Overview

• MCI
  • Definitions, Subtypes, Screening/ assessment

• Dementias
  • Definitions, Subtypes, Screening / Assessment

• Management of Cognitive issues for the general clinician
  • Referrals/ treatments
  • Family
  • Legal / Driving
Dementia and Mild Cognitive Impairment

• Globally, the number of people diagnosed with dementia is increasing every year at an alarming rate. There are currently over 46.8 million people living with dementia and this is estimated to rise to **131.5 million people by 2050**. (Tozer, 7/5/17)

• Dementia
  • A loss of cognitive processes from a prior level of cognitive processes, as compared to age-mates, and due to a pathophysiological process.

• MCI
  • An intermediate step between normal cognition and dementia
  • A measurable deficit in at least one domain, absent dementia and showing no appreciable deficit in ADL functioning
Mild Cognitive Impairment

**Diagnostic concepts to describe cognitive change in aging**

- Benign senescent forgetfulness (BSF) – Kral, 1962
- Mild Cognitive Impairment (MCI) – Reisberg et al., 1982
- Age-Associated Memory Impairment (AAMI) – Cook et al., 1986
- Late-life forgetfulness (LLF) – Blackford & La Rue, 1989
- Age-Associated Cognitive Decline (AACD) – Levy et al., 1994
- Cognitive Impairment No Dementia (CIND) – Graham et al., 1997
- Amnestic Mild Cognitive Impairment (aMCI) – Petersen et al., 1999
- Age Related Cognitive Decline (ARCD) – DSM IV
- Mild Cognitive Disorder (MCD) – ICD-10
- Prodromal AD – Dubois et al., 2010
- MCI due to AD – NIA-AA criteria; Albert et al., 2011
- Mild Neurocognitive Disorder (MNCD) – DSM-5

**Typical clinical/cognitive problems in MCI**

- Changes in memory (more dependent on reminders, notes, diaries; misplacing things; etc.)
- More difficulties with multi tasking
- Changes in attention and executive functions (more easily distracted; less flexible; new difficulties with problem solving; less skilled or interested in planning ahead (e.g. traveling)
- Changes in language (word-finding difficulties)
- Changes in visuospatial function
- Often slower or more stressed (routines change)
- Limited insight can occur (what is their theory?)
- Often increase in conflict with significant others (new safety concerns from family members; change of roles in family)
- ADLs can be impacted (new difficulties with driving in challenging situations; subtle new problems with managing finances; cog. decline in skills; e.g. bridge, golf etc.)

Holsinger et al., 2007; Laurschläger & Kurz, 2010; McGarten et al., 2013 Management of SMC and MCI
Mild Cognitive Impairment

Subtypes

- Amnestic
  - Most Common? *? Precursor to SDAT

- Non-Amnestic
  - Impairment in a single or multiple non-memory domain
  - Language, executive functioning, spatial skills
  - Depending: could progress to Fronto-Temporal Dementia (FTD), Vascular Dementia (VD), Primary Progressive Aphasia (PPA), Diffuse Lewy Body Dementia (DLB).

*Mark has issues with this!
Heterogeneity of MCI & possible multiple etiologies

Clinical Presentations
- MCI
- Amnestic MCI
- Multiple Domains MCI
- MCI Single Non-memory Domain

Possible Etiologies
- Degenerative
- Vascular
- Metabolic
- Traumatic
- Psychiatric
- Others?

Mild Cognitive Impairment

• Rate of progression from MCI to dementia: 2 to 20%
• Risk factors:
  • age, race, lower education
  • HTN, DM, sleep disorders
  • Apolipoprotein E- epsilon 4 genotype
  • h/o CVA and h/o cardiac disease have more chance of amnestic than non-amnestic MCI
• Pathology: predominantly, MCI autopsy samples show AD pathology ie, tau distribution in medial temporal lobes
The aging process

Brain Amyloid-β Burden Is Associated with Disruption of Intrinsic Functional Connectivity within the Medial Temporal Lobe in Cognitively Normal Elderly
Zhuang Song, Philip S. Insel, Shannon Buckley, Seghel Yohannes, Adam Mezher, Alix Simonson, Sarah Wilkins, Duygu Tosun, Susanne Mueller, Joel H. Kramer, Bruce L. Miller and Michael W. Weiner

Journal of Neuroscience 18 February 2015, 35 (7) 3240-3247; DOI: https://doi.org/10.1523/JNEUROSCI.2092-14.2015

Alzheimer’s Process: Destruction of Cortex
Alzheimer’s Process: Destruction of Cortex

Agreement of new perspectives

• Currently, biomarkers, esp. CSF markers can be used as research tool

• POSSIBLY: identifying persons @ risk of progressing to AD

• Findings from small # of studies from selected clinical samples cannot be generalized (as yet) to the general population
Genetics

- MCI is a genetically complex condition and there are currently no major genes known to be involved.
- Each of the disorders that may possibly underlay MCI (e.g., AD, vascular pathology, depression) may partially have some genetic components.
- Consequently, different genes could underlie etiologies, and genetic, environmental, health history, drug/ethoh abuse likely creates even a more complex and heterogeneous picture.

Mild Cognitive Impairment

- Cognitive:
  - Neuropsychiatric: depression, irritability, anxiety, aggression, apathy, dysphoria
  - Olfactory changes
- Gait slowing: motoric cognitive risk
Mild Cognitive Impairment

- If patient or a close contact voices concern about memory or impaired cognition, assess for MCI and not assume the concerns are related to normal aging.
- MCI can reflect a pathological disease that may progress to dementia.
- Assessment can rule out reversible cause, help pt and family to understand cause of cognitive decline and prognosis.

Recommendations for General Criteria: MCI

- **General Criteria for MCI**
  - Not normal, not demented (Does not meet criteria (DSM IV, ICD 10) for a dementia syndrome

  **Cognitive Decline**
  - Self and/or informant report - and impairment on objective cognitive tests
  **And/or:**
  - Evidence of decline over time on objective cognitive tests

  **Preserved basic activities of daily living (ADLs) / or minimal impairment in complex instrumental functions.**
Mild cognitive Impairment

- should not rely on historical report alone of subjective memory concerns when assessing for MCI

- Subjective cognitive complaints alone can result in both over- and under-diagnosis of MCI and thus are insufficient

- To **screen** for MCI - should use a brief, validated cognitive assessment instrument in addition to eliciting patient and informant history regarding cognitive concerns
Mild Cognitive Impairment

- Should use validated assessment tools
- For pts who test positive, perform a more formal clinical assessment
- Various instruments have acceptable diagnostic accuracy but none is superior to another.
- Because brief cognitive assessment tests are more sensitive than specific, patients who test positive for MCI should then have further assessment

Mild Cognitive Impairment

- Assess for the presence of functional impairment related to cognition before diagnosing of dementia.
- Cooking, water running, misplacing food/ incidentals, need to replace lost items, financial management, driving/ directional issues, medication errors, gets lost in stores
- Diagnosing dementia prematurely can lead to negative consequences for patients and families.
- Assess for evidence of functional impairment limiting independence in daily activities
- A requirement for all dementia diagnoses, to help distinguish between MCI and dementia
Mild Cognitive Impairment

• Clinicians who themselves lack the necessary experience should refer these patients to a specialist with experience in cognition

• Remember the possible reversible causes

• Perform a medical evaluation for MCI risk factors that are potentially modifiable

• Some cases of MCI are reversible, including medication adverse events, sleep apnea, depression, anxiety disorders, NPH, Infection, Vitamin B12, D deficiencies, various metabolic disorders (chronic UTIs, chronic infections)

Mild Cognitive Impairment

• Clinicians should perform serial assessments over time to monitor for changes in cognitive status

• MCI can improve, remain stable, or progress over time, which can change diagnosis and approach
Assessments for MCI (incomplete lists)

- Cognitive Assessment Toolkit (Alzheimer’s Association)
  - General Practitioner Assessment of Cognition (GPCOG)
  - Memory Impairment Screen (MIS)
  - Mini-Cog
  - Informant Questionnaire
- Mini Mental Status Exam (MMSE)
- Montreal Cognitive Assessment (MoCA)
  - Now APP for iPhone

- Saint Louis University Mental Status (SLUMS).
- Cognistat
  - Cognistat Assessment System: Web based
  - Cognistat Paper
  - Cognistat Active Form

Cognitive Assessment Toolkit (Medicare Wellness Visit)
Mini Cog Validity and Reliability

- **Validity and Reliability**
  - The primary validation of the Mini-Cog© was tested in studies of accuracy in detecting the presence of dementia, now termed major neurocognitive disorder. Most studies included mainly individuals with Alzheimer type and mixed degenerative/vascular dementias. The recommended cut score for dementia screening (0-2 = positive; 3-5 = negative) was derived empirically to optimize the balance of sensitivity and specificity. High specificity is usually preferable in screening large populations, such as older adults in health care settings; some studies, seeking higher sensitivity to subtler cognitive impairments, have used 0-3 as “positive”, but this has not been adequately tested against formal cognitive disorder diagnoses. Individuals with mild cognitive impairment (cognitive impairment/no dementia; mild neurocognitive disorder) are often detected by the Mini-Cog© using the conventional cut score, but there is insufficient evidence to recommend the Mini-Cog© as a ‘screen for MCI.’ Studies conducted in primary care settings have shown that non-professionals, including medical assistants, can administer the Mini-Cog© with high reliability after minimal training and practice.

Authors’ conclusions:

There is a limited number of studies evaluating the accuracy of the Mini-Cog for the diagnosis of dementia in primary care settings. Given the small number of studies, the wide range in estimates of the accuracy of the Mini-Cog, and methodological limitations identified in most of the studies, at the present time there is insufficient evidence to recommend that the Mini-Cog be used as a screening test for dementia in primary care. Further studies are required to determine the accuracy of Mini-Cog in primary care and whether this tool has sufficient diagnostic test accuracy to be useful as a screening test in this setting.

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**Mini Mental Status Exam (MMSE)**

**Mini-Mental State Examination (MMSE)**

**Interpretation of the MMSE**

<table>
<thead>
<tr>
<th>Method</th>
<th>Score</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ringa-Codec</td>
<td>30</td>
<td>Normal</td>
</tr>
<tr>
<td>Range</td>
<td>24-30</td>
<td>Normal for 8th grade education</td>
</tr>
<tr>
<td>&lt;24</td>
<td></td>
<td>Abnormal for high school education</td>
</tr>
<tr>
<td>&lt;12</td>
<td></td>
<td>Abnormal for college education</td>
</tr>
<tr>
<td>&lt;4</td>
<td></td>
<td>Severe cognitive impairment</td>
</tr>
<tr>
<td>&lt;1</td>
<td></td>
<td>None cognitive impairment</td>
</tr>
</tbody>
</table>

** vivo:**

1. **Date:**
2. **Clinical:** Ask the questions in the order listed. Score one point for each correct response and zero for each incorrect response.
3. **Clock:** What is the date? What is the month? What is the year?
4. **Names:** Do you have any family members who are called by this name? What is the name?
5. **Writing:** Write down the name of this place. What is the name of this place?
6. **Numbers:** What is the number of this room? What is the number of this place?
7. **Time:** What is the time? What is the month? What is the year?
8. **Memory:** Do you have any memories of this place? What is the name of this place?
9. **Repetition:** Repeat the name of this place. What is the name of this place?
10. **Writing:** Write down the name of this person. What is the name of this person?
11. **Language:** Do you have any languages other than this one? What is the name of this person?
12. **Orientation:** What is the name of this person? What is the name of this person?
13. **Date:** What is the date? What is the month? What is the year?
14. **Clock:** What is the time? What is the month? What is the year?
15. **Time:** What is the time? What is the month? What is the year?
16. **Memory:** Do you have any memories of this place? What is the name of this place?
17. **Repetition:** Repeat the name of this place. What is the name of this place?
18. **Writing:** Write down the name of this person. What is the name of this person?
19. **Language:** Do you have any languages other than this one? What is the name of this person?
20. **Orientation:** What is the name of this person? What is the name of this person?
21. **Date:** What is the date? What is the month? What is the year?
22. **Clock:** What is the time? What is the month? What is the year?
23. **Time:** What is the time? What is the month? What is the year?
24. **Memory:** Do you have any memories of this place? What is the name of this place?
25. **Repetition:** Repeat the name of this place. What is the name of this place?
26. **Writing:** Write down the name of this person. What is the name of this person?
27. **Language:** Do you have any languages other than this one? What is the name of this person?
28. **Orientation:** What is the name of this person? What is the name of this person?
29. **Date:** What is the date? What is the month? What is the year?
30. **Clock:** What is the time? What is the month? What is the year?
31. **Time:** What is the time? What is the month? What is the year?
32. **Memory:** Do you have any memories of this place? What is the name of this place?
33. **Repetition:** Repeat the name of this place. What is the name of this place?
34. **Writing:** Write down the name of this person. What is the name of this person?
35. **Language:** Do you have any languages other than this one? What is the name of this person?
36. **Orientation:** What is the name of this person? What is the name of this person?
Main results
• 11 heterogeneous studies with a total number of 1569 MCI patients followed for conversion to dementia.
• Four studies assessed the role of baseline scores of the MMSE in conversion from MCI to all-cause dementia.
• Eight studies assessed this test in conversion from MCI to Alzheimer’s disease dementia.
• Only one study provided information about the MMSE and conversion from MCI to vascular dementia.
• For conversion from MCI to dementia in general, the accuracy of baseline MMSE scores ranged from sensitivities of 23% to 76% and specificities from 40% to 94%.
• In relationship to conversion from MCI to Alzheimer’s disease dementia, the accuracy of baseline MMSE scores ranged from sensitivities of 27% to 89% and specificities from 32% to 90%.
• Only one study provided information about conversion from MCI to vascular dementia, presenting a sensitivity of 36% and a specificity of 80% with an incidence of vascular dementia of 6.2%.

MMSE: In detecting MCI

• Authors’ conclusions
• Our review did not find evidence supporting a substantial role of MMSE as a stand-alone single-administration test in the identification of MCI patients who could develop dementia. Clinicians could prefer to request additional and extensive tests to be sure about the management of these patients. An important aspect to assess in future updates is if conversion to dementia from MCI stages could be predicted better by MMSE changes over time instead of single measurements. It is also important to assess if a set of tests, rather than an isolated one, may be more successful in predicting conversion from MCI to dementia.
MMSE in detecting MCI

**PLAIN LANGUAGE SUMMARY**

- Baseline scores of Mini-Mental State examination (MMSE) for early prediction of developing dementia in people with mild cognitive impairments (MCI)
- Patients with MCI should be evaluated and monitored due to their increased risk of progression to dementia.
- At present there are no agreements about what the best approach is to register the progression to dementia.
- Several cognitive function tests have been proposed for this task because most of them are easy to administer, take no longer than 10 minutes to complete, involve major executive functions, and yield an objective score.
- After an extensive search and analysis of available information, we did not find evidence supporting a substantial role of MMSE as a stand-alone single-administration test in the identification of patients who will convert to dementia in the future.

Montreal Cognitive Status Assessment (MoCA)

The scoring breakdown is as follows:

- Visuospatial and Executive Functioning: 5 points
- Animal Naming: 3 points
- Attention: 6 points
- Language: 3 points
- Abstraction: 2 points
- Delayed Recall (Short-term Memory): 5 points
- Orientation: 6 points
- Education Level: 1 point is added to the test-taker's score if he or she has 12 years or less of formal education.
Brief Stats on MoCA

- In a study by the original test authors, the MoCA was administered to three groups: Alzheimer’s disease (AD) patients, mild cognitive impairment (MCI) patients, and normal elderly controls.
- All test items were capable of discriminating between at least two of the groups, in the expected direction (p < 0.001).
- Content validity was assessed by comparing scores from MoCA and the Mini-Mental State Exam (MMSE) and correlation was found to be high (r = 0.87).
- Sensitivity was found to be high for identifying both AD and MCI patients (100% and 90%, respectively). The specificity of the MoCA (defined as the ability to identify non-cognitively impaired subjects) was 87%.
- Positive and negative predictive values were also high for both AD patients (89% and 100%, respectively) and MCI patients (89% and 91%, respectively).

Brief Stats on MoCA

- The MoCA was determined to be useful for screening for mild stages of cognitive impairment (including MCI and mild AD), while not as useful as the MMSE for assessing more advanced stages of AD.
- **Reliability (Quantitative):** Test-retest reliability (patients tested 35 days apart) was high, with an intraclass correlation coefficient of 0.92. The internal consistency was also found to be high (Cronbach alpha on standardized items = 0.83) (Nasreddine et al., 2005).
- The MoCA is a promising alternative to the MMSE because of its sensitivity to early detection of dementia and MCI. Although Holsinger et al. (2007) recommended the MoCA for use by primary care physicians with “plenty of time available” (p. 2401), further empirical attention is needed. The MoCA’s range of specificity is wide across the few studies that have examined its clinical utility, and it has not been compared to screens other than the MMSE. Therefore, comparisons across cut scores and CDR* rating to other recently developed dementia screens requiring less time to administer is recommended.


https://doi.org/10.1016/B978-0-12-374961-1.10019-3

**Global Clinical Dementia Rating**
The President’s Physician

VAMC Saint Louis University Mental Status (SLUMS)

VAMC SLUMS Examination

St. Louis University Mental Status (SLUMS) Examination

This tool was created to automate the scoring of the Saint Louis University Mental Status (SLUMS) Exam. This assessment tool was developed at the Division of Geriatric Medicine, Saint Louis University School of Medicine in affiliation with the Veterans Association. It was initially developed as a screening tool for detecting mild cognitive impairment in a veteran population, however, it is now used in several other patient populations. This examination has been found to measure up to the popular Montreal Cognitive Assessment (MOCA) and has also been shown to be superior to the Mini-Mental State Exam (MMSE) in the detection of early dementia. For additional information, please visit the primary source of this tool.
Brief Stats on VAMC SLUMS


• The SLUMS showed statistically a smaller mean, lower rank scores, and less skewness than the MMSE.

• Comparisons of the correlations of the screening tests with the neuropsychological measures indicated that the SLUMS demonstrated stronger relationships with the TMT compared with the MMSE.

• Multiple regression analyses were conducted to determine the ability of the SLUMS and the MMSE to predict scores on common neuropsychological tests after controlling for demographic variables.

• Results demonstrated that the SLUMS significantly predicted performance across all measures over the MMSE and demographic variables, with the exception of the WCST's perseverative errors.

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**Brief Stats on VAMC SLUMS**


• **CONCLUSION:**

• Although the SLUMS and the MMSE are strongly correlated, the SLUMS significantly adds to the prediction of neuropsychological measures beyond the MMSE scores. Our findings suggest that the SLUMS may be an appropriate measure to use as a screening tool among older adults and may have fewer ceiling effects than the MMSE.
CogniStat

**COGNISTAT PAPER**

**Cognitive Status Profile**

- Average Age
- Male
- Female
- Educational Level
- Current Occupation
- Nature of Test
- Date of Previous Cognitive Test
- Date of Present Cognitive Test
- Time of Day
- Date of Test
- Location

**Factors Potentially Influencing Test Performance**

- Neurological Condition
- Head Trauma
- Hearing Loss/Tinnitus
- Sleeplessness
- Medications
- Alcohol/Drug Use
- Post Concussion Syndrome
- Psychiatric Illness
- Fatigue
- Epilepsy

**COGNISTAT ACTIVE FORM**

- Name
- Age
- Sex
- Phone
- Date of Test
- Location
- Time
- Date of Test

**Brief Stats on CogniStat**

- A survey of 12 medical factors that frequently invalidate screening exams as well as lengthy neuropsychological testing
- An efficient screen and metric approach that streamlines testing
- A clear and immediately understandable graphic profile of impairments
- A normative database for diverse adult and geriatric populations
- Availability in 11 languages, including Spanish, Cantonese, Japanese, and Hebrew
- More than 225 clinical and research articles in peer-reviewed medical, psychiatric, rehabilitation medicine, and psychological journals document its power in:
  - Dementia
  - Stroke
  - Traumatic Brain Injury
  - Substance Abuse
  - Geriatrics
  - Epilepsy

CogniStat is the tool of choice for cognitive screening in:

- Neuropsychology
- Neurology
- Psychiatry
- Neurosurgery
- Rehabilitation Medicine
- Speech Therapy
- Geriatrics
- Nursing Home Assessment
- Elder Abuse Investigation
- Alcohol and Substance Abuse

COGNISTAT is capable of differentiating late-life depression from late-onset AD, based on higher scores in orientation and comprehension subtests, among patients with both depressive symptoms and cognitive dysfunction at baseline, despite similar scores on MMSE. At endpoint, patients with late-life depression showed significant improvement in subtests for memory, similarities, and judgment, whereas patients with late-onset AD showed significant worsening in the calculation subtest compared to baseline.
THE TAKE HOME OF COGNITIVE SCREENS

1. These are tasks almost never missed by age mates.
2. If you get them all correct, it doesn’t mean there is NOT a problem due to the low floor, and low ceiling effects of the tasks.
3. If you start missing a number of these items, you need to become suspicious of “some cognitive problem.”
4. It is irresponsible to declare that, due to a 30/30 on the MOCA that you have “ruled out early onset Alzheimer’s or other dementias.”
5. Smarter people can “fool” a brief cognitive screen.
6. I regularly tell people that, “Thinking I’m going to know all about your brain health in a 10-15 minute exam is somewhat of an insult.”

Mild Cognitive Impairment-- Medications

- There are no pharmacologic or dietary agents currently shown to have symptomatic cognitive benefit in MCI and no FDA- approved medications
- If Cholinesterase inhibitors are being used, discuss that this as an “off label” use
- May be more acceptable with multi-dimensional, or amnestic MCI
- Side effects of cholinesterase inhibitors are common, including gastrointestinal symptoms and cardiac concerns.
- “On-Off-ON” research designs suggests that, unless poorly tolerated, once used the person should stay on them for life.
Mild Cognitive Impairment

• Assess for behavioral and neuropsychiatric symptoms in MCI and treat with both pharmacologic and nonpharmacologic approaches

• Behavioral/psychiatric symptoms are common in MCI and may be associated with greater functional impairment and an increased risk of progression from MCI to dementia.

• Clinicians may recommend cognitive interventions may be beneficial in improving measures of cognitive function.

Other Dementias (Brief OVERVIEW)

• Alzheimer's disease. Alzheimer's disease is the most common cause of neurocognitive disorder.*
• Creutzfeldt-Jakob disease.
• Dementia with Lewy bodies.
• Frontotemporal dementia.
• Parkinson's disease.
• Huntington's disease.
• Mixed dementia.
• Normal pressure hydrocephalus.

• Vascular dementia
• Binswanger’s disease (subcortical Leukoencehalopathy)
• Wernicke-Korsakoff Syndrome
• Primary Progressive Aphasia
• Dementia due to TBI
  • Acquired Bipolar disorder
• Chronic Traumatic Encephalopathy
• Dementia Pugilistica

*Once again, Mark's “issue” with this
What is CTE?

• This trauma, which includes multiple concussions, triggers progressive degeneration of the brain tissue, including the build-up of an abnormal protein called tau.

• These changes in the brain can begin months, years, or even decades after the last concussion or end of active athletic involvement.

• The brain degeneration is associated with memory loss, confusion, impaired judgment, paranoia, impulse control problems, aggression, depression, and, eventually, progressive dementia.
Managing MCI / Dementia at home and office

Common issues

Managing MCI at home and office

• 1. Remain active socially
• Seek out educational venues, (presentations, Elderhostels, college classes)
• Remain active with friends
• Exercise regularly
  • https://www.nia.nih.gov/health/exercise-physical-activity

• Cognitive Remediation:
  • https://www.lumosity.com
  • https://www.neuronation.com
  • Puzzles
  • Visuo-spatial skills
• Cards
  • Turn taking, memory, sequencing
• Video games:
  • Speeded processing, flexibility of thought, problem solving.
Managing Mild Cognitive Impairment

- Anything that’s good for the heart is good for the head
  - Exercise or general increase in activity
  - Diet
  - Medication compliance
  - Smoking
  - Alcohol (within limits)

- If you don’t use it, you lose it
  - Cognitive activity that is enjoyed, hopefully with some history of use
  - Reading, Crossword puzzles
  - Jigsaw Puzzles, Sudoku
  - Cards
  - Conversation
  - TV with caveat

- Journal of the American Geriatrics Society

- Can Exercise Improve Cognitive Symptoms of Alzheimer's Disease?

  - Gregory A. Panza, MS; Beth A. Taylor, PhD; Hayley V. MacDonald, PhD; Blair T. Johnson, PhD; Amanda L. Zaleski, MS; Jill Livingston, MS; Paul D. Thompson, MD; Linda S. Pescatello, PhD. J Am Geriatric Soc. 2018;66(3):487-495.

  Conclusion Our findings suggest that exercise training may delay the decline in cognitive function that occurs in individuals who are at risk of or have AD, with aerobic exercise possibly having the most favorable effect. Additional randomized controlled clinical trials that include objective measurements of cognitive function are needed to confirm our findings.
Neurology: Clinical Practice

- Exercise for cognitive brain health in aging
- A systematic review for an evaluation of dose

**Purpose of review** We systematically appraised randomized controlled trials proposing exercise to influence cognition in older adults to (1) assess the methodologic quality using Cochrane criteria; (2) describe various exercise dose measures and assess their relationship with improved cognitive performance; and (3) identify consistent patterns of reported effects on cognition.

**Recent findings** There was overall good methodologic quality in all 98 included studies. The assessment of the relationship between improved cognition and various measures of exercise dose (session duration, weekly minutes, frequency, total weeks, and total hours) revealed a significant correlation with total hours. Improvements in global cognition, processing speed/attention, and executive function were most stable and consistent.

**Summary** We found that exercising for at least 52 hours (over 6 months) is associated with improved cognitive performance in older adults with and without cognitive impairment. Exercise modes supported by evidence are aerobic, resistance (strength) training, mind–body exercises, or combinations of these interventions.

Sitting & Aging

- Sedentary behavior associated with reduced medial temporal lobe thickness in middle-aged and older adults

**Summary:** In this preliminary study of middle-aged and older adults, self-reported hours per day spent sitting, but not physical activity level, was associated with less thickness in the MTL substructures. These findings are novel and require further exploration in longitudinal studies and analysis of mediating mechanisms. Better understanding the effects of sedentary behavior on our brains is important given the global epidemic of physical inactivity and sedentary lifestyles.
Participants were randomized to cognitive training, a psychosocial intervention, or a no–contact control condition. Interventions were provided in small groups in eight 2–hour sessions.

Outcome measures were immediate and delayed composite performance memory scores, psychological health (depression, anxiety, well–being), and generalization effects of the intervention (strategy use in everyday life, difficulties in complex activities of daily living, memory complaints). Testing was administered before training and immediately, 3 months, and 6 months after training.

Participants in the cognitive training condition improved on the delayed composite memory score and on strategy use in everyday life. Improvement was maintained at the 3– and 6–month follow–up assessments. Participants in the psychosocial and no–contact conditions did not show any significant improvement.

Conclusion Cognitive training improves the memory of persons with amnestic MCI. The effect persists over a 6–month period, and learned strategies are used in everyday life. Cognitive training is a valid way to promote cognition in MCI.
Super Agers

• 85+ year olds who live without significant memory problems
• Active
• Upbeat
• Cognitively Challenge
• Push Through

Driving
Driving

A recent diagnosis of dementia does not necessarily mean that a patient is incapable of driving safely. Dementia progresses differently among different patients and for some it can incapacitate them rapidly, for others the decline is much slower.

Nonetheless, given the diagnosis, it is desirable to have a discussion with the patient about the eventual day when she will not be able to drive carefully and it is desirable to have the children involved. Ideally, the children will be willing to speak up when the time comes. A history of recent accidents is a sign that driving abilities may be deteriorating.

Discussions of alternatives could include reliance on Uber or similar companies, using home deliveries for groceries, etc. It is important that the loss of driving should not mean a decline of social contact.

Insight and receptiveness to feedback are important. I worry most about patients who refuse to accept feedback or discuss the issue.

If it seems that she can drive safely right now, patients can nevertheless take some additional steps to ensure safe driving such as by driving only in non-rush hour times, going only to familiar places, or taking routes with only right turns.

Information that leans toward the side of making a report to the Department of Motor Vehicles include recent accidents, failure to acknowledge the potential for a driving problem, failure to adopt safe driving strategies, and an observation of general decline in cognitive functioning.

Sam Knapp 5/10/2018
PPA List serve
PennDOT’s Medical Program

• Pennsylvania regulations outline the minimum medical standards required for licensure.

• The Bureau of Driver Licensing reviews medical information submitted to the Department for an applicant/license holder to ensure the minimum licensing standards are met.

• PA currently has over 8.9 million licensed drivers:
  • Over 1.9 million drivers are 65 years of age and older.
Pennsylvania Crash Information Tool
https://www.dotcrashinfo.pa.gov/PCIT/welcome.html

Crash Statistics 2017

- Number of drivers 65+
  - 2,115,442
- Crashes involving 65+ driver
  - 21,319 (1%)
- Fatalities involving 65+ driver
  - 270 (.01%)

- Number of drivers 75+
  - 772,495
- Crashes involving 75+ driver
  - 8,423 (1.1%)
- Fatalities involving 75+ driver
  - 153 (.02%)
## Crash Statistics 2016

### Crash Type

<table>
<thead>
<tr>
<th>Crash Type</th>
<th>All Drivers</th>
<th>16-21</th>
<th>65-74</th>
<th>75+</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non collision</td>
<td>3.3% (4310)</td>
<td>2.6%</td>
<td>2.1%</td>
<td>1%</td>
</tr>
<tr>
<td>Rear End</td>
<td>22.8% (29,499)</td>
<td>25.2%</td>
<td>28.8%</td>
<td>23 %</td>
</tr>
<tr>
<td>Head on</td>
<td>3.7% (4,754)</td>
<td>4.2%</td>
<td>4.7%</td>
<td>5.2%</td>
</tr>
<tr>
<td>Backing up</td>
<td>0.3% (387)</td>
<td>0.2%</td>
<td>0.4%</td>
<td>0.4%</td>
</tr>
<tr>
<td>Angle</td>
<td>26.9% (34,794)</td>
<td>30%</td>
<td>39.6%</td>
<td>46.6%</td>
</tr>
<tr>
<td>Sideswipe</td>
<td>6.6% (8517)</td>
<td>5.1%</td>
<td>6.8%</td>
<td>7%</td>
</tr>
<tr>
<td>Hit fixed object</td>
<td>29.6% (38,176)</td>
<td>30.1%</td>
<td>12.7%</td>
<td>13%</td>
</tr>
<tr>
<td>Hit pedestrian</td>
<td>3.1% (4.034)</td>
<td>0.9%</td>
<td>2.4%</td>
<td>2.5%</td>
</tr>
<tr>
<td>Other</td>
<td>3.7% (4,727)</td>
<td>1.6%</td>
<td>2.5%</td>
<td>1.4%</td>
</tr>
</tbody>
</table>

### Number of Vehicles

<table>
<thead>
<tr>
<th>Number of Vehicles</th>
<th>All Drivers</th>
<th>16-21</th>
<th>65-74</th>
<th>75+</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single</td>
<td>44.1% (56,940)</td>
<td>37.1%</td>
<td>20.4%</td>
<td>20.2%</td>
</tr>
<tr>
<td>Multiple</td>
<td>55.9% (72,258)</td>
<td>62.9%</td>
<td>79.6%</td>
<td>79.8%</td>
</tr>
</tbody>
</table>

### Location

<table>
<thead>
<tr>
<th>Location</th>
<th>All Drivers</th>
<th>16-21</th>
<th>65-74</th>
<th>75+</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intersection</td>
<td>38.3% (49,487)</td>
<td>40%</td>
<td>49.6%</td>
<td>54%</td>
</tr>
<tr>
<td>Non Intersection</td>
<td>61.7% (79,711)</td>
<td>60%</td>
<td>50.4%</td>
<td>46%</td>
</tr>
</tbody>
</table>
Methods for Identifying Medically Unqualified Drivers:

- The Re-Examination Program
  § 1514(b): Examination of applicants for renewal

- Mandatory Physician Reporting
  § 1518(b): Reports by health care personnel

Re-Examination Program:

- This is a proactive approach to randomly assess driver’s medical qualifications to determine if they meet the Department’s minimum standards for the safe operation of a motor vehicle.

- Every month drivers over the age of 45 are randomly selected for a medical exam seven months prior to their license expiration date.
  - License will not be renewed if driver fails to comply.
Re-Examination Program:

- Each driver is required to undergo both a vision screening and a physical examination.
  - Results from an examination within the last 12 months are acceptable.
  - Vision screenings are given for free at all PennDOT Driver License Centers.
- If warranted by the results of the medical examination, an individual may also be required to submit additional medical information and/or successfully complete a driver’s examination.

Mandatory healthcare Reporting:

- PA law requires all physicians or licensed health care providers to report to PennDOT any patient 15 years of age or older that has a medical condition that may affect their ability to drive safely.
- In 2016, over 60,000 medical reports were received.
  - Over 23,000 of those reports were considered initial reports.
  - Approximately 13,000 drivers were determined to have a condition that warranted recalling their driving privilege.
  - Approximately 4,000 drivers had their license suspended for non-compliance of PennDOT’s request for information.
  - Half involve drivers under the age of 65
- Drivers wishing to surrender their driving privilege for medical reasons are entitled to one (1) free photo identification card using a DL-54A application.
Some statistics
Jan 2, 2017 – June 1, 2017

- Total medical condition reports to Penndot
  - 34,957 – 10,003 through initial form
- Cognitive
  - 3,579 – 1,553 through initial form
- Substance Use
  - 3,492 – 1,648 through initial form
- Psychiatric
  - 1,008 – 330 through initial form
- #1 Seizures
- #2 Vision
- Majority reported through the DL-13
  - Specific reporting forms
  - Crash/citizen reports
  - POA papers
  - Rehab centers
  - Self report
  - Driving schools
  - ER

Minimum Medical Standards

- The minimum standards for licensure are outlined in Chapter 83.
  - [http://www.pacode.com/secure/data/067/chapter83/chap83toc.html](http://www.pacode.com/secure/data/067/chapter83/chap83toc.html)

- The minimum standards for school bus drivers are outlined in Chapter 71.
  - [http://www.pacode.com/secure/data/067/chapter71/chap71toc.html](http://www.pacode.com/secure/data/067/chapter71/chap71toc.html)
Sources of information

- Law enforcement
- Rehab facilities
- Self report
- Crash reports
- Family report / signed ‘other’ individuals
- Physician / Psychologist referral

Interview Questions - Driving

- Any accidents in the last 6-9 mos.- near misses
- Directional uncertainty
- Lost in familiar places
- Drifting center line/ outer edge
- Family afraid to drive with you
- Stop signs/ traffic lights
- Wide turns
- Excessively slow driving
- Helpful to have corroboration / input from family / others
Some Neuropsychological “flags”

1. Significantly reduced speeded processing
2. Significantly reduced Visuo-spatial skills
3. Significantly reduced Memory skills*
4. Significantly reduced Executive Functions

If present and/or in combination, may lead to disqualification or recommendation to be further evaluated; eg: Erie County has Transportation Solutions.

Possible actions by PennDOT

Upon careful evaluation of the information that is received, the Medical Unit will do one of the following:

(1) Recall the driving privilege;
(2) Restore the driving privilege;
(3) Add medical restrictions to the driving privilege;
(4) Delete medical restrictions from the driving privilege;
(5) Request additional examinations, such as a medical examination or a driver’s test; or
(6) Take no action.
To access the specific medical condition forms you will need to register for a user name and password.

Mature driver program

Social Living
Social Living

- Behavior
  - Deficit Awareness
  - Inappropriate
- Medical Decision Making
- Financial Management
  - Guardianship
- Independent Living
  - Basic ADL’s
  - Handle Emergency Situations
  - Compensate for limitations

Caregiver Distress
Adjusting to Caregiving

• May experience grief or loss
  • Personal choice
  • Relationship with loved one
  • Change in relationship with other family members
  • Social isolation
  • Loss of spontaneity
  • Loss of privacy
  • Loss of control
  • Ongoing cycle of grief

Adjusting to Caregiving

• Short and Long-term impact of caregiving
  • Health issues
  • Emotional impact
  • Financial issues
Adjusting to Caregiving

• Adapting to the situation and finding ways to cope
  • Support systems
    • Types of support vary
  • Spirituality
  • Time for self

Questions / Concerns?
Select References


Select References


