Consequences of Driving Cessation: Decreased Out-of-Home Activity Levels

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Objectives. Increasing age, socioeconomic factors, and declining function and health have been linked to driving cessation, but little is known about the consequences of stopping driving. This study was designed to test the hypothesis that driving cessation leads to a decline in out-of-home activity levels.

Methods. In 1989 a survey of driving practices was administered to surviving noninstitutionalized members of the New Haven Established Populations for Epidemiologic Studies of the Elderly (EPESE) cohort. Of 1,316 respondents, 502 were active drivers as of 1988, 92 had stopped driving between 1982 and 1987, and 722 never drove or stopped before 1982. Information on sociodemographic and health-related variables came from in-home EPESE interviews in 1982, 1985, and 1988, and from yearly phone interviews. Activity was measured at all three in-home interviews, and an activity measure was created based on self-reported participation in nine out-of-home activities. A repeated measures random-effects model was used to test the effect of driving cessation on activity while controlling for potential confounders.

Results. Driving cessation was strongly associated with decreased out-of-home activity levels (coefficient–1.081, standard error 0.264, $p < .001$) after adjustment for sociodemographic and health-related factors.

Discussion. The potential consequences of driving limitations or cessation should be taken into account when advising older drivers and developing alternative transportation strategies to help maintain their mobility.

THE number of older drivers is increasing as the U.S. population ages (Retchin & Anapolle, 1993). Because of declines in health, functional abilities, or finances, many older drivers must decide whether to continue, limit, or stop driving. Given that driving a personal automobile is the primary means of transportation for most older persons, this decision has important implications for an individual's ability to continue participating in out-of-home activities.

A growing body of evidence indicates that out-of-home activity not only affects well-being in old age, but may also have important consequences for physical health status. A higher level of social interconnectedness, or social integration, has been linked to lower mortality risk. Out-of-home activity, such as church attendance and participation in non-religious group activities, is often a key ingredient in measures of social integration (Glass, Mendes de Leon, Seeman, & Berkman, 1997). Recently, studies focusing more specifically on social activities, instead of social integration, have found that they are significantly associated with improved survival and better functional status (Bygren, Konlaan, &

Johansson, 1996; House, Robbins, & Metzner, 1982; Phillips & King, 1988; Welin, Larsson, Svardsudd, Tibblin, & Tibblin, 1992). In the same population used in the current study, social and productive activities were independently associated with lower mortality risk even after controlling for relevant health and sociodemographic factors (Glass, Mendes de Leon, Marottoli, & Berkman, 1999). Thus, the ability to participate in out-of-home activities provides an important context in which to examine the effects of driving cessation among older adults.

Older persons are dependent on cars for their transportation. Rosenbloom (1993) notes that more than 80% of trips occur in a private vehicle (as a driver or passenger), even among the oldest old. Also, approximately 80% of women and 90% of men age 70 years and older have drivers' licenses. In a study of driving patterns over a 10-year period, Jette and Branch (1992) reported that the vast majority of older persons in the cohort used a car as their primary mode of transportation and continued to do so over the 10 years.

To date, most studies addressing driving cessation have

focused on the factors that contribute to stopping driving, not on consequences of having stopped. Several recent community-based studies, utilizing diverse samples, have found similar sociodemographic and health-related factors associated with driving cessation. These studies included: the 1,656 surviving participants age 65 years and older in the Florida Geriatric Research Program in Dunedin, Florida (Campbell, Bush, & Hale, 1993); the 1,331 surviving participants age 65 years and older in the New Haven, Connecticut, site of the Established Populations for Epidemiologic Studies of the Elderly (EPESE) project (Marottoli et al., 1993); the 1,625 participants 65 years and older in the Massachusetts Health Care Panel Study (Jette & Branch, 1992); and the 2,293 respondents age 50 years and older to the 1990 health supplement to the Panel Study of Income Dynamics (Kington, Reuben, Rogowski, & Lillard, 1994). In each of these studies advancing age, female gender, poorer health (defined as poorer self-perceived health or the presence of neurological disorders [such as stroke or Parkinson's disease] or visual impairment or disorders [such as cataract, macular degeneration, or retinal hemorrhage]), and functional limitations (including impairment in basic or instrumental activities of daily living or higher level physical activities) were associated with driving cessation.

Little is known, however, about the consequences of driving cessation. An important methodological challenge in this research is that the main precipitants of driving cessation (especially declining health) also affect the outcome (in this case, activity restriction). In other words, declining health may well result in reduced activity regardless of the ability to drive. Longitudinal studies with multiple measurements are best suited to disentangling the effect of driving cessation from the common antecedents of driving cessation and its consequences. Using such a longitudinal model, we recently reported that driving cessation was followed by a significant increase in depressive symptoms, even adjusting for the changes in sociodemographic and health-related factors commonly associated with depressive symptoms in old age (Marottoli et al., 1997). The current study investigated the association between driving cessation and changes in out-of-home activities.

Given the link between activity level and health status and well-being, as well as the reliance of older persons on driving to meet transportation needs, we hypothesized that driving cessation would contribute to a decline in out-of-home activities. Younger people, with fewer physical limitations, may have a wider range of transportation options including walking, biking, and using public transportation. Older persons with limited mobility may be less able to utilize these options, especially in inclement weather. As a result, driving cessation may constrict the activity levels of older individuals. The purpose of this study was to test the hypothesis that driving cessation leads to a decline in out-of-home activity levels after controlling for health and functional status, using data from a longitudinal study of community-dwelling elderly individuals. Knowledge of the consequences of driving cessation will help us advise older individuals contemplating driving cessation. Furthermore, this knowledge will stimulate the development of interventions and alternative transportation strategies to decrease the adverse effects of cessation.

METHODS

Participants

Participants came from the New Haven site of the Established Populations for Epidemiologic Studies of the Elderly (EPESE) cohort, one of four sites funded by the National Institute on Aging. This probability sample of 2,812 noninstitutionalized men and women aged 65 years and older living in New Haven, Connecticut, in 1982 was stratified by housing type with an oversampling of men. Housing types included public housing complexes (age and income restricted), private housing complexes (age restricted), and community dwellings. Details of the sampling design have been described previously (Berkman et al., 1986). Consent procedures were reviewed and approved by the Yale University School of Medicine human investigation committee, and consent was obtained from all participants.

Data Collection

Data for this analysis came from the baseline and yearly follow-up interviews of the New Haven EPESE study. In-home interviews were conducted at baseline in 1982 and every third year thereafter (1985, 1988), and telephone interviews were conducted in intervening years (1983, 1984, 1986, 1987) and the two years following the last in-person interview (1989 and 1990). These interviews were performed by trained research associates blinded to study questions. Questions on driving practices were added to the seventh follow-up interview in 1989. The driving segment was administered to all surviving cohort members in 1989 ($n = 1,684$), with the exception of the persons living in institutions ($n = 225$). Of the remaining 1,459 eligible persons, 143 (9%) had missing driving data, due to either a missed interview ($n = 78$) or incomplete data ($n = 65$), leaving a total of 1,316 individuals. Because they were 7-year survivors, these 1,316 persons were on average younger, more likely to be female, and healthier compared to the overall cohort at baseline.

Measures

The 1989 driving survey was designed to ascertain driving history and current driving practices. Subjects were asked if they were still driving or if they had ever driven, but had stopped. Those who indicated having stopped driving were asked how many years ago they had stopped. From these data, we reconstructed the year they had stopped to create the driving cessation variable. For example, a person reporting having stopped 5 years ago was assumed to have stopped in 1984 (1989 − 5 years). If a person reported having stopped more than 7 years ago, then he/she was considered a nondriver at baseline (1982).

Information on an individual's activity level was ascertained only during the in-home interviews in 1982, 1985, and 1988. The activity measure was constructed on the basis of self-reported participation in a number of activities that were social in nature and that were likely to require some degree of out-of-home mobility so that driving cessation might affect participation. Nine activities were included in

the measure: shopping; going to a movie, restaurant, or sporting event; taking day or overnight trips; performing unpaid community or volunteer work; performing paid community work; regularly playing cards, games, or bingo; attending religious services; participation in nonreligious voluntary organizations; and paid employment. Each item was coded on a 0–2 scale based on frequency of participation, with 0 indicating never participating, 1 indicating participating sometimes, and 2 participating often. However, group participation and paid employment were asked by yes/no questions, which were recoded to 2 (= yes) and 0 (= no). The activity measure was created by summing these scores across the nine activities, with a possible range from 0 to 18 points. The activity variable was set to missing if five or more of the nine component items were missing (1% of the subjects at each interview). Otherwise, a mean imputation was employed based on the average of the nonmissing items (<2.5% at each interview).

In constructing the activity measure, no specific assumptions were made about intercorrelations among the individual activities that compose it. Choices about activity participation are subject to zero-sum conditions. That is, the choice to spend time doing one activity means that one has less time to do other activities; a heavy commitment to one activity would rule out commitment to other activities. As Thoits (1995) has argued about stressful life events, there is no a priori reason that individual activity items should be highly correlated. No latent measure of activity level is presupposed that will determine the value of answers to questions about activities that are chosen. Thus, an aggregated summation of discrete (in some cases unrelated) activities constitutes a reasonable index of the amount of activity in which a participant engages.

Sociodemographic and health-related features that could affect the outcome were also assessed. Sociodemographic factors included age, gender, race, marital status (married vs not married), number of years of education, and housing type (public housing complex, private housing complex, or independent community residence). Health-related factors included the presence or absence of several medical conditions including arthritis, cancer, diabetes, hip or other fracture, hypertension, myocardial infarction, and stroke. These were categorized as present if participants reported that a doctor had told them they had the condition or if they had been hospitalized for it. Individual conditions were added into a summary index of chronic conditions. Cognitive status was measured by the number of errors on the Short Portable Mental Status Questionnaire (Pfeiffer, 1975) and dichotomized at four or more errors (Fillenbaum, 1980). Sensory impairments were defined as self-reported problems with vision (inability to recognize a friend across the street) and hearing (inability to understand a conversation without seeing the speaker's face; Cornoni-Huntley, Brock, Ostfeld, Taylor, & Wallace, 1986). Limitations in basic activities of daily living (ADLs) were ascertained by asking whether the subject required help or was unable to do the following tasks: dressing, bathing, transferring, grooming, toileting, eating, and walking across a room (Katz, Downs, Cash, & Grotz, 1970). A summary index was created by adding the number of tasks with limitations.

Analysis

Baseline characteristics of the three driving groups (drivers, stopped driving 1982–1987, and nondrivers) were compared using chi-square tests for categorical variables and analysis of variance for continuous variables. The main analysis focused on modeling the effect of driving cessation on changes in activity level during follow-up, using data from the three in-home interviews. We fitted a random-effects model with a linear link function to estimate an individual's trajectory of change in activity during follow-up as a linear function of a set of explanatory variables. This model further assumes that the average effect of each explanatory variable varies between individuals because of unmeasured factors, and that this variability can be represented by normally distributed random components (Diggle, Liang, & Zeger, 1994). We fitted two random components to account for individual variability in activity at baseline (random intercept) and in rate of change in activity during follow-up (random slope), as well as the interaction of intercept with slope. Preliminary analysis revealed that a linear change (decline) in activity over time provided an adequate fit of the data. We next fitted the effect of driving status at baseline and change in driving status (cessation) at each follow-up interview. Additional variables were added to the model, based on the literature on determinants of either driving status or activity in older adults.

In the first model, we tested the effect of driving cessation after adjustment for age, sex, race, housing stratum, and baseline driving status. Next, we examined the degree to which the association between driving cessation and activity was affected by other major determinants of activity, in particular education, marital status, cognitive impairment, visual problems, hearing problems, number of chronic conditions, and basic ADLs. Additional adjustment for income did not affect any of the findings. Marital status and all health-related variables were updated at each follow-up interview to account for change over time in each of these variables, affording rigorous adjustment for the potential confounding due to these factors, because changes since baseline, particularly in health, may affect both the decision to stop driving and activity level.

Information on driving cessation was related to the timing of the in-home interviews in the following way: Those who reported having stopped between 7 and 5 years ago and between 4 and 2 years ago were assumed to have stopped during the first interval between in-home interviews (1982–1985) and the second interval (1985–1988), respectively. This variable was coded as one dummy variable and modeled as a time-varying covariate to reflect the average effect of driving cessation on change in activity during follow-up. The lack of an exact date of driving cessation posed a problem in the years of the in-home interviews (1982, 1985, 1988), because we could not determine whether cessation occurred before or after the interview. For the analyses, we coded it both ways: (a) assuming that cessation reported during face-to-face interviews occurred *before* the interview, and (b) *after* the interview. Both analyses yielded similar findings; only the results for the latter are reported here because this coding ensures that cessation preceded change in activity. In other words, driving cessation re-

ported for the year 1985 contributes to change in activity in 1988, and not to change in 1985.

Currently, no commercially available software is available to compute weighted random-effects models adjusted for the complex sampling design. Dummy variables for housing stratum were therefore added to all models to account for the complex sampling design. Sex, the other sampling variable, was already included in the models. We further examined the potential impact of the sampling design by testing whether the effect of driving cessation varied significantly by housing stratum or sex, but no significant interactions were found. The random effects models were fitted using the Proc Mixed procedure in SAS (SAS Institute, 1997).

RESULTS

Of the 1,316 participants, 502 (38%) were active drivers as of 1988, 92 (7%) had stopped driving between 1982–1987, and 722 (55%) had never driven or had stopped driving before 1982. Participants' baseline characteristics are depicted in Table 1. Compared to the other two groups, active drivers were more likely to be younger, male, married, live in the community, have more years of education, and have fewer visual problems, chronic medical conditions, ADL limitations, and cognitive difficulties.

The mean activity score at baseline was 6.45, with a standard deviation of 3.08 and a range of 0–16. We first examined the amount of change in activity during follow-up by modeling activity as a function of time only. The results indicate a small but significant decline in activity levels during follow-up; the average of the subject-specific paths of decline was about 0.12 units per year ($\beta = -0.118$, $p < .001$), or about 0.36 units (3×0.12) on the activity measure between each two in-home interviews (data not shown). There was also substantial heterogeneity between subjects in terms of initial activity level (intercept parameter = 6.36, $p < .001$) and in terms of rate of decline during follow-up (slope parameter = 0.07, $p < .001$). In addition, the negative intercept by slope interaction (parameter = -0.014, $p = .004$) suggests that subjects with higher initial values

show the greatest decline, and those with the lowest initial values show the least decline or most improvement (regression-to-the-mean effect).

The results of the main random-effects analysis are presented in Table 2. Of the 1,316 subjects, 67 (5%) were removed from this analysis because of missing data on activity during follow-up or on predictor variables. In this model, there was still a significant main effect for time ($\beta = -0.049$, $p = .03$), but activity decline over time varied as a function of age, indicating more decline at higher ages ($\beta = -0.008$, $p = .002$). Age also had a negative main effect on activity ($\beta = -0.030$, $p = .04$). Men and residents of private housing complexes (compared to community residents) reported significantly lower activity levels ($p \leq .01$ for each). Driving at baseline had a significant positive effect ($\beta = 1.820$, $p < .001$) on activity level, indicating that those who drove at baseline had, on average (across all three interviews), a higher activity level compared with subjects who did not drive at baseline. Driving cessation, on the other hand, was negatively associated with activity ($\beta = -1.293$, $p < .001$), indicating that those who had stopped driving reported lower activity levels during the subsequent in-home interview(s). The magnitude of the decline in activity due to driving cessation is more than three times higher than the average decline in the cohort for each 3-year follow-up period (0.36).

Adjustment for sociodemographic and health-related variables reduced the association of both driving at baseline ($\beta = 1.216$, $p < .001$) and driving cessation ($\beta = -1.081$, $p < .001$) with activity, but both effects remained statistically significant (see Table 2, right column). This suggests that part of the effect of driving cessation on activity level is mediated by these factors, but that most of it is independent of health and sociodemographic factors. Education and all health-related variables were significantly associated with activity, but marital status was not.

DISCUSSION

Driving cessation was associated with a decrease in out-of-home activity levels even when adjusting for sociodemo-

Table 1. Participant Characteristics at Baseline in 1982 (Overall and by Driving Status During Follow-up)[a]

Variable	Total Cohort at Baseline (1982) $n = 1316$	Never Drove or Stopped Driving Before 1982 $n = 722$	Stopped Driving 1982–1987 $n = 92$	Driving as of 1988 $n = 502$
Age	72.1 (5.5)[b]	73.5 (5.9)	73.3 (5.1)	69.9 (4.3)***
% Male	38	17	51	65***
% African American	21	26	18	13***
Education (years)	9.3 (3.9)	8.1 (3.6)	9.5 (3.7)	11.0 (3.6)***
Housing stratum				
% Public complex	22	33	21	7***
% Private complex	28	30	35	23
% Community	50	37	45	70
% Married	43	28	43	64***
% ≥.4 SPMSQ errors	7	10	4	2***
% Visual problems	7	10	7	3***
% Hearing problems	9	9	11	8
% ≥1 ADL limitations	7	9	9	3***
No. medical conditions	1.5 (1.1)	1.6 (1.1)	1.5 (1.2)	1.3 (1.0)***

[a]Data source: New Haven Established Populations for Epidemiologic Studies of the Elderly.
[b]Mean (standard deviation).
*$p < .05$; **$p < .01$; ***$p < .001$.

Table 2. Association of Driving Cessation With Change in Out-of-Home Activity Adjusting for Relevant Sociodemographic and Health-Related Factors: Results From Random-Effects Models ($n = 1249$)[a]

Variable	Coefficient (SE)[b]	Coefficient (SE)[c]
Intercept	6.213 (.280)***	5.390 (.308)***
Time	−0.049 (.022)*	−0.027 (.023)
Age	−0.030 (.015)*	−0.012 (.014)
Age × Time	−0.008 (.002)**	−0.005 (.002)*
Sex (male)	−0.827 (.158)***	−0.684 (.157)***
Race (African American)	−0.293 (.197)	0.240 (.185)
Public housing complex[d]	0.367 (.207)	0.102 (.200)
Private housing complex[d]	−0.420 (.166)**	−0.581 (.160)***
Married		−0.087 (.132)
Education		0.165 (.019)***
Cognitive impairment		−0.626 (.146)***
Visual problems		−0.551 (.266)*
Hearing problems		−0.473 (.218)*
No. of chronic conditions		−0.103 (.047)*
No. of ADL limitations		−0.696 (.060)***
Driving at baseline	1.820 (.170)***	1.216 (.171)***
Driving cessation	−1.293 (.261)***	−1.081 (.264)***

[a]Data source: New Haven Established Populations for Epidemiologic Studies of the Elderly.

[b]Regression coefficient (standard error), adjusted for basic demographic information.

[c]Regression coefficient (standard error), adjusted for sociodemographic, health, and function variables.

[d]Community stratum is referent category.

*$p < .05$; **$p < .01$; ***$p < .001$.

graphic and health-related factors in this cohort of older persons followed longitudinally. Among the strengths of the study were the utilization of a cohort that at its inception was representative of community-living older persons; the prospective collection of information on activity participation that allowed for the determination of the trajectory of outcomes over a 6-year period; and the inclusion of prospectively collected information on sociodemographic and health-related factors that could potentially affect the outcome and that was updated during follow-up.

There were also several limitations to the study. At the time of the transportation survey, self-reports were used to ascertain the timing of driving cessation, but we lacked information on the exact timing of driving cessation and changes in activity levels. As noted above, this posed a particular problem for individuals who reported stopping driving in the same year that activity assessments occurred. To ensure that change in the activity did not precede cessation, it was assumed that cessation took place after the interview for those years. Thus, these analyses do not reveal the exact temporal relationship between driving cessation and changes in activity levels, but they do demonstrate the association between driving cessation and decreases in out-of-home activity levels, independent of the other measured factors. Because this study was done in a small northeastern city (New Haven, CT) that offers reasonably good public transportation alternatives for elderly people, it is possible that the deleterious effect of driving cessation on activity levels would be more pronounced in cities and suburban or rural areas without such services.

Also, the range of social and productive activities included in the activity measure was limited by the number of items available in the original interview. It is possible that individuals may have substituted other activities or that participation frequencies may have changed more subtly than could be detected by the measure. While we are unable to directly address the former possibility given the available data, the latter possibility may actually strengthen the findings given that if even a crude frequency measure can identify an association between driving cessation and decreased activity levels, a more precise measure may have found an even stronger association.

Medical conditions were ascertained by self-report. Some conditions (such as Parkinson's disease) had very low prevalence in the cohort and were not included in the index. In addition, there was a limited range of conditions available in the original interview. It is possible that other conditions may have existed that affected both the decision to stop driving and to participate in activities. However, we did have information on the most common conditions, including sensory impairments and functional limitations likely to affect driving status, and we updated this information yearly.

The findings of this study suggest that driving cessation may adversely affect an older individual's activity level. This in turn may have further negative consequences. Increasing evidence supports the idea that out-of-home activity levels affect health status, well-being, and survival in old age (Mor et al., 1989; Paffenbarger, Hyde, Wing, & Hsieh, 1986; Phillips & King, 1988; Slattery, Jacobs, & Nichaman, 1989; Welin et al., 1985; Zimmer, Hickey, & Searle, 1995). An active lifestyle has been shown to be protective against the risk of stroke (Abbott, Rodriguez, Burchfiel, & Curb, 1994; Kiely, Wolf, Cupples, Beiser, & Kannel, 1994; Lapidus & Bengtsson, 1986; Wannamethee & Shaper, 1992), heart disease (Hartley, 1985; Paffenbarger, Wing, & Hyde, 1978), and fractures (Michel, Bloch, & Fries, 1992). Activity levels have been shown to be associated with health promotion behaviors (Gillis & Perry, 1991), with recovery from illness such as myocardial infarction (Yates & Belknap, 1991), with perceived health status (Lindgren, Svardsudd, & Tibblin, 1994), and with psychosocial outcomes (Hoyt, Kaiser, Peters, & Babchuk, 1980; Jackson, 1985). Zimmer and colleagues (1995) demonstrated a link between social activity and well-being among older persons with arthritis. Among older adults, inactivity has also been shown to increase the risk of disability (Hubert, Bloch, & Fries, 1993; Simonsick et al., 1993). Recently, disengagement from out-of-home activities has also been shown to be associated with declines in cognitive function among elderly persons (Bassuk, Glass, & Berkman, 1999).

In addition to a lower risk of disabling illnesses, numerous studies have linked activity level with lower risk of mortality. A prospective study of 2,754 adults in Tecumseh, Michigan (House et al., 1982) found that men who reported high levels of social activity were less likely to die during 9–12 years of follow-up. Welin and colleagues (1992) reported that social activities were associated with cardiovascular mortality and with other sources of mortality, but not with cancer mortality. Framingham Study data have shown that activity levels and work-related activity are protective

against cardiovascular mortality (Kannel, Belanger, D'Agostino, & Israel, 1986).

In the current study, the association between driving cessation and decline in out-of-home activity level remained statistically significant even when adjusting for sociodemographic and health-related factors. However, it is also evident from these analyses that many other factors contribute to declining activity levels. Some of these factors may also contribute to the decision to stop driving. This process suggests a number of potential interventions. If function or health status can be improved, it may be possible to delay driving cessation. Alternatively, if such interventions are not possible or not successful, it may be possible to focus on ways to maintain activity levels among older persons who stop driving, both on a personal and public policy level. These might include advance planning for alternative transportation, improved transportation options, and more senior centers. In any case, a better understanding of the factors involved will help in the development of approaches to maintain safe mobility as long as possible.

Similarly, we have previously reported a negative effect of driving cessation on depressive symptoms (Marottoli et al., 1997). It is possible that the observed association with decreased activity is at least in part a consequence of increased depressive symptoms following driving cessation. However, the correlations between depressive symptoms (Center for Epidemiological Studies-Depression Scale score) and out-of-home activity levels at each interview are modest (Pearson's $r = -0.23$ to -0.26), and further adjustment for depressive symptoms in the multivariable models has only a relatively small effect (10%) on the magnitude of the association of driving cessation with activity level, which remains highly statistically significant. Moreover, the temporal relationship between these adverse effects of driving cessation is unclear, because increased depressive symptoms following driving cessation may lead to decreased activity, but decreased activity itself may exacerbate feelings of depression. The New Haven EPESE study is not well suited to addressing the exact temporal order of this relationship due to a lack of more detailed data on the course of behavioral and emotional changes after driving cessation. However, the present analysis suggests that the effects of driving cessation on these adverse outcomes are largely independent of one another, and highlights another potential target (depressive symptoms) for monitoring and intervening to maintain mobility.

This study provides prospective evidence in support of our hypothesis, that driving cessation is associated with decreased out-of-home activity levels. While earlier studies have focused on the factors associated with cessation, little information is available on the consequences of having stopped driving. There are a number of potential clinical and policy implications of these findings. Clinicians are often asked to make a recommendation about the possible need for driving limitations or cessation by patients or concerned family members. The potential negative effects of driving cessation, such as decreases in activity levels demonstrated here and increases in depressive symptoms (Marottoli et al., 1997), should not discourage clinicians from addressing this issue with patients and family members.

Rather, it should provide the impetus to develop more accurate assessment instruments to determine who is at increased risk for driving safety difficulties. From a licensing perspective, caution should be exercised in crafting legislation until acceptable levels of risk are identified in order to avoid overregulating and unnecessarily preventing large numbers of people from driving, with potentially substantial negative effects on their lifestyles. There is a need for a fair and evidence-based assessment process that will allow us to identify individuals truly at increased risk for safety difficulties; this assessment will help people reach appropriate decisions about continued driving while still being able to maintain mobility. At the same time, developing a range of acceptable transportation options may encourage people who need or want to limit or stop driving to do so. Providing at-risk individuals and their families with appropriate information on the risks of continued driving versus cessation and the availability of transportation options may facilitate planning for the transition to driving limitations or cessation. These findings should encourage older persons, family members, and clinicians to begin planning for the future transportation needs of the older driver, so that mobility, independence, and activity levels can be maintained even if they are no longer able to drive.

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