34. Welford AT. Motor skills and aging. In Mortimer J, Pirozzolo FJ, Maletta G (eds) The Aging Motor system. New York: Praeger, 1982, pp. 152–87.
35. Nashner LM, Black FO, Wall C. Adaptation to altered support and visual conditions during stance: patients with vestibular deficits. J Neurosci 1982; 2: 536–44.
36. Peterka RJ, Benolken MS. Role of somatosensory and vestibular cues in attenuating visually induced human postural sway. Exp Brain Res 1995; 105: 101–10.

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# Driving cessation in patients attending a memory clinic

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## Abstract

**Background:** driving is an increasingly important form of transport for older people. Dementia is common in later life and will eventually lead to driving cessation, which reduces the public health risk of impaired driving but also impairs access to services. The factors associated with driving cessation in dementia are uncertain.
**Objective:** to examine the demographic, psychometric and personal factors associated with driving cessation in patients attending a memory clinic in a European setting.
**Design, subjects and setting:** a retrospective study of 430 consecutive patients referred over a 21 month period to the memory clinic at a university teaching hospital.
**Methods:** the data collected included a questionnaire administered to their carers regarding demographic and personal factors as well as driving practices. All subjects had standardised neuropsychological and functional assessments. Dementia diagnosis was recorded using DSM IV criteria.
**Results:** driving cessation in this population was associated with poorer cognitive and functional status, older age, and living in the city. Of those studied, 22% continued to drive: 63% of these were driving daily, 71% were driving unaccompanied and 31% reported an accident. There was no difference in the neuropsychological testing between those who reported an accident and those who did not report an accident.
**Conclusions:** driving cessation was affected not only by psychometric performance but also by demographic and personal factors.

Keywords: *automobile driving, cognitive disorders, dementia, aged, elderly*

## Introduction

Driving is increasingly the primary mode of transportation for older people. This is illustrated by the fact that the greatest relative increase in licence holding between 1965 and 1985 in the UK was amongst the older age group [1] and this trend is expected to continue. Older people also regard driving as an important skill. In those aged 55 or over, 77% of drivers perceive driving as essential or very important [2]. Furthermore, most available alternatives to car driving are less safe for older persons who frequently do not regard public transport as an adequate alternative

[3]. Conversely, it has been shown that those without transportation have decreasing life satisfaction scores [4]. The loss of a driver's licence and discontinuation of driving are associated with depression, isolation and increasing dependence [5].

Dementia is a common syndrome, affecting 6% of those aged 65 and rising to 29% of those aged 90 and over [6]. It is likely that it will become more common as the demography of populations changes. In Ireland, in 1999, 400,000 (11.1%) of the population were over the age of 65. It is predicted that by 2040 this will have risen to 900,000 (23.7% of the total population) [7].

Knowing how increasingly important driving is to older people and how common dementia is, it is hardly surprising that one-fifth of patients who present to memory clinics continue to drive [8]. However, the identification of those with increased crash risk due to mild to moderate dementia poses a significant clinical problem [9]. There is also little consensus about the risk to the public of driving with dementia. Although a minority of drivers continue when it is no longer safe [10], a significant proportion of individuals with dementia restrict their driving or stop [11]. Also, in jurisdictions where there is strict medical screening for older licence holders there is evidence that this has very little active effect but instead introduces a self-screening process. Individuals therefore appear to choose to renounce their licence rather than have medical screening [12]. Driving cessation is therefore a key issue in the study of dementia and driving. It has a dual impact: it protects the drivers and the general public from increased crash risk [11], while also causing significant transportation difficulty for those who stop driving [4]. A better understanding of this process would help in the management of driving cessation, ensuring that it is neither premature (disadvantaging the older driver), or too late (adding to risk for road users).

To date, research has explored the factors associated with continuation of driving among older people in more heterogeneous populations. For example, Finnish women aged over 70 years old who have a long and active driving career are more likely to continue driving [13]. A similar study population of both genders in Finland showed that health conditions were a central factor in decisions about continued driving [12]. A Canadian study of octogenarian drivers showed they were more likely to be married men living in larger households and reporting no more than one chronic disease [14]. Data from the USA suggest that those in more urban counties and in households with more adults were less likely to drive [15]. Therefore socio-demographic, driving experience and health factors appear to have a significant role in driving behaviour.

When driving cessation is examined amongst older people, similar factors are found. For example, in those aged over 55 years old in California, older age, driving fewer miles and medical reasons were the most common reasons given in the survey for stopping driving [16]. In a population survey of over-60-year-olds in Baltimore, age, female gender, non-white race and errors on the copy design task of the Mini-Mental State Examination were associated with driving cessation [17]. It has also been found that those who live in larger households are more likely not to drive [14]. Partners driving and the presence of other drivers in the household moderated the effect of cognition on driving restriction and cessation [18]. Conversely, people with dementia who do not live with a licensed driver report the greatest mismatch between their need and desire to travel [4]. In women in a rural non-farming area, driving cessation and decline in driving were associated with older age and co-morbidity [19]. If the driving cessation rates in different studies in North America are compared, older community-dwelling women from rural non-farming areas appear to have a lower cessation rate [19] than men and women living in urban areas [20]. Furthermore, a survey in the USA of community-dwelling elders found that the proportion of non-drivers is greater in an urban setting [15].

In the early studies of populations with dementia [21, 22] and a recent larger study limited to men [23], driving cessation was found to be associated with lower neuropsychological scores. A smaller recent study has failed to replicate this finding [24]. In these studies older age was not clearly associated with driving cessation and the role of other socio-demographic factors such as home location or living arrangements was not described.

Furthermore, the studies of factors associated with driving cessation and dementia have taken place in North America exclusively and data are required for European countries. There are reasons to believe that the situation may not necessarily be the same in Europe where public transport is used by older people to a much greater extent than in North America [25]. Ireland is particularly unusual, having a high concentration of rural areas with small and medium-sized towns as well as free public transport for older people.

Therefore, our aim was to examine the factors associated with driving cessation in a memory clinic population in a European setting. By eliciting these factors we will better understand the natural history of driving cessation and this in turn will allow us to determine whether there are critical stages in this process when advice or counselling will assist those with cognitive impairment who wish to drive. This information will also allow for more effective planning to meet the transportation needs of elderly individuals.

## Design, subjects and setting

The participants in the study were consecutive patients referred to the memory clinic at the Mercer's Institute for Research on Ageing, St James's Hospital, Dublin, from July 1997 to November 2001 for assessment of cognitive impairment. These patients were referred from throughout Ireland, as it was the only memory clinic operating in the country at that time.

During the study period 517 patients attended the memory clinic. A total of 427 patients (263 women) provided information on driving. The average age of the subjects was 74 years (range 46–92 years), the mean Folstein Mini-Mental State Examination (MMSE) was 19/30, and 73% of subjects had a diagnosis of dementia. Alzheimer's disease was diagnosed in 60% of cases, mixed vascular and Alzheimer's in 16%, vascular in 10%, unknown in 10%, fronto-temporal dementia in 2% and Lewy Body dementia in 1%. Other

non-dementia diagnoses included mild cognitive impairment, vascular cognitive impairment, subjective memory complaints, depression and normal pressure hydrocephalus. The symptoms had been present for an average of 41 months. The diagnoses of the participants in the study are representative of other memory clinic populations [8]. Two hundred and thirty-three (55%) informants were spouses, 142 (33%) were children, 28 (7%) were siblings, 13 (3%) were friends and 11 (3%) were nieces or nephews. One hundred and fifty-nine (37%) informants were male and 268 (63%) were female.

## Methods

As part of their routine assessment, each participant in the study had a multidisciplinary evaluation by a clinical nurse specialist, physician and neuropsychologist. This consisted of a 90 minute assessment by a neuropsychologist who perfomed standardised neuropsychological testing using the MMSE [26] and cognitive section of the Camdex (CAMCOG) [27], followed by a 30 minute physical and mental state assessment by a medical doctor and nurse. In addition, memory clinic patients were asked to bring an informant who knew them well and this informant was questioned for about 30 minutes to allow completion of an assessment of physical and instrumental activities of daily living (IADL, PSMS) [28], Blessed Dementia Rating Scale (BDRS) [29, 30] and information about driving practice. At the end of the visit the multidisciplinary team arrive at a consensus diagnosis with dementia severity assessed by the Clinical Dementia Rating (CDR) scale [31]. Neuro-imaging was used to assist in the diagnosis in all cases. The dementia diagnosis was recorded using DSM IV criteria.

The driving practices and demographics of the participants were assessed using a 16-item questionnaire that was administered to the patient's informant on their first visit to the clinic. This questionnaire addressed the participants' driving frequency, urban versus rural location, whether they lived with others, accident history, perceived importance of driving, identification of the decision maker for driving cessation and informant's subjective opinion about the patient's safety. Because of the high degree of cognitive impairment in the participants attending the clinic, it was decided to survey their carers/next-of-kin for this information. If a participant turned up unaccompanied, their next of kin was contacted by telephone. When an informant could not be identified, the participant was not included in the study.

For the purposes of this study, an accident was defined as an event that led to at least minor damage to a person (e.g. bruises, or worse) or road vehicle (e.g. scratches, dents or worse). Due to their subjective nature, events that could have but did not lead to damage (i.e. 'near misses') were not quantified but the informant was asked to give a subjective opinion on the participant's safety while driving (safe, unsafe, unsure). 'Driving safely' was not defined as the imprecise nature of its recording (proxy or third party opinion) was not considered likely to be improved by a more formal definition. This question was put to the informant at the end of the interview so as to allow for full reflection. The subjective opinion (re driving ability) of a carer of a patient with cognitive impairment was considered to have value notwithstanding the above limitations. Stepwise multiple logistic regression modelling established the relative contribution of subject characteristics and demographics on the decision to stop driving. One-way analysis of variance was applied to test the differences in cognitive and functional scores between groups. A two-way chi-square test was also used to test for associations.

## Results

Appendix 1 (available as supplementary data on the journal's website: www.ageing.oupjournals.org) describes the personal and demographic factors of the participants in the study. Of those studied, 175 (41%) had never driven, 140 (33%) had stopped driving and 112 (26%) continued to drive. The cognitive and functional status of patients who continued to drive was significantly better ($P < 0.001$) than that of those who had stopped driving (Table 1).

After adjustment for cognitive and functional status in logistic regression analysis, the proportion continuing to drive reduced with the increasing age of patients ($P < 0.001$) (Table 2). With respect to gender, women were no more or less likely than men to stop driving ($P < 0.145$, CDR-SB (where SB is sum of boxes)).

Participants in the study living outside cities were more likely to continue driving than those in cities ($P < 0.05$) (Table 2). Those living alone were as likely to continue driving as those living with family members. Of the seven subjects in the study living alone outside a city, all continued to drive (Figure 1).

Of those continuing to drive, 63% were driving daily, 71% were driving unaccompanied and 31% of these reported an accident. There was no significant difference in neuropsychological scores in those who had accidents compared with those who had not ($P < 0.57$) (Appendix 2 on the journal's website). Of those currently driving, 70% (59/85) were considered to be safe by the informant. Some 73% (43/59) of those living alone were reported as driving safely, while 52% (10/21) of those living with others were considered to be safe while driving (probability in chi-square test of difference = 0.12).

The decision to stop driving was made by 40% (56/134) of patients themselves, either fully or partially by family in 29% (40/134) of cases, by the general practitioner in 25% (35/134) of cases and made by others in 2% (3/134) of cases.

**Table 1.** Cognitive and functional status in relation to driving practice

| | Driving currently | Stopped driving | Never drove | SE | One way ANOVA *F* probability (d.f.) |
|---|---|---|---|---|---|
| CDR-SB Scale | 3.44 | 6.11 | 6.11 | 0.416 | <0.01 (2,425) |
| MMSE (serial 7s) | 22.5 | 18.5 | 18.1 | 0.598 | <0.01 (2,403) |
| IADL | 0.76 | 0.57 | 0.51 | 0.040 | <0.01 (2,425) |
| PSMS | 0.88 | 0.79 | 0.72 | 0.050 | <0.01 (2,425) |

Table 2. Contribution of personal and demographic factors to the decision to stop driving—results of logistic regression analysis

| | | Cognitive status assessed by: | | | | | |
|---|---|---|---|---|---|---|---|
| | | CDR-SB | | IADL 2 | | PSMS | |
| Factor | d.f.[a] | Mean deviance[b] | $P$[c] | Mean deviance[b] | $P$[c] | Mean deviance[b] | $P$[c] |
| Cognitive status | 1 | 45.64 | <0.001 | 22.36 | <0.001 | 3.59 | 0.058 |
| Gender | 1 | 2.13 | 0.145 | 0.59 | 0.444 | 0.05 | 0.821 |
| Age | 1 | 13.28 | <0.001 | 15.78 | <0.001 | 17.23 | <0.001 |
| Home location | 1 | 6.15 | 0.013 | 4.47 | 0.034 | 5.72 | 0.017 |
| Living accommodation | 3 | 1.29 | 0.277 | 1.59 | 0.189 | 2.09 | 0.099 |
| Gender × living accommodation | 3 | 1.77 | 0.151 | 1.15 | 0.328 | 1.00 | 0.391 |
| Residual | 235 | 1.11 | | 1.22 | | 1.28 | |
| Total | 245 | 1.38 | | 1.38 | | 1.37 | |

[a]Degrees of freedom associated with the deviance.
[b]Mean deviance is a measure of the additional contribution of a factor to a logistic regression model that includes all of the preceding terms as independent variables and with a binary dependent variable (0 = driving; 1 = ceased driving).
[c]Probability that the factor makes no contribution to the fit of the model, assuming an approximate chi-squared distribution.

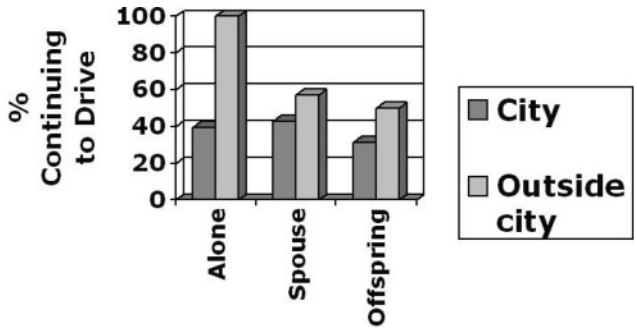


Figure 1. Home location, living accommodation and driving practice.

## Discussion

This study is the first published investigation of driving practices in a European cognitively impaired population. It has shown that there was a complex association between clinical, social and demographic factors and driving behaviour in people with dementia. Also, a significant minority of individuals with cognitive impairment who were studied continued to drive.

Cognitive impairment was the strongest factor influencing driving cessation. This echoes previous work which has shown driving cessation to be associated with lower cognitive scores in both heterogeneous populations and those with dementia [10, 17, 18, 32] but not to such an extent as to be predictive. It may represent a general effect from a more advanced stage of dementia rather than a specific effect of cognitive decline on driving skills.

The finding that, after controlling for cognitive status, female gender was not strongly associated with driving cessation is at odds with the research in the general elderly population and in those with cognitive impairment [12, 14, 17]. These studies, however, did not control for cognitive impairment and it may be that this is a significant confounder.

Older age has been consistently associated with driving cessation in both this study and other studies [10, 16, 17]. This probably reflects the fact that older individuals have more physical and cognitive co-morbidity rather than the effect of age *per se* [33].

Driving cessation was associated with living in cities. Previously this has been shown in the general elderly population but our results extend this association to a cognitively impaired group. It is hardly surprising, given the lack of suitable transportation alternatives and the longer distances that may need to be covered outside urban areas. If there are few alternatives to the car, then individuals are likely to continue driving longer in an effort to access shops, family, friends, healthcare and recreational activities.

We were not able to replicate the finding that having other drivers in the household is associated with driving cessation [18, 15]. However, there was a suggestion that those living with offspring, as compared with spouses, were more likely to continue driving as the severity of the disease progressed. It may be that offspring find it difficult to provide alternatives to driving or to suggest a change of driving habit. Indeed, a qualitative study in the USA found that spouses seemed to have more influence than other family members in the decision to stop driving [34]. Our findings do point to international differences in driving cessation. In the USA, physicians seem to have the most influence in the decision to cease driving, whereas in our study, family members were more influential than physicians in making the decision to stop driving. This difference may reflect the different roles of the family in the USA and in Ireland.

A significant number of informants reported accidents, similar to the 22% of Chicago memory clinic patients having accidents over 6 months [21]. There was no difference in the neuropsychological scores between those who had accidents and those who did not have any accidents. Although the numbers in this group were small, there has been a wide range of neuropsychological test scores recorded in those with dementia who have car crashes [35].

Those continuing to drive were generally doing so daily and unaccompanied. This is of particular relevance as there is evidence to suggest that those who drive accompanied have fewer accidents [36].

The wider application of these results may be affected by two factors. Although a relatively high completion rate for the driving questionnaires was achieved, there were a number who attended during the study period where information was missing. Also, the setting in a memory clinic is not necessarily relevant to that of primary care. However, without the rigorous assessment that occurs in a memory clinic we would not have been able to make a clear assessment of personal, cognitive and functional factors and, in turn, relate these to driving behaviour.

Driving cessation in dementia has been explored in a European setting and has been found to be associated with socio-demographic factors in addition to cognitive and functional factors. By addressing these personal and demographic factors it may be possible to influence positively driving behaviour and argue for timely and suitable transportation options.

## Key points

- Driving and dementia are increasingly important issues for older people.
- There is a complex association between clinical, social and demographic factors and driving behaviour of people with dementia.
- Driving cessation was associated with poorer cognitive and functional performance and older age.
- Participants living with others and living in the city were likely to discontinue driving.

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## Conflicts of interest

None.

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## References

1. The Department of Transport. The older road user measures for reducing the number of casualties among older people on our roads. 1991, pp. 2–3.
2. AA Foundation for Road Safety Research. Motoring and the older driver. 1988.
3. Rabbitt P, Carmicheal A, Jones S, Holland C. When and why older drivers give up driving. Basingstoke: AA Foundation for Road Safety Research, 1996.
4. Taylor BD, Tripodes S. The effects of driving cessation on the elderly with dementia and their caregivers. Accid Anal Prev 2001; 33: 519–28.
5. Marottoli RA, Mendes de Leon CF, Glass TA *et al*. Driving cessation and increased depressive symptoms: prospective evidence from the New Haven EPESE. J Am Geriatr Soc 1997; 45: 202–6.
6. Lobo A, Launer LJ, Fratiglioni L *et al*. Prevalence of dementia and major subtypes in Europe: a collaborative study of population based cohorts. Neurology 2000; 54: S4–S9.
7. USA Bureau of the Census, International Data Base. 2003.
8. O'Neill D, Neubauer K, Boyle M, Gerrard J, Surmon D, Wilcock GK. Dementia and driving. J R Soc Med 1992; 85: 199–202.
9. Dobbs DM, Carr DB, Morris JC. Evaluation and management of the driver with dementia. Neurologist 2002; 8: 61–70.
10. Adler G, Kuskowski M. Driving cessation in older men with dementia. Alzheimer Dis Assoc Disord 2003; 17: 68–71.
11. Trobe JD, Waller PF, Cook-Flannagan CA, Teshima SM, Bieliauskas LA. Crashes and violations among drivers with Alzheimer disease. Arch Neurol 1996; 53: 411–6.
12. Hakamies-Blomqvist L, Wahlström B. Why do older drivers give up driving? Accid Anal Prev 1998; 30: 305–12.
13. Hakamies-Blomqvist L, Siren A. Deconstructing a gender difference: driving cessation and personal driving history of older women. J Safety Res 2003; 34: 383–8.
14. Chipman ML, Payne J, McDonough P. To drive or not to drive: the influence of social factors on the decisions of elderly drivers. Accid Anal Prev 1998; 30: 299–304.
15. Kington R, Reuben D, Rogowski J, Lillard L. Sociodemographic and health factors in driving patterns after 50 years of age. Am J Public Health 1994; 84: 1327–9.
16. Dellinger AM, Sehgal M, Sleet DA, Barrett-Connor E. Driving cessation: what older former drivers tell us. J Am Geriatr Soc 2001; 49: 431–5.
17. Gallo JJ, Rebok GW, Lesikar SE. The driving habit of adults aged 60 years and older. J Am Geriatr Soc 1999; 47: 335–41.
18. Freund B, Szinovacz M. Effects of cognition on driving involvement among the oldest old: variations by gender and alternative transportation opportunities. Gerontologist 2002; 42: 621–33.
19. Forrest KY, Bunker CH, Songer TJ, Cohen JH, Cauley JA. Driving patterns and medical conditions in older women. J Am Geriatr Soc 1997; 45: 1214–8.
20. Marottoli R, Ostfield A, Merrill S, Perlman GD, Foley DJ, Conney LM. Driving cessation and changes in mileage driven among elderly individuals. J Gerontol Soc Sci 1993; 48: S255–S250.
21. Gilley DW, Wilson RS, Bennett DA, Stebbins GT, Bernard AA, Whalen ME, Fox JH. Cessation of driving and unsafe motor vehicle operation by dementia patients. Arch Intern Med 1991; 151: 941–6.
22. Lucas-Blaustein MJ, Filipp L, Dungan C, Tune L. Driving in patients with dementia. J Am Geriatr Soc 1988; 36: 1087–91.
23. Foley DJ, Masaki KH, Ross GW, White LR. Driving cessation in older men with incident dementia. J Am Geriatr Soc 2000; 48: 928–30.
24. Cotrell V, Wild K. Longitudinal study of self-imposed driving restrictions and deficit awareness in patients with Alzheimer disease. Alzheimer Dis Assoc Disord 1999; 13: 151–6.
25. Eberhard J. Safe mobility for senior citizens. IATSS 1996; 20: 29–37.
26. Folstein MF, Folstein SE, McHugh PR. 'Mini-mental state'. A practical method for grading the cognitive state of patients for the clinician. J Psychiatr Res 1975; 12: 189–98.

27. Roth M, Tym E, Mountjoy Q. CAMDEX: a standardised instrument for the diagnosis of mental disorder in the elderly with special reference to the early detection of dementia. Br J Psychiatry 1986; 149: 698–709.
28. Lawton MP, Brody EM. Assessment of older people: self-maintaining and instrumental activities of daily living. Gerontologist 1969; 9: 179–86.
29. Morris JC, Mohs RC, Rogers H, Fillenbaum G, Heyman A. Consortium to establish a registry of Alzheimer's disease (CERAD) clinical and neuropsychological assessment of Alzheimer's disease. Psychopharmacol Bull 1988; 24: 641–52.
30. Blessed G, Tomlinson BE, Roth M. The association between quantitative measures of dementia and of senile change in the cerebral grey matter of elderly subjects. Br J Psychiatry 2004; 114: 797–811.
31. Morris JC. The Clinical Dementia Rating (CDR): current version and scoring rules. Neurology 1993; 43: 2412–4.
32. Valcour VG, Masaki KH, Blanchette PL. Self-reported driving, cognitive status, and physician awareness of cognitive impairment. J Am Geriatr Soc 2002; 50: 1265–7.
33. Duchek JM, Carr DB, Hunt L *et al.* Longitudinal driving performance in early stage dementia of the Alzheimer type. J Am Geriatr Soc 2003; 51: 1342–7.
34. Persson D. The elderly driver: Deciding when to stop. Gerontologist 1993; 33: 88–91.
35. Withaar FK, Brouwer WH, Van Zomeren AH. Fitness to drive in older drivers with cognitive impairment. J Int Neuropsychol Soc 2000; 6: 480–90.
36. Bedard M, Molloy DW, Lever JS. Factors associated with motor vehicle crashes in cognitively impaired older adults. Alzheimer Dis Assoc Disord 1998; 12: 135–9.


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# Perceived age as a predictor of old age mortality: a 13-year prospective study

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## Abstract

**Objectives:** to examine whether in older people perceived age is associated with risk of total mortality independent of chronological age.
**Design:** prospective population-based study (Evergreen project) with mortality surveillance for 13 years after the baseline.
**Setting:** face-to-face interview among community-dwelling residents of the city of Jyväskylä, Finland.
**Subjects:** 395 men and 770 women aged 65–84 years at baseline.
**Measures:** perceived physical age and perceived mental age were rated either as younger, the same or older in comparison with subject's chronological age. Death dates were received from the official register of the province of Central Finland. Confounders used were chronological age, education in years, number of long-term illnesses, self-rated health, depression score (Beck's 13-item depression scale), and cognitive status.
**Results:** mortality rates per 1,000 person-years from the older to younger perceived physical age category were 99, 65 and 59 in men, and 81, 54 and 36 in women. In the perceived mental age categories, correspondingly, mortality rates were 139, 63 and 64 in men, and 82, 55 and 44 in women. The fully adjusted relative risk (RR) of death over 13 years with the perceived younger physical age category as referent was 1.42 (95% CI 1.00–2.02) in the older category and 1.28 (1.03–1.60) in the same age category ($P$=0.049). The crude RR of mortality for perceived mental age categories was 1.56 (1.09–2.23) in the older and 1.10 (0.92–1.31) in the same age as compared with the younger category ($P$=0.046). Adding cognitive status into the model diminished the predictive value of the model ($P$=0.545).