of the medical profession in elderly mobility and safety and implementing practical guidelines for physician evaluation, treatment and referral.
 - “ Law enforcement — Coordinated with the Michigan Office of Highway Safety Planning and Michigan Department of State, addressing law enforcement officials and judges who interact with elderly drivers and pedestrians.
 - “ Transportation providers — Coordinated with the Federal Transit Administration, Michigan Department of Transportation’s Bureau of Urban and Public Transportation and the Office of Services to the Aging, addressing transportation providers, both public and private/non-profit.

Recommendations

In an effort to meet the varying needs of the elderly, their families and care givers and those who serve the elderly population, the following recommendations are offered, with the Michigan Department of State, Office of Services to the Aging and Office of Highway Safety Planning as lead agencies:

- C Establish a statewide mature mobility resource center offering the elderly, their families and care givers services including:
 - “ Skill evaluation, rehabilitation and improvement.
 - “ Education, support, counseling and referral.
 - “ Alternative transportation resources and training.

- C Educate the various professional groups dealing with the issues of elderly mobility and safety by distributing this *Plan of Action*.
- C Educate the general public about the importance of lifelong mobility planning and techniques/resources needed to accomplish this, much as one would plan financially for retirement.
- C Host periodic statewide mature mobility summits to increase awareness of the current issues and solutions.

Model Programs and Key Resources

55 ALIVE/Mature Driving Program — Developed by the American Association of Retired Persons (AARP), this eight-hour class is designed as a refresher course for elderly drivers and addresses such issues as general driving skills, understanding the impact of aging on driving skills such as declining vision and cognitive functioning and tips for increasing driving safety. Also included is a discussion of self-assessment and how to make the decision to stop driving.

DriveWise, Boston, MA — Beth Israel Deaconess Medical Center provides a comprehensive rehabilitation program including assessment, rehabilitation and training as well as a coordinated service referral system to assist participants in obtaining resources necessary for safe driving or transitioning to non-driving status. Unlike many other rehabilitation programs, however, DriveWise is covered almost entirely by traditional insurance programs such as Medicare and Medicaid.

A Guide for Families and Friends Concerned About an Older Driver — AAA Foundation for Traffic Safety developed this guide for family members and friends assisting the elderly in maintaining safe mobility.

Independence for Life — Independence for Life (IFL) purchases and provides vans and small paratransit buses to non-profit organizations serving the elderly. The receiving organizations pay a nominal annual fee and coordinate with IFL to maintain safety, reliability and accessibility for the elderly in their communities. IFL has also developed *Places to Go, People to See: A Guide to Transportation Resources in Southeast Michigan*.

Mature Driver Retraining Workshops for Southeast Michigan — Developed by the Traffic Improvement Association of Oakland County, this eight-hour workshop is designed to help elderly drivers continue to drive as safely as possible for as long as possible through self-assessment by their peers (usually retired law enforcement officers serving as AAA- certified driving instructors). Topics covered in the two-day workshop (two four-hour sessions on consecutive days) include the effects of aging on driving ability, medications and driving, current traffic laws and vehicle technology and self-evaluations for brake reaction time,

peripheral vision, depth perception, visual acuity and glare recovery. Also included is a Useful Field of View (UFOV) test . There is an optional on-road driving test in the participant's own vehicle. While the evaluation results are strictly confidential, the driving instructor provides useful advice to the driver on improving driving skills.

Southeast Michigan Mature Mobility Resource Consortium — The Traffic Improvement Association of Oakland County, Independence for Life and Area Agency on Aging 1-B developed a pilot program proposal to deliver services in the areas of 1) driver evaluation, rehabilitation and improvement, 2) education, support, counseling and referral and 3) alternative transportation and training. The three-phased program includes 1) coordination among existing programs and initiation of a central source for information and referral (an 800-number telephone resource), 2) expansion and continuation of mobility services and 3) development of a full-service, “one-stop-shopping” mobility resource center.

Supporting the Mature Driver: Guidance for Friends, Family Members and Advisors — AgeQuest has developed a publication and workshop to support family members and friends in assisting the elderly with mobility decisions.

Tips You Can Give to a Mature Driver — State of California, Department of Motor Vehicles (DMV) developed this booklet for family members and friends of elderly drivers. It provides tips for assessing driving ability, maintaining safe driving and transitioning to non-driving status. The booklet also explains the DMV's role in licensing issues.

You Decide: Senior Driving Awareness Program — Area Agency on Aging 1-B developed this pilot program to provide the elderly with information, assistance and support necessary to manage their own mobility including continuation of unrestricted driving, self-regulation of driving and the transition, if necessary, to non-driving status. Monthly meetings consist of a one-hour information session on topics such as driver retraining opportunities, public transportation (including transit training sessions), effects of medication on driving and licensing/enforcement and a one-hour peer counseling session. One-on-one assistance is also provided to all interested individuals, whether or not they attend the monthly meetings. The agency has also developed a resource manual for other communities interested in developing similar programs.

American Association of Motor Vehicle Administrators. “Older Driver Information: A Supplement to AAMVA's *Communications Resource Guide*.” 1997.

American Association of Retired Persons. “55 ALIVE Mature Driving Program.” <http://www.aarp.org/55alive/about.html>

Area Agency on Aging 1-B. “You Decide: Senior Driving Awareness Program.” (Pamphlet)

Area Agency on Aging 1-B. *You Decide: Older Drivers Program Evaluation Report*. 1998.

Beth Israel Deaconess Medical Center. "DriveWise: A Driving Fitness Evaluation Program." <http://www.bih.harvard.edu/behavneuro/OtherServ.html>

Eby, David W., Deborah A. Trombley, Lisa J. Molnar, et. al. *The Assessment of Older Drivers' Capabilities: A Review of the Literature*. The University of Michigan Transportation Institute. 1998.

Malfetti, James L. and Darlene J. Winter. "A Guide for Families or Friends Concerned About an Older Driver." AAA Foundation for Traffic Safety. 1991.

Michigan Aging Services System. Michigan Office of Services to the Aging. <http://www.mdch.state.mi.us/mass.html>.

Spreitzer-Berent, Barbara. *Supporting the Mature Driver: Guidance for Friends, Family Member, and Advisors*. AgeQuest. 1999.

The Senior Alliance/Area Agency on Aging 1-C. *Senior's Guide to Western and Southern Wayne County — 1999 Edition*. 1999.

St. John Rehabilitation Services. "Drive to Independence Program." St. John Health System. (Pamphlet)

St. Joseph Mercy Oakland. "Drivers Rehabilitation Program." (Pamphlet)

Shope, Jean T. and David W. Eby. *Improvement of Older Driver Safety Through Self-Evaluation: Focus Group Results*. The University of Michigan Transportation Research Institute. 1998.

State of California Department of Motor Vehicles. "Tips You Can Give to a Mature Driver." <http://www.dmv.ca.gov/pubs/matured/dl663toc.htm>

Stuart Packard and Associates. *Evaluation of the 1998 Mature Driver Retraining Workshop Program*. Traffic Improvement Association of Oakland County. 1998.

U.S. Department of Transportation, National Highway Traffic Safety Administration. *Draft Safe Mobility for Older People Notebook*. 1999.

U.S. Department of Transportation, National Highway Traffic Safety Administration. *Model Driver Screening and Evaluation Program*.

U.S. Department of Transportation, Office of the Assistant Secretary for Transportation Policy. *Improving Transportation for an Aging Society*. 1997.

U.S. Department of Transportation, National Highway Traffic Safety Administration, Federal Highway Administration. "Walking Through the Years...Pedestrian safety for the older (65+) adult."

William Beaumont Hospital. "REHAB: Driver Rehabilitation Program." (Pamphlet)

Conclusion

Recognizing the need to plan now for expected changes in Michigan's population, the Michigan State Safety Commission asked SEMCOG, the Southeast Michigan Council of Governments, to conduct an elderly mobility and safety assessment and develop a statewide plan of action designed to guide state policy. In February 1998, SEMCOG, with funding from the Michigan Office of Highway Safety Planning, convened a statewide, interdisciplinary Elderly Mobility & Safety Task Force.

In the course of studying the underlying issues, the Task Force came to realize mobility and safety issues affect our entire society, not just the elderly. By striving to meet the needs of the elderly, therefore, we improve quality of life for everyone. In keeping with that philosophy, the Task Force developed this plan of action for consideration by the Michigan State Safety Commission. The recommendations included here are based on activities including:

- " Elderly Mobility & Safety Task Force.
- " Public involvement strategy.
- " Analysis of elderly population trends, travel patterns and crash characteristics as detailed in *Background Paper #1 — Elderly Population, Travel Pattern and Crash Characteristic Analysis, State of Michigan* (bound separately).
- " Literature review and research as detailed in *Background Paper #2 — Literature Review and Resource Inventory* (bound separately).
- " Elderly Mobility & Safety Forum (April 1999) as detailed in the *Forum Proceedings* (bound separately).
- " Focus group research as detailed in the *Focus Group Research Summary* (bound separately).
- " Development of the *Final Plan of Action*.

Because the issues and needs presented here are believed to affect everyone, the recommendations must become part of a systematic approach carried out in all community planning, design and policy decisions. This plan of action represents only the first vital step toward developing this systematic approach. The goal now is to implement the recommendations made and realize positive change for Michigan citizens.

Appendix A
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