LEGACY HEALTH PARTNERS

Dementia Evaluation and Imaging
Clinical Collaboration Guide

Right patient, right service, right time

Scope: Evaluation of memory loss in the ambulatory, primary care setting.

Last Reviewed: March 2024 – **FINAL**	
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History and Physical evaluation:

- Detailed history (Include family and caregivers for collateral information)
- Medication review [Ask about CNS depressants (e.g., opioids, benzodiazepines) and OTC meds (e.g., diphenhydramine) that can cause cognitive symptoms]
- Ask about alcohol and substance use
- Assess ADLs and IADLs
- Ask about vision and hearing (Encourage use of glasses and hearing aids for exam. Use pocket talker in clinic if needed)
- Mental status exam such as MoCA* or SLUMS
- Assess mental health. (Screen for depression with GDS 15)
- Detailed neurologic examination including gait assessment
- Address safety concerns (driving, living situation)

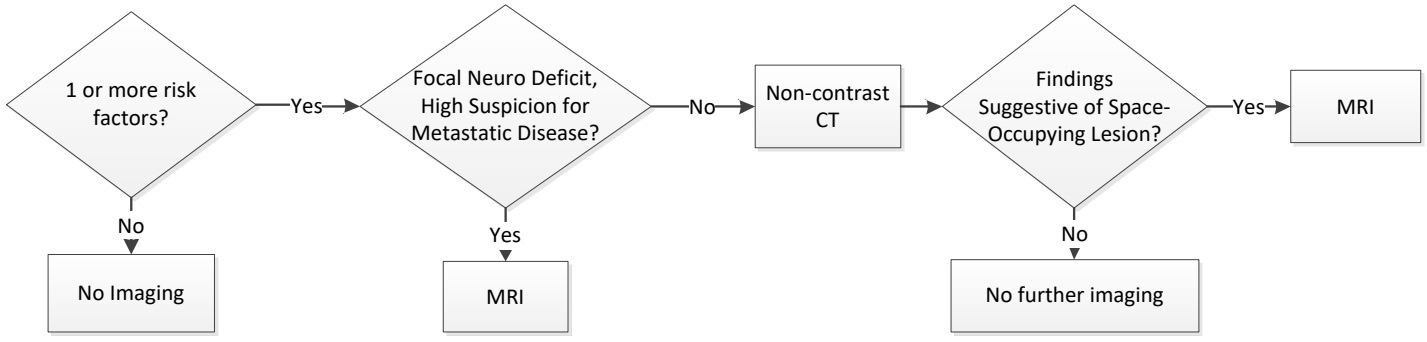
*Provider must complete MoCA certification

Lab evaluation:

CBC, CMP, TSH, methylmalonic acid if high index of suspicion for B12 deficiency). Consider RPR or HIV depending on patient's history and exposure.

Neuroimaging Risk Factors:

- Age < 60 years
- Rapid (e.g., 1 or 2 months) unexplained decline in cognition or function
- "Short" duration of dementia (< 2 years)
- Recent and significant head trauma
- Unexplained neurological symptoms (e.g., new onset of severe headache or seizures)
- Any new localizing sign (e.g., hemiparesis or a Babinski reflex)
- History of cancer (especially in sites and types that metastasize to the brain)
- Use of anticoagulants or history of bleeding disorder
- Clinical picture suggesting NHP (cognitive symptoms, urinary incontinence, gait disorder
- Unusual or atypical cognitive symptoms (e.g., progressive aphasia)
- Recent fall or gait disturbance



Referral:

Patients with cognitive deficits that need further specialty evaluation can be evaluated by neurology or geriatrics, as available. It is most helpful if the initial laboratory eval is done before referral, but if there are questions on appropriate imaging, this decision may be deferred to the specialist.

Cognitive symptoms in patients <65 years should be evaluated by Neurology first to rule out early onset Alzheimer's dementia.

In general, patients with cognitive deficits and neurologic symptoms may benefit from neurology evaluation, while patients with cognitive deficits, behavior issues related to dementia, or having issues with falls or ADLs and IADLS may benefit from geriatric evaluation.

Table 1: Dementia, Depression, and Delirium

	Alzheimer's Dementia	Vascular Dementia	Frontotemporal Dementia	Parkinson's Disease Dementia	Lewy Body Dementia	Depression	Delirium
History/ Onset	Insidious, presents w/ depression, vague sx 2-3yrs before dx. Memory, language, visual-spatial probs, indifference, delusions, agitation	Hx of HTN, vascular disease, CAD, abrupt onset but may be insidious. Stepwise deterioration	Insidious, personality change, apathy, disinhibition	Motor signs precede dementia by at least 1 year	Prominent detailed visual hallucinations precede motor signs	Subacute	Sudden onset, tends to have underlying medical disorder
Motor signs	Late	Motor signs, Balance deficits or hemiparesis	Apraxia, gait instability	Tremor, stiffness, gait changes	Parkinsonian signs; motor signs & dementia may occur in same year	Anergia	Postural tremor, myoclonus, asterixis
Attention	Normal	Difficulty with mental tracking	Normal	AMS, marked fluctuation in alertness, attention		Poor concentration	Fluctuating, inattentive, easily distracted
Memory	Early: difficulty learning new info & retaining it	Decreased memory retrieval	May be normal	Slowed	Mildly impaired early	Impaired motivation affects testing	Impaired by poor attention, cannot register objects
Language	Aphasia, anomia, decreased verbal fluency	Variable depending on lesion Most have prominent aphasia	Progressive nonfluent (logopenic) or fluent (semantic) aphasia	Slowed, dysarthria is common		Normal on testing	Unintelligible to confused; misnaming may be prominent
Thought disorders	Delusions			Visual hallucinations, and delusions		Auditory hallucinations common, VH rare	Visual or tactile hallucinations common
Visual Spatial	Mild early and progressive	Variable, depending on lesion	Relativepreservation of visual-spatial skills	Prominent visual spatial abnormality			
Mood, Affect	Apathy, depression, personality change	Behavioral changes	Marked apathy, disinhibition, personality change	Apathy		Sadness, hopelessness, may have SI	Fear and suspiciousness may be prominent
Executive Function	Mild early and progressive	More prominent than memory loss	Abnormal frontal lobe, judgment	Slowing of thought process Impaired		Normal on testing	Gross confusion
Treatment	Start early with ChEI, add NMDA antagonist. Avoid anticholinergics.	ChEI +/- NMDA antagonist. Treat vascular risk factors.	Low dose SSRI helpful. Avoid ChEI; may worsen symptoms. Antipsychotics variable effect, Consider mood stabilizer.	Avoid all neuroleptics except low dose quetiapine or pimavanserin. Possible role for low dose ChEI, rivastigmine patch best. NMDA antagonist variable, possibly unhelpful.		SSRI, DARI. Augment with SGA for severe cases,	FGA or SGA for psychosis. Treat underlying medical disorder. Recent studies do not support ChEI except for persistent delirium.

DARI: dopamine reuptake inhibitor
SGA: second generation antipsychotic (e.g., atypicals like risperidone, olanzapine, quetiapine)
FGA: first generation antipsychotic (e.g., typicals, like haloperidol, perphenazine)

Background:

National clinical guidelines around evaluation for dementia often suggest neuroimaging, but do not specify between CT vs MRI, even though there is a significant cost differential between these two imaging modalities. To help create a consistent practice throughout LHP, representative geriatricians and neurologists from the network have evaluated the available evidence and propose the following approach.

Data also shows that advanced imaging is a significant driver of our patients' total cost of care. Our network orders more CT scans and MRIs than other similar sized health systems when we compare ourselves to benchmarks. As out-of-pocket patient responsibilities rise, our patients carry a notable portion of this burden as well. A significant portion of these advanced imaging tests are MRIs of the brain done to evaluate memory loss.

Neuroimaging with Head CT or MRI scan is unequivocally indicated in patients with acute onset of cognitive impairment and/or rapid neurologic deterioration.

Neuroimaging indicated when history or physical exam suggestive of subdural hematoma, thrombotic stroke, cerebral hemorrhage, or another structural lesion.

Serial imaging is not informative unless there is an unexpected clinical change e.g., abrupt mental status changes with a readily identified cause, new focal neurological findings or seizure.

NOTE: some payors and decision-support tools may suggest MRI over CT – this guide was developed within our network using available evidence to support clinical decision-making and may not always match individual payor expectations or requirements.

References:

Clinical-Provider-Roadmap-Final.pdf (oregonspado.org)

Bermingham SL. The appropriate use of neuroimaging in the diagnostic work-up of dementia: an economic literature review and cost-effectiveness analysis. Ont Health Technol Assess Ser [Internet]. 2014 February;14(2):1–67. Available from: http://www.hqontario.ca/evidence/publications-and-ohtac-recommendations/ontario-health-technology-assessment-series/imaging-for-dementia.

Contact: If you have questions or comments about this guide, or are interested in the development of future collaboration guides, please contact LHP medical director Albert Chaffin, M.D. achaffin@lhs.org

Disclaimer: No guideline can anticipate all the unique circumstances of patient care, and as such, there are times when good clinical judgement will result in deviation from this guideline. In those settings, the reason for such deviation from this guideline should be documented in the medical record.

Appendix follows

- The Saint Louis University Mental Status (SLUMS) Examination for Detecting Mild Cognitive.

- Montreal Cognitive Assessment (MOCA)

- Montreal Cognitive Assessment Administration and Scoring Instructions

VAMC
SLUMS EXAMINATION

Questions about this assessment tool? E-mail aging@slu.edu

Name_____ Age_____

Is the patient alert?_____ Level of education_____

__/1 (1) **1. What day of the week is it?**

__/1 (1) **2. What is the year?**

__/1 (1) **3. What state are we in?**

4. Please remember these five objects. I will ask you what they are later.
Apple Pen Tie House Car

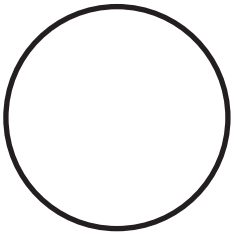
5. You have $100 and you go to the store and buy a dozen apples for $3 and a tricycle for $20.
(1) **How much did you spend?**
__/3 (2) **How much do you have left?**

6. Please name as many animals as you can in one minute.
__/3 (0) 0-4 animals (1) 5-9 animals (2) 10-14 animals (3) 15+ animals

__/5 **7. What were the five objects I asked you to remember? 1 point for each one correct.**

8. I am going to give you a series of numbers and I would like you to give them to me backwards. For example, if I say 42, you would say 24.
__/2 (0) 87 (1) 648 (1) 8537

9. This is a clock face. Please put in the hour markers and the time at ten minutes to eleven o'clock.



(2) Hour markers okay
__/4 (2) Time correct

(1) **10. Please place an X in the triangle.**

__/2 (1) **Which of the above figures is largest?**

11. I am going to tell you a story. Please listen carefully because afterwards, I'm going to ask you some questions about it.

Jill was a very successful stockbroker. She made a lot of money on the stock market. She then met Jack, a devastatingly handsome man. She married him and had three children. They lived in Chicago. She then stopped work and stayed at home to bring up her children. When they were teenagers, she went back to work. She and Jack lived happily ever after.

(2) **What was the female's name?** (2) **What work did she do?**
__/8 (2) **When did she go back to work?** (2) **What state did she live in?**

_____ **TOTAL SCORE**

SCORING

High School Education		Less than High School Education
27-30	Normal	25-30
21-26	Mild Neurocognitive Disorder	20-24
1-20	Dementia	1-19

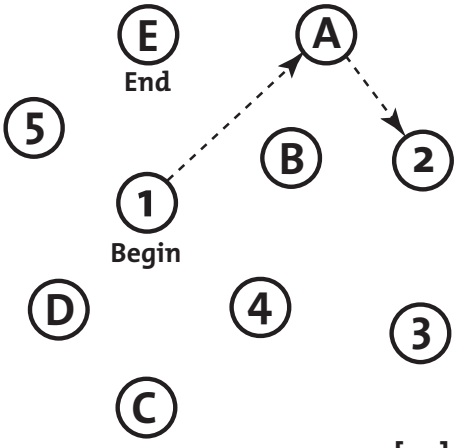
CLINICIAN'S SIGNATURE DATE TIME

SH Tariq, N Tumosa, JT Chibnall, HM Perry III, and JE Morley. The Saint Louis University Mental Status (SLUMS) Examination for detecting mild cognitive impairment and dementia is more sensitive than the Mini-Mental Status Examination (MMSE) - A pilot study. *Am J Geriatr Psych* 14:900-10, 2006.

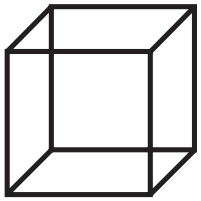
MONTREAL COGNITIVE ASSESSMENT (MOCA)

NAME :
Education : Date of birth :
Sex : DATE :

VISUOSPATIAL / EXECUTIVE



Copy cube



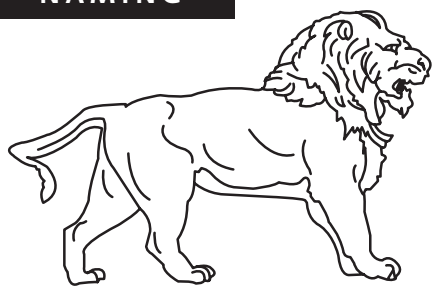
[ ] [ ]

Draw CLOCK (Ten past eleven)
(3 points)

[ ] Contour [ ] Numbers [ ] Hands

POINTS ___/5

NAMING



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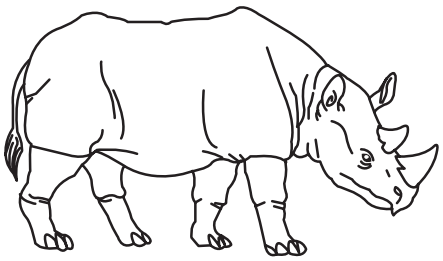

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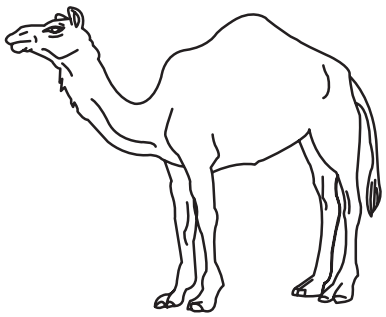

[ ]

___/3

MEMORY

Read list of words, subject must repeat them. Do 2 trials. Do a recall after 5 minutes.

	FACE	VELVET	CHURCH	DAISY	RED
1st trial					
2nd trial					

No points

ATTENTION

Read list of digits (1 digit/ sec.). Subject has to repeat them in the forward order [ ] 2 1 8 5 4

Subject has to repeat them in the backward order [ ] 7 4 2

___/2

Read list of letters. The subject must tap with his hand at each letter A. No points if ≥ 2 errors

[ ] F B A C M N A A J K L B A F A K D E A A A J A M O F A A B

___/1

Serial 7 subtraction starting at 100 [ ] 93 [ ] 86 [ ] 79 [ ] 72 [ ] 65

4 or 5 correct subtractions: **3 pts**, 2 or 3 correct: **2 pts**, 1 correct: **1 pt**, 0 correct: **0 pt**

___/3

LANGUAGE

Repeat : I only know that John is the one to help today. [ ]

The cat always hid under the couch when dogs were in the room. [ ]

___/2

Fluency / Name maximum number of words in one minute that begin with the letter F [ ] _____ (N ≥ 11 words)

___/1

ABSTRACTION

Similarity between e.g. banana - orange = fruit [ ] train – bicycle [ ] watch - ruler

___/2

DELAYED RECALL

	Has to recall words WITH NO CUE	FACE [ ]	VELVET [ ]	CHURCH [ ]	DAISY [ ]	RED [ ]	Points for UNCUED recall only
Optional	Category cue						
	Multiple choice cue						

___/5

ORIENTATION

[ ] Date [ ] Month [ ] Year [ ] Day [ ] Place [ ] City

___/6

 Version November 7, 2004

www.mocatest.org

Normal ≥ 26 / 30

TOTAL ___/30

Add 1 point if ≤ 12 yr edu

Montreal Cognitive Assessment
(MoCA)

Administration and Scoring Instructions

The Montreal Cognitive Assessment (MoCA) was designed as a rapid screening instrument for mild cognitive dysfunction. It assesses different cognitive domains: attention and concentration, executive functions, memory, language, visuoconstructional skills, conceptual thinking, calculations, and orientation. Time to administer the MoCA is approximately 10 minutes. The total possible score is 30 points; a score of 26 or above is considered normal.

1. Alternating Trail Making:

Administration: The examiner instructs the subject: *"Please draw a line, going from a number to a letter in ascending order. Begin here* [point to (1)] *and draw a line from 1 then to A then to 2 and so on. End here* [point to (E)]."

Scoring: Allocate one point if the subject successfully draws the following pattern: 1 –A- 2- B- 3- C- 4- D- 5- E, without drawing any lines that cross. Any error that is not immediately self-corrected earns a score of 0.

2. Visuoconstructional Skills (Cube):

Administration: The examiner gives the following instructions, pointing to the **cube**: *"Copy this drawing as accurately as you can, in the space below".*

Scoring: One point is allocated for a correctly executed drawing.

- Drawing must be three-dimensional
- All lines are drawn
- No line is added
- Lines are relatively parallel and their length is similar (rectangular prisms are accepted)

A point is not assigned if any of the above-criteria are not met.

3. Visuoconstructional Skills (Clock):

Administration: Indicate the right third of the space and give the following instructions: *"Draw a **clock**. Put in all the numbers and set the time to 10 after 11".*

Scoring: One point is allocated for each of the following three criteria:

- Contour (1 pt.): the clock face must be a circle with only minor distortion acceptable (e.g., slight imperfection on closing the circle);
- Numbers (1 pt.): all clock numbers must be present with no additional numbers; numbers must be in the correct order and placed in the approximate quadrants on the clock face; Roman numerals are acceptable; numbers can be placed outside the circle contour;
- Hands (1 pt.): there must be two hands jointly indicating the correct time; the hour hand must be clearly shorter than the minute hand; hands must be centred within the clock face with their junction close to the clock centre.

A point is not assigned for a given element if any of the above-criteria are not met.

4. Naming:

Administration: Beginning on the left, point to each figure and say: *"Tell me the name of this animal".*

Scoring: One point each is given for the following responses: (1) camel or dromedary, (2) lion, (3) rhinoceros or rhino.

5. Memory:

Administration: The examiner reads a list of 5 words at a rate of one per second, giving the following instructions: *"This is a memory test. I am going to read a list of words that you will have to remember now and later on. Listen carefully. When I am through, tell me as many words as you can remember. It doesn't matter in what order you say them".* Mark a check in the allocated space for each word the subject produces on this first trial. When the subject indicates that (s)he has finished (has recalled all words), or can recall no more words, read the list a second time with the following instructions: "*I am going to read the same list for a second time. Try to remember and tell me as many words as you can, including words you said the first time."* Put a check in the allocated space for each word the subject recalls after the second trial.

At the end of the second trial, inform the subject that (s)he will be asked to recall these words again by saying, "*I will ask you to recall those words again at the end of the test."*

Scoring: No points are given for Trials One and Two.

6. Attention:

Forward Digit Span: Administration: Give the following instruction: "*I am going to say some numbers and when I am through, repeat them to me exactly as I said them".* Read the five number sequence at a rate of one digit per second.

Backward Digit Span: Administration: Give the following instruction: "*Now I am going to say some more numbers, but when I am through you must repeat them to me in the backwards order."* Read the three number sequence at a rate of one digit per second.

Scoring: Allocate one point for each sequence correctly repeated, (*N.B.:* the correct response for the backwards trial is 2-4-7).

Vigilance: Administration: The examiner reads the list of letters at a rate of one per second, after giving the following instruction: "*I am going to read a sequence of letters. Every time I say the letter A, tap your hand once. If I say a different letter, do not tap your hand".*

Scoring: Give one point if there is zero to one errors (an error is a tap on a wrong letter or a failure to tap on letter A).

Serial 7s: Administration: The examiner gives the following instruction: "*Now, I will ask you to count by subtracting seven from 100, and then, keep subtracting seven from your answer until I tell you to stop."* Give this instruction twice if necessary.

Scoring: This item is scored out of 3 points. Give no (0) points for no correct subtractions, 1 point for one correction subtraction, 2 points for two-to-three correct subtractions, and 3 points if the participant successfully makes four or five correct subtractions. Count each correct subtraction of 7 beginning at 100. Each subtraction is evaluated independently; that is, if the participant responds with an incorrect number but continues to correctly subtract 7 from it, give a point for each correct subtraction. For example, a participant may respond "92 – 85 – 78 – 71 – 64" where the "92" is incorrect, but all subsequent numbers are subtracted correctly. This is one error and the item would be given a score of 3.

7. Sentence repetition:

Administration: The examiner gives the following instructions: "*I am going to read you a sentence. Repeat it after me, exactly as I say it* [pause]*:* ***I only know that John is the one to help today.*****"** Following the response, say: "*Now I am going to read you another sentence. Repeat it after me, exactly as I say it* [pause]*:* ***The cat always hid under the couch when dogs were in the room.****"*

Scoring: Allocate 1 point for each sentence correctly repeated. Repetition must be exact. Be alert for errors that are omissions (e.g., omitting "only", "always") and substitutions/additions (e.g., "John is the one who helped today;" substituting "hides" for "hid", altering plurals, etc.).

8. Verbal fluency:

Administration: The examiner gives the following instruction: "*Tell me as many words as you can think of that begin with a certain letter of the alphabet that I will tell you in a moment. You can say any kind of word you want, except for proper nouns (like Bob or Boston), numbers, or words that begin with the same sound but have a different suffix, for example, love, lover, loving. I will tell you to stop after one minute. Are you ready?* [Pause] *Now, tell me as many words as you can think of that begin with the letter F.* [time for 60 sec]. *Stop."*

Scoring: Allocate one point if the subject generates 11 words or more in 60 sec. Record the subject's response in the bottom or side margins.

9. Abstraction:

Administration: The examiner asks the subject to explain what each pair of words has in common, starting with the example: "*Tell me how an orange and a banana are alike"*. If the subject answers in a concrete manner, then say only one additional time: "*Tell me another way in which those items are alike"*. If the subject does not give the appropriate response (*fruit*), say, "*Yes, and they are also both fruit.*" Do not give any additional instructions or clarification.

After the practice trial, say: "*Now, tell me how a train and a bicycle are alike"*. Following the response, administer the second trial, saying: "*Now tell me how a ruler and a watch are alike"*. Do not give any additional instructions or prompts.

Scoring: Only the last two item pairs are scored. Give 1 point to each item pair correctly answered. The following responses are acceptable:

Train-bicycle = means of transportation, means of travelling, you take trips in both;

Ruler-watch = measuring instruments, used to measure.

The following responses are **not** acceptable: Train-bicycle = they have wheels; Ruler-watch = they have numbers.

10. Delayed recall:

Administration: The examiner gives the following instruction: "*I read some words to you earlier, which I asked you to remember. Tell me as many of those words as you can remember.* Make a check mark (✓) for each of the words correctly recalled spontaneously without any cues, in the allocated space.

Scoring: **Allocate 1 point for each word recalled freely without any cues**.

Optional:

Following the delayed free recall trial, prompt the subject with the semantic category cue provided below for any word not recalled. Make a check mark (✓) in the allocated space if the subject remembered the word with the help of a category or multiple-choice cue. Prompt all non-recalled words in this manner. If the subject does not recall the word after the category cue, give him/her a multiple choice trial, using the following example instruction, "*Which of the following words do you think it was, NOSE, FACE, or HAND?"*

Use the following category and/or multiple-choice cues for each word, when appropriate:

FACE:	category cue: part of the body	multiple choice: nose, face, hand
VELVET:	category cue: type of fabric	multiple choice: denim, cotton, velvet
CHURCH:	category cue: type of building	multiple choice: church, school, hospital
DAISY:	category cue: type of flower	multiple choice: rose, daisy, tulip
RED:	category cue: a colour	multiple choice: red, blue, green

Scoring: **No points are allocated for words recalled with a cue.** A cue is used for clinical information purposes only and can give the test interpreter additional information about the type of memory disorder. For memory deficits due to retrieval failures, performance can be improved with a cue. For memory deficits due to encoding failures, performance does not improve with a cue.

11. Orientation:

Administration: The examiner gives the following instructions: "*Tell me the date today"*. If the subject does not give a complete answer, then prompt accordingly by saying: *"Tell me the [year, month, exact date, and day of the week]."* Then say: *"Now, tell me the name of this place, and which city it is in."*

Scoring: Give one point for each item correctly answered. The subject must tell the exact date and the exact place (name of hospital, clinic, office). No points are allocated if subject makes an error of one day for the day and date.

TOTAL SCORE: Sum all subscores listed on the right-hand side. Add one point for an individual who has 12 years or fewer of formal education, for a possible maximum of 30 points. A final total score of 26 and above is considered normal.