

Mini-Mental State Exam (MMSE)

Tech-Administered

Background and Rationale:

Cognitive function may decline as a result of certain risk factors (e.g. hypertension, elevated cholesterol, cardiac arrhythmias). This in turn could adversely impact the physical functioning and quality of life of older adults. Dementia is a major illness and cause of disability among the elderly. Cerebrovascular disease or multi infarct dementia is the second leading cause of dementing illness among Caucasians, preceded only by Alzheimer's disease. The Mini-Mental State Exam (MMSE) is a widely used test of cognitive function among the elderly; it includes tests of orientation, attention, memory, language and visual-spatial skills.

The MMSE is a 30 point test that was designed as a short screening measure of cognitive status. The goal of the test was to determine if people show signs of cognitive impairment. It has come to be used widely as a screening test for progressive dementing disorders, such as Alzheimer's disease.

Within Framingham, it is used to determine if someone is showing changes in cognitive function, and we do so by looking for a drop in the MMSE score compared to previous exams. If there is a drop of 3 points or more from the immediately preceding exam, we would invite the participant into the Dementia study for further neuropsychological testing and a neurological exam. If there is a drop in 5 points or more across all exams, this will also trigger a request for further follow up by the Neuro group.

While the MMSE has been useful in serving as a screening tool, it also has some significant limitations. One major issue is that younger and/or highly educated people are likely to score the maximum score of 30. This is known as a ceiling effect - even when people might be starting to experience real changes in cognition, the MMSE might not pick it up until much later on. The other major limitation with the MMSE is that the test is not diagnostic and a poor score does not always indicate the presence of dementia. Or even if your score suggests you have dementia, it's hard to tell what type of dementia. It is very hard to determine with any level of confidence what areas of cognition are impaired based on MMSE performance. Sometimes, researchers do try to look at specific items on the test, and determine cognitive-domain specific deficits. For example, poor performance on the recall item may lead some to decide there is a memory problem.

If there are any concerns regarding the participant's memory, notify the Clinic physician and refer the participant for further assessment with the Neuro group. The Clinic physician should complete a Referral Form and give to the Neuro Project Coordinator, [REDACTED], after the exam. Referral forms can be found in the appendices.

If a participant has been seen by the Neuro group previously, it is indicated on the PTS Roster screen. Sometimes a family member will tell the recruiters that there is a memory issue.

During the admitting process, if the participant has trouble answering questions (i.e., children's names, sibling's names, etc.) the Admitter will notify the Clinic staff who will then notify the Clinic physician.

Methods:

1. The MMSE asks questions to ascertain cognitive status. Responses are scored:
0=incorrect
1=correct
6=item administered, participant does not answer
9=test item not administered/unknown
2. If a response is ambiguous, the interviewer records the response in the margin so a decision can be made on its appropriateness. Please refer all questionable responses to the neuropsychologists [REDACTED]
[REDACTED]
3. When a participant is incapacitated by blindness, has a functional disability, is illiterate, or is otherwise unable to respond to a question, the interviewer should specify the problem and questions involved (see "Factors Potentially Affecting Mental Status Testing" later in the section).

Expanded Scoring Instructions for Mini-Mental Exam:

Important note: Sometimes a participant might produce a response that is not a word (i.e. a neologism) but has been responding with intelligible responses on previous items (right or wrong). In this case the items should be scored **0**. The key to differentiating a **0** or a **9** is consistency within test. If a person has a speech abnormality, such as aphasia or dysarthria, across all items, most (or many) responses will be unintelligible. If a person is, for example, demented, he/she may produce a flow of intelligible responses with occasional unintelligible responses. A "**9**" must represent situations in which the EXAMINER is not sure whether (1) the participant responded correctly (because of slurred speech, severe stuttering, etc.), or (2) if the participant has some other factor that prevents test item administration (such as an inability to administer *copy this figure* test

item to a right-handed person who has right-handed paralysis, or to someone who has a visual impairment or inability to hear).

Scoring for Administered Individual Items: (applies only if a test item is administered)

Score **0** for the following reasons:

- Incorrect response
- I don't know
- Unintelligible response in context of other intelligible responses

Score **9** for the following reason:

- When test item was not administered (refused or inability because of physical limitations), or
- When the subject's response is uninterpretable (response could be correct, but tester is unable to discern the response).

Important note: The single exception to scoring **6** for no response is if a participant is in a coma (this circumstance would be encountered in a nursing home visit) In this instance, administer the first item (to establish no response -- give a **0** to the first item if there is no response). (This exception is made to conform with the stroke protocol.)

Questions: Scripts and Procedures for Each Question:

Introductory Script: *I'm going to start by asking questions that require concentration and memory. Some questions are more difficult than others and some will be asked more than one time.*

Read each question on the form.
Record the response on the form.

1. *What is the date today?* (**3** = correct score for month (1 pt), day (1 pt) and year (1 pt))
 - a. Ask for the date. Then ask specifically for parts omitted (e.g. *Can you also tell me what month, year it is?*)
 - b. If participant supplies part or all of the date (e.g. month and day, or month, day, and year), record as appropriate and do not ask those questions again.

2. *What is the season?*

Since distinctions between seasons can be difficult during certain months, one week leeway is allowed on either side of the actual date.

**MMSE ACCEPTABLE ANSWERS
FOR
“WHAT IS THE SEASON”?**

2011

Month	Correct Response	Acceptable Dates (2 Seasons)
April	Spring	n/a
May	Spring	n/a
June	Spring or Summer	6/14/11 – 6/28/11
July	Summer	n/a
August	Summer	n/a
September	Summer or Fall/Autumn	9/16/11 – 9/30/11
October	Fall/Autumn	n/a
November	Fall/Autumn	n/a
December	Fall/Autumn or Winter	12/15/11 – 12/29/11

2012

Month	Correct Response	Acceptable Dates (2 Seasons)
January	Winter	n/a
February	Winter	n/a
March	Winter or Spring	3/13/12 – 3/27/12
April	Spring	n/a
May	Spring	n/a
June	Spring or Summer	6/13/12 – 6/27/12
July	Summer	n/a
August	Summer	n/a
September	Summer or Fall/Autumn	9/15/12 – 9/29/12
October	Fall/Autumn	
November	Fall/Autumn	

December	Fall/Autumn or Winter	12/14/12 – 12/28/12
----------	-----------------------	---------------------

2013

Month	Correct Response	Acceptable Dates (2 Seasons)
January	Winter	n/a
February	Winter	n/a
March	Winter or Spring	3/13/13 – 3/27-13
April	Spring	n/a
May	Spring	n/a
June	Spring or Summer	6/14/13 – 6/28/13
July	Summer	n/a
August	Summer	n/a
September	Summer or Fall/Autumn	9/15/13 – 9/29/13
October	Fall/Autumn	
November	Fall/Autumn	
December	Fall/Autumn or Winter	12/14/13 – 12/28/13

2014

Month	Correct Response	Acceptable Dates (2 Seasons)
January	Winter	n/a
February	Winter	n/a
March	Winter or Spring	3/13/14 – 3/27/14
April	Spring	n/a
May	Spring	n/a
June	Spring or Summer	6/14/14 – 6/28/14
July	Summer	n/a
August	Summer	n/a
September	Summer or Fall/Autumn	9/16/14 – 9/30/14
October	Fall/Autumn	
November	Fall/Autumn	
December	Fall/Autumn or Winter	12/14/14 – 12/28/14

3. *What day of the week is it?*

4. *What town, county, and state are we in? (Town, County, State, correct score = 3)*
 - a. Ask the participant what town, county, and state we are in.
 - b. If the participant is from out of town or out of state, it is acceptable for them to respond with the county they live in. It is okay to prompt them if they live out of the area.
 - c. For offsite visits, refer to the section of the manual titled “New England Counties” for a complete list of all counties.
5. *What is the name of this place?*
 - a. Ask the participant where they are. Any appropriate answer is okay. (possible acceptable responses = FHS, Perini, Mt. Wayte).
 - b. On home visits, the examiner can ask, *What is the address of this place?*(possible acceptable responses = *Nursing Home, my house, or their address*).
6. *What floor of the building are we on?*
 - a. *Clinic Visit = 1st Floor. If they say “Main Floor”, repeat the question adding “now”.*
7. *I am going to name 3 objects. After I have said them I want you to repeat them back to me. Are you ready? **Apple, Table, Penny**. Could you repeat the three items for me? Remember what they are because I will ask you to name them again in a few minutes:*
 - a. Make sure participant is attentive when beginning the question.
 - b. Read the list of objects slowly. DO NOT REPEAT ITEMS UNTIL AFTER THE FIRST TRIAL.
 - c. If participant asks you to repeat the 3 items, respond, *Can you tell me the items I just mentioned?* or *Just do the best you can.*
 - d. Read *Apple, Table, Penny*.
 - e. Script: *Could you repeat the three items for me?*
 - f. Record the score for the first trial.
 - g. If, after scoring the first attempt, the participant has not learned the 3 objects, repeat the list of objects up to 6 times until he/she has learned them.
 - h. If, 3 items are repeated regardless of order, score 3 points. Occasionally hearing impairments prevent subjects from correctly hearing test questions (for example, when asked to repeat three items, *apple, table, penny*, they may repeat *April, tablet, pencil* -- these alternate responses should be accepted both under the repetition and recall conditions).

8. *Now I am going to spell a word forward and I want you to spell it backwards. The word is WORLD. W-O-R-L-D. Please spell it in reverse order. Write in letters _____* (letters are entered and computer scored later).

- a. Read the question slowly. Where *world* has hyphens between the letters, spell out the word.
- b. Repeat the spelling if necessary.
- c. Record the participant's response. Write in the letter as the participant has spelled the word.
- d. If the participant spells the word forward rather than in reverse, they can be cued once with a reminder to spell it backwards.

9. *What are the 3 objects I asked you to remember a few moments ago?*

- a. Items may be repeated in any order.

10. *What is this called? (Watch)*

Show the wristwatch to the participant

Correct responses include: watch, wristwatch, timepiece

Code 1 = correct answer

11. *What is this called? (Pencil)*

- a. Show the pencil to the participant. NOTE: the pencil should be a standard sharpened wooden pencil with eraser.
- b. Correct responses include: Pencil, number 2 pencil
- c. Code **1** = correct for correct answer.

12. *Please repeat the following: No ifs, ands or buts.*

- a. Enunciate clearly -- include the "**S**" at the end of *ifs*, *ands*, or *buts*, (if you think the participant heard you but repeated it incorrectly, make a note of what was missed and score **0**).
- b. Allow only **one** attempt.
- c. Code **1** = correct when the participant correctly repeated the phrase.
- d. Code **0** = incorrect when the participant did not repeat the phrase exactly.

Occasionally hearing impairments prevent participants from correctly hearing test questions. In the case of repeating *no ifs, ands, or buts*, some judgment must be made on the part of the examiner as to whether the participant could hear the "**s**" or not.

13. *Please read the following and do what it says.*

- a. Hand participant the “Please Close Your Eyes” card.
- b. The participant may read the sentence out loud. The task to be coded is the participant’s ability to follow instructions by closing his/her eyes. It is not necessary for the sentence to be read out loud if the participant performs the function properly.
- c. Code **1** = correct when the participant closes his/her eyes.
- d. Code **0** = incorrect when the participant did not close his/her eyes.

14. *Please write a sentence.*

- a. Script: *Write any complete sentence on this piece of paper for me.*
 - b. Repeat the instructions to participant if necessary.
 - c. Code **1** = correct if the participant wrote a complete sentence as directed.
 - d. Written commands, such as *sit down*, where the subject is implied, are considered correct responses.
 - e. Spelling and/or punctuation errors are not counted as errors.
 - f. Code **0** = incorrect when the participant did not write a complete sentence as directed.
 - g. Code **1** = if the participant is cognitively able to dictate a sentence but is physically unable to write it. In this case the examiner should write the dictated sentence and make a note that it was dictated.
- Code **6** = Low vision

15. *Please copy this drawing.*

- a. Script: *Here is a drawing. Please copy the drawing on the same piece of paper.*
- b. If the participant asks if the figures should be drawn separately or together the examiner should respond, *Draw the figures as you see them.*
- c. To be correct, each pentagon must have 5 sides, 5 sides that point outward. The two figures must be overlapping.
- d. The overlap figures must have 4 sides.
- e. Code “**0**” = incorrect when the participant’s figure did not match.

16. *Take this piece of paper in your right hand, fold it in half with both hands, and put it in your lap.*

(If participant is unable to use right hand because of physical disability, you can alter instructions to read “Take this piece of paper in your left hand, fold it in half with your left hand, and put it in your lap”. The goal is to see whether the subject is able to follow a 3-step command, so this variation to the directions to accommodate subject’s physical limitations is allowable.)

Read the full statement **BEFORE** handing the paper to the participant.

- a. **DO NOT** direct the paper to participant's right side. Hold the paper in front and have the participant reach out to take it. Observe which hand is used.
- b. **DO NOT** repeat instructions or coach participant. Only repeat if the examiner felt it was not heard or if instructions were not given clearly (just repeat the directions in full as they were the first time).
- c. Score: This is a 3 step command. Score **one** for each correctly performed act (code **6** if low vision).

Factors Potentially Affecting Mental Status Testing

The examiner's impression for Offspring Exam 9 will include the following:

<u>NO</u>	<u>YES</u>	<u>MAYBE</u>	<u>UNKNOWN</u>	
0	1	2	9	Illiteracy or low education
0	1	2	9	Not fluent in English
0	1	2	9	Poor eyesight
0	1	2	9	Poor hearing
0	1	2	9	Other

Note: Questions cannot be answered by a proxy.