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## Instruments for detection and screening of cognitive impairment for older adults in primary care settings: A review

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## ABSTRACT

The Patient Protection and Affordable Care Act requires evaluation for cognitive impairment as part of the Annual Wellness Visit (AWV). Nurses and nurse practitioners in primary care are in a good position to incorporate brief cognitive screens into the AWV. Early recognition of cognitive problems allows clinicians and patients the opportunity to discuss any new or ongoing concerns about cognition, address possible reversible causes, or refer for further evaluation. It should be noted that some patients may prefer not to explore for cognitive impairment. Numerous brief cognitive screens have been developed for primary care, with no one screen being appropriate for all patients or clinicians. This review examines the psychometric properties, usefulness, and limitations of both patient and informant brief (under five minutes) cognitive screens endorsed by the Alzheimer's, National Institute of Aging (NIA), and Gerontological Society (GSA) workgroups, plus a recently developed brief version of the standard MoCA.

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## Introduction

Early identification of cognitive impairment in older adults is important given its prevalence. Successful aging incorporates normal cognitive function as a requirement for managing general activities of daily living. As longevity increases, so does the prevalence of cognitive problems. A national estimate of the prevalence of cognitive impairment of all types is available from the Aging, Demographics, and Memory Study (ADAMS) that estimates 14% of people older than 71 have cognitive impairment.<sup>1</sup>

Research demonstrates that clinicians do not recognize or may not document suspicion of cognitive impairment in as many as 27–81% of their patients during routine visits.<sup>2–4</sup> A number of complex reasons may be in play to hamper clinicians' ability to recognize or document cognitive impairment, which may include discomfort with a discussion of findings of cognitive impairment,<sup>2–4</sup> uncertainty about the desire of a patient to explore cognitive problems, brief time for office visits, lack or systematic method of screening, concerns about the risk of misdiagnosis, and lack of ex-

perience with geriatric clients with cognitive impairment.<sup>5</sup> Some clinicians may believe that the impact of early diagnosis does not impact the individual's life sufficiently to warrant screening, or there are a lack of treatment options.<sup>4,5</sup> For screening choices, clinicians are familiar with the Mini-Mental State Examination (MMSE)<sup>3</sup> and the Montreal Cognitive Assessment (MoCA),<sup>6,7</sup> impractical for this brief appointment, and may not be aware of brief cognitive screens available for use.

The fifteen minute Annual Wellness Visit (AWV) was added as a new Medicare benefit with the passage of the *Patient Protection and Affordable Health Care Act of 2010*. The Centers for Medicare and Medicaid Services (CMS) requires detection of cognitive impairment in addition to a routine review of history, physiological assessment, list of medications and clinicians, and suggested preventative care (AWV). The CMS has not recommended a particular instrument for detection of cognitive impairment. The National Institute of Aging (NIA), The Gerontological Society of America (GSA), and the Alzheimer's Association formed task forces, and have published their recommendations for conducting a patient visit that includes recommendations for use of brief cognitive screens.<sup>1,8</sup> The workgroups agreed that informal observation by the primary clinician was not sufficient to determine impairment.

The primary aim of the workgroups was to identify cognitive screens that can be administered in less than five minutes, are free of charge, have sound psychometric properties, and produce valid assessment data in Medicare populations.<sup>8</sup> To determine whether or not screens have solid psychometric properties, screens should include the principle components of a neurocognitive

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assessment: attention, memory, language, visuospatial skills, and executive function.<sup>9</sup>

The purpose of this article is to provide a review of five brief cognitive screens for potential use in the AWW. While lengthier, the MMSE and the Montreal Cognitive Assessment (MoCA) are also presented because each continue to be highly utilized in a variety of health care settings and are used as comparisons when brief cognitive screens are under consideration for adoption by clinicians. An additional purpose is to discuss how clinicians may incorporate brief cognitive screens into primary care visits and provide recommendations for choosing a suitable screen.

## Method

A search of articles presenting brief cognitive screens were identified from databases (PubMed, CINAHL) using key terms *brief cognitive screening, older adults, and cognitive impairment* yielded over 200 results. The narrowing of the search by adding *primary care* yielded 33 results. In addition to the published articles by authors of the screens, the National Institute on Aging's (NIA's) searchable database of 116 screens for cognitive impairment was also useful to find brief cognitive screens meeting criteria appropriate for use in primary care.<sup>10</sup> Patient assessment instruments from the Alzheimer's toolkit were chosen for evaluation, as the workgroup had narrowed their search by evaluating systematic reviews of brief screens that met should include the principle components of a neurocognitive assessment.<sup>2</sup>

Brief cognitive screens may address questions that both patients and caregivers may have about memory. Such screens capture patient-only, informant-only, or a combination of patient and informant data. Suitable screens (preferably less than 5 minutes) should be reliable and produce valid data. Each screen must have high sensitivity, meaning that it accurately identifies patients who have mild cognitive impairment as well as more advanced states of cognitive decline, and high specificity, meaning that it identifies patients who are not likely to have cognitive impairment. These screens should be low or no cost, easy to administer, acceptable to patients, and free from cultural, educational, and language biases.<sup>2</sup> In addition, brief screens should perform well against the widely used Mini-Mental State Examination.<sup>11</sup>

Meeting a number of these criteria above, the the s-MOCA,<sup>12</sup> Mini-Cog™,<sup>13</sup> the Memory Impairment Screen (MIS),<sup>14</sup> the General

Practitioner Assessment of Cognition (GPCOG),<sup>15</sup> and the Eight-Item Interview to Differentiate Aging and Dementia (AD8)<sup>16</sup> are presented. The five screens can be administered by clinicians or allied health staff and have little or no language, educational, or cultural bias. All brief screens can be administered in 5 minutes or less and are equal or superior to the longer Mini-Mental State Exam (MMSE)<sup>17</sup> and MoCA<sup>6,7</sup> used for screening more select cognitive problems.

The characteristics of each cognitive screen are described with psychometric properties, usefulness and limitations. A summary description of these screening instruments, including scoring properties, is included in Table 1, and the instruments' psychometric properties are summarized in Table 2.

*Mini-mental state examination (MMSE): considered the "gold standard"*

The Mini-Mental State Examination was developed for primary care clinicians in 1975.<sup>17</sup> While there were other, lengthier cognitive batteries available at that time, the MMSE was developed as a clinically appropriate and relatively brief screen to give a practical assessment of change in cognitive status in older adults.<sup>6,17</sup> Not considered brief by today's standards, the screen includes 5 sections covering a wide range of diverse items: orientation, attention/concentration, memory, language, and visuospatial ability. The MMSE is the most widely used screen available in multiple languages and therefore has a wide range of utility. Registration and purchase are required per the copyright, which may be prohibitive.

### Psychometric properties

The MMSE has demonstrated reliability ranging from 0.31 to 0.96 depending on the setting and who administered the instrument. The MMSE was originally validated in a group of 206 subjects ( $r = 0.66-0.77$ ) and over decades has continued to demonstrate moderate validity across different populations.<sup>27</sup> Sensitivity and specificity of the MMSE to determine cognitive impairment has ranged from 61% - 91% and 86.2% - 99%, respectively.<sup>3,28</sup>

The MMSE may not be able to accurately distinguish normal cognitive function from mild impairment due to the influence of educational level and cultural biases, called the "ceiling effect."<sup>6,18,28</sup> Foreign culture or low reading levels as well as sensory impairments may also cause false positive screens.<sup>18</sup>

**Table 1**  
Characteristics of Screening Instruments.

Instrument	Administration time	Total Score (points)	Number of Items	Components
<b>MMSE</b> Interview Paper/pencil	10 minutes	0-30	11	Five subscales measure orientation/concentration, memory, language, visuospatial
<b>MoCA</b> Interview Paper/pencil	10 minutes	0-30	18	Six subscales measure orientation, memory, language, attention, concentration, executive function
<b>s-MoCA</b> Interview Paper/pencil	5 minutes	0-16	8	Memory, orientation, language, attention, concentration and executive function
<b>GPCOG</b> Interview/ Informant	4 minutes for patient 2 minutes for informant	0-9 patient 0-6 informant	6	Memory, orientation, judgment, and function Strictly interview
<b>MIS</b> Interview	<5 minutes	0-8	1 = recall of 4 words	Memory
<b>MiniCog</b> Pencil	<5 minutes	0-5	2 = recall of three words and CDT	Memory, visuospatial, and executive function, includes clock drawing
<b>AD8</b> Patient and/or informant interview	3-4 minutes for patient 3-4 minutes for informant	0-8 patient 0-8 informant	8 Yes/No answers	Memory, orientation, judgment, and function. Uses same interview for patient and informant

MMSE, Mini Mental State Examination<sup>15</sup>; MoCA, Montreal Cognitive Assessment<sup>6</sup>; GPCOG, General Practitioner Assessment of Cognition<sup>9</sup>; MIS, Memory Impairment Screen<sup>10</sup>; AD8, "Eight-item Interview to Differentiate Aging and Dementia".<sup>13</sup>

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