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16. Abstract <p>A growing percentage of all drivers are aged 55 and older. The findings of a number of safety studies have also fostered national interest in older driver issues.</p> <p>The needs and problems of Virginia drivers age 55 and older were identified in 10 focus group discussions and 100 in-depth telephone interviews. Respondents described a number of roadway information problems, which were often attributed to a lack of advance warning signs, confusing sign content, and not enough informational redundancy. Visibility problems caused by poor sight distances, inclement weather, night, and large trucks were another major concern. Complex driving environments created by heavy traffic, high speeds, and other factors were a problem for many older drivers. Finally, "expectancy violations," often caused by other drivers' behavior, were a common problem. These findings replicate those of previous studies, as does the finding that older Virginia drivers often engage in "self-regulating" behaviors.</p> <p>The research on older driver interventions was also reviewed. The evidence related to reductions in older driver accidents has been largely inconclusive; data limitations have often been a problem.</p>			
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FINAL REPORT
TRANSPORTATION NEEDS OF THE OLDER DRIVER

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(The opinions, findings, and conclusions expressed in this report are those of the authors and not necessarily those of the sponsoring agencies.)

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INTRODUCTION

Demographic Trends

The transportation needs and problems of older drivers have become issues of national interest in recent years. In 1990, 24% of all licensed drivers in the U.S. were 55 years of age or older and 13% were 65 or older. In Virginia, the percentages were very similar: 21% of all licensed drivers were 55 or older, and 13% were 65 or older (Federal Highway Administration [FHWA], 1991a). The nation's interest in the needs of older drivers stems not only from the current number of older drivers but also from projected increases in the size of the older population. Demographers project that 31% of the population will be 55 or older by the year 2020 (FHWA, 1989).

Between 1978 and 1988, the number of licensed drivers age 70 and older increased 57%, more than any other age group. (By comparison, the total number of licensed drivers of all ages increased 16% over the same period) (FHWA, 1989).

Accident Involvement of Older Drivers

Media attention and the findings of a number of safety studies have also provided an important impetus for increased interest in the needs and problems of older drivers. A number of safety studies have shown that drivers over age 54 are involved in significantly more crashes per mile driven than drivers age 26 to 54 (Cerrelli, 1989; McKelvey and Stamatiadis, 1989; TRB, 1988). Crash involvement rates per mile driven climb steeply above age 70. The crash involvement rates per mile driven for the oldest drivers (80+) and the youngest drivers are similar; crash rates for drivers between the two age extremes are much

lower. Hence, frequent references are made in the literature to a "U-shaped curve" (Cerrelli, 1989; Stamatiadis et al., 1991; Staplin and Lyles, 1991).

Also, older drivers tend to be involved in different kinds of accidents than younger drivers are. The types of accidents most frequently caused by older drivers are rear-end collisions, right-angle collisions, head-on collisions while turning left, and angle-while-turning collisions (Stamatiadis et al., 1991; Garber and Srinivasan, 1991). The accumulating accident data highlight the importance of research on the needs and problems of older drivers, particularly since many of the design standards for our current roadways date back to the 1940s, when only 7% of licensed drivers were 65 or older (Mathews, 1990).

The Importance of Driving to Older People

Older people place a great deal of importance on being able to drive. Mobility not only contributes to their sense of well-being but is essential to the maintenance of their quality of life and independence (Mathias, 1992; TRB, 1988). Like the rest of the population, older people rely heavily upon the automobile as their primary mode of transportation. More than 80% of the trips made by individuals age 65 and older are made by car (TRB, 1988). The older driving population rarely uses any mode of transportation other than the automobile. This behavior partly reflects older people's preferences for driving personal automobiles; it may also reflect the lack of alternative modes of transportation in many communities, especially rural ones.

From a safety perspective, there is considerable evidence that that certain driving-related functional abilities can deteriorate with age (FHWA, 1991b; National Highway Traffic Safety Administration [NHTSA], 1989; Staplin, 1987). Reaction times tend to increase with age, particularly in complex driving situations and/or when driving conditions are poor. Visual acuity and visual "field of view" may decrease, and night vision often worsens. Age-related changes in cognitive ability (e.g., short term memory) can make the driving task difficult for some older drivers (NHTSA, 1989; Staplin, 1987; TRB, 1988). Nonetheless, there is substantial variability among older drivers, and there is also evidence that some of these driving-related functional abilities can be improved with training (NHTSA, 1989).

PURPOSE AND SCOPE

In view of demographic trends and accident research to date, many states are reviewing their existing roadway programs. Further research on older drivers' needs and problems has been given high priority by both the FHWA and the transportation community. A study of the needs of older Virginia drivers seemed warranted, given both the national interest in the subject and the fact that no previous studies had given older Virginians an opportunity to identify their problems on the roads.

The specific objectives of this study were (1) to identify the needs and problems of drivers age 55 and older in the state of Virginia; (2) to compare the needs and problems of Virginia's older drivers to the needs of older drivers identified in previous research; and (3) to review existing programs and interventions for older drivers in order to assess their possible value for the Commonwealth.

This report describes the older driver study's methodology and findings and presents recommendations based on the research. The results of the analysis will be reviewed by the Traffic Research Advisory Committee (TRAC) for consideration in the design of future transportation improvements in Virginia. The results will also be shared with other state and national groups involved in older driver programs and research.

MATERIALS AND METHODS

The data for this study were collected and analyzed in an ongoing series of steps, which are described below. Dr. Frankie Rodwell, formerly of the Research Council, had the original idea for this study; she also conceptualized the study's general approach, which is outlined below.

Step 1: A sampling frame of communities was identified for focus groups and the individual interviews. The state's cities and towns were stratified into 3 size categories: (1) 50,000 or more population, (2) 2,500 to 49,999 population, or (3) less than 2,500 population (these are categories frequently used by the Census Bureau). Using information provided by VDOT's Traffic Engineering Division, a number of "dangerous" localities were identified--places where 55 and older drivers were involved in a disproportionately large percentage of total accidents.

For the focus group sample of communities, towns and cities were selected from each of the 3 size categories and also from different regions of the state, since there are distinctive differences in topography, climate, and level of urbanization. A number of the "dangerous" cities and towns (e.g., Orange,

Tappahannock) were included in the focus group sample of communities, given the importance of identifying a broad range of older driver problems and issues in the focus groups.

For the individual interviews, a number of cities and towns in each of the 3 size categories from the various regions of the state were selected. The Department of Motor Vehicles (DMV) provided a list of 100 randomly selected names and addresses of licensed drivers aged 55 and older residing in each of these communities.

Step 2: After the focus group communities had been identified, administrators of area agencies on aging and/or leaders of senior citizen groups were contacted and asked to help in the recruitment of focus group participants. Ultimately, 10 focus group discussions were held with older drivers in 6 different localities in Virginia--Norfolk (2 groups), Orange (2 groups), Tappahannock (Essex County), Blacksburg (2 groups), Burkeville (Nottoway County), Lebanon (Russell County), and Edinburg (Shenandoah County).

These focus groups took place between January and May of 1990. Each focus group was led by either Dr. Frankie Rodwell or Dr. Amy O'Leary of the VTRC. Mr. Jack Corley, VDOT Bristol District Administrator, and Mr. L.C. Taylor III, VDOT Salem District Traffic Engineer, served as co-leaders in 9 of the 10 groups. Their engineering and field expertise proved to be extremely valuable within the groups.

The focus groups were scheduled to last 2 hours, and refreshments were provided. Participants were generally very enthusiastic and pleased that they were being asked for their views. Although the group leaders came prepared with a list of topics for discussion, participants often brought up the topics themselves without any prompting. Each focus group discussion was recorded on audiotape, and the tapes were then transcribed. A content analysis of these transcribed interviews was then performed to identify common themes. These themes, along with the findings of previous older driver studies, provided the basis for further data-gathering processes.

Step 3: Using the focus group findings and the older driver literature, a survey instrument was developed for use in interviews with individual older drivers across the state. This questionnaire (see Appendix A), composed of both open-ended and close-ended questions, was created for use in in-depth telephone interviews. Originally, face-to-face interviews were planned. A delay in the availability of DMV sample list necessitated the change to telephone interviews.

The instrument included questions in the following categories: (1) personal driving patterns; (2) in-town driving; (3) interstate driving; (4) state highway driving (i.e., non-Interstates); (5) traffic signals; (6) road signs and markings; (7) weather and time-of-day effects; (8) older drivers' capabilities. The instrument also included basic demographic questions.

A pilot study of the instrument was conducted in the first few months of 1991. Revisions were made, and a second pilot study was conducted. Interviews averaged 30 minutes in length. After completion of the pilot studies, 12 communities of varying sizes throughout the state were identified for the final interviews. Some of these communities were among the "dangerous" locations identified in Step 1. The communities included in the final interview sample are listed in Table 1.

Table 1. Communities Included in the Final Interview Sample

<u>Population Category</u>	<u>City or Town</u>
50,000+	Alexandria Richmond Roanoke Virginia Beach
2,500 - 49,999	Christiansburg Dumfries Farmville Fredericksburg
< 2,500	Bassett (Henry Co.) Honaker (Russell Co.) Mount Jackson (Shenandoah Co.) Rustburg (Campbell Co.)

Names on the DMV-generated lists for these 12 communities were first stratified by age group and gender, and then random samples were drawn. Potential respondents from each community were placed in 4 age groups for sampling purposes: (1) 55 to 59, (2) 60 to 64, (3) 65 to 69, and (4) 70 and above. These age groups were used for two reasons. First, the incidence of the functional changes mentioned previously increases with advancing age. Second, accident research demonstrates distinct differences in the crash risks of the "young old" and the "old old." Hence, the driving-related problems and concerns of 55-year-olds and 75-year-olds might differ.

Men age 55 and older constitute 11% of all licensed Virginia drivers; women 55 and older constitute 10% of the total (FHWA, 1991a). For that reason, efforts were made to ensure that approximately equal numbers of men and women were represented in the final sampling lists for each community.

Anyone for whom no phone number could be obtained (using phone books and directory assistance) was necessarily eliminated from the sample. Rustburg had to be eliminated from the final community sample because very few phone numbers were obtainable.

A letter about the study was sent to each of the approximately 24 individuals who were to be called initially in each community (see Appendix B). A total of 279 letters were mailed to potential respondents; only 5 letters were returned due to no forwarding address.

It was hoped that the letter would allow the respondents some time to reflect on their driving needs and problems, so that their responses to our questions would be more thorough and informative.

A second reason letters were sent was to ease any concerns the respondents might have had about threats to their license. In the spring of 1991, Virginia newspapers published stories about a VTRC study for DMV on the licensing of at-risk drivers (see, for example, Burrows, 1991). Older drivers were 1 of 6 groups of "at-risk" drivers discussed in the study by Alcee et al. (1990). Apparently, many older drivers thought that the DMV was close to a decision to require more frequent license renewals by older Virginia drivers (DMV announced shortly thereafter that no such changes were imminent). Having received the letters, the individuals we contacted appeared to be at ease about the purpose of the interviews and the larger study.

For the final 117 completed interviews in the study, there was a 27% refusal rate. It should be noted here that refusals occurred for a variety of reasons. In addition to those who merely did not care to participate, a number of people said they preferred not to participate due to poor health or an inability to hear well over the phone.

The data collected from the 117 completed interviews were then coded and entered into a database. Statistical analysis of the data was performed using SPSS software.

Step 4: Upon completion of the data-gathering and analysis activities, we compared our findings to the findings of previous older driver studies. The results of those comparisons are summarized later in the report.

Step 5: Existing programs and interventions for older drivers nationally and within the state of Virginia were reviewed. A separate section of the Results summarizes the findings of that review.

RESULTS

Focus Groups

The content analysis of the focus group tapes and transcripts revealed 8 major categories of issues: (1) concerns about other drivers' behavior; (2) concerns about lane markings, signs, and traffic signals; (3) concerns about interstates; (4) other issues, including road geometrics, large trucks, and enforcement of traffic laws, (5) suggestions for improvements; (6) automobile features; (7) weather conditions and time of day; and (8) the capabilities of older drivers in general. These response categories partly reflect questions and probes used by the group leaders and co-leaders.

Other Drivers' Behavior

The topic of other drivers' behavior was a potent one for beginning the discussion and making group participants feel at ease. Drivers who cut in front were cited as a problem in 7 of the 10 groups, and drivers who cut in front immediately before turning were mentioned in 4 groups. Automobile drivers and truckers who exceed the speed limit were mentioned in 5 groups; however, because slow drivers were cited as a problem in 7 groups, group participants were clearly not endorsing driving below posted speed limits. People who drive without regard for poor weather conditions were mentioned as a problem in 5 groups. Although a number of other irritating or frightening behaviors by other drivers were mentioned, these were some of the most prevalent themes.

Road Markings

With respect to lane markings, there was much praise for reflective pavement markers particularly among residents of more rural areas. In 4 of the 10 groups, participants reported difficulty seeing painted lane markings in dark and/or rainy conditions. Individuals in 3 groups said that the absence of markings in divided highway crossovers was a problem. Several people were confused by median crossover channelization, describing it as "driving on the wrong side of the road."

Signs

Inconsistent sign placement was identified as a problem in 5 of the 10 groups. In 4 groups, older drivers suggested that larger signs and/or signs with larger lettering would be helpful. One person said "...whenever you've got a choice, opt for the larger letters." There was enthusiasm for symbol signs. The need for more advance signing was mentioned in 5 groups, and focus group participants said that at 55-65 m.p.h., they miss information if they have only one opportunity to see it. For example, one man said "There should be maybe three signs to tell you what you're coming up to." In 4 groups, drivers mentioned having difficulty seeing signs at night, in some instances because of the number of lighted business signs. One Blacksburg resident said: "Weather conditions and all that stuff has a lot to do with it. I can go to Roanoke in a drizzling rain or on a dark night and I get lost because I can't read the street signs or I can't find them."

Signals

A number of the problems older drivers described with respect to traffic signals involve lagging green, and to a lesser extent, leading green left-turn signals. These kinds of problems were mentioned in 4 of 10 groups. Some of these signals apparently cause older drivers to hesitate and/or to suspect a signal malfunction (especially if the transition between phases is delayed). Individuals in 4 groups held in smaller towns wanted more traffic signals, whereas individuals in one group felt their community had too many signals.

Interstates

Many of the older drivers in the focus groups were clearly regular travelers on interstates. A number of the issues raised in regard to interstates were related to exit sign placement and content. Participants said they had difficulty when signs for a number of different exits are clustered in the same location. These situations can create "information overload," even when one's spouse is along as "co-pilot." Also, group participants said that the cities or towns named on exit signs often confused them; they could not determine whether they could reach their desired destination by taking a particular exit.

A number of the focus group participants admitted being scared of or overwhelmed by large trucks (especially on downgrades). Visibility problems caused by the spray from big trucks in inclement weather were also mentioned.

Older Driver Licensing

The focus group leaders did not originally intend to raise the issue of whether licensing requirements should differ by age. It was felt that this was not only a potentially very sensitive topic but also that this was not within VDOT's purview. Nevertheless, in 4 groups, individuals expressed strong views that more frequent renewals should be required above a certain age.

Finally, focus group participants' comments about how older drivers compare to younger age groups revealed some interesting insights. Older drivers freely admitted that their reflexes were slower than they had once been, that they could not "drive as steady [a speed]" as they once had, that their night vision was poorer (mentioned in 9 of 10 groups), and that they had more trouble with visual glare in general. Nevertheless, group participants felt that older drivers are more patient, more socially responsible behind the wheel, and more experienced in a range of driving situations. It was also evident from a number of the comments that many of these older drivers "self-regulate," generally avoiding certain driving situations that are inherently more dangerous (e.g., peak traffic, night, snow).

Individual Interviews

Respondent Profile

The average age of individuals interviewed was 68; the youngest respondent was 56 and the oldest was 92. The age group distribution of the respondents is shown in Table 2.

Table 2. Age Group Distribution of Interview Respondents (N=100)

<u>Age Group</u>	<u>% of Respondents</u>
55-59	13%
60-64	25%
65-69	29%
70-74	16%
75+	17%

Approximately equal numbers of men and women were interviewed in each of the 4 age groups. Fifty-two percent of the sample were males, and 48% were females. The distribution of the sample by size of community of residence is shown in Table 3.

Table 3. Size of Community of Residence for Interview Respondents (N=100)

<u>Community Size</u>	<u>% of Respondents</u>
< 2,500	30%
2,500-49,999	29%
50,000+	41%

This sample distribution approximates census figures for Virginia.

Interview respondents had a wide range of educational attainments, which are shown in Table 4.

Table 4. Educational Attainments of Interview Respondents (N=100)

<u>Level of Education</u>	<u>% of Respondents</u>
7th Grade or Less	13%
8th - 11th Grade	16%
High School Graduate	33%
Some College	10%
College Graduate	20%
Graduate or Professional Degree	8%

The majority (73%) of our interview respondents were married; 25% were widowed, divorced, or separated; and the remainder (2%) had never married. Approximately two-thirds

of those who were married had spouses who drove. Virtually all (11 of 12) of the spouses who did not drive were wives.

Calls made to individuals in the final sample yielded 17 respondents who no longer drove. Nondrivers were asked only a few questions and then thanked for their time, since much of the interview schedule was not applicable to them. Twelve of the 17 nondrivers were women. When asked why they no longer drove, 9 nondrivers cited health; 4 said they voluntarily decided they were too old to be driving; and the remaining 4 cited heavy traffic or the fact that they did not have to drive.

Of the 100 respondents who currently drove, 82% were either retired or homemakers, 13% were employed full-time, and 4% were employed part-time. Respondents who were either retirees or homemakers had been so for an average of more than 11 years.

Respondents' Personal Driving Habits

When asked how often they drove, 74% of the respondents drove at least once daily (47% drove several times every day). Twelve percent reported driving 4 to 6 times per week. Only 14% drove 3 times per week or less, on average. How often respondents drove did not vary significantly by age group. Frequency of driving varied by gender, however; 87% of the men respondents drove at least once per day, compared to 59% of the women.

Married respondents were asked how much of the driving they did when traveling with their spouse. Husbands drove the vast majority of the time when spouses traveled together. This was true for both in-town trips (75% of the respondents indicated that the husband drove all or most of the time) and out-of-town trips (64% indicated that the husband drove all or most of the time).

Respondents were asked if there had been any changes in the amount of driving they did in the last 3 years. Twenty-six percent of the sample reported that they were driving less than they had previously. Reasons cited for driving less included health changes, an awareness of diminishing abilities, and not needing to drive as much following retirement. Respondents were also asked if there had been any changes in the type of driving they did in the last 3 years. Fifteen percent of the sample mentioned such changes, the most common of which were less night driving and less highway driving.

The vast majority of our interview respondents (88%) indicated that being able to drive was very important to them. Ninety-five percent of our respondents said that being able to drive was very important for maintaining their independence and

lifestyle. Other reasons cited for the importance of being able to drive included a lack of other people to help with transportation needs (17%), enjoyment of driving (16%), and a lack of public transportation alternatives (11%).

In-town Driving

Virtually all of our respondents did some in-town driving (described for them by the interviewer as "...going to the grocery store or running errands"). Half (49%) of the respondents mentioned problems related to in-town driving. The most frequently mentioned problems were too much traffic (28%) and bad driving by others (21%). Not surprisingly, complaints about traffic were voiced significantly more often by residents of cities with populations above 50,000 than residents of smaller cities and towns. There were also significantly fewer complaints about other drivers' behavior by small town residents.

Fifty-two percent of those who did in-town driving scheduled it for particular times of the day. Nearly all of those who scheduled their in-town trips did so to avoid rush hour traffic. In addition to trip scheduling, one-third (32%) of the respondents mentioned other strategies they used for making their in-town driving easier and safer. Taking alternate routes was mentioned most often (24%), including avoiding areas with heavy traffic, construction, or dangerous intersections.

Respondents were asked about problems with intersections and left turns in the context of in-town driving. Forty percent of the respondents had complaints about intersections, the most frequent of which were poor visibility in intersections and too much traffic. Other intersection problems included either the absence of turn lanes or turn lanes that were too short; the absence of traffic signals; convenience store entrances and exits near intersections; and other drivers making improper right turns on red.

Thirty percent of the respondents said they had difficulty making left turns at non-signalized intersections; many were anxious about what other drivers would do in these situations. Consequently, respondents felt that they had to be extremely cautious in these situations. Left turns at nonsignalized intersections appear to be a problem for many older drivers, regardless of their age or the size of their community of residence.

When asked what VDOT could do to make their in-town driving safer and easier, 45 respondents offered suggestions. The most common suggestions were to reduce traffic, to increase law enforcement, and to install more traffic signals. Other

suggestions included placing more signs overhead, widening roads, and providing more dedicated turn lanes.

Interstate Driving

Eighty-five percent of the respondents drove on interstate highways. Significantly fewer (65%) of the respondents age 75 and older were interstate users. Thirteen of the 15 respondents who did not drive on interstates were women, primarily in the older age categories.

When we asked respondents who used the interstates if there was anything they disliked about interstate driving, 59% mentioned one or more problems. Interstate driving problems were mentioned significantly more often by residents of the largest cities (50,000+) than by residents of smaller communities. Four kinds of interstate driving problems emerged in the interviews: (1) difficulty finding the correct exit (mentioned by 33% of interstate users), (2) heavy traffic volumes and/or high speeds (mentioned by 25%), (3) other drivers' behavior (mentioned by 22%), and (4) large trucks and buses (mentioned by 18%). Since problems locating Interstate exits were often described as sign-related, they are discussed further in the Results.

Respondents were also asked what, if anything, they liked about interstate driving. Three categories of answers emerged. Forty-six percent liked being able to drive faster and make better time. Approximately 20% liked being able to drive a constant, uninterrupted speed; many said that they liked being able to use cruise control. Sixteen percent liked interstate driving because they felt it was safer; some mentioned that limited access and all traffic going in the same direction made them feel more relaxed.

Eighteen percent of the interstate users favored a lower speed limit on the interstates; 55 mph was the most frequently mentioned alternative. Desire for a lower speed limit was not significantly related to respondents' age. Several respondents also felt that truck and car speed limits should be the same.

Of our 85 respondents who were interstate users, 36% scheduled their interstate driving for specific times of day, primarily to avoid rush hour traffic. The other frequently mentioned reason for scheduling interstate trips was to avoid driving at night.

Apart from scheduling their trips, 38% of the interstate users mentioned other strategies they used to make interstate driving easier and safer. Use of cruise control was mentioned by half of those who had specific strategies, and taking rest breaks

and/or limiting one's time behind the wheel to avoid fatigue was also mentioned frequently.

Almost half of the interstate users suggested ways that VDOT could make their interstate driving easier and safer. The most frequently offered suggestions were: (1) to make improvements to signs; (2) to enforce laws better; and (3) to "do something about trucks."

State Highway Driving

Nearly all (93%) of our respondents drove on state highways (i.e., non-interstate highways). Forty-four percent of the state highway users mentioned one or more problems related to them. The three most frequently mentioned kinds of problems related to road geometrics, traffic flow, and safety. In the geometrics category, older drivers said that narrow road width, narrow bridges, curves, or poor sight distances caused problems for them. In the traffic flow category, respondents said that slow-moving traffic, farm vehicles, and the lack of bypasses around small towns were problems. In the safety category, respondents mentioned bad drivers, unlimited access points, and the general dangerousness of state highways as problems. Age group comparisons did not reveal any significant variations in the frequency of these problems.

Notwithstanding these complaints, half of the state highway users mentioned things that they specifically liked or preferred about driving on these roads. The two most frequently cited reasons for liking state highways were their scenery and safety. A number of respondents said they "just liked them [state highways] in general." Others said that travel on state highways was "easier on the nerves." There were positive comments about less traffic, lower speeds, and greater safety on state highways. Older drivers prefer state highways that are 4-lane divided roads, with wide shoulders if they wish to pull off. Based on these comments, it seems likely that some of the state's scenic byways would have considerable appeal to a segment of the older driving population.

Our respondents' comments about state highways seem to contain some contradictions. Some older drivers in the sample said state highways were safer than interstates, while others said they were less safe. Some respondents liked the slower speeds on state highways, while other respondents did not. This probably reflects differences in the referent(s) people had in mind when we asked them about state highways.

Approximately one-third of state highway users scheduled their trips on state highways for specific times of day (usually between 9 a.m. and 4 p.m., or early in the morning). The

majority of those individuals said they scheduled their trips to avoid traffic; a few individuals mentioned avoidance of nighttime driving as their reason.

When asked how VDOT could make their state highway driving easier and safer, respondents offered a wide range of suggestions (48% of the state highway users offered ideas). The most frequent recommendations involved improving road geometrics (widening roads, improving shoulders, straightening curves). The next most frequent group of recommendations was traffic related: limit access, reduce traffic, add more dedicated turn lanes, and build bypasses around small towns.

After completing the interview questions on in-town, interstate and state highway driving, respondents were asked to estimate the percentage of their driving that occurred on each of these three types of roads. The averages of these self-estimates indicate that approximately 50% of the driving done by our respondents was in-town driving, 25-30% was state highway driving, and the remaining 20-25% was interstate driving. As might be expected, residents of larger urban areas reported doing more in-town driving than residents of smaller, more rural areas.

Traffic Signals

Twenty-three percent of the respondents had problems with particular traffic signals in their community. The most frequent complaint was poor signal timing (too-long cycles were cited as a problem more often than too-short cycles). Among respondents who identified "problem" signals in their communities, avoidance was a common strategy: 25% said they always or often avoided the problem signals. Another 35% said they sometimes avoided the problem signals.

Almost half (45%) of the respondents mentioned features of traffic signals that they liked or found helpful. One-fourth of the older drivers in the sample "just liked having traffic lights in general" to control traffic flow and, presumably, to make their driving judgments easier. Fifteen percent mentioned leading green turn arrows as a signal feature they particularly liked.

The most common suggestions respondents made for improving traffic signals were adjusting signal timing for better traffic flow, adding more dedicated turn lanes and protected turn phases, and enforcing of right turn on red laws (RTOR) more stringently. Older drivers are disturbed by other drivers who fail to come to a complete stop before making a RTOR, forcing them to react quickly.

Road Signs

The topic of road signs elicited many comments in both the focus groups and in the individual interviews. Older drivers made numerous comments about the importance of predictably placed (preferably, overhead) signs that are large, luminous, and easy to read. A number of respondents stressed their need for advance warning signs that give them sufficient time to make traffic maneuvers. Respondents also mentioned having problems when dedicated turn lanes are marked only on the road surface.

Twenty percent of the interview respondents had complaints about road signs in general. The most frequent complaint was that signs were poorly placed, making them easy to miss and/or hard to read. More specifically, signs placed on the side of the road, rather than overhead, often created problems. The second most frequent complaint was that the content of signs was confusing and/or not specific enough. There were also a number of complaints about signs that gave insufficient warning, such as signs placed too close to intersections. There were no statistically significant variations in the incidence of problems with signs by age group or community size.

Problems with inadequate advance warning signs on interstates were frequently mentioned by respondents. Thirty-five percent of the interstate users said they had problems finding the proper exit. The most frequently offered suggestion for improving interstate signs was to provide drivers with more advance warning. The second most frequent suggestion was to modify sign content, so that it is clearer which destinations can be reached from a given exit. There were no statistically significant differences in the incidence of interstate exit problems by sex, age group, or community size (although interstate exit problems were most common among residents of cities with 50,000+ populations).

One-third (35%) of the respondents suggested one or more ways in which VDOT could improve road signs. The most frequent suggestions were (1) to make signs more visible (by making the lettering or the sign larger, or keeping foliage cut back); (2) to provide more advance warning signs; (before interstate exits, intersections, and hazards) (3) to make sign placement more consistent and predictable; and (4) to make sign content less ambiguous and more informative.

Road Markings

Only 14% of the interview respondents described problems with road markings. The most frequent complaint was about painted lines that are not visible in bad weather. To remedy

this problem, respondents suggested that VDOT "make the markings clearer" and repaint more often.

Seventy percent of the respondents made comments about markings that they liked or found helpful. There were many positive comments about reflective pavement markers, in particular. Interview respondents also spoke favorably about edge-lines on roads. Respondents stressed their need for markings that are highly visible in inclement weather.

Night Driving

Many of the 55 and older drivers in the sample "self-regulate" by avoiding night driving as much as possible--only 13% of the respondents said they "often" drove at night. Half (53%) of the sample answered "never," "seldom," or "only if I have to" in response to a question about night driving. The percentage of individuals who never or seldom drove at night was highest among the over-75 age group.

Seventy-three percent of the respondents mentioned one or more night driving problems. One-third of the respondents said that headlight glare was a significant problem for them. One-fourth of the respondents said that their own poor night vision and/or low visibility was a problem for them, and 14% said they were scared or uncomfortable while driving at night.

Thirty-three percent of the respondents offered a range of suggestions about what VDOT could do to make their night driving easier and safer. The most frequent suggestion was to place more reflective pavement markers on the roads. Other suggestions were to improve lighting in cities and towns, particularly at intersections, and to improve lane markings. A number of respondents felt that nothing could be done to improve night driving conditions; they felt that their own poor night vision was a large part of the problem.

Bad Weather Driving

Respondents were asked a series of questions about their driving in rain and snow. Forty-three percent of our respondents mentioned problems related to driving in the rain. The most frequent rain-related complaints were dislike of the reduced visibility and/or problems with spray from large trucks. Some respondents also said the combination of darkness and rain posed a significant problem for them. Only about one-third of our respondents, however, said they avoided driving in the rain "sometimes" or more often.

Although only a minority of the respondents avoided driving in the rain, 55% said they "often" or "always" avoided driving in snow, and an additional 13% said they "sometimes" avoided it. The primary reasons respondents gave for avoiding driving in the snow were reduced control of their own vehicle, the increased danger on the roads in general, fear of ice, and concerns about other drivers maintaining control of their vehicles. Female respondents were 5 times more likely to express concerns about icy conditions than male respondents.

When asked what VDOT could do to make their bad weather driving easier and safer, the two most frequent comments (which were contradictory) were (1) that VDOT should clear the roads sooner, and (2) that VDOT's current snow removal efforts were satisfactory.

Comparisons of Older Drivers and Other Age Groups

Respondents were asked to compare 55 and older drivers to drivers in other age groups (interviewers prefaced this question by noting that all age groups have drivers of different abilities). The most common answer to this question, given by 52% of the respondents, was that older drivers were better than other age groups because of their greater experience and/or their attitudes behind the wheel. Respondents said older drivers were more cautious, more aware, more law-abiding, more alert, and in less of a hurry.

Thirty percent of the respondents expressed the opposing view--that older drivers were worse than drivers in other age groups. Slower reaction times, diminished driving ability, and fear behind the wheel were cited as reasons that older drivers were worse drivers. Men were twice as likely as women to make negative comments about older drivers' abilities (39% of men did, compared to 18% of women in the sample).

On this question it was possible for respondents to give multiple responses. Nineteen percent of the respondents made both a positive and a negative comment about older drivers.

If respondents did not mention any physical changes of aging in response to the question about older drivers vs. other age groups, a follow-up question was asked: "Are there any particular kinds of changes that affect many drivers 55 and older, in your opinion?" Forty-nine percent of the sample mentioned negative physical changes, such as poorer vision or slower reflexes, in response to the probe. A significantly greater percentage of large city residents (i.e., 50,000+ populations) mentioned these negative physical changes, compared to residents of smaller cities and towns. Large city residents were also 3

times more likely than others in the sample to say that slower reflexes affect many older drivers.

Approximately one-fourth (28%) of the sample did not identify any kinds of changes as affecting many older drivers. Significantly more residents of the smallest communities (under 2,500 population) were in this "no changes" response category. Also, the oldest individuals in our sample were the most likely to be in the "no changes" response group. Approximately 40% of the individuals 70 and older gave "no changes" responses. By contrast, no more than 25% of the individuals in any under-70 age group were in the "no change" response category.

As noted earlier, the issue of more frequent license renewals for older drivers was often raised by focus group participants. For that reason, we asked respondents whether they thought more frequent license renewals should be required "above a certain age." The responses to this question were split, with 44% agreeing or strongly agreeing that older drivers should have to renew their license more often, 36% disagreeing or strongly disagreeing, and 20% undecided. A greater percentage of large city residents endorsed more frequent renewals, while small town residents (under 2,500 population) were least likely to favor it.

The reasons respondents offered for their views on more frequent renewals revealed a similar split. Changes in vision, reflexes, and alertness; variation among individuals; and the fact that "after a certain age, things can change quickly" were cited. Those who opposed more frequent renewals said that the current renewal requirements were satisfactory, that requirements should not differ on the basis of age, and that there was variation among individuals. Those who were undecided on the issue cited variation among individuals as the reason for their view.

Respondents who endorsed more frequent license renewals for older drivers were asked at what age the requirements should become more stringent. Answers ranged from 55 to 80, with a mean of 67 years.

Respondents who favored more frequent license renewals for older drivers were asked what tests DMV should require for renewal. Virtually all those who answered this question recommended an eye test. A written test, a behind-the-wheel test, and/or a physical examination were each endorsed by approximately one-third of those favoring more frequent renewals above a certain age. About one-sixth recommended that DMV require a mental acuity test for drivers above a certain age.

Respondents were asked whether they thought older driver improvement courses, such as AAA's "Safe Driving for Mature Operators" or AARP's "55 Alive," were a good idea. Of the 84 people who answered this question, 57% thought such courses were

people who answered this question, 57% thought such courses were a good idea, 25% said maybe, and 18% did not think they were a good idea. A number of respondents made comments such as "It's okay if people want it" or "It's good for some people" but indicated that they personally were not interested in such a course. (It is possible that some of our respondents thought that endorsement of such courses would be interpreted as an admission that their own driving skills were deficient.) Support for older driver improvement courses tended to be greater among respondents living in areas with a population above 2500 than among residents of the smallest towns.

Respondents who thought that older driver improvement courses were a good idea or might be a good idea were asked two questions about what the components of an older driver review course should be. Answers to those questions indicate that the respondents felt that classroom and behind-the-wheel instruction were equally important. Respondents' other suggestions for content of such older driver review courses included: general information ("like when you first learn to drive"), information about problems that older drivers may experience (e.g., judging distances), recent changes in the laws, and defensive driving skills.

As a "wrap up" question for the interview, we asked respondents if they had any other driving-related problems or concerns that VDOT should know about. The most frequent responses this elicited were complaints about other drivers' behavior--speeding, weaving, and tailgating--and the need for more law enforcement. This question also elicited a number of complaints about traffic congestion.

Comparisons with the Results of Previous Older Driver Studies

The results of our focus group discussions and individual interviews are very consistent with the results of other recent assessments of older drivers' needs and problems (Staplin, 1987; Lerner et al., 1990; Maryland DOT, 1991; TRB, 1988). A few of the most apparent areas of convergence are highlighted below.

Older Virginia drivers' frequently expressed needs for more consistent sign placement and more advance signing replicate findings in Maryland (Maryland DOT, 1991), Pennsylvania (Staplin, 1987), Washington, D.C., and Wisconsin (Lerner et al., 1990). Similarly, older Virginia drivers' difficulties with exit signs, particularly on interstates, have been reported in other studies such as Staplin's (1987).

Older Virginia drivers' concerns about the visibility of markings and their enthusiasm for reflective pavement markers replicate the findings of the Maryland DOT (1991) and Staplin (1987). On a related note, older Virginians' problems with headlight glare and frequent avoidance of night driving are consistent with Staplin's (1987) findings in Pennsylvania. Older drivers in Maryland, like those in Virginia, said that road markings indicating dedicated turn lanes needed to be supplemented with signs.

The problems that some older Virginia drivers experience with signal timing and their uncertainties related to signals with lagging or leading green turn arrows confirm the results of focus groups held in Maryland (Maryland DOT, 1991) and Pennsylvania (Staplin, 1987). And older Virginia drivers' avoidance of "problem" signals, intersections, etc., is also consistent with Staplin's focus group results.

The strongest convergence between our study's results and those of previous older driver studies lies in older Virginia drivers' frequently voiced concerns about what Lerner et al. (1990) called the "social climate of driving"--the behavior of other drivers on the road and the actions of law enforcement personnel. In the studies conducted by Staplin (1987), the Maryland DOT (1991), and Lerner et al. (1990), older drivers attributed many of their problems on the road to other drivers' inconsiderate or dangerous behavior. In all of the studies, there were concerns that law enforcement needed to be stricter (e.g., right turn on red laws, speed limits).

There are very few instances in which our study's findings diverge from those of the previous studies. Our focus group respondents generally had favorable things to say about symbol signs; some of the previous studies cited in this section have reported that older drivers do not understand some symbol signs. Also, compared to the results reported by Staplin (1987), relatively fewer older Virginia drivers had complaints about the size of lettering on signs. Our respondents' primary difficulties with signs appeared to be related to their placement more than anything else.

Some findings of this study that are less prominent in the previous research probably reflect the inclusion of residents of rural areas. For example, older Virginia drivers' concerns that state highways do not offer enough opportunities for passing and that there are not enough bypasses around small towns have not been highlighted in previous older driver studies.

Participants in this study were not asked to rank order their driving problems or their suggestions for improvements. In Staplin's (1987) focus group study, research staff ranked the older drivers' suggestions based on both the number of mentions

and the focus group members' apparent level of agreement with suggestions made in the discussion. The rankings for older Pennsylvania drivers were (in order of decreasing importance):

1. More reflective edgelines and curbs
2. More raised pavement markers
3. Better maintenance of lane markings
4. More use of corrugated pavements
5. More law enforcement, especially speed limits and RTOR
6. Making RTOR illegal
7. More "jug handles" for left turns at intersections
8. More use of restricted truck lanes
9. Better sign and signal maintenance
10. Larger minimum letter size on signs
11. Replacing black and white signs with brighter colored ones
12. Longer yellow clearance at signals
13. Better timing for signals on busy streets
14. More use of multiple signs to mark upcoming intersections
15. More use of public safety messages on radio and TV to stress traffic laws (e.g., drivers must stop before RTOR)

Judging from Staplin's rankings, older Virginia drivers seemed to have more concerns about advance warning signs and consistent sign placement than older Pennsylvania drivers apparently did. Older drivers in both Pennsylvania and Virginia seemed to give high priority to reflective edgelines and pavement markers. Although some Virginia respondents mentioned maintenance of markings on state highways as a problem, sign and signal maintenance was not a common complaint. The color contrast of road signs in Virginia was seldom mentioned as problem, in contrast to the Pennsylvania findings. Older drivers in both states indicated that left-turn lanes made their driving considerably easier.

Review of Older Driver Interventions

Our review of current programs and interventions for older drivers revealed that a variety of approaches have been implemented. The FHWA's (1990) report on its pilot program for older drivers describes what a number of states have done for older drivers. Broadly, current older driver programs and interventions can be categorized as (1) restrictive measures, which operate through the licensing process; (2) accommodative measures, which involve modifications of traffic control devices

or roadways; (3) driver education programs; or (4) provision of alternative modes of transportation (FHWA, 1991b).

This report does not elaborate upon restrictive licensing as an older driver intervention, except to note that 16 states have license renewal requirements that vary by driver age (AARP, 1992). A discussion of states' age-based licensing practices can be found in Alcee et al. (1990). There is a growing body of literature on "graduated" licensing for older drivers (and others). Graduated licenses carry restrictions tailored to the limitations of an individual (e.g., daytime driving only, no freeway driving).

California is focusing efforts on developing more sophisticated driver testing to aid it in the implementation of graduated licensing. In particular, California is implementing more sophisticated vision testing, with tests for night vision and peripheral vision. There have been numerous criticisms of the static visual acuity tests employed by most state DMVs. Some professionals working in older driver research have noted, however, that many states probably could not afford the larger and more highly trained DMV testing staff needed to make the new approach work (Mathews, 1990).

This report also does not discuss the intervention of providing alternative modes of transportation to older people. This is certainly a subject worthy of study in its own right, though beyond the scope of this report. A number of participants in the focus groups mentioned that transit or paratransit was either unavailable in their area, or available only to persons below a certain income level.

The best known of the educational interventions for older people are driver improvement or "refresher" courses. Two of the better-known courses of this type are AAA's "Safe Driving for Mature Operators" and AARP's "55 Alive." In a number of states, course graduates receive discounts on their automobile insurance. The AAA course provides 8 hours of standardized classroom instruction. The AAA course attended by Dr. O'Leary in Norfolk, Virginia, also gave participants the opportunity to use a night driving simulator. The availability of these courses varies within Virginia, as does the cost. Although the courses are generally offered through AAA branches, AARP branches, senior centers, or community colleges, the Fairfax County, Virginia, Police Department began offering the course for a \$5 fee in March 1990.

California has facilitated older driver training courses on a large scale. The state legislature directed the California DMV to establish standards for mature driver improvement (MDI) courses, to develop criteria for the approval of such courses, and to submit annual reports comparing the driving records of

older people who have taken the courses and those who have not (Foster, 1991). California also makes a self-assessment inventory available to older drivers.

Foster (1991) reported the results of the most recent comparisons of the driving records of 36,000 California MDI course graduates and 65,000 nongraduates. Three years after the legislature's mandate to the DMV to develop course standards, Foster concluded "...there is no compelling evidence that the MDI program reduces the accident risk of course graduates." He reported, however, that the MDI courses "...may have reduced the rate of traffic violation convictions of course graduates."

Although Foster's large sample sizes tend to make his conclusions convincing, it is possible that the comparisons have not been made over a sufficiently long period of time for the benefits of the MDI to become evident. That is, the probability of accident involvement may not be high within a 3-year period, even for individuals in the oldest age groups.

The majority of older driver programs and interventions documented in the literature have been of the accommodative type. A number of states' efforts within this category are described in the FHWA's "Older Driver Pilot Program" report to Congress (1990). States' specific countermeasures to assist older drivers are listed in Table 5.

Table 5. States' Countermeasures for Older Drivers

Sign Improvements

- o Larger lettering on signs
- o More advance signing
- o Better lighting in the vicinity of signs
- o Use of high-performance sheeting

Road Markings Improvements

- o Installation of additional reflective pavement markers
- o Wider markings (e.g., edgelines)
- o Brighter markings

Signal Improvements

- o Use of larger (12") signal lenses
- o Placing signals above roadways
- o Use of signals with separate left-turn phases at new installations

Road Geometrics Improvements

- o Improved sight distances
- o Delineation of left-turn lanes

The accommodative strategies outlined seem justifiable, given the results of previous studies of older drivers' problems on the road and their stated preferences. Nevertheless, at least one state (California) reported that it could not find a sufficient concentration of older driver accidents at any particular location to justify engineering countermeasures. As noted previously, California has instead focused on the areas of older driver education and more sophisticated driver testing.

The results of recent FHWA-sponsored experiments in 3 states (Arizona, Florida, and Nevada) indicate that when engineering improvements are made, it may be difficult to demonstrate benefits to older drivers that exceed the benefits to all drivers. Older drivers may not even notice the improvements, as transportation officials in Arizona learned (FHWA, 1990).

In its pilot program, Arizona made improvements to street name signs and roadway markings. Officials concluded that the interventions may have lowered the number of unsafe lane change accidents among older drivers. The officials felt, however, that their evaluation periods--1 year before the improvements and 1 year after them--were inadequate for making a definitive conclusion.

Nevada's pilot program for older drivers involved the upgrading of signal mast arms and signal heads and increasing the size of signal lenses (to 12") to improve their visibility. Nevada officials initially concluded that their countermeasures produced greater reductions in accidents among all drivers than among older drivers. Upon further analysis, however, Nevada officials reported that there appeared to be a greater reduction in angle accidents among older drivers than among all drivers.

Florida's improvements for older drivers included increasing the size of street signs and advance warning signs, widening lane markings, and installing additional pavement markers. Florida officials concluded that the accident data available to them--4 years before the improvements and 6 months after the improvements--did not permit them to make any valid conclusions about the effects of the intervention. There were decreases in both total accidents and older driver accidents at some of the Florida test sites, but there were increases at other sites (suggesting random fluctuations in the accident rates). Clearly, evaluation of all three states' pilot programs was hindered by a lack of long-term follow-up data. Although two of the states sent surveys to older drivers following the interventions, reductions in accident rates were clearly being used as the "gold standard" for judging the benefits of the roadway improvements.

In Virginia, VDOT has adopted a number of practices that are among the accommodative measures for older drivers listed previously. These practices include: use of high-intensity sheeting

for virtually all highway signs since 1985; placement of street name signs in advance of intersections; use of reflective pavement markers on interstate and major primary routes; use of 12" signal lenses; use of auxiliary signals where road alignments make signals less visible; standard use of backplates to reduce glare behind signal heads and improve signal visibility; and use of warning signs and flashing lights to alert drivers to upcoming signals where sight distance is limited (Gehr, 1989). The state's cities and some large towns, however, employ their own traffic engineering personnel; their use of these countermeasures may differ.

DISCUSSION

The majority of problems described by older Virginia drivers fall into 4 categories: (1) roadway information problems; (2) reduced visibility problems; (3) problems related to complex or demanding driving environments; and (4) problems resulting from what are called "driver expectancy violations."

Most roadway information problems experienced by older Virginia drivers are related to signs (or their absence). Insufficient advance signing, confusing sign content, and not enough "informational redundancy" create problems for older Virginia drivers. These problems appear to be especially pronounced when older drivers try to locate interstate exits, but they occur in other driving situations as well.

Older Virginia drivers often mentioned visibility problems in the context of state highway driving and intersections, where sight distances were a concern of a number of respondents. The visibility of road markings in inclement weather was also a concern of a number of the respondents in this study. Complaints about large trucks were also complaints about reduced visibility, in part. And concerns about visibility are most evident in older Virginia drivers' comments about night driving, and the fact that many of them avoid it as much as possible.

Older drivers' concerns about complex or demanding driving environments are evident in their complaints about heavy traffic and high speeds, particularly on interstate highways. Also, their frequent practice of trip scheduling to avoid peak traffic confirms these concerns. Older drivers' appreciation of traffic signals, particularly those with protected turn phases, likely stems from the fact that signals reduce the demands on drivers' judgment.

Finally, older Virginia drivers' problems with "expectancy violations" (a term used in older driver research) are evident in their complaints about other drivers' behavior, poor signal

timing, and lagging green turn arrows. The majority of complaints about other drivers' actions are complaints about other drivers "doing the unexpected"--failing to yield, exiting immediately after passing, etc. These "expectancy violations" cause problems for older drivers for multiple reasons. They cause confusion or anxiety or, more often, force older drivers to try to react very quickly.

The problems older Virginia drivers experience on the road are quite consistent with the gradual changes of aging that medical professionals and cognitive psychologists have identified. This is not to say that younger drivers may not also have problems related to roadway information, visibility, expectancy violations, etc. However, by virtue of their better vision, or shorter reaction times, or being more accustomed to complex driving environments, younger drivers may be better able to adjust to these situations.

Comments made by older Virginia drivers indicate that they engage in a range of "self-regulating" behaviors, so that their driving abilities and confidence will not be pressed to the limit. They frequently schedule trips and avoid problem intersections, night driving, and snow driving. Most participants in this study freely admitted that aging can diminish one's driving ability, and many respondents endorsed more frequent license renewals for people above a certain age.

The review of older driver countermeasures indicated that it has often been difficult to obtain adequate data to evaluate interventions on the basis of accident rate reductions. Given the consensus among researchers about the problems that older drivers experience, and the relatively low cost of some countermeasures (e.g., advance warning signs), it would seem that accident rate reductions should not be the sole rationale for making improvements. Virginia has adopted a number of accommodative measures for older drivers on a broad scale in the past, and it should continue to do so in the future.

RECOMMENDATIONS

1. VDOT's Traffic Engineering Division, perhaps in cooperation with DMV, may wish to identify cities, towns, and counties in Virginia where older drivers are greatly overrepresented in accidents.

This analysis would involve comparing the percentage of older individuals in the population to the percentage of accidents involving older drivers. Ideally, multiple years of

data would be used to reduce the effects of year-to-year variations. If the data permit, analysis by driver at fault and/or type of accident would be desirable.

2. VDOT may wish to conduct additional focus groups to identify specific problem locations for older drivers in cities, towns, and counties.

The 10 focus groups that were conducted as part of this study yielded a wealth of information about specific problem locations for older drivers. The focus groups could be led by any of the 4 leaders involved in the older driver study and the local resident engineer. The resident engineer could then consider specific countermeasures for the problem locations identified in the groups. If particularly hazardous localities for older drivers are identified (Recommendation 1), focus groups should initially be held in those places.

3. VDOT may wish to encourage additional Traffic Engineering staff members and/or resident engineers to attend the FHWA short course on older drivers' needs and problems. These individuals could then serve as resource persons to (1) other VDOT staff, and/or (2) traffic engineers employed by the state's cities and towns.

The FHWA course provides an excellent 1-day overview of age-related changes in driving ability, older driver problems, and countermeasures. Although some VDOT staff have had the opportunity to take the course, others might benefit from it as well. Given demographic projections, VDOT should encourage its staff to become aware of older driver needs, problems, and suitable countermeasures.

4. AAA of Virginia and the AARP may wish to explore ways to increase the availability of their older driver improvement classes to residents of the state's more rural areas.

The availability of these courses in the state's larger urban areas is good. Numerous older Virginians residing in more rural areas could benefit from the opportunity to take the courses.

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APPENDIX A**Letter Sent to Potential Telephone Interview Respondents**

DEPARTMENT OF TRANSPORTATION
RAY D. PETHTEL, COMMISSIONER
RAY ALLEN, PH. D.
RESEARCH DIRECTOR



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IN REPLY PLEASE
REFER TO FILE NO

RAY D. PETHTEL
COMMISSIONER

Dear Mr./Mrs. _____:

The Virginia Transportation Research Council, an affiliate of the University of Virginia, is currently calling drivers around the state who are 55 and older. We are interested in finding ways to improve driving conditions and make driving easier and safer for drivers throughout Virginia. As an older driver with a vast array of driving experience to draw upon, we are especially interested in any ideas you have that can assist us in making such improvements.

Areas of interest to us include such things as traffic signals, intersections, road signs and markings, the effects of weather and lighting conditions, and the type of driving situations encountered, such as driving around town versus highway driving. We want to know what kinds of things are helpful to you as a driver. Then we can emphasize the use of these things in future traffic planning. Likewise, we are interested in what kinds of things, if any, create difficulties for you. We can then try to correct them in future planning.

In addition to the areas of general interest already mentioned, we would also like to know if you think there have been any changes in your driving over the years. As you may already know, most of our existing roads were developed when only a small portion of Virginia's drivers were in the older age groups. Current population trends show that more and more of the people driving on Virginia's roads will be drivers over 55. We need to be more aware of the needs and preferences of older drivers so that we can take these into account in future traffic planning and road design. Your experiences in this area can be extremely helpful to us in making such decisions. We feel that the actual experiences of our state's drivers can be most helpful in making future designs safer and easier for everyone.

Your name has been specially selected from a sample of Virginia drivers. In the next few weeks, we will call you and ask you to take part in a telephone interview about driving. All responses will be totally anonymous. We think your opinions will be very valuable. We hope that you will choose to participate in our efforts at improving driving conditions on Virginia's roads. If you have any questions in the meantime, please feel free to call us at (804) 293-1995 or 293-1947. Thank you.

Amy O'Leary and Randy Atkins

APPENDIX B

Older Driver Telephone Survey Instrument

TRANSPORTATION NEEDS OF THE OLDER DRIVER
TELEPHONE SURVEY

ID #: ___ ___ ___ R'S NAME: _____
CITY/TOWN: _____

START TIME: ___ ___ : ___ ___ AM OR PM?

SECTION I. DEMOGRAPHIC INFORMATION

[FIRST, I'D LIKE TO ASK A FEW BASIC BACKGROUND QUESTIONS]

- 1) Are you male or female? (ASK ONLY IF NECESSARY)
1=M
2=F
- 2) What year were you born in? ___ ___ ___
- 3a) How many years have you lived in <_____ place _____?>
___ ___ years [IF LESS THAN 10 YEARS, GO TO Q. 3B BELOW]
- 3b) What city or town did you live in before moving to <place>?
- 4) How would you describe the area where you live now? Is it...
1=In the city
2=In a suburb
3=In a small town, or
4=In the country?
- 5) What is the highest grade in school that you completed?
___ ___ grade 14=Some college 16=BA/BS 18=MA/MS/MBA
21=Ph.D./J.D./M.D
- 6) What is your current marital status?
1=Married
2=Widowed
3=Divorced or separated
4=Never married
9=No answer or refused
- 7) How many people currently live in your household, including you?
___ ___ people
- 8) How many people living in your household currently drive?
___ ___ people

SECTION I. DEMOGRAPHIC INFORMATION, cont.

9) [IF NECESSARY, ASK MARRIED RESPONDENTS]

Does your husband/wife currently drive?

1=No

2=Yes

9=NA or refused

10) Do you currently drive?

1=No [GO TO Q. 11A BELOW]

2=Yes [GO TO Q. 13]

[NON-DRIVERS ONLY]

11a) Did you ever drive?

1=No

2=Yes [GO TO Q.11B BELOW]

11b) [IF YES] How many years ago did you stop driving?

— — years ago

11c) [IF YES] Was there any particular reason you stopped driving?

12a) Since you don't drive, how do you usually get to places you need to go?

[CIRCLE 1= FOR EACH ITEM MENTIONED]

1=City bus

1=Cab

1=Metrorail

1=Senior citizen bus or van (JAUNT)

1=Spouse drives me

1=Other relative(s) drive me

1=Friend(s) drive me

1=Walk

Other: _____

12b) IS THERE ANYTHING THAT YOU THINK THE DEPT. OF TRANSPORTATION COULD DO TO MAKE DRIVING EASIER AND SAFER FOR PEOPLE OVER 55?

SINCE YOU DON'T DRIVE, I DON'T HAVE ANY MORE QUESTIONS FOR YOU.
 THANK YOU VERY MUCH FOR YOUR TIME. YOU HAVE BEEN VERY HELPFUL.
 [CONCLUDE INTERVIEW]

SECTION I. DEMOGRAPHIC INFORMATION, cont.

[DRIVERS ONLY]

13) What is your current employment status? Are you...

1=Retired [GO TO Q. 14]

2=A homemaker [GO TO Q. 14]

3=Employed part-time [GO TO Q. 15]

4=Employed full-time [GO TO Q. 15]

Other: _____

9=No answer or refused

14) **[IF RETIRED OR HOMEMAKER ONLY]**

How long have you been retired/ a homemaker?

__ __ years [GO TO Q. 24]

[EMPLOYED RESPONDENTS ONLY]

15) How many hours a week do you usually work?

__ __ hours/week

16) How many days a week do you usually work?

__ __ days

17) How do you usually get to work? Do you...

1=Drive yourself

2=Ride in a carpool or vanpool

3=Take public transportation

4=Walk to work

Other: _____

18a) How far is your workplace from your home?

__ __ miles or __ __ minutes

18b) What time of day do you leave home to go to work?

__ __ :__ __ A.M. P.M.

19) What time of day do you usually leave work to go home?

__ __ :__ __ A.M. P.M.

20) Do you do any driving as part of your job? That is, do your job responsibilities ever include driving?

1=No [GO TO Q. 24]

2=Yes [GO TO Q. 21]

[EMPLOYED R'S WHOSE JOBS REQUIRE DRIVING]

21) How many hours a week do you usually drive as part of your job?

__ __ hours/week

22) What kind of vehicle do you drive while working?

TYPE, MAKE, MODEL: _____

SECTION I. DEMOGRAPHIC INFORMATION, cont.

23a) Do you ever drive to a place 50 miles away or more
as part of your job?

1=No

8=DK

2=Yes

9=NA or refused

23b) [IF YES] How many times in the average month?
___ ___ times

SECTION II. PERSONAL DRIVING HABITS

[LET'S TALK ABOUT YOUR OWN PERSONAL DRIVING HABITS FOR A
MINUTE]

[IF R DRIVES AS PART OF A JOB]

[WHEN I SAY "PERSONAL DRIVING" I MEAN ALL DRIVING THAT YOU DO
EXCEPT FOR ON-THE-JOB DRIVING. PERSONAL DRIVING DOES INCLUDE
DRIVING TO AND FROM WORK.]

24) How old were you when you first started driving?
___ ___ years old

25) What kind of vehicle do you usually drive?

Year, Make, Model: _____

26) Do you usually wear eyeglasses to drive?

1=No

2=Yes

9=NA or refused

27) How often do you usually drive?

[PROMPT, IF NECESSARY: Several times a day, once a day, two or
three times a week, once a week, two or three times a month, once
a month or less.]

28. [IF YES TO Q. 9: MARRIED RESPONDENTS WITH SPOUSES WHO DRIVE]

When you and your husband/wife go somewhere together in-town,
how much of the driving do you do?

1=All of it

2=Most

3=Some

4=A little.

5=None of it

8=DK

9=NA or refused

SECTION II. PERSONAL DRIVING HABITS, cont.

29. When you and your husband/wife go someplace out-of-town together, how much of the driving do you do?
- | | |
|--------------|-----------------|
| 1=All of it | |
| 2=Most | 8=DK |
| 3=Some | 9=NA or refused |
| 4=A little | |
| 5=None of it | |

[ALL RESPONDENTS]

- 30) How often do you drive 100 miles or more in a single trip? By this I mean how often you are actually driving this much on a single trip, not as a passenger.

[PROMPT, IF NECESSARY: Once a week or more, several times a month, once a month, 3 or 4 times a year, twice a year, once a year or less, never.]

- 31) How many miles do you think you drive per week, on average?
 ___ ___ ___ ___ miles

8888=DK
 9999=No answer or refused

- 32) How many miles do you think you drive per year, on average?
 ___ ___ ___ ___ ___ miles

8888=DK
 9999=No answer or refused

- 33a) Over the last 2 or 3 years, have there been any changes in the amount of driving that you do?

1=No	8=DK
2=Yes	9=NA or refused

- 33b) **[IF YES]** What kinds of changes?

- 33c) **[IF YES]** Were there any particular reasons for the change(s)?

SECTION II. PERSONAL DRIVING HABITS, cont.

34a) Over the last 2 or 3 years, have there been any changes in the type of driving that you do?

1=No

2=Yes

8=DK

9=NA or refused

34b) [IF YES] What kinds of changes?

34c) [IF YES] Were there any particular reasons for the change(s)?

35a) How important is it to you to be able to drive yourself places? Would you say it is

1=Very important

2=Somewhat important

3=A little important, or

4=Not important at all?

8=DK

9=NA or refused

35b) What are the main reasons that you feel that way about being able to drive?

SECTION III. IN-TOWN DRIVING

[LET'S TALK FOR A MINUTE ABOUT IN-TOWN DRIVING. IN-TOWN DRIVING WOULD BE DRIVING TO THE GROCERY STORE OR RUNNING ERRANDS, FOR EXAMPLE. ANY DRIVING WHERE YOU MIGHT HAVE TO DEAL WITH INTERSECTIONS, TRAFFIC SIGNALS AND THE LIKE.]

36) Do you ever do any in-town driving?

1=NO [IF NO GO TO Q.45]

2=YES

37) When you drive in-town, how often do you have family or friends riding with you?

1=Always

2=Often

3=Sometimes

4=Seldom, or

5=Never

8=DK

9=NA or refused

SECTION III. IN-TOWN DRIVING, cont.

- 38a) Is there anything that you dislike about in-town driving where you live?
1=NO
2=YES
- 38b) [IF YES]
What is it that you dislike about in-town driving?
- 39a) Is there anything you especially like about in-town driving?
1=NO
2=YES
- 39b) [IF YES] What is it that you like about it?
- 40a) Do you ever try to schedule your in-town driving for certain times of the day?
1=No
2=Yes
8=DK
9=NA or refused
- 40b) [IF YES] What times of the day? Between what hours?

_____ [RECORD HOURS MENTIONED BY R]
- 40c) [IF YES] What are the main reasons you do your in-town driving then?
- 41) Is there anything else you do to make your in-town driving easier? What is that?

[PROMPT: DO YOU EVER TAKE ALTERNATE ROUTES OR MAKE A SERIES OF RIGHT HAND TURNS TO AVOID A DIFFICULT LEFT HAND TURN]

SECTION III. IN-TOWN DRIVING, cont.

[IN-TOWN DRIVING USUALLY INVOLVES INTERSECTIONS. SOME INTERSECTIONS HAVE STOPLIGHTS, WHILE OTHER INTERSECTIONS MAY ONLY HAVE STOP SIGNS OR YIELD SIGNS]

42a) Is there anything that you don't like about the intersections where you live?

1=NO

2=YES

42b) [IF YES]

What is it about those intersections that you dislike?

43a) Is there anything you dislike about trying to make left hand turns at intersections that do not have traffic lights? What might that be?

43b) Is there anything you like about making left hand turns at intersections without traffic lights? What might that be?

43c) Is there anything you dislike about trying to make left hand turns at intersections that do have traffic lights? What might that be?

43d) Is there anything you like about making left hand turns at intersections that do have traffic lights? What might that be?

SECTION III., IN-TOWN DRIVING cont.

- 44) Is there anything the Department of Transportation could do to improve conditions and make in-town driving easier? What would that be?

SECTION IV. INTERSTATE DRIVING

[NOW THAT WE'VE TALKED ABOUT DRIVING IN-TOWN, LET'S TALK ABOUT DRIVING ON THE HIGHWAYS--INTERSTATE HIGHWAYS AND STATE HIGHWAYS THAT AREN'T INTERSTATES]

[LET'S TALK ABOUT DRIVING ON INTERSTATES FIRST.
INTERSTATE # _____ (GIVE EXAMPLE) IS IN YOUR AREA]

- 45) Do you ever do any driving on interstate highways?
1=NO [IF NO GO TO Q.53]
2=YES
- 46) When you drive on the Interstate, how often do you have family or friends riding with you?
1=Always
2=Often
3=Sometimes
4=Seldom, or
5=Never
8=DK
9=NA or refused
- 47a) Is there anything you dislike about driving on the Interstate(s) where you live? What might that be? (Anything else?)
- 47b) Is there anything you especially like about driving on the interstates where you live? What might that be? (Anything else?)
- 48a) What speed do you usually like to drive on the Interstate?
__ __ miles per hour

SECTION IV. INTERSTATES, cont.

48b) Would you like to see the speed limits for Interstates changed? To what? Why?

49a) Do you try to schedule your Interstate driving for certain times of the day?

1=No

8=DK

2=Yes

9=NA or refused

49b) [IF YES] What time or times of the day? Between what hours?

_____ [RECORD HOURS]

49c) [IF YES] Why do you choose to drive at those times?

50) Is there anything else you do to make your Interstate driving easier? What is that?

51) Is it hard to find the proper exit or turn off you are looking for on the interstates you use? Why is that?

52) Is there anything the Department of Transportation could do to improve conditions and make your Interstate driving easier? What would that be?

SECTION IV. HIGHWAY DRIVING

[LET'S TALK ABOUT THE DRIVING YOU DO ON STATE HIGHWAYS THAT AREN'T INTERSTATES. THEY COULD BE 2-LANE OR 4-LANE ROADS. SOME STATE HIGHWAYS IN YOUR AREA ARE ROUTE #_____ (EXAMPLE) AND ROUTE #_____ (EXAMPLE)]

53) Do you ever do any driving on State highways?

1=NO [IF NO GO TO 59]
2=YES

54) When you drive on State highways, how often do you have family or friends riding with you?

1=Always
2=Often
3=Sometimes
4=Seldom, or
5=Never
8=DK
9=NA or refused

55) Is there anything you dislike about driving on State highways in the area where you live? What might that be?

56) Is there anything you like about driving on the State highways in the area where you live? What might that be?

57a) Do you try to schedule your driving on State highways for certain times of the day?

1=No
2=Yes
8=DK
9=NA or refused

57b) [IF YES] What time or time(s) of the day?

_____ [RECORD HOURS MENTIONED]

57c) [IF YES] Why do you choose to drive at those times of day?

SECTION IV. HIGHWAY DRIVING, cont.

- 58) Is there anything the Department of Transportation could do to improve conditions and make your driving on State highways easier? What would that be?

WE HAVE TALKED ABOUT THREE TYPES OF DRIVING; DRIVING IN-TOWN, ON INTERSTATES, AND ON STATE HIGHWAYS. I WOULD LIKE TO GET SOME IDEA OF HOW MUCH OF YOUR DRIVING IS DONE IN EACH TYPE OF SITUATION.

- 59a) Approximately what percentage of your total driving, in time behind the wheel or miles driven, is done in-town?
- 59b) Approximately how much of your total driving is done on interstates?
- 59c) Approximately how much of your total driving time is done on State Highways?

SECTION V. SIGNALS

[LET'S TALK ABOUT STOPLIGHTS OR TRAFFIC SIGNALS. DEPENDING ON WHERE YOU LIVE, THERE MAY BE MANY STOPLIGHTS OR ONLY A FEW.]

- 60a) Are there any stoplights in your city or town that you don't like?
- | | |
|-------------------------|-----------------|
| 1=No [IF NO GO TO Q.62] | 8=DK |
| 2=Yes | 9=NA or refused |
- 60b) [IF YES]
What is it that you don't like about them (it)?

SECTION V. SIGNALS, cont.

60c) [IF YES] How do you usually deal with stoplights you don't like?

60d) [IF YES] How often, if ever, do you avoid those lights?

- 1=Always
- 2=Often
- 3=Sometimes
- 4=Seldom, or
- 5=Never

61) Is there anything that can be done to improve these stoplights? What might that be?

62) Is there anything that you especially like about any of the traffic lights in your area? What might that be?

SECTION VI. SIGNS AND MARKINGS

[SINCE WE'VE TALKED ABOUT YOUR DRIVING ON DIFFERENT KINDS OF ROADS, I'D LIKE TO HEAR WHAT YOU THINK ABOUT ROAD SIGNS AND ROAD MARKINGS]

63a) When you're driving, are there any types of road signs you dislike or find confusing?

- 1=No
- 2=Yes
- 8=DK
- 9=NA or refused

63b) [IF YES]
Which kinds of signs do you dislike?

SECTION VI. SIGNS AND MARKINGS, cont.

63c) [IF YES] What kinds of problems, if any, do these road signs pose for you?

64) What are the main things the Department of Transportation could do to make these road signs more helpful to you?

65) Are there any types of road signs that you especially like?
[IF YES] What are they? Why do you like them?

66a) How about the markings on the road, such as the painted lines? Are there any road markings you dislike?

1=No

8=DK

2=Yes

9=NA or refused

66b) [IF YES] Which kinds of markings do you dislike?

66c) [IF YES] What kinds of problems, if any, do these road markings pose for you?

SECTION VII. SIGNS AND MARKINGS, cont.

- 67) What are the main things the Department of Transportation could do to make these types of road markings more helpful to you?
- 68) Are there any types of road markings that you especially like? What are they? Why do you like them?

SECTION VII. WEATHER AND TIME OF DAY EFFECTS

[SOMETIMES PEOPLE HAVE PROBLEMS SEEING SIGNS OR MARKINGS AT NIGHT OR IN CERTAIN KINDS OF WEATHER. LET'S TALK ABOUT HOW THE TIME OF DAY AND WEATHER CONDITIONS AFFECT YOUR DRIVING]

- 69) How often do you drive at night? (PROMPT: Would you say you never, seldom, sometimes, or often drive at night?)
- 70) Is there anything you like about driving at night? What might that be?
- 71a) Is there anything you dislike about driving at night? What would that be?
- 71b) [IF DISLIKES] What types of difficulties, if any, do these things cause you when you are driving at night?

SECTION VII. NIGHT DRIVING, cont.

71c) What are the main things the Department of Transportation could do to make nighttime driving easier and safer?

SECTION VII. DRIVING IN RAIN

[LET'S TALK ABOUT THE EFFECTS OF WEATHER ON YOUR DRIVING FOR A MINUTE].

72) How do you feel about driving in the rain?

73) [IF HAS DISLIKES] Does driving in the rain ever pose any difficulties for you? What are they?

74) Do you ever avoid driving in rain? How often?

(PROMPT: Would you say never, seldom, sometimes, often, or always.)

SECTION VII. DRIVING IN SNOW

75) What about snow? Do you dislike driving in snow?

1=No

8=DK

2=Yes

9=NA or refused

76) [IF YES] Why do you dislike driving in the snow?

SECTION VII. DRIVING IN SNOW, cont.

77) Do you ever avoid driving in the snow? How often?

(PROMPT: Would you say never, seldom, sometimes, often, or always.)

78) Based on your experience, what do you think the Department of Transportation could do to make bad weather driving easier for you?

SECTION VIII. OLDER DRIVERS

[WE ARE INTERESTED IN WHAT YOU THINK ABOUT DRIVERS AGED 55 AND OLDER AS A GROUP, BASED ON YOUR OWN EXPERIENCE]

79a) Of course, every age group has drivers of different abilities--some better, some worse. In general, though, how do you think drivers 55 and older compare to drivers of other age groups?

[PROBE: IN WHAT WAYS DO YOU THINK DRIVERS 55 AND OLDER MAY BE BETTER THAN DRIVERS IN OTHER AGE GROUPS? IN WHAT WAYS DO YOU THINK THEY MAY NOT BE AS GOOD?]

79b) [IF RESPONDENT DOES NOT MENTION PHYSICAL CHANGES OF AGE]
Are there any particular kinds of changes that affect many drivers 55 and older, in your opinion? What are the most important ones?

SECTION VIII. OLDER DRIVERS, cont.

80a) Right now, Virginia driver's licenses are good for five years, regardless of the driver's age. Some of the 55 and older drivers we have interviewed think that people above a certain age should renew their driver's licenses more often than that. What do you think about that? Do you strongly agree, agree, disagree, or strongly disagree with that idea?

1=Strongly agree

8=DK

2=Agree

9=NA/refused

3=Neither agree nor disagree

4=Disagree

5=Strongly disagree

80b) What are the main reasons you feel that way?

[IF AGREE ONLY]

80c) At what age should this be the case?

80d) In your opinion what should the DMV require of people above that age before renewing their license?

[PROMPT: Are there any types of tests or examinations that should be required?]

[CIRCLE 1= FOR ALL ITEMS MENTIONED]

1=Written test

1=Eye test

1=Behind-the-wheel test

1=Physical examination

Other:

81a) Some of the people we have interviewed say they would be interested in taking a driver's review course, like the one offered by AAA or AARP's "55 Alive." Do you think that such review driving courses are a good idea?

1=No

2=Maybe

3=Yes

8=DK

9=NA or refused

[RECORD ANY COMMENTS BY RESPONDENT]

SECTION VIII. OLDER DRIVERS, cont.

81b) [IF YES OR MAYBE] What should be included in the review course? Should it include some classroom learning?

1=No

2=Maybe

3=Yes

8=DK

9=NA or refused

81c) Should the review course include some behind-the-wheel training?

1=No

2=Maybe

3=Yes

8=DK

9=NA or refused

81d) What are the main things you think such a course should cover?

SECTION IX. MISCELLANEOUS ISSUES

82) Are there any other concerns or problems with driving in (respondent's location) that we should know about? What are they?

[I DON'T HAVE ANY MORE QUESTIONS FOR YOU. ARE THERE ANY QUESTIONS YOU WOULD LIKE TO ASK ME ABOUT THE STUDY?]

[THANK YOU VERY MUCH FOR YOUR TIME AND PARTICIPATION. TALKING TO PEOPLE LIKE YOU REALLY HELPS US UNDERSTAND THE NEEDS OF DRIVERS 55 AND OLDER. WE WILL USE THE INFORMATION FROM THESE INTERVIEWS TO MAKE RECOMMENDATIONS TO THE DEPARTMENT OF TRANSPORTATION AND OTHER GROUPS]

[CONCLUDE INTERVIEW]

FINISH TIME: __ __: __ __ AM OR PM?