

Mild cognitive impairment in clinical care

A survey of American Academy of Neurology members

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ABSTRACT

Objective: To assess how neurologists view mild cognitive impairment (MCI) as a clinical diagnosis and how they treat patients with mild cognitive symptoms.

Methods: Members of the American Academy of Neurology with an aging, dementia, or behavioral neurology practice focus were surveyed by self-administered questionnaire.

Results: Survey respondents were 420 providers (response rate 48%), and 88% reported at least monthly encounters with patients experiencing mild cognitive symptoms. Most respondents recognize MCI as a clinical diagnosis (90%) and use its diagnostic code for billing purposes (70%). When seeing these patients, most respondents routinely provide counseling on physical (78%) and mental exercise (75%) and communicate about dementia risk (63%); fewer provide information on support services (27%) or a written summary of findings (15%). Most (70%) prescribe cholinesterase inhibitors at least sometimes for this population, with memantine (39%) and other agents (e.g., vitamin E) prescribed less frequently. Respondents endorsed several benefits of a diagnosis of MCI: 1) involving the patient in planning for the future (87%); 2) motivating risk reduction activities (85%); 3) helping with financial planning (72%); and 4) prescribing medications (65%). Some respondents noted drawbacks, including 1) too difficult to diagnose (23%); 2) better described as early Alzheimer disease (21%); and 3) diagnosis can cause unnecessary worry (20%).

Conclusions: Patients with mild cognitive symptoms are commonly seen by neurologists, who view MCI as a useful diagnostic category. Information and treatments provided to patients with MCI vary significantly, suggesting a need for practice guidelines and further research on clinical decision-making with this population. *Neurology*® 2010;75:425-431

GLOSSARY

AAMI = age-associated memory impairment; **AAN** = American Academy of Neurology; **AD** = Alzheimer disease; **CIND** = cognitive impairment, no dementia; **DSM-V** = *Diagnostic and Statistical Manual of Mental Disorders*, 5th edition; **MCI** = mild cognitive impairment; **NOS** = not otherwise specified.

Extensive clinical research has focused on the often transitional state between normal cognitive aging and dementia, often characterized as mild cognitive impairment (MCI).^{1,2} Persons with MCI are at high risk of developing Alzheimer disease (AD), with annual rates of progression from the amnesic form of MCI to clinical AD estimated at approximately 10%–15%.³ Over time, MCI has moved from research into clinical practice. The American Academy of Neurology (AAN) and the European Consortium on Alzheimer's Disease have published practice guidelines for MCI,^{4,5} clinical trials have tested potential treatments,⁶⁻⁸ and clinical screening

Supplemental data at
www.neurology.org

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Study funding: Supported by a grant to Dr. Roberts from the Alzheimer's Association. The Geriatric and Behavioral Neurology sections of the American Academy of Neurology (AAN) endorsed the survey; the AAN Surveys and Research Department conducted the survey and provided financial compensation to members for participation. Dr. Green is supported by NIH grants R01-HG02213, K24-AG027841, and P30-AG13846. W.R. Uhlmann is supported by NIH grant HG02213. Dr. Karlawish is supported by NIH grant P30-AG-10124, the Robert Wood Johnson Foundation Investigator Award in Health Policy Research, and the Marian S. Ware Alzheimer Program. Dr. Petersen is supported by NIH grants P50 AG016574, U01 AG006786, and U01 AG024904.

Disclosure: Author disclosures are provided at the end of the article.

tools have been developed specifically for this population.⁹⁻¹³ The MCI concept has undergone some criticism, however. In particular, some experts argue that MCI is usually better described as early AD,^{14,15} while others contend that MCI represents an unwarranted expansion of the neurologic disease spectrum.¹⁶ However, MCI continues to emerge as a clinical entity. Per a 2007 revision, the International Classification of Diseases now has a billing code for MCI (331.83).¹⁷ The *DSM-V* that is being developed will likely include a category corresponding to MCI.¹³

Despite these developments, few data exist on MCI in clinical practice. Do clinicians use the MCI label? How do they view its benefits and limitations? What do they do for patients with MCI? Answers to these questions would be useful not only to tailor practice guidelines, but also to inform debate about the utility of the term. We report here on a survey that systematically examined neurology service providers' attitudes and usual practices regarding patients with cognitive symptoms of mild severity.

METHODS **Survey development and content.** This project was undertaken as part of an Alzheimer Association-funded project to develop and evaluate an education and risk communication protocol for people with MCI. To inform protocol development, our group was interested in the extent to which MCI was being used in clinical practice, how providers viewed its benefits and limitations, and what constituted usual care with this population. A brief survey was therefore developed to assess neurology service providers' attitudes and usual practices when caring for patients who present with cognitive symptoms of mild severity. A multidisciplinary team of experts created the survey, led by a first author with experience in developing reliable scales to measure AD-related attitudes and beliefs.^{18,19} The survey was reviewed in multiple iterations by the Chairs of Geriatric and Behavioral Neurology, who suggested revisions to questionnaire items and ways to frame questions regarding cognitive symptoms. The survey was further reviewed by the AAN's Surveys and Research Department and Member Research Subcommittee, who made edits to improve wording of items and response choices. The survey was pilot tested on a small sample of academic and community-based neurologists, who confirmed that items were clearly worded and addressed domains relevant to their practice. The final version had 3 sections, described below. A copy of the instrument is provided as an e-questionnaire on the *Neurology*[®] Web site at www.neurology.org. The University of Michigan's Institutional Review Board reviewed and approved this study.

Terms and definitions. This section assessed preferred terms and definitions for "cognitive symptoms of mild severity." Respondents were asked which terms they "recognize[d] as a clinical

diagnosis (as opposed to a research category)," with choices including MCI, age-associated memory impairment (AAMI), cognitive impairment, no dementia (CIND), and other. Respondents could also elaborate in an open-ended item on how they defined their diagnostic term of choice. Respondents who recognized MCI were asked whether they used subtypes including amnesic vs nonamnesic and single vs multiple domain.

Usual practices. This section assessed typical activities when treating patients with cognitive symptoms of mild severity. Questions asked 1) how frequently respondents saw such patients, 2) which medical code(s) they used for diagnostic or billing purposes, and 3) how they communicated with these patients regarding their cognitive difficulties. Respondents were also asked how often they 1) counseled patients on various potential means of promoting cognitive health identified in the national Alzheimer's Association "Maintain Your Brain" campaign,²⁰ 2) communicated with patients on various issues related to their risk of AD, and 3) treated patients with mild cognitive symptoms with medications.

Attitudes toward MCI. This scale asked about attitudes toward use of the MCI concept in clinical practice. Respondents reviewed statements of 6 potential benefits and 4 potential drawbacks and indicated their level of agreement with each statement. Respondents were also asked to comment on the benefits and limitations of MCI in an open-ended format.

Survey recruitment and administration. We selected the AAN because of its status as the main professional organization for neurologists in the United States and its capability via its Surveys and Research Department for implementing surveys of practicing clinicians. The main eligibility criterion for participation, determined via the most recent *AAN Member Census*, was a stated focus on aging/dementia or behavioral neurology in one's practice. Per AAN policies, members who were still in medical school or residency, were retired, had received 3 or more AAN surveys in the last 3 years, or served on any of the committees sponsoring or reviewing the survey were excluded from the list of eligible participants. A random sample of 900 AAN members was selected from all eligible participants ($n = 2,338$). During data collection, 21 participants were removed because they either had invalid contact information or indicated that the survey's topic was not relevant to their professional activities. The resulting final sample size was 879.

The AAN Surveys and Research Department collected data from January to March 2009. The survey was administered in multiple formats, including by fax, mail, and Internet, with an initial cover letter/e-mail message from the Chairs of the AAN Geriatric and Behavioral Neurology sections. Two reminders were sent to nonrespondents. Respondents received a \$25 gift certificate to the AAN Online Store.

Data analyses. The AAN Surveys and Research Department conducted data analyses. Descriptive statistics were used to characterize respondents in terms of their demographics and responses to survey items. Cronbach α was used to assess the reliability of the attitudes scale. t Tests and χ^2 analyses were used to compare 1) survey respondents to nonrespondents on basic demographic and practice characteristics (Likert-scale items were treated as categorical variables and sometimes collapsed for analyses), 2) responses between general neurologists and subspecialists, and 3) academic vs private practice clinicians. To correct for multiple comparisons, a significance level of $p < 0.01$ was used. The first author reviewed responses to open-ended items for common themes.

Table 1 Respondent demographics and practice information^a

Characteristics	Values
Age, y, mean (SD)	54.0 (8.6)
Gender, % men	78.9
Medical specialty, %	
Neurology	94.4
Neuropsychology/clinical psychology	4.4
Psychiatry	3.4
Geriatrics	3.1
Subspecialty training, % yes	59.6
Practice setting, %	
Group practice	48.4
Solo practice	30.0
Hospital or clinic	17.9
Other	3.6

^a Medical specialty percentages add up to greater than 100% because respondents could select more than 1 item as appropriate.

RESULTS Survey respondents. A total of 420 clinicians responded to the survey, yielding a response rate of 48%. The margin of error for all respondents at a 95% confidence level was $\pm 4.8\%$. Demographic and practice characteristics of respondents are presented in table 1. As compared to survey nonrespondents, respondents were similar in age (mean = 54 years vs 53 years) and gender (79% male vs 78% male). They differed in AAN membership type ($p < 0.001$), with respondents more likely to be an AAN Fellow.

Terms and definitions. The vast majority of respondents (90.1%) reported that they recognized MCI as a clinical diagnosis. A minority reported recognizing AAMI (21.9%) and CIND (21.7%). Of those clinicians endorsing MCI, a majority reported also using category subtypes including amnesic vs nonamnesic (83.8%) and single vs multiple domain (50.7%). A small minority (5.7%) recognized other terms including benign senescent forgetfulness, isolated memory impairment, and memory loss. Responses in this domain did not differ significantly by specialists vs subspecialists or academic vs private practice clinicians. In the open-ended item, respondents defined diagnostic terms above in various ways, citing published diagnostic criteria,² noting Mini-Mental State Examination cutoff scores, and offering general descriptions of cognitive impairment without functional impairment.

Usual practices. The vast majority of respondents (88.3%) reported seeing patients with cognitive symptoms of mild severity at least once a month

(with 65.1% reporting seeing such patients several times a month). Respondents reported using a variety of medical codes for diagnostic or billing purposes with this population, including MCI (70.3%), memory loss (51.1%), AD (30%), cognitive disorder not otherwise specified (NOS; 22.4%), dementia NOS (15.4%), and amnesic disorder NOS (10.6%). Private practice respondents were more likely to have used a memory loss code than academic respondents (60% vs 37%, $p < 0.0001$), while academic respondents were more likely to have used cognitive disorder NOS (32% vs 17%, $p < 0.01$).

Respondents reported counseling patients with cognitive symptoms of mild severity on several topics relevant to their well-being and brain health. A majority of respondents reported that they sometimes or routinely counseled patients regarding 1) physical exercise (93.7%), 2) mental exercise (91.9%), 3) diet and nutrition (70%), and 4) vitamins and supplements (68.3%). There were also several educational topics that respondents sometimes or routinely addressed with patients, including 1) recommendations for monitoring and follow-up (98.7%), 2) risk of AD in general terms (90%), 3) driving (85.1%), 4) support services (73.7%), and 5) advance planning (72%). Relatively fewer respondents reported sometimes or routinely communicating about the following: 1) research studies (67.6%), 2) AD risk in numeric terms (59.1%), and 3) referral to the Alzheimer's Association or similar organization (44%). Only 34.5% sometimes or routinely provided a written summary letter of findings for the patient and family. Academic respondents were more likely to routinely communicate information about research studies (32% vs 17%, $p < 0.001$) and routinely provide a written summary letter of findings (26% vs 10%, $p < 0.001$) than private practice respondents.

A total of 69.8% of respondents reported sometimes or routinely prescribing cholinesterase inhibitors for patients with cognitive symptoms of mild severity, with private practice respondents reporting higher rates than academic respondents (77% vs 63%, $p < 0.01$). Overall, 39.2% reported sometimes or routinely prescribing memantine. Over half of respondents reported sometimes or routinely prescribing other medications, with antidepressants and stimulants most frequently mentioned in this category (along with supplements including *Ginkgo biloba*). Table 2 summarizes responses in this domain.

Attitudes toward MCI. Each of the 6 benefit items was endorsed with greater frequency than any of the 4 drawback/limitation items ($p < 0.001$). A majority of respondents agreed with each of the following statements: 1) labeling the problem is helpful for patients and family members (91.2% agree), 2) diagno-

Table 2 Usual practices when seeing patients with cognitive symptoms of mild severity

	Never, %	Rarely, %	Sometimes, %	Routinely, %
Patient counseling				
Physical exercise	1.8	4.5	15.9	77.8
Mental exercise	3.0	5.1	17.0	74.9
Diet and nutrition	13.6	16.4	31.5	38.5
Vitamins or supplements	11.6	20.1	36.9	31.4
Patient education				
Recommendations for monitoring and follow-up	0.0	1.3	10.4	88.3
Risk of Alzheimer disease (general terms)	1.0	8.9	27.0	63.0
Driving	2.6	12.3	44.2	40.9
Advance planning	7.9	20.0	41.0	31.0
Support services	4.3	21.9	46.4	27.3
Risk of Alzheimer disease (numeric estimates)	11.1	29.8	35.7	23.4
Research studies	6.4	26.0	47.4	20.2
Written summary letter	27.8	37.6	19.6	14.9
Referral to Alzheimer's Association	19.5	36.5	34.7	9.3
Medications prescribed				
Cholinesterase inhibitors	14.3	15.9	45.0	24.8
Memantine	35.1	25.6	30.7	8.5
Other ^a	33.3	10.8	40.2	15.7

^a Most commonly cited in open-ended responses were vitamins (n = 19), antidepressants (n = 13), and *Ginkgo biloba* (n = 8).

sis is useful so the patient can be more involved in planning for the future (86.6% agree), 3) diagnosis can be useful in motivating the patient to engage in risk reduction activities (84.6% agree), 4) diagnosis helps the family with financial planning (72.3% agree), 5) certain medications can be useful in treating some patients with MCI (65.3% agree), and 6) diagnosis helps the family with insurance planning (55.6% agree). In open-ended responses, a common theme was that a MCI label alerts physicians and families to monitor for changes and progression of symptoms.

In contrast, fewer than one-quarter of respondents agreed with the following statements: 1) MCI is too difficult to diagnose accurately or reliably (23% agree), 2) MCI is usually better described as early AD (20.5% agree), 3) diagnosing MCI causes unnecessary worry for patients and family members (19.6% agree), and 4) there is no approved treatment for MCI so it does not make sense to diagnose it (8.3% agree). In open-ended responses, some noted that the MCI category was “too heterogeneous and vague,” claiming that such ambiguity frustrated both physicians and families; others called it an “invented” and not validated disease category. A description of

responses to all close-ended items in this domain is provided in table 3. The reliability estimate for this overall attitudes scale was 0.71.

DISCUSSION Survey findings suggested that neurologists regularly see patients with cognitive symptoms of mild severity, with over 88% of respondents reporting at least monthly encounters. Practitioners preferred the MCI label for describing these patients, with 90% recognizing it as a clinical diagnosis (including over 80% who recognized its amnesic vs nonamnesic subtype) and 70% reporting they had already used the MCI code for diagnostic or billing purposes. Alternate terms (e.g., AAMI, CIND) and other diagnostic codes (e.g., memory loss, cognitive disorder NOS) were recognized and used by some respondents, with the frequency of such use varying by respondent practice type and subspecialty training status. Taken together, these findings suggest that the MCI concept has gained acceptance as a clinical category among neurologists treating this patient population.

Clinicians reported regularly addressing several topics when educating and counseling patients with mild cognitive symptoms and their family members. Most emphasized the need for monitoring and follow-up and discussed potential risks for dementia. Yet over 40% of respondents said they never or only rarely used quantitative estimates when discussing dementia risk. Fewer than half reported routinely addressing issues including driving, advance planning, and support services. Only 15% routinely provide a written summary letter of findings for patients and families (with this rate even lower among private practice respondents), and fewer than 10% routinely refer such patients to the Alzheimer's Association. The variable frequency with which clinicians reported addressing these key topics suggests a need for guidelines and supplementary educational materials in this area, and the AAN is currently revising its MCI evidence-based medicine practice parameter for clinicians. The development of standardized education and counseling tools tailored for MCI populations may be appropriate to accompany these professional guidelines. For example, a growing body of literature on other diseases might be drawn upon to support the development of empirically validated tools for risk communication and decision support.^{21,22} Such materials may be particularly helpful for a population facing important decisions regarding future planning and treatment options while contending with symptoms that might potentially affect their decisional capacity.^{23,24}

Notably, respondents prescribe a variety of medications to treat patients with cognitive symptoms of

Table 3 Perceptions of benefits, drawbacks, and limitations of MCI as a clinical diagnosis

	Strongly agree, %	Somewhat agree, %	Neither agree nor disagree, %	Somewhat disagree, %	Strongly disagree, %
Benefits					
Labeling the problem is helpful for patients and family members	45.5	45.7	5.6	2.7	0.5
Diagnosis is useful so the patient can be more involved in planning for the future	43.8	42.8	8.8	3.9	0.7
Diagnosis can be useful in motivating the patient to engage in risk reduction activities	35.2	49.4	9.3	4.9	1.2
Diagnosis helps the family with financial planning	28.7	43.6	22.1	3.6	1.9
Diagnosis helps the family with insurance planning	21.5	34.1	34.1	7.3	2.9
Certain medications can be useful in treating some patients with MCI	18.0	47.3	17.8	11.7	5.1
Drawbacks and limitations					
MCI is too difficult to diagnose accurately or reliably	2.0	21.0	12.7	34.9	29.5
MCI is usually better described as early Alzheimer disease	6.1	14.4	20.8	32.8	25.9
Diagnosing MCI causes unnecessary worry for patients and family members	2.0	17.6	17.8	36.8	25.9
There is no approved treatment for MCI so it does not make sense to diagnose it	2.7	5.6	7.8	31.0	52.9

Abbreviation: MCI = mild cognitive impairment.

mild severity, including cholinesterase inhibitors (70% sometimes or routinely), memantine (nearly 40% sometimes or routinely), and other agents including vitamin E and *Ginkgo biloba*. In addition, two-thirds of respondents reported sometimes or routinely counseling patients about vitamin and supplement use, although none are proven to reduce risk of dementia in patients with MCI. Although our data do not allow us to comment on the appropriateness of treatment in a given case, the frequency of reported medication use (particularly among private practice respondents) is striking given that there are no medications that are approved by the Food and Drug Administration specifically for the treatment of MCI. Although several clinical trials have been conducted with MCI populations, to date none have achieved their primary outcomes. One of the largest trials, sponsored by the National Institute on Aging and Pfizer, Inc. through the Alzheimer's Disease Cooperative Study Group, examined the treatment effects of donepezil and vitamin E on an amnesic MCI population in a multicenter randomized clinical trial.⁷ Participants in the donepezil group had a reduced risk of progressing to AD for 12 months and for up to 24 months in the *APOE* ϵ 4 carrier subset. No treatment effect occurred in the vitamin E group.

Our data on reported medication use are consistent with a recent study of nearly 600 patients with

MCI treated across 10 AD research centers of California, which found that almost 30% of patients were receiving anti-AD medications "off-label."²⁵ It may be that clinicians consider some patients with MCI to already be in the early stages of AD (e.g., 30% of respondents have used the AD billing code for patients with mild cognitive symptoms) and therefore appropriate for use of cholinesterase inhibitors and memantine. Nevertheless, given these potential trends toward overutilization of medications to treat MCI, as well as numerous "brain health" products being marketed over-the-counter to individuals with concerns about their cognitive functioning,^{26,27} it will be important to educate practitioners and patients alike on the benefits and limitations of emerging treatment options in MCI.

Overall, respondents believed that the benefits of a clinical diagnosis of MCI outweighed its potential drawbacks and limitations. These findings suggest that clinicians generally find the MCI concept a useful diagnostic tool to inform treatment, education, and advance planning with patients and families. In open-ended responses, some respondents also expressed the view that an MCI diagnosis was reassuring to patients and families by labeling "what they already know" and allowing them "to do their homework and explore the problem on their own." The most commonly endorsed limitation was that MCI is

too difficult to diagnose accurately or reliably. This finding among one-quarter of specialty providers suggests that incorporating MCI into primary care may pose diagnostic challenges. Relatively few respondents believed a MCI diagnosis would cause unnecessary worry among patients and families, a notion supported by recent psychological studies in the area.²⁸ The strongest beliefs about drawbacks were expressed in open-ended responses by neurologists who objected to the notion of MCI as a formal clinical category, implying that MCI is often better characterized as early dementia. These views reflect the sometimes contentious nature of the debate about MCI.

Limitations to this study include that survey responses are subject to self-report recall biases and do not provide information about the quality of provider interactions with patients with MCI and their family members. Future studies should seek more objective measures of outcomes such as billing codes used and medications prescribed. Exploration of patient–provider communication and treatment decision-making (e.g., via audiorecording of clinical encounters) may also be warranted. While respondents were similar to nonrespondents on key demographic characteristics, they may differ from the general population of neurologists seeing patients with MCI in terms of their usual practices or attitudes. For example, the use of the MCI term in survey recruitment materials may have attracted respondents more inclined to use this category and view it in strong terms (favorable or unfavorable). The overall response rate, while not ideal, was typical for surveys of practicing physicians, who tend to respond less frequently to survey requests than other groups.²⁹ This survey primarily involved neurologists, but other medical professionals (e.g., geriatricians, internists, allied health professionals) often encounter MCI and should therefore be queried in future research (of note here, a recent survey of 163 geriatricians in Australia and New Zealand also found that MCI was being commonly used in clinical practice, but pharmacologic treatment was reported less frequently in this study than ours).³⁰ Given the brief survey format used, we could not collect data on all patient and provider characteristics of interest. We plan in future analyses of this dataset to examine correlations between provider demographics (e.g., years of experience) and reported attitudes and practices. Consideration could be given in future research to examining other practice groups, as well as practice patterns in other countries.

ACKNOWLEDGMENT

The authors thank the following individuals and organizations: Oksana Drogan and the AAN Surveys and Research Department for assistance

with development and implementation of the survey instrument, as well as data analyses; Dr. Daniel Kaufer and Dr. Victor Henderson for assistance with survey development, and for enlisting the support of the AAN Behavioral and Geriatric Neurology sections; Dr. Rhonna Shatz for comments regarding survey items; and Sarah Tersegno for assisting with preparation of the manuscript and response to reviewers, including copyediting, formatting, and creation of tables.

DISCLOSURE

Dr. Roberts receives research support from the NIH (R01 HG02213-07 [Co-PI] and the Alzheimer's Association. Dr. Karlawish serves as an Associate Editor of the *Journal of the American Geriatrics Society*; serves as a site investigator for a NIA-Pfizer Inc. sponsored clinical trial in persons with Alzheimer disease; and receives research support from the NIH (NINDS 1 R01 NS065087-01 [PI], NIMH R01-MH071643 [PI], and NIA P30-AG-10124 [Co-I]) and the Robert Wood Johnson Foundation. W.R. Uhlmann receives research support from the NIH (HG02213 [Co-I] and HG004500 [Co-I]) and the Alzheimer's Association. Dr. Petersen serves on scientific advisory boards for Elan Corporation, Wyeth, and GE Healthcare; receives royalties from the publication of *Mild Cognitive Impairment* (Oxford University Press, 2003); and receives research support from the NIH/NIA (U01 AG 06786 [PI], P50 AG 16574 [PI], U01 AG 024904 [Subcontract PI], and R01 AG11378 [Co-I]). Dr. Green receives research support from the NIH/NHGRI (3 R01 HG02213-09S1 [PI]); NIA (1 K24 AG27841-01A1 [PI]) (P30-AG13846 [Center Associate Director]); NIMH (R01-MH080295 [Co-I]); and from the Alzheimer's Association [Co-I/Site PI]; serves as site PI and steering committee member for the NIA Alzheimer's Disease Cooperative Study and as site PI, steering committee member and committee chair for the NIA Alzheimer's Disease Neuroimaging Initiative; serves on scientific advisory boards for GlaxoSmithKline, Medivation, Inc., Amgen, and Schering-Plough Corp.; serves on the editorial board of *Medscape Neurology*; and serves on the Ethical, Legal, Social Implications Study Section of the NHGRI.

Received December 13, 2009. Accepted in final form April 12, 2010.

REFERENCES

1. Petersen RC, Smith GE, Waring SC, Ivnik RJ, Tangalos EG, Kokmen E. Mild cognitive impairment: clinical characterization and outcome. *Arch Neurol* 1999;56:303–308.
2. Petersen RC. Mild cognitive impairment as a diagnostic entity. *J Intern Med* 2004;256:183–194.
3. Petersen R, Knopman D, Boeve B, et al. Mild cognitive impairment: ten years later. *Arch Neurol* 2009;66:1447–1455.
4. Petersen RC, Stevens JC, Ganguli M, Tangalos EG, Cummings JL, DeKosky ST. Practice parameter: early detection of dementia: mild cognitive impairment (an evidence-based review): report of the Quality Standards Subcommittee of the American Academy of Neurology. *Neurology* 2001;56:1133–1142.
5. Portet F, Ousset PJ, Visser PJ, et al. Mild cognitive impairment (MCI) in medical practice: a critical review of the concept and new diagnostic procedure: report of the MCI Working Group of the European Consortium on Alzheimer's Disease. *J Neurol Neurosurg Psychiatry* 2006;77:714–718.
6. Grundman M, Petersen RC, Ferris SH, et al. Mild cognitive impairment can be distinguished from Alzheimer disease and normal aging for clinical trials. *Arch Neurol* 2004;61:59–66.
7. Petersen RC, Thomas RG, Grundman M, et al. Vitamin E and donepezil for the treatment of mild cognitive impairment. *N Engl J Med* 2005;352:2379–2388.
8. Farlow MR. Treatment of mild cognitive impairment (MCI). *Curr Alzheimer Res* 2009;6:362–367.

9. Nasreddine ZS, Phillips NA, Bedirian V, et al. The Montreal Cognitive Assessment, MoCA: a brief screening tool for mild cognitive impairment J Am Geriatr Soc 2005;53:695–699.
10. Kokmen E, Smith GE, Petersen RC, Tangalos E, Ivnik RC. The short test of mental status: correlations with standardized psychometric testing Arch Neurol 1991;48:725–728.
11. Lee KS, Kim EA, Hong CH, Lee DW, Oh BH, Cheong HK. Clock drawing test in mild cognitive impairment: quantitative analysis of four scoring methods and qualitative analysis. Dement Geriatr Cogn Disord 2008;26:483–489.
12. Tang-Wai DF, Knopman DS, Geda YE, et al. Comparison of the short test of mental status and the mini-mental state examination in mild cognitive impairment. Arch Neurol 2003;60:1777–1781.
13. Petersen RC, O'Brien J. Mild cognitive impairment should be considered for *DSM-V*. J Geriatr Psychiatry Neurol 2006;19:147–154.
14. Morris JC, Storandt M, Miller JP, et al. Mild cognitive impairment represents early-stage Alzheimer disease. Arch Neurol 2001;58:397–405.
15. Graham JE, Ritchie K. Mild cognitive impairment: ethical considerations for nosological flexibility in human kinds. Philos Psychiatr Psychol 2006;13:31–43.
16. Whitehouse PJ, Juengst ET. Antiaging medicine and mild cognitive impairment: practice and policy issues for geriatrics. J Am Geriatr Soc 2005;53:1417–1422.
17. Mild cognitive impairment, so stated. In: ICD-9-CM Index to Diseases and Injuries (FY10) [online]. Available at: ftp://ftp.cdc.gov/pub/Health_Statistics/NCHS/Publications/ICD9-CM/2009/. Accessed February 15, 2010.
18. Roberts JS. Anticipating response to predictive genetic testing for Alzheimer's disease: a survey of first-degree relatives. Gerontologist 2000;40:43–52.
19. Roberts JS, Connell CM. Illness representations among first-degree relatives of people with Alzheimer's disease. Alzheimer Dis Assoc Disord 2000;14:129–136.
20. Alzheimer's Association. Maintain your brain [online]. Available at: http://www.alz.org/we_can_help_brain_health_maintain_your_brain.asp. Accessed March 5, 2010.
21. O'Brien MA, Whelan TJ, Villasis-Keever M, et al. Are cancer-related decision aids effective? A systematic review and meta-analysis. J Clin Oncol 2009;27:974–985.
22. O'Connor AM, Bennett CL, Stacey D, et al. Decision aids for people facing health treatment or screening decisions. Cochrane Database Syst Rev 2009;3:CD001431.
23. Jefferson AL, Lambe S, Moser DJ, Byerly LK, Ozonoff A, Karlawish JH. Decisional capacity for research participation in individuals with mild cognitive impairment. J Am Geriatr Soc 2008;56:1236–1243.
24. Karlawish J. Measuring decision-making capacity in cognitively impaired individuals. Neurosignals 2008;16:91–98.
25. Weinstein AM, Barton C, Ross L, Kramer JH, Yaffe K. Treatment practices of mild cognitive impairment in California Alzheimer's Disease Centers. J Am Geriatr Soc 2009;57:686–690.
26. Small GW, Vorgan G. The Memory Prescription: Dr. Gary Small's 14-Day Plan to Keep Your Brain and Body Young. New York: Hyperion; 2004.
27. Olshansky SJ, Hayflick L, Perls TT. The hype and the reality: part I. J Gerontol A Biol Sci Med Sci 2004;59: B513–B514.
28. Carpenter BD, Xiong C, Porensky EK, et al. Reaction to a dementia diagnosis in individuals with Alzheimer's disease and mild cognitive impairment. J Am Geriatr Soc 2008; 56:405–412.
29. Asch DA, Jedrzewski MK, Christakis NA. Response rates to mail surveys published in medical journals. J Clin Epidemiol 1997;50:1129–1136.
30. Mitchell T, Woodward M, Hirose Y. A survey of attitudes of clinicians towards the diagnosis and treatment of mild cognitive impairment in Australia and New Zealand. Int Psychogeriatr 2008;20:77–85.

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