



Canadian Geriatrics Society

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**Key words:**

Cognition, cognitive  
assessment,  
comprehensive geriatric  
assessment, dementia

## VIRTUAL APPROACHES TO COGNITIVE SCREENING DURING PANDEMICS

### Abstract

Assessment of cognition is a key element of Comprehensive Geriatric Assessment (CGA). There are numerous valid, reliable in-person assessment tools to assess cognition, which can be used as case-finding instruments (i.e. screening) or as part of CGA (i.e. assessment). With the recent COVID-19 pandemic, there is a need to provide remote assessments of cognition. This can prove challenging. There are a number of remote assessment tools, which have been studied in population-based samples. Most of these are adaptations of existing instruments. There are few head-to-head comparisons of the diagnostic performance of these instruments, and some trial and error may be needed to determine the most appropriate tool for various outpatient settings. In some cases, formal cognitive assessment may not be necessary, or may be delayed until in-person assessments become possible. In some cases, formal assessment may be necessary, and the choice of the tool should be based upon the comfort level and experience of the assessors. As with in-person testing, the formal score must be interpreted in conjunction with clinical data and collateral information.

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This article has been peer reviewed.

**Conflict of Interest:** None

This article was published in May 2020.

## Key Points

- In-person cognitive assessments combining clinical interviews and formal cognitive testing are the gold standard, but are impractical in the situations where in-person assessments are not possible.
- There are numerous cognitive assessment instruments that can be administered by telephone or videoconference, which may be useful.
- As with in-person assessments, cognitive assessment tools must be interpreted within the individual patient context.
- There is less evidence of education effects, gender effects, and sociocultural considerations when using telephone-based assessments compared to in-person assessments; the telephone-based assessments are less well studied than their in-person counterparts.
- The choice of instrument should be guided by local experience and preferences.

## Background

Assessing cognition is a central component of CGA. In clinical encounters, this is done by conducting a complete history and physical examination, mental status examination, and gathering collateral information from as many sources as possible. To supplement this, standardized cognitive assessment tools have been developed and extensively studied. These tools can be used to supplement the clinical assessment, as part of CGA, or as case-finding (also referred to as opportunistic screening) instruments. There is debate about the best instrument, and how these tools should be incorporated into clinical practice, and which tool is most appropriate. Their use is guided by the setting, the resources available, and the preferences and history of the health care providers.

Several of these instruments are widely used in Canada – notably the Mini-Mental State Examination (MMSE)<sup>1-3</sup> and the Montreal Cognitive Assessment (MoCA).<sup>4,5</sup> The evidence for their use has been recently reviewed.<sup>2-4</sup> Several instruments are useful adjuvants to clinical practice, but their scores must be interpreted in light of the client context. A recent practice guideline does not recommend screening for dementia, but notes that the sensitivity and specificity of several instruments are acceptable for the detection of dementia if used appropriately in the appropriate clinical setting. The best studied of these is the MMSE.<sup>6,7</sup>

With recent social distancing guidelines related to the current COVID-19 outbreak, there has been considerable interest in remote measures of cognition, and we have therefore conducted a brief review of remote standardized assessments of cognition. There have been reviews and meta-analyses of telephone-based screening and cognitive assessment instruments,<sup>8-12</sup> but these have focused primarily on their use in epidemiological studies, rather than clinical practice. Given the time constraints, this is not a formal systematic review of the evidence. Nor do we wish to comment upon the privacy issues of remote assessments, or on copyright issues related to these instruments.

## General Considerations

These tools may be new to clinicians, and some time may be needed to understand how to incorporate them into clinical practice. As with in-person assessment tools, a detailed clinical history with appropriate collateral history remains the cornerstone of assessment, and any cognitive assessment tool should be considered supplementary data. The impact of cognitive loss, rather than the level of cognitive decline, is the most relevant issue facing the client and caregiver. Important data to gather are symptoms of cognitive impairment, functional impairments related to cognitive impairment, the trajectory of cognition over time, and behaviours related to cognitive loss. Indeed, in some cases, this may prove enough, and formal cognitive testing can be conducted at a later date.

As with in-person assessments, vision and hearing should be asked about, and the client should be comfortable with the virtual assessment approach. Both the environment of the assessor and the assessed should be quiet and comfortable, should ensure privacy (i.e. cannot be overheard by persons not privy to this information), and the client should participate actively without assistance unless requested by the assessor. This may be difficult during remote assessments.

## Specific Instruments Validated for Use by Telephone

### 1. Telephone Interview for Cognitive Status (TICS)

The Telephone Interview for Cognitive Status (TICS)<sup>13</sup> is a derivation of the Folstein Mini-Mental State Examination (MMSE), which has been adapted for use over the telephone. It has been used in population-based cohort studies. Most of the studies on reliability and validity come from these populations rather than clinical samples.<sup>14,15</sup> In these settings, it takes approximately 5-10 minutes to administer. It assesses orientation to time and place, attention, short-term memory, sentence repetition, immediate recall, naming to verbal description, word opposites, and praxis. The score ranges from 0-41, with a cut-off of 28, which roughly corresponds to a cut-off of 25 on the MMSE. For this cut point, the sensitivity is 94% and the specificity is 100% in differentiating participants with Alzheimer's disease (AD) from those with normal cognition.

There are at least two modifications of the original TICS (in addition to the TICS-M below) – the Aging Demographic and Memory Study (ADAMS) TICS-30 and TICS-40, with 30 and 40 items respectively.<sup>16</sup> These have been used in epidemiological studies, and a crosswalk is available to convert these scores to the MMSE.<sup>16</sup> The TICS copyright is apparently held by PAR, which charges for forms and instruction manuals.

### 2. Telephone Interview for Cognitive Status – Modified (TICS-M)

The TICS-M<sup>17</sup> is a modification of the TICS, which adds delayed recall. This adds additional items, but it is not clear if this additional information is more informative than the TICS. It appears to have reasonable test performance to detect cognitive impairment<sup>18</sup> and dementia,<sup>19-22</sup> but there are conflicting data on its use for detecting mild cognitive impairment.<sup>23,24</sup> A French version has been validated.<sup>25</sup> In one Australian study, it required adaptation of the questions, and was not well tolerated.<sup>26</sup> PAR appears to hold copyright. It is not clear if there is a charge to using this test.

### 3. Telephone-based MMSE Instruments

There are at least three instruments derived directly from the MMSE – the Adult Lifestyles and Function Interview (ALFI-MMSE),<sup>27</sup> the Telephone MMSE (T-MMSE),<sup>28</sup> and the TAMS.<sup>29</sup> The ALFI-MMSE was developed for use in epidemiological surveys, and has been validated against the formal in-person MMSE. It omits items that cannot be done without verbal cues. It is scored from 0 to 22.<sup>27</sup> The ALFI-MMSE has been translated into French and has been used in epidemiological studies in Quebec.<sup>30</sup> The T-MMSE adds a three-step command. They likely take about the same time to administer as the in-person MMSE. The TAMS is briefer. In general, telephone-based MMSE scores are highly correlated with the in-person MMSE.<sup>31</sup>

### 4. Telephone-based 3MS

The modified MMSE (3MS)<sup>32</sup> is a modification of the MMSE, which expands the scoring of some items on the MMSE, as well as adding iterative naming and similarities. It was used in the Canadian Study of Health and Aging (CSHA), where it was shown to be slightly more sensitive and specific than the MMSE;<sup>33</sup> however, the administration time was considerably longer. Another advantage over the MMSE is the greater variability, particularly at the high end of cognition, which may make it more useful for the detection of MCI.<sup>34</sup> There is a telephone-based version, which correlates well with the in-person 3MS.<sup>35</sup>

### 5. Telephone-based Montreal Cognitive Assessment (MoCA)

There are two versions of the original MoCA,<sup>36</sup> which have been adapted for use over the telephone. Both are very similar to the MoCA-Blind.<sup>37</sup> They have been studied and validated for use in post-stroke populations, but not yet in clinical samples of individuals without cerebrovascular disease. The telephone MoCA seems sensitive to detecting Mild Cognitive Impairment (MCI) as well as dementia, at least in a population with cerebrovascular disease.<sup>38,39</sup> The cut points are 18-19/22 for the T-MoCA and 10-11/22 for the T-MoCA-Short. The copyright is presumably held by the creators of the MoCA. The training needed, and

costs associated with use, are not clear at the present time. Administration time is likely comparable to the MoCA.

## **Instruments That Could be Administered by Telephone or Videoconference**

### **1. IQCODE**

The IQCODE is an informant-based instrument intended to be used in clinical assessments as a case-finding instrument and assessment tool for cognitive impairment. It should not be used as a stand-alone test, but as a supplement to clinical assessment.<sup>39-42</sup> It has comparable sensitivity and specificity to the MMSE, and has been used in the general population, primary care, secondary care, and hospital settings.<sup>39-42</sup> In theory, it could be administered over the telephone or by videoconference with caregivers. There are truncated versions, and the 16-item version appears as accurate as the original 26-item version. There are several reported cut points. Using a cut point of 3.3, the sensitivity is 80% and the specificity is 85%.<sup>39-42</sup> A telephone version of the IQCODE has been used to supplement telephone-based cognitive status measures in large epidemiological studies.<sup>43</sup> It is less sensitive and specific than the TICS, but using both instruments improves accuracy.

### **2. The Ottawa 3DY (O3DY)**

The Ottawa 3DY<sup>44</sup> is a very brief cognitive screening tool employed by the Ottawa Regional Geriatric Program. It was derived from the 3MS, and is composed of four questions that do not require equipment, paper, or pencil. The 3DY questions are **D**ay of the week, **D**ate, **D**LROW (WORLD spelled backwards), and **Y**ear. Patients who answer any one of these questions incorrectly should then be further assessed with longer more sensitive and specific tests. The O3DY is a purely oral test that may lend itself to telephone-based cognitive screening; however, it has not yet been validated using that approach. The psychometric properties have been reported in several Emergency Department<sup>45-47</sup> research studies. The O3DY has been validated in French.<sup>48</sup> Reviews comparing O3DY performance to other brief instruments have been reported.<sup>49,50</sup>

### **3. The AD8**

The AD8<sup>51,52</sup> is a very brief informant questionnaire, which consists of only eight questions. In a recent review, it has been shown to be sensitive to detect dementia, but lacks specificity.<sup>53</sup> In theory, it could be adapted for use over the telephone for caregiver interviews. As with the longer IQCODE, issues around caregiver contact frequency and caregiver stress should be considered in interpreting the score.

## **Instruments that Require Audio and Visual**

Telehealth assessments for follow-up appear well tolerated in rural areas.<sup>54</sup> Full versions of common cognitive screening tests, such as the MoCA and MMSE, can be performed remotely if audio and visual capabilities are present. Some clinics report using the MMSE successfully in a videoconference with patients in rural and remote settings. The authors of the MoCA have included instructions and recommendations on how to complete the full MoCA using audio-visual conference on their website, which can be found at <https://mailchi.mp/mocatest/remote-moca-testing?e=bbeb81559c>. To summarize, the authors provide a script on how to instruct the patient to complete the Trails, cube, clock drawing, and animal naming components with pencil and a blank paper and then display the completed task to the assessor using camera/video capabilities. The remainder of the test proceeds in standard fashion. Other clinics have suggested sending copies of the Trails task and cube to the patient prior to the virtual assessment to aid in remote assessment of these tasks. This could be done by mail or email and printed prior to the assessment. During the audio-visual assessment, the patient can then be given verbal instructions for completion of these tasks and asked to display their work to the camera for the assessor to capture as a screenshot and score. In some instances, the paper copies can be mailed back to the assessor.

## Use in Clinical Practice

We now report the experience of outreach teams in several sites using remote cognitive assessments. Generally, all teams are struggling to adapt to telephone-based interviews. Teams in Ottawa have been using the Ottawa 3DY and the MoCA-Blind. Teams in Winnipeg have used the MoCA-Blind, the TICS, and the IQCODE. Rural and remote clinics have a long experience with remote assessments, and have used a variety of tools. We have informally described these experiences, which are presented in Table 1.

There have been a number of challenges. Telephone audio quality is occasionally poor. As well, some of the persons being assessed had hearing impairment, which made testing difficult. Assessments of persons where there were educational or language barriers were particularly challenging. There may also be cultural biases in many of the cognitive screening tools. The lack of visual cues during telephone assessments may also have been problematic. As well, there have been issues with family members assisting and prompting the client. This is easier to detect during in-person assessments. Many of the instruments have multiple versions, some of which have been better studied than others. This has also complicated the choice of instrument, as well as the interpretation of scores. Some of the instruments, notably the TICS and IQCODE, were fairly time consuming. Moreover, some items on some versions of the TICS were specific to US settings (such as identifying the US Vice President). The IQCODE depends upon a cognitively intact caregiver with a firsthand knowledge of the client, and was found by some assessors to be cumbersome over the telephone.

In spite of these limitations, these remote assessments have proved possible albeit limited. To deal with some of the challenges, calling at an optimum time over a good phone line, discussing testing procedures with families, and considering the context and limitations of the remote testing has been important. Finally, some patience is required.

## Conclusions

Clearly, the preferred cognitive assessment is best done in person. However, this may prove difficult in the short and perhaps longer term, and some form of cognitive assessment may need to be done by audio and/or audio-visual means. There are numerous instruments intended for use over the phone, or adapted for phone use, which have been validated. However, we are unable to identify literature to support one instrument preferentially over others. As well, none of the telephone instruments are as well studied as their in-person counterparts, and the gold standard used in studies is usually the in-person version of the test.

We therefore conclude with a few preliminary suggestions. First, a formal cognitive test may not be needed. If the client has recently been assessed, and there is an adequate history obtained, a formal cognitive test may be omitted. Second, a formal cognitive test could potentially be delayed until an in-person assessment can be done. This will depend upon the presenting symptoms, the urgency of the clinical issues, and the delay expected until an in-person assessment can be done. Third, some experimentation with instruments may be appropriate until teams find a tool with which they are comfortable, and with which they become proficient. Finally, there is no perfect instrument with established reliability and validity and which can be easily administered. Some caution is therefore needed in interpreting the scores, and this interpretation will depend upon clinical data. In most circumstances, this information will likely guide the interpretation of any formal score. As well, some diagnostic humility may be needed, and ultimately teams may need to accept some uncertainty regarding a client's cognition.

**Table 1:** Telephone Cognitive Screens – Feedback from Geriatric Outreach Clinicians

<b>TEST</b>	<b>ADVANTAGES</b>	<b>DISADVANTAGES</b>
<b>TICS</b>	<p>Good face validity</p> <p>Good reliability and validity in population-based studies</p> <p>Appears to correlate well with functional questions</p> <p>Some hospital teams are familiar with the instrument</p> <p>Useful with visual impairment</p> <p>Questions are easily understood</p> <p>MMSE score can be derived from some versions</p> <p>So far, most clients are cooperative and do not find it threatening</p>	<p>Difficult with hearing impairment</p> <p>Language barriers</p> <p>Culturally biased (e.g. US political leader; comments on Methodists and Episcopalians)</p> <p>Ten word recall has proved difficult</p> <p>Unclear if client is using aids (calendar, family, etc.) on an audio assessment</p> <p>Unclear if individual domains are useful</p>
<b>IQCODE</b>	<p>Data often gathered as part of collateral history</p> <p>User-friendly</p>	<p>Lengthy via telephone</p> <p>Caregiver stress may influence results</p> <p>Caregiver contact frequency may influence results (particularly in social distancing situations)</p>
<b>Ottawa 3DY</b>	<p>Very quick</p> <p>Low client burden; acceptable to clients</p>	<p>Less discrimination than longer instruments</p> <p>Less sensitive to high-end cognitive variation</p>
<b>MoCA-Blind and MoCA-T</b>	<p>Easily administered</p> <p>Non-threatening</p> <p>Users are familiar with MoCA</p>	<p>Unclear if cost will be associated with access and training/ certification as will full MoCA as of September 2020</p>



**REFERENCES:**

1. Folstein MF, Folstein SE, McHugh PR. "Mini-mental state". A practical method for grading the cognitive state of patients for the clinician. *Journal of psychiatric research* 1975;12:189-98.
2. Arevalo-Rodriguez I, Smailagic N, Roqué i Figuls M, et al. Mini-Mental State Examination (MMSE) for the detection of Alzheimer's disease and other dementias in people with mild cognitive impairment (MCI). *Cochrane Database of Systematic Reviews* 2015.
3. Creavin ST, Wisniewski S, Noel-Storr AH, et al. Mini-Mental State Examination (MMSE) for the detection of dementia in clinically unevaluated people aged 65 and over in community and primary care populations. *Cochrane Database of Systematic Reviews* 2016.
4. Davis DHJ, Creavin ST, Yip JLY, Noel-Storr AH, Brayne C, Cullum S. Montreal Cognitive Assessment for the diagnosis of Alzheimer's disease and other dementias. *Cochrane Database of Systematic Reviews* 2015.
5. Nasreddine ZS, Phillips NA, Bédirian V, et al. The Montreal Cognitive Assessment, MoCA: A Brief Screening Tool For Mild Cognitive Impairment. *Journal of the American Geriatrics Society* 2005;53:695-9.
6. Patnode CD, Perdue LA, Rossom RC, et al. Screening for Cognitive Impairment in Older Adults: Updated Evidence Report and Systematic Review for the US Preventive Services Task Force. *JAMA* 2020;323:764-85.
7. Force UPST. Screening for Cognitive Impairment in Older Adults: US Preventive Services Task Force Recommendation Statement. *JAMA* 2020;323:757-63.
8. Smith MM, Tremont G, Ott BR. A review of telephone-administered screening tests for dementia diagnosis. *American journal of Alzheimer's disease and other dementias* 2009;24:58-69.
9. Martin-Khan M, Wootton R, Gray L. A systematic review of the reliability of screening for cognitive impairment in older adults by use of standardised assessment tools administered via the telephone. *Journal of telemedicine and telecare* 2010;16:422-8.
10. Herr M, Ankri J. A critical review of the use of telephone tests to identify cognitive impairment in epidemiology and clinical research. *Journal of telemedicine and telecare* 2013;19:45-54.
11. Castanho T, Amorim L, Zihl J, Palha J, Sousa N, Santos N. Telephone-based screening tools for mild cognitive impairment and dementia in aging studies: a review of validated instruments. *Frontiers in Aging Neuroscience* 2014;6.
12. Wolfson C, Kirkland SA, Raina PS, et al. Telephone-administered cognitive tests as tools for the identification of eligible study participants for population-based research in aging. *Canadian journal on aging = La revue canadienne du vieillissement* 2009;28:251-9.
13. Brandt J, Spencer M, Folstein M. The telephone interview for cognitive status. *Neuropsychiatry Neuropsychol Behav Neurol* 1988;1:111-7.
14. Barber M, Stott DJ. Validity of the Telephone Interview for Cognitive Status (TICS) in post-stroke subjects. *International journal of geriatric psychiatry* 2004;19:75-9.
15. Manly JJ, Schupf N, Stern Y, Brickman AM, Tang MX, Mayeux R. Telephone-based identification of mild cognitive impairment and dementia in a multicultural cohort. *Archives of neurology* 2011;68:607-14.
16. Fong TG, Fearing MA, Jones RN, et al. Telephone interview for cognitive status: Creating a crosswalk with the Mini-Mental State Examination. *Alzheimer's & dementia : the journal of the Alzheimer's Association* 2009;5:492-7.

17. Welsh KA, Breitner JC, Magruder-Habib KM. Detection of dementia in the elderly using telephone screening of cognitive status. *Neuropsychiatry, Neuropsychology, & Behavioral Neurology* 1993.
18. Lacruz M, Emeny R, Bickel H, Linkohr B, Ladwig K. Feasibility, internal consistency and covariates of TICS-m (telephone interview for cognitive status-modified) in a population-based sample: findings from the KORA-Age study. *International journal of geriatric psychiatry* 2013;28:971-8.
19. Gallo JJ, Breitner JC. Alzheimer's disease in the NAS-NRC Registry of aging twin veterans, IV. Performance characteristics of a two-stage telephone screening procedure for Alzheimer's dementia. *Psychological medicine* 1995;25:1211-9.
20. de Jager CA, Budge MM, Clarke R. Utility of TICS-M for the assessment of cognitive function in older adults. *International journal of geriatric psychiatry* 2003;18:318-24.
21. Duff K, Tometich D, Dennett K. The Modified Telephone Interview for Cognitive Status is More Predictive of Memory Abilities Than the Mini-Mental State Examination. *Journal of geriatric psychiatry and neurology* 2015;28:193-7.
22. Bentvelzen AC, Crawford JD, Theobald A, et al. Validation and Normative Data for the Modified Telephone Interview for Cognitive Status: The Sydney Memory and Ageing Study. *Journal of the American Geriatrics Society* 2019;67:2108-15.
23. Knopman DS, Roberts RO, Geda YE, et al. Validation of the telephone interview for cognitive status-modified in subjects with normal cognition, mild cognitive impairment, or dementia. *Neuroepidemiology* 2010;34:34-42.
24. Cook SE, Marsiske M, McCoy KJ. The use of the Modified Telephone Interview for Cognitive Status (TICS-M) in the detection of amnesic mild cognitive impairment. *Journal of geriatric psychiatry and neurology* 2009;22:103-9.
25. Vercambre MN, Cuvelier H, Gayon YA, et al. Validation study of a French version of the modified telephone interview for cognitive status (F-TICS-m) in elderly women. *International journal of geriatric psychiatry* 2010;25:1142-9.
26. Baker AT, Byles JE, Loxton DJ, McLaughlin D, Graves A, Dobson A. Utility and Acceptability of the Modified Telephone Interview for Cognitive Status in a Longitudinal Study of Australian Women Aged 85 to 90. *Journal of the American Geriatrics Society* 2013;61:1217-20.
27. Roccaforte WH, Burke WJ, Bayer BL, Wengel SP. Validation of a telephone version of the mini-mental state examination. *Journal of the American Geriatrics Society* 1992;40:697-702.
28. Newkirk LA, Kim JM, Thompson JM, Tinklenberg JR, Yesavage JA, Taylor JL. Validation of a 26-point telephone version of the Mini-Mental State Examination. *Journal of geriatric psychiatry and neurology* 2004;17:81-7.
29. Lanska DJ, Schmitt FA, Stewart JM, Howe JN. Telephone-Assessed Mental State. *Dementia (Basel, Switzerland)* 1993;4:117-9.
30. Quail JM, Addona V, Wolfson C, Podoba JE, Lévesque LY, Dupuis J. Association of unmet need with self-rated health in a community dwelling cohort of disabled seniors 75 years of age and over. *European Journal of Ageing* 2007;4:45-55.
31. Kennedy RE, Williams CP, Sawyer P, Allman RM, Crowe M. Comparison of in-person and telephone administration of the Mini-Mental State Examination in the University of Alabama at Birmingham Study of Aging. *Journal of the American Geriatrics Society* 2014;62:1928-32.



32. Teng EL, Chui HC. The Modified Mini-Mental State (3MS) examination. *The Journal of clinical psychiatry* 1987;48:314-8.
33. McDowell I, Kristjansson B, Hill GB, Hebert R. Community screening for dementia: the Mini Mental State Exam (MMSE) and Modified Mini-Mental State Exam (3MS) compared. *Journal of clinical epidemiology* 1997;50:377-83.
34. Van Patten R, Britton K, Tremont G. Comparing the Mini-Mental State Examination and the modified Mini-Mental State Examination in the detection of mild cognitive impairment in older adults. *International psychogeriatrics* 2019;31:693-701.
35. Norton MC, Tschanz JA, Fan X, et al. Telephone adaptation of the Modified Mini-Mental State Exam (3MS). The Cache County Study. *Neuropsychiatry Neuropsychol Behav Neurol* 1999;12:270-6.
36. Nasreddine ZS, Phillips NA, Bedirian V, et al. The Montreal Cognitive Assessment, MoCA: a brief screening tool for mild cognitive impairment. *Journal of the American Geriatrics Society* 2005;53:695-9.
37. Wittich W, Phillips N, Nasreddine ZS, Chertkow H. Sensitivity and specificity of the Montreal Cognitive Assessment modified for individuals who are visually impaired. *Journal of visual impairment & blindness* 2010;104:360-8.
38. Zietemann V, Kopczak A, Muller C, Wollenweber FA, Dichgans M. Validation of the Telephone Interview of Cognitive Status and Telephone Montreal Cognitive Assessment Against Detailed Cognitive Testing and Clinical Diagnosis of Mild Cognitive Impairment After Stroke. *Stroke* 2017;48:2952-7.
39. Pendlebury ST, Welch SJ, Cuthbertson FC, Mariz J, Mehta Z, Rothwell PM. Telephone assessment of cognition after transient ischemic attack and stroke: modified telephone interview of cognitive status and telephone Montreal Cognitive Assessment versus face-to-face Montreal Cognitive Assessment and neuropsychological battery. *Stroke* 2013;44:227-9.
40. Harrison JK, Fearon P, Noel-Storr AH, McShane R, Stott DJ, Quinn TJ. Informant Questionnaire on Cognitive Decline in the Elderly (IQCODE) for the diagnosis of dementia within a general practice (primary care) setting. *Cochrane Database of Systematic Reviews* 2014.
41. Harrison JK, Fearon P, Noel-Storr AH, McShane R, Stott DJ, Quinn TJ. Informant Questionnaire on Cognitive Decline in the Elderly (IQCODE) for the diagnosis of dementia within a secondary care setting. *Cochrane Database of Systematic Reviews* 2015.
42. Harrison JK, Stott DJ, McShane R, Noel-Storr AH, Swann-Price RS, Quinn TJ. Informant Questionnaire on Cognitive Decline in the Elderly (IQCODE) for the early diagnosis of dementia across a variety of healthcare settings. *Cochrane Database of Systematic Reviews* 2016.
43. Arnold AM, Newman AB, Dermond N, Haan M, Fitzpatrick A. Using telephone and informant assessments to estimate missing Modified Mini-Mental State Exam scores and rates of cognitive decline. The cardiovascular health study. *Neuroepidemiology* 2009;33:55-65.
44. Molnar FJ, Wells GA, McDowell I. The derivation and validation of the Ottawa 3D and Ottawa 3DY three-and four-question screens for cognitive impairment. *Clinical Medicine Insights Geriatrics* 2008;2:1.
45. Eagles D, Otal D, Wilding L, et al. Evaluation of the Ottawa 3DY as a screening tool for cognitive impairment in older emergency department patients. *The American journal of emergency medicine* 2019.
46. Wilding L, Eagles D, Molnar F, et al. Prospective Validation of the Ottawa 3DY Scale by Geriatric Emergency Management Nurses to Identify Impaired Cognition in Older Emergency Department Patients. *Annals of emergency medicine* 2016;67:157-63.

47. Yadav K, Boucher V, Carmichael PH, et al. Serial Ottawa 3DY assessments to detect delirium in older emergency department community dwellers. *Age and ageing* 2019;49:130-4.
48. Bedard C, Boucher V, Voyer P, et al. Validation of the O3DY French Version (O3DY-F) for the Screening of Cognitive Impairment in Community Seniors in the Emergency Department. *The Journal of emergency medicine* 2019;57:59-65.
49. Carpenter CR, Bassett ER, Fischer GM, Shirshekan J, Galvin JE, Morris JC. Four sensitive screening tools to detect cognitive dysfunction in geriatric emergency department patients: brief Alzheimer's Screen, Short Blessed Test, Ottawa 3DY, and the caregiver-completed AD8. *Academic emergency medicine : official journal of the Society for Academic Emergency Medicine* 2011;18:374-84.
50. Carpenter CR, Banerjee J, Keyes D, et al. Accuracy of Dementia Screening Instruments in Emergency Medicine: A Diagnostic Meta-analysis. *Academic emergency medicine : official journal of the Society for Academic Emergency Medicine* 2019;26:226-45.
51. Galvin JE, Roe CM, Powlishta KK, et al. The AD8: a brief informant interview to detect dementia. *Neurology* 2005;65:559-64.
52. Galvin JE, Roe CM, Coats MA, Morris JC. Patient's rating of cognitive ability: using the AD8, a brief informant interview, as a self-rating tool to detect dementia. *Archives of neurology* 2007;64:725-30.
53. Hendry K, Green C, McShane R, et al. AD-8 for detection of dementia across a variety of healthcare settings. *Cochrane Database of Systematic Reviews* 2019.
54. Morgan DG, Crossley M, Kirk A, et al. Evaluation of Telehealth for Preclinic Assessment and Follow-Up in an Interprofessional Rural and Remote Memory Clinic. *Journal of applied gerontology : the official journal of the Southern Gerontological Society* 2011;30:304-31.