

Cognitive Impairment in Primary Care

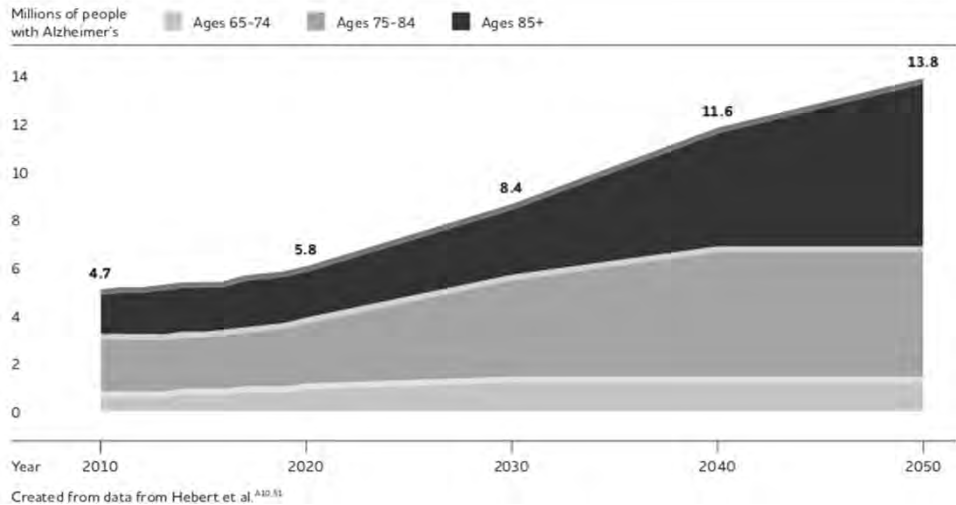
Thuan Ong, MD, MPH
Division of Gerontology and Geriatric Medicine
University of Washington
June 2, 2020

Objectives

- At the end of this presentation, one should be able to:
 - Identify common screening tools used in primary care to identify cognitive impairment in adult patients.
 - Differentiate the different types of cognitive impairment.
 - Recognize the impact of cognitive assessments on your patients.

FIGURE 4

Projected Number of People Age 65 and Older (Total and by Age) in the U.S. Population with Alzheimer's Dementia, 2010 to 2050



Case #1

- 85 year old retired Professor here for routine visit.
 - PMH: Crohn's disease, anxiety, hypertension
 - Meds: lisinopril, aspirin, temazepam PRN.
 - Social hx: Lives with wife; occ ETOH, still driving to Grand Rounds
 - "Doc, I'm having trouble with my memory . . ."

Cognitive Impairment in Primary Care: Barriers to Diagnosis

- Physicians vary in ability to diagnose and document symptomatic dementia (up to 75% missed in some studies)
- Lack of knowledge/lack of protocols/lack of time
- Opinion that specialists should do this
 - Screening for asymptotic disease vs active case finding
- Concerned about negative impact of diagnosis
- May doubt usefulness of early diagnosis/limited treatment options
- Difficulty relaying the diagnosis

Bradford A et al. Missed and Delayed Diagnosis of Dementia in Primary Care: Prevalence and Contributing Factors. *Alzheimer Dis Assoc Disord.* Oct-Dec 2009;23(4):306-14.

Delayed Diagnosis May Have Negative Consequences

- Missed opportunity to identify contributing factors and potential beneficial treatments
- Uninformed hospital/consult care providers
 - One study: 42% of acute medical admissions > age 70 had dementia, but only half were diagnosed at the time
- Impacts the care plan
 - Less able to trust medical history taking
 - Need simpler med regimen, written instructions
 - Overall goals of care may change
- Missed opportunity for advanced care planning
 - Patients with mild dementia can still participate in discussions

Normal Aging

- No consistent, progressive deviations on testing of memory
- Some decline in processing and recall of new info: slower, harder
- Intact memory for current events
- Retention of verbal abilities and vocabulary
- Reminders work- visual tips, notes
- Absence of significant effects on ADLs or IADLs due to cognition

Dumas, 2015; Emory Alzheimer's Disease Research Center, 2017; UCSF Memory and Aging Center, 2018

Dementia

- DSM-5: Major Neurocognitive Disorder
- Significant decline from prior level of function with impairment in at least one domain:
 - Learning and Memory
 - Executive function: finances, complex activities
 - Complex attention: sustained and divided attention, processing speed
 - Language: word finding, syntax errors
 - Visuospatial: difficulty in recognizing faces, objects in direct view, orienting clothes to body
 - Social cognition: difficulty in regulating emotion, behavior; empathy
- *AND* affects daily function/independence
- *AND* not a result of delirium or other mental disorder

- Specified as mild, moderate or severe
- With or without behavioral disturbance

Normal Aging or Dementia?

Normal Aging:

- Making a bad decision once in a while
- Missing a monthly payment
- Forgetting which day it is, and remembering later
- Sometimes forgetting which word to use
- Losing things from time to time
- Sometimes needing help using electronic devices
- More time/energy needed to encode new information

Dementia:

- Poor judgment and decision making
- Can no longer manage a budget
- Losing track of the season or year
- Difficulty having a conversation
- Misplacing things and unable to retrace steps
- Difficulty with familiar tasks
- Very difficult to encode new information

Alzheimer's Association (alz.org)

Mild Cognitive Impairment (MCI)

- DSM-5: Minor Neurocognitive Disorder
- Modest cognitive decline without functional impairment
- Problems with memory, language, judgment, and thinking—problems greater than expected for the age of the person, but less than is required for dementia diagnosis
- Prevalence of about 15-20% of those > 70 years old
- Not necessarily a precursor to dementia
 - About a three-fold risk of dementia
 - About 1/3
 - Improve to normal
 - Remain stable with MCI
 - Progress to dementia

HRSA modules on MCI, (Etgen et al., 2011; Langa & Levine, 2014)

When Does It Become Dementia?

- Presence of cognitive impairment detected via history taking and cognitive assessment
- Decline from previous level of function
- Interference with the ability to function at work or usual activities
- Distinguish from normal aging
- Exclusion of delirium or major psych disorder

Alzheimer's & Dementia 7 (2011) 263–269

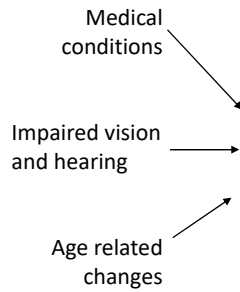
Delirium

- Acute onset and fluctuating course
- *AND* disturbance in attention and awareness
- *AND* disturbance in cognition
- *AND* evidence that this is the consequence of another medical condition

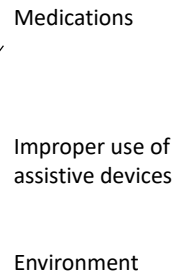
- Can occur in outpatients! Can last months after a hospitalization.

Geriatric Syndrome

Intrinsic Factors

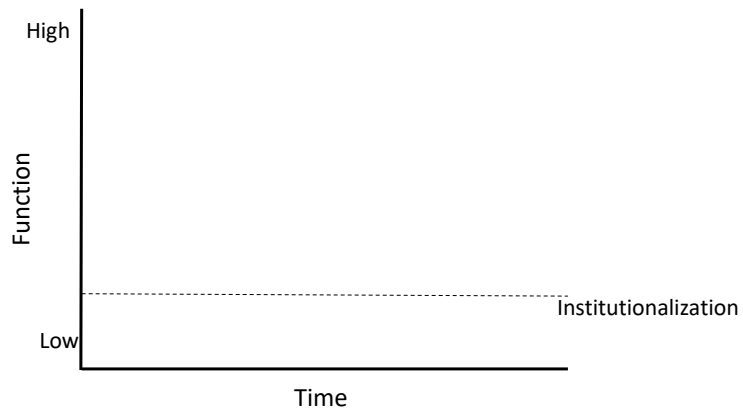


Extrinsic Factors

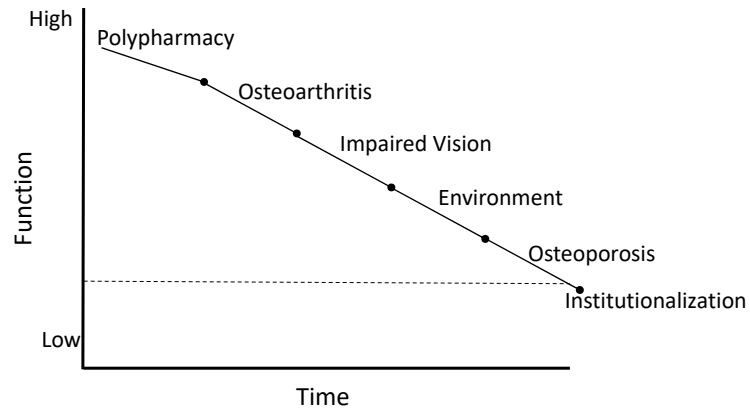


FALLS

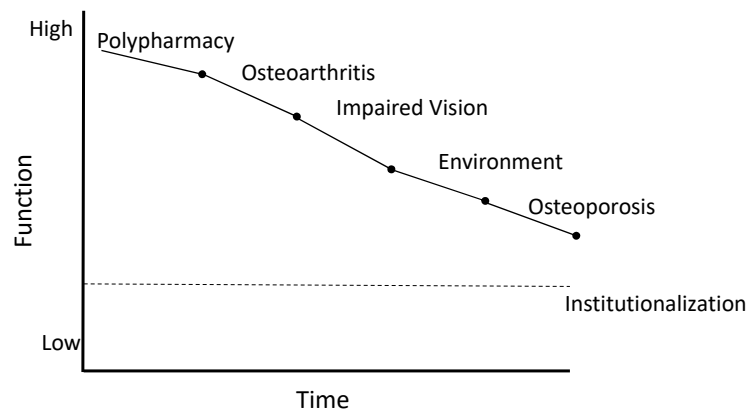
Functional Status and Syndromes



Functional Status and Syndromes: Falls



Functional Status and Syndromes: Risk Factor Mitigation Additive/Synergistic?



Geriatric Syndrome: Cognitive Impairment

Intrinsic Factors

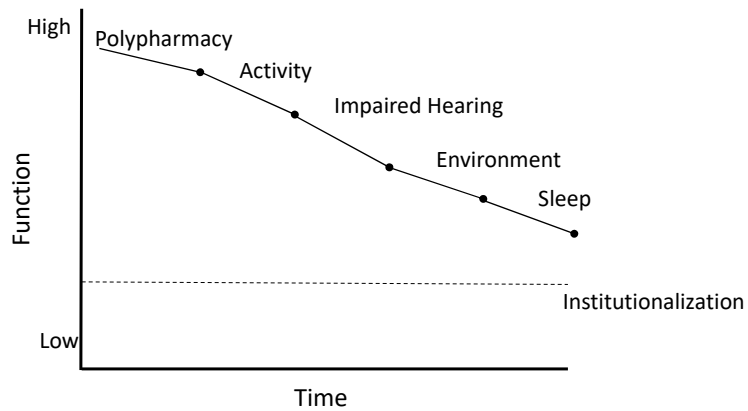
Medical conditions
Impaired hearing
Age related changes

Cognitive Impairment

Extrinsic Factors

Medications
Activity
Environment

Cognitive Impairment



Cognitive Impairment: Impact of Medications

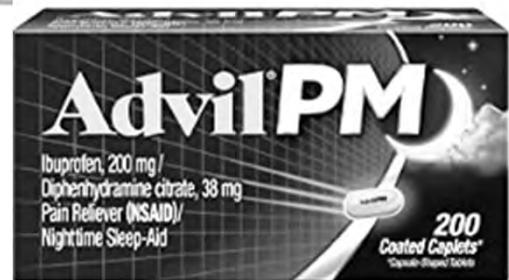
- Anticholinergics
- Side effects
 - Poor coordination
 - Dry mouth, eyes
 - Constipation
 - Urinary retention
 - Cognitive impairment
 - Delirium

Table 7. Drugs With Strong Anticholinergic Properties

Antiarrhythmic	Promethazine
Disopyramide	Pyrilamine
	Triprolidine
Antidepressants	
Amitriptyline	
Amoxapine	
Clopramine	Antimuscarinics
Desipramine	(urinary incontinence)
Doxepin (>6 mg)	Danfenacin
Imipramine	Fesoterodine
Nortriptyline	Flavoxate
Paroxetine	Oxybutynin
Protriptyline	Solifenacin
Trimipramine	Tolterodine
	Tropium
Antiemetics	
Prochlorperazine	Antiparkinsonian agents
Promethazine	Benztropine
	Trihexyphenidyl
Antihistamines (first generation)	
Brompheniramine	Antipsychotics
Carbinoxamine	Chlorpromazine
Chlorpheniramine	Clozapine
Clemastine	Loxapine
Cyproheptadine	Olanzapine
Dexbrompheniramine	Perphenazine
Dexchlorpheniramine	Thioridazine
Dimenhydrinate	Trifluoperazine
Diphenhydramine (oral)	
Doxylamine	Antispasmodics
Hydroxyzine	Atropine (excludes ophthalmic)
	Belladonna alkaloids
Mecizine	Scopolamine (excludes ophthalmic)
Clidinium-chloridazepoxide	
Dicyclomine	
Homatropine (excludes ophthalmic)	Skeletal muscle relaxants
Hyoscyamine	Cyclobenzaprine
Methscopolamine	Orphenadrine
Propantheline	

American Geriatrics Society 2019 Updated AGS Beers Criteria® for Potentially Inappropriate Medication Use in Older Adults

Over the Counter Medications



Cognitive Impairment: Impact of Medications

- Higher cumulative anticholinergic medication use is associated with an increased risk for dementia.
 - 3,434 participants aged 65 and older with no dementia at study entry
 - Prospective population-based cohort study, mean follow-up of 7.3 years
 - Most common drug classes used were:
 - Tricyclic antidepressants (e.g., amitriptyline, nortriptyline, etc..)
 - First generation antihistamines (e.g., chlorpheniramine, diphenhydramine, doxylamine, meclizine, dicyclomine, promethazine)
 - Bladder antimuscarinics (e.g., oxybutynin, tolterodine, solifenacin, trospium, darifenacin)

Gray SL et al. Cumulative Use of Strong Anticholinergic Medications and Incident Dementia. *JAMA Intern Med.* 2015 Mar 1; 175(3): 401–407. doi: 10.1001/jamainternmed.2014.7663

Table 3
Association of Incident Dementia and Alzheimer's Disease with 10-year Cumulative Anticholinergic Medication Use^a

TSDD ^b	Follow-up time (person-years)	Number of Events	Unadjusted ^{c,d}		Adjusted ^{d,e}	
			HR	95% CI	HR	95% CI
Dementia						
0	5618	136	1.00	Reference	1.00	Reference
1-90	7704	203	0.96	0.77-1.20	0.92	0.74-1.16
91-365	5051	172	1.31	1.04-1.65	1.19	0.94-1.51
366-1095	2626	102	1.39	1.07-1.82	1.23	0.94-1.62
>1095	4022	184	1.77	1.40-2.23	1.54	1.21-1.96
Alzheimer's Disease						
0	5618	112	1.00	Reference	1.00	Reference
1-90	7704	168	0.96	0.75-1.24	0.95	0.74-1.23
91-365	5051	128	1.21	0.93-1.58	1.15	0.88-1.51
366-1095	2626	83	1.38	1.03-1.85	1.30	0.96-1.76
>1095	4022	146	1.73	1.34-2.24	1.63	1.24-2.14

TSDD Total Standardized Daily Dose; HR Hazard Ratio; CI Confidence Interval; ACT Adult Changes in Thought

^aObservations with missing adjustment variables are excluded from the model (n=115; 3.3%).

^bTSDD example: the minimum effective daily dose for oxybutynin is 5 mg daily (=1 TSDD); a person would fall into the following TSDD category if they were using 5 mg daily for 45 days (TSDD 1-90); 5 mg daily for 180 days (TSDD 91-365); 5 mg daily for 720 days (TSDD 366-1095); 5 mg daily for 4 years (TSDD>1095)

^cAge adjustment via the time-axis.

^dTest for trend *P* value <0.001 for an association between exposure categories and each outcome

^eAdjusted for ACT cohort, age (via the time-axis), age at ACT study entry, sex, education, body mass index, current smoking, regular exercise, self-rated health, hypertension, diabetes, stroke, coronary heart disease, Parkinson's disease, history of depressive symptoms, and current benzodiazepine use.

Cognitive Impairment: Impact of Medications

- Benzodiazepines

- One of the most common medication classes
- Management of anxiety and insomnia
- Conflicting studies: dementia can be preceded by symptoms such as insomnia, anxiety, and depression
- American Geriatric Society Beers Criteria 2019

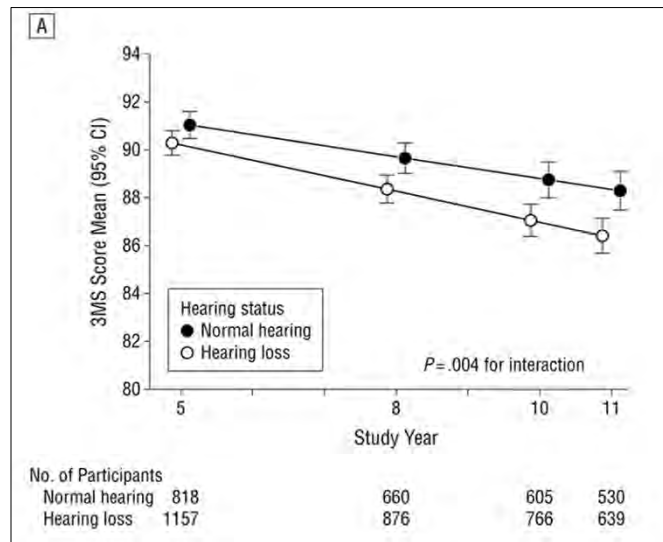
Organ System, Therapeutic Category, Drug(s)	Rationale	Recommendation	Quality of Evidence	Strength of Recommendation
Benzodiazepines <i>Short and intermediate acting:</i> Alprazolam Estazolam Lorazepam Oxazepam Temazepam Triazolam <i>Long acting:</i> Chlordiazepoxide (alone or in combination with amitriptyline or citalopram) Clonazepam Clorazepate Diazepam Flurazepam Quazepam	Older adults have increased sensitivity to benzodiazepines and decreased metabolism of long-acting agents; in general, all benzodiazepines increase risk of cognitive impairment, delirium, falls, fractures, and motor vehicle crashes in older adults. May be appropriate for seizure disorders, rapid eye movement sleep behavior disorder, benzodiazepine withdrawal, ethanol withdrawal, severe generalized anxiety disorder, and perioperative anesthesia.	Avoid	Moderate	Strong

Billioti de Gage S et al. Is there really a link between benzodiazepine use and the risk of dementia? *Expert Opin Drug Saf.* 2015 May;14(5):733-47. doi: 10.1517/14740338.2015.1014796
 Gray SL et al. Benzodiazepine Use and Risk of Incident Dementia or Cognitive Decline: Prospective Population Based Study. *BMJ.* 2016 Feb 2;352:i90. doi: 10.1136/bmj.i90.

Cognitive Impairment: Hearing Loss

- Up to two-thirds of older adults suffer from early loss
- Untreated hearing loss experience a faster decline in thinking and memory skills than do those with normal hearing.
- 1984 adults (mean age, 77.4y), prospective observational study of baseline cohort without cognitive impairment
 - Modified Mini-Mental State Examination [3MS] score, ≥ 80
 - Incident cognitive impairment was defined as a 3MS score < 80 or a decline in 3MS score of > 5 points from baseline.
 - 30-40% faster decline after six years when compared with those who did not have hearing loss

Lin FR et al. Hearing Loss and Cognitive Decline in Older Adults. *JAMA Intern Med.* 2013;173(4):293-299. doi:10.1001/jamainternmed.2013.1868



- 24% increased risk of cognitive impairment among those with hearing loss

Lin FR et al. Hearing Loss and Cognitive Decline in Older Adults. *JAMA Intern Med.* 2013;173(4):293-299. doi:10.1001/jamainternmed.2013.1868

Cognitive Impairment: Modifiable Risk Factors

- Vascular health
- Diabetes
- Physical inactivity
- Mental inactivity and social engagement
- Depression and anxiety
- Smoking
- Substance abuse
- Sleep disorders
- Diet

Cognitive Impairment: History Taking

- Which cognitive domains are impacted?

- Learning and Memory
 - Working memory: verbal, spatial, location
 - Episodic memory
 - Semantic memory: long term
 - Prospective memory: future
 - Procedural memory
- Executive function
 - Reasoning
 - Problem solving
- Language/verbal
- Complex attention
- Visuospatial
- Social Cognition: insight

10 Warning Signs of Alzheimer's

1. Memory loss that disrupts daily life.
2. Challenges in planning or solving problems.
3. Difficulty completing tasks at home, at work or at leisure.
4. Confusion with time or place.
5. Trouble understanding visual images and spatial relationships.
6. New problems with words in speaking or in writing.
7. Misplacing things and losing the ability to retrace steps.
8. Decreased or poor judgment.
9. Withdrawal from work or social activities.
10. Changes in mood or personality.

Alzheimer's Association. 10 early signs and symptoms of Alzheimer's.

Cognitive Impairment: History Taking

- How long has the problem been present?
- What is the tempo of the condition?
- Has there been a history of repeated traumatic brain injuries?
- Is there tobacco, alcohol, and/or illicit drug use?
- What is the highest level of education attained?
- What are your hobbies? Do you still enjoy doing them?
- Medication review.
- Corroborate the history.
- Is there a family history?

Cognitive Impairment: Non-Modifiable Risk Factors

- APOE4 is the major genetic risk factor for Alzheimer's disease.
 - Pleomorphic effects of APOE4
 - Interferes with A β clearance from the brain
 - Damage to brain blood vessels → leakage of the blood-brain barrier
- Lifetime risk for Alzheimer's disease is more than 50% for APOE4 homozygotes and 20-30% for APOE3 and APOE4 heterozygotes, compared with 11% for men and 14% for women overall irrespective of APOE genotype*

Genin E et al. APOE and Alzheimer disease: a major gene with semi-dominant inheritance. *Mol Psychiatry* 2011;16: 903-907

Cognitive Impairment: Examination

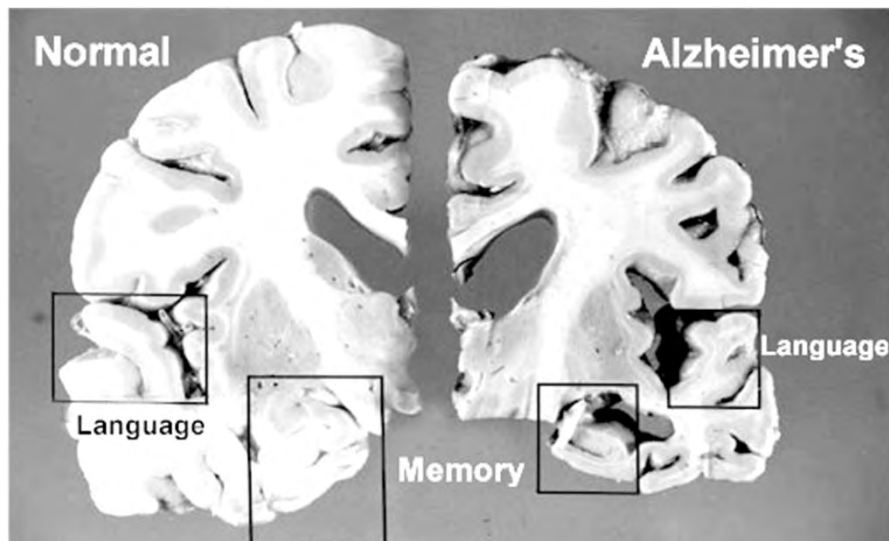
- Vitals
- Appearance and language
- Hearing impairment
- Psychiatric: content, attention, mood, affect, hallucinations, standardized screen for depression and anxiety
- HEENT: facies, ear canals, audiometry
- Cardiovascular
- Neurological: focal deficits, ambulation, tone

Alzheimer's Disease

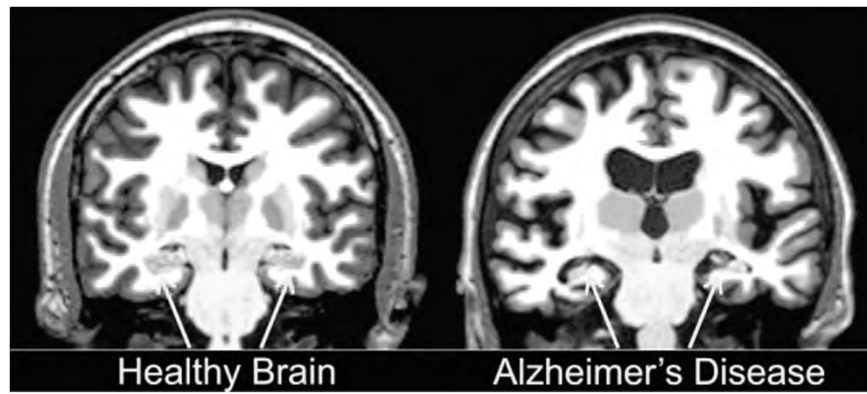
- 60-80% of dementia cases; after age 60 usually
- Clear evidence of decline in memory and learning and at least one other domain
- Typical presentation: Amnestic (\downarrow learning and recall)
- Atypical: non-amnestic (language or executive predominant)

- Steadily progressive, gradual decline w/o plateaus
- Prognosis 3-10 years after diagnosis
- Imaging: Possible global atrophy, small hippocampus

Hippocampal Atrophy in AD



Hippocampal Volumes



Brewer JB et al. Technical Note AJNR 2009:578

Vascular Dementia

- 2nd or 3rd leading cause; can occur with or w/o diagnosed stroke
- Clinical features c/w vascular etiology:
 - Onset temporally related to a vascular event
 - Prominent decline in complex attention, processing speed, executive function
 - Evidence of cerebrovascular disease
 - Small vessel strokes
 - Bilateral thalamic lesions OR
 - Multiple basal ganglia, thalamic and frontal WM lacunar stroke: need at least 2 in the BG area and at least 2 in the frontal white matter OR
 - “Extensive” periventricular WM lesions
- Classically presents with stepwise progression, but can be gradual as well
- Imaging: Cortical or subcortical changes in MRI

Dementia with Lewy Bodies

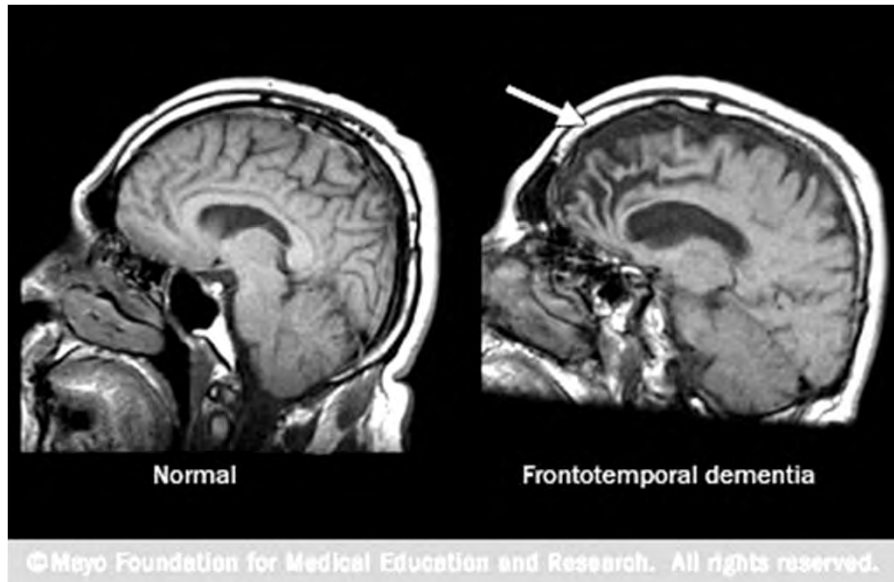
- 2nd or 3rd leading cause; more frequent in men, age of onset range 50-85y
- Insidious onset but progresses faster than AD
- Core diagnostic features:
 - Fluctuating cognition and attention/alertness, staring for long periods.
 - Recurrent well-formed detailed visual hallucinations
 - Parkinsonism onset within 1 year of cognitive decline.
- Suggestive diagnostic features:
 - REM sleep behavior disorder
 - Severe neuroleptic sensitivity
- Imaging may show global atrophy

Frontotemporal Dementia

- 1-5%, gradual onset, usually age <60
- Relative sparing of learning and memory
- Behavioral variant: ≥ 3 of the following behavioral symptoms: disinhibition, apathy, loss of empathy, perseverative or compulsive behavior, hyperorality and prominent decline in social cognition and/or executive abilities (often mistaken for mental health illness).
- Language variant: Prominent decline in language ability.
- Imaging: Frontal/temporal atrophy

Brain 2011; 134,2456-2477

Frontotemporal Dementia

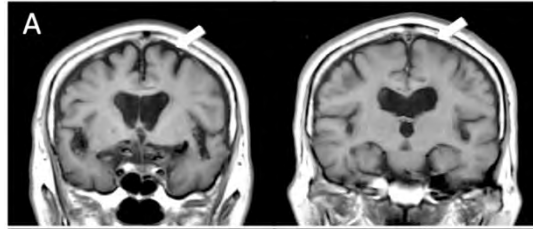


Normal Pressure Hydrocephalus

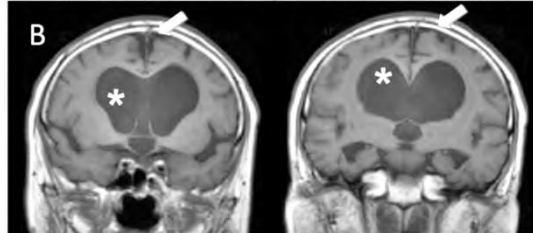
- Gait difficulty: Frontal ataxia. “Magnetic gait” – feet appear stuck to the floor
- Cognition: psychomotor slowing, decreased attention & concentration, executive function, apathy
- Urinary urgency/incontinence
- May have hyperreflexia/spasticity
- MRI: ventriculomegaly without sulcal enlargement, loss of signal in Sylvian aqueduct

Normal Pressure Hydrocephalus

Due to brain atrophy



Due to obstruct. hydrocephalus



Note enlarged subarachnoid spaces (arrow) proportionate to ventriculomegaly indicating brain atrophy (A), and the open high-convexity and medial subarachnoid spaces (arrow) despite enlarged ventricles (*) suggesting chronic occlusive hydrocephalus (B).

Hashimoto M, Cerebrospinal Fluid Res
2010

Substance-Induced Dementia

- Commonly alcohol, methamphetamine
- Neurocognitive impairments persisting beyond time of intoxication/withdrawal
- Deficits remain stable after a period of abstinence

Mixed Dementia

- Combination of etiologies.

Other Forms of Dementia-Like Symptoms

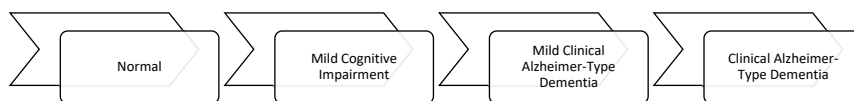
- Creutzfeldt-Jakob disease (prion disease)
- Parkinson's disease
- Huntington's disease
- Chronic traumatic encephalopathy (CTE)
- HIV-associated dementia (HAD)

Case #1

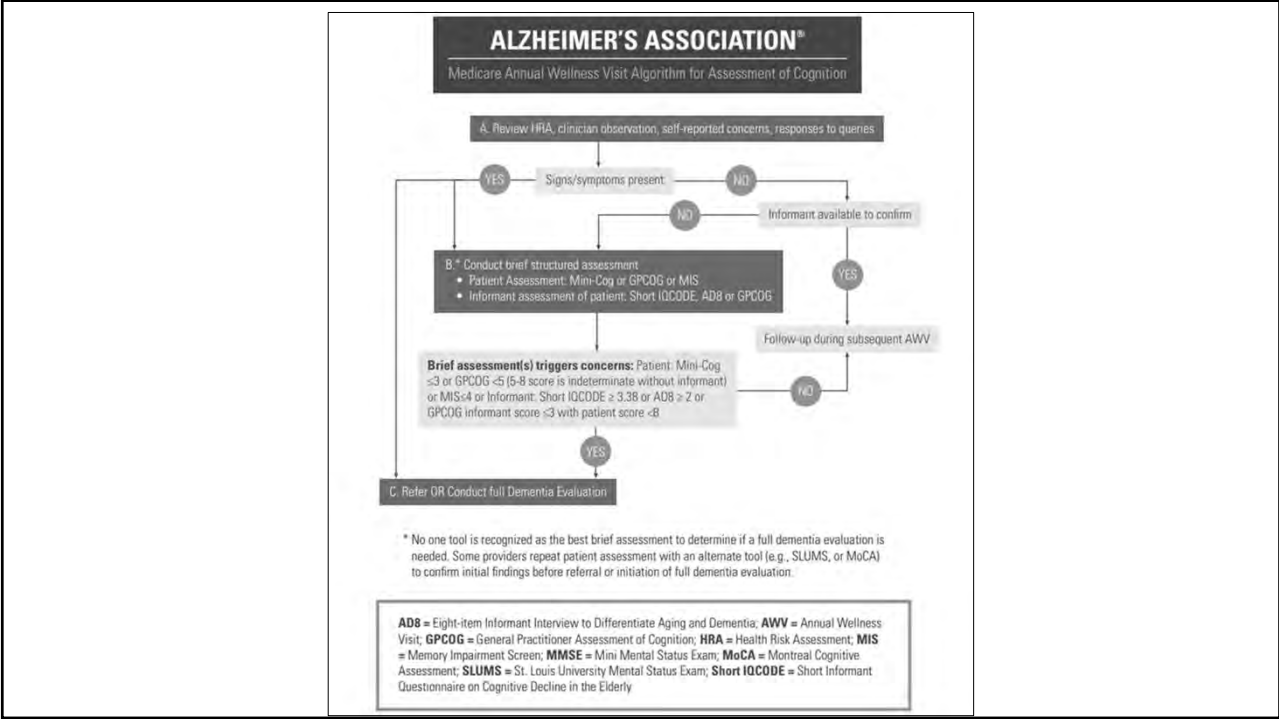
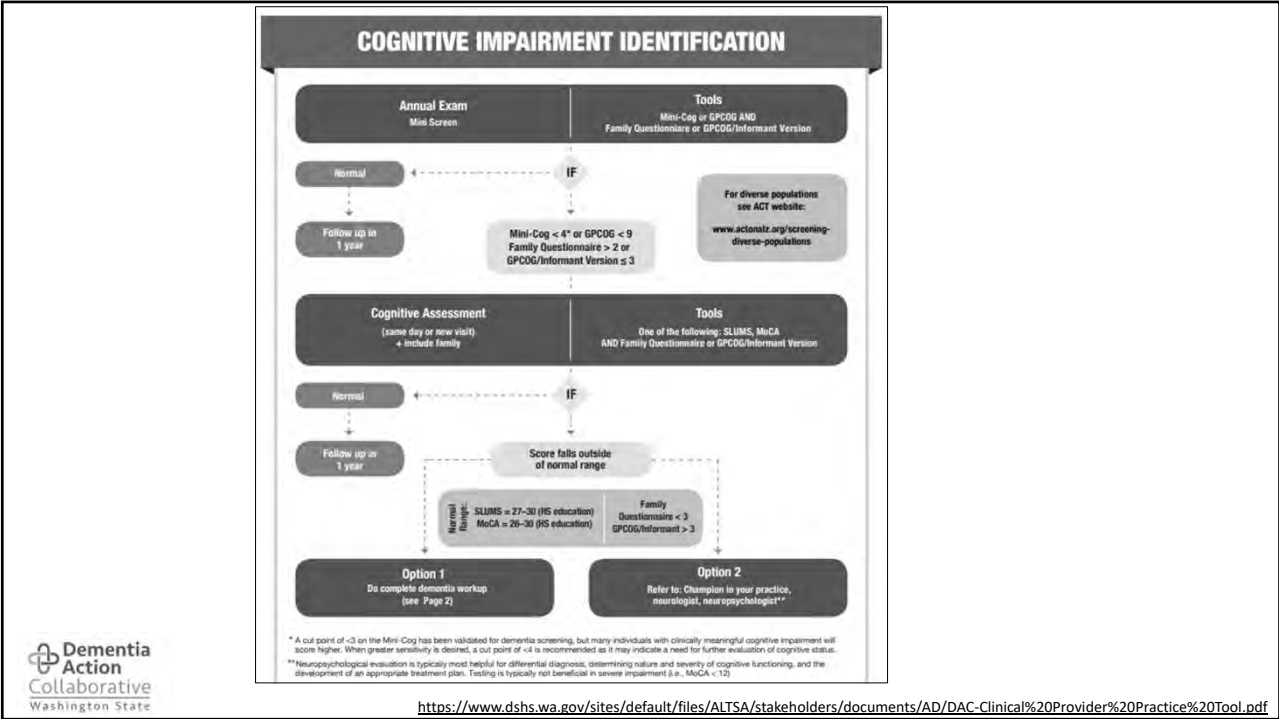
- 85 year old retired Professor here for routine visit.
 - PMH: Crohn's disease, anxiety, hypertension
 - Meds: lisinopril, aspirin, temazepam PRN.
 - Social hx: Lives with wife; occ ETOH, still driving to Grand Rounds
 - "Doc, I'm having trouble with my memory . . ."
- Exam was unremarkable except for obesity & mild hypertension
- Requested to stop temazepam and alcohol
- Sleep study

Cognitive Tests

- Single cognitive tests:
 - Accurate in distinguishing clinical Alzheimer-type dementia from normal cognition in older adults
 - Moderate accuracy in distinguishing mild clinical Alzheimer-type dementia from normal cognition
 - Tests are not adequate by themselves for making a clinical diagnosis.
 - Identifies who warrants further evaluation



Hemmy LS et al. Brief Cognitive Tests for Distinguishing Clinical Alzheimer-Type Dementia From Mild Cognitive Impairment or Normal Cognition in Older Adults With Suspected Cognitive Impairment. *Ann Intern Med* 2020. <https://doi.org/10.7326/M19-3889>



Patient Cognitive Screen Tools: Mini-Cog

DATE _____ ID _____ AGE _____ GENDER M F LOCATION _____ TESTED BY _____

MINI-COG™

1) GET THE PATIENT'S ATTENTION, THEN SAY: "I am going to say three words that I want you to remember. The words are
Banana Sunrise Chair.
Please say them for me now." (Give the patient 3 tries to repeat the words. If unable after 3 tries, go to next item.)
(Fold this page back at the TWO dotted lines BELOW to make a blank space and cover the memory words. Hand the patient a pencil/pen.)

2) SAY ALL THE FOLLOWING PHRASES IN THE ORDER INDICATED. "Please draw a clock in the space below. Start by drawing a large circle." (When this is done, say) "Put all the numbers in the circle." (When done, say) "Now set the hands to show 11:10 (10 past 11)." If subject has not finished clock drawing in 3 minutes, discontinue and ask for recall items.

3) SAY: "What were the three words I asked you to remember?" (Score 1 point for each) 3-Item Recall Score

Score the clock (see other side for instructions) Normal clock 2 points Clock Score
Abnormal clock 0 points

Total Score = 3-item recall plus clock score 0, 1, or 2 possible impairment; 3, 4, or 5 suggests no impairment

Mini-Cog

- Takes 2-4 min to administer
- Easy to memorize
- Does require paper and pencil
- Less effect of education level than w/ MMSE
- Similar sensitivity and specificity to MMSE
 - Minicog 76% sensitive, 89% specific
 - MMSE 79% sensitive, 88% specific

Patient Cognitive Screen Tools: General Practitioner Assessment of Cognition (GPCOG)

- 6 items
- 5-6 minutes to administer
- Sensitivity: 85%
- Specificity: 86%

University of New South Wales as represented by the Dementia Collaborative Research Centre – Assessment and Better Care; Brodaty et al. J Am Geriatr Soc. 2002; 50:530-534.

GPCOG Screening Test

Step 1: Patient Examination
Unless specified, each question should only be asked once

Name and Address for subsequent recall test

1. "I am going to give you a name and address. After I have said it, I want you to repeat it. Remember this name and address because I am going to ask you to tell it to me again in a few minutes. John Brown, 42 West Street, Kensington." (Allow a maximum of 4 attempts).

Time Orientation

2. What is the date? (exact only) Correct Incorrect

Clock Drawing – use blank page

3. Please mark in all the numbers to indicate the hours of a clock (correct spacing required) Correct Incorrect

4. Please mark in hands to show 10 minutes past eleven o'clock (11.10) Correct Incorrect

Information

5. Can you tell me something that happened in the news recently? (Recently = in the last week. If a general answer is given, eg "war", "lot of rain", ask for details. Only specific answer scores). Correct Incorrect

Recall

6. What was the name and address I asked you to remember

John	<input type="checkbox"/>	<input type="checkbox"/>
Brown	<input type="checkbox"/>	<input type="checkbox"/>
42	<input type="checkbox"/>	<input type="checkbox"/>
West (St)	<input type="checkbox"/>	<input type="checkbox"/>
Kensington	<input type="checkbox"/>	<input type="checkbox"/>

(To get a total score, add the number of items answered correctly)

Total correct (score out of 9) /9

If patient scores 9, no significant cognitive impairment and further testing not necessary.

If patient scores 5-8, more information required. Proceed with Step 2, informant section.

If patient scores 0-4, cognitive impairment is indicated. Conduct standard investigations.

© University of New South Wales as represented by the Dementia Collaborative Research Centre – Assessment and Better Care; Brodaty et al. JAGS 2002; 50:530-534.

Informant Screen Tools: GPCOG Informant

These six questions ask how the patient is compared to when s/he was well, say 5 – 10 years ago

Compared to a few years ago:

	Yes	No	Don't Know	N/A
• Does the patient have more trouble remembering things that have happened recently than s/he used to?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
• Does he or she have more trouble recalling conversations a few days later?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
• When speaking, does the patient have more difficulty in finding the right word or tend to use the wrong words more often?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
• Is the patient less able to manage money and financial affairs (e.g. paying bills, budgeting)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Is the patient less able to manage his or her medication independently?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Does the patient need more assistance with transport (either private or public)? (If the patient has difficulties due only to physical problems, e.g. bad leg, tick 'no')	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

(To get a total score, add the number of items answered 'no', 'don't know' or 'N/A')

Total score (out of 6)

If patient scores 0-3, cognitive impairment is indicated. Conduct standard investigations.

University of New South Wales as represented by the Dementia Collaborative Research Centre – Assessment and Better Care; Brodaty et al. J Am Geriatr Soc. 2002; 50:530-534.

Informant Screen Tools: AD8 Dementia

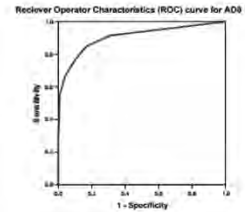
Remember. "Yes, a change" indicates that there has been a change in the last several years caused by cognitive (thinking and memory) problems.	YES. A change	NO. No change	N/A Don't know
1. Problems with judgment (e.g., problems making decisions, bad financial decisions, problems with thinking)			
2. Less interest in hobbies/activities			
3. Repeats the same things over and over (questions, stories, or statements)			
4. Trouble learning how to use a tool, appliance, or gadget (e.g., VCR, computer, microwave, remote control)			
5. Forgets correct month or year			
6. Trouble handling complicated financial affairs (e.g., balancing checkbook, income taxes, paying bills)			
7. Trouble remembering appointments			
8. Daily problems with thinking and/or memory			
TOTAL AD8 SCORE			

Based on clinical research findings from 995 individuals included in the development and validation samples, the following cut points are provided:

- 0 – 1: Normal cognition
- 2 or greater: Cognitive impairment is likely to be present

Administered to either the informant (preferable) or the patient, the AD8 has the following properties:

- Sensitivity > 84%
- Specificity > 80%
- Positive Predictive Value > 85%
- Negative Predictive Value > 70%
- Area under the Curve: 0.908; 95%CI: 0.888-0.925



Galvin JE et al. The AD8, a brief informant interview to detect dementia. *Neurology* 2005: 559-564.

Informant Screen Tools: Family Questionnaire

• Scoring:

- Not at all = 0
- Sometimes = 1
- Frequently = 2

• Score ≥ 3 prompt further evaluation

1. Repeating or asking the same thing over and over?	<i>Not at all</i>	<i>Sometimes</i>	<i>Frequently</i>	<i>Does not apply</i>
2. Remembering appointments, family occasions, holidays?	<i>Not at all</i>	<i>Sometimes</i>	<i>Frequently</i>	<i>Does not apply</i>
3. Writing checks, paying bills, balancing the checkbook?	<i>Not at all</i>	<i>Sometimes</i>	<i>Frequently</i>	<i>Does not apply</i>
4. Deciding what groceries or clothes to buy?	<i>Not at all</i>	<i>Sometimes</i>	<i>Frequently</i>	<i>Does not apply</i>
5. Taking medications according to instructions?	<i>Not at all</i>	<i>Sometimes</i>	<i>Frequently</i>	<i>Does not apply</i>

Informant Screen Tools: Short Form of the Informant Questionnaire on Cognitive Decline in the Elderly (Short IQCODE)

Compared with 10 years ago how is this person at:	1	2	3	4	5
1. Remembering things about family and friends e.g. occupations, birthdays, addresses	Much improved	A bit improved	Not much change	A bit worse	Much worse
2. Remembering things that have happened recently	Much improved	A bit improved	Not much change	A bit worse	Much worse
3. Recalling conversations a few days later	Much improved	A bit improved	Not much change	A bit worse	Much worse
4. Remembering his/her address and telephone number	Much improved	A bit improved	Not much change	A bit worse	Much worse
5. Remembering what day and month it is	Much improved	A bit improved	Not much change	A bit worse	Much worse
6. Remembering where things are usually kept	Much improved	A bit improved	Not much change	A bit worse	Much worse
7. Remembering where to find things which have been put in a different place from usual	Much improved	A bit improved	Not much change	A bit worse	Much worse
8. Knowing how to work familiar machines around the house	Much improved	A bit improved	Not much change	A bit worse	Much worse
9. Learning to use a new gadget or machine around the house	Much improved	A bit improved	Not much change	A bit worse	Much worse
10. Learning new things in general	Much improved	A bit improved	Not much change	A bit worse	Much worse
11. Following a story in a book or on TV	Much improved	A bit improved	Not much change	A bit worse	Much worse
12. Making decisions on everyday matters	Much improved	A bit improved	Not much change	A bit worse	Much worse
13. Handling money for shopping	Much improved	A bit improved	Not much change	A bit worse	Much worse
14. Handling financial matters e.g. the pension, dealing with the bank	Much improved	A bit improved	Not much change	A bit worse	Much worse
15. Handling other everyday arithmetic problems e.g. knowing how much food to buy, knowing how long between visits from family or friends	Much improved	A bit improved	Not much change	A bit worse	Much worse
16. Using his/her intelligence to understand what's going on and to reason things through	Much improved	A bit improved	Not much change	A bit worse	Much worse

Jorm AF. A Short Form of the Informant Questionnaire on Cognitive Decline in the Elderly (IQCODE): Development and Cross-Validation. *Psychol Med.* 1994 Feb;24(1):145-53. doi: 10.1017/s003329170002691x

Patient Cognitive Testing: Montreal Cognitive Assessment (MoCA)

- 30 question test, 10-12 minutes to administer
- 90% sensitivity; 90% specificity
- Measures executive function, can detect MCI
- Free for non-profit use
- Available in >35 languages
- MoCA Test Blind
- Education Level: 1 point is added to the test-taker's score if he or she has 12 years or less of formal education

MONTREAL COGNITIVE ASSESSMENT (MOCA) Education: _____ Date of birth: _____
 Version 8.3 English Sex: _____ DATE: _____

VISUOSPATIAL / EXECUTIVE Copy bed _____ Draw CLOCK (Five past ten) _____
 (10 min) (10 min)

Points: _____ / 5

NAMING

Points: _____ / 3

MEMORY Repeat list of words. Subject must repeat them. Do 2 trials, even if 1st trial is successful. Do a recall after 3 minutes.

LEG	COTTON	SCHOOL	TOMATO	WHITE	NO POINTS
1st TRIAL					
2nd TRIAL					

ATTENTION Read list of ages (1 digit/ sec.). Subject has to repeat them in the forward order. [] 2 4 8 1 5
 Subject has to repeat them in the backward order. [] 4 2 7

Points: _____ / 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 R

Points: _____ / 1

Serial 7 subtraction starting at 60 [] 153 [] 145 [] 136 [] 132 [] 125 [] 125
 4 or 5 correct subtractives: 3 pts. 2 or 3 correct: 2 pts. 1 correct: 1 pt. 0 correct: 0 pts

Points: _____ / 3

LANGUAGE Repeat: The child walked his dog in the park after midnight. []
 The child finished his painting at the right moment for the exhibition. []

Points: _____ / 2

Language Fluency: Name maximum number of words in one minute that begin with the letter B. [] _____ (N = 11 words)

Points: _____ / 1

ABSTRACTION Similarity between: e.g. banana - orange = fruit [] Hammer - screwdriver: [] matches - lamp

Points: _____ / 2

DELAYED RECALL (MIS) Has to recall words LEG COTTON SCHOOL TOMATO WHITE Points for UNCUED recall only

X3	WITH NO CUE	[]	[]	[]	[]	[]	
X2	Category cue						
X1	Multiple choice cue						MIS = ____ / 15

Points: _____ / 5

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

Points: _____ / 6

© Z. Nasreddine MD www.mocatest.org MIS: /15 (Normal > 26/30)

Administered by: _____

Treasurer and Co-facilitators are required to cover subjects. Add 1 point @ 12 yr education. TOTAL _____ / 30

MoCA-MIS as a Predictor of Conversion From Mild Cognitive Impairment to Alzheimer's Disease

- Individuals with MCI with a low MoCA score *and* a low memory index score (MoCA-MIS) are at greater risk of conversion to Alzheimer's Disease
 - Retrospective chart review
 - 90.5% of subjects MoCA > 20/30 and a MoCA-MIS > 7 at baseline converted to AD within the average follow-up period of 18 months (compared with 52.7% with MCI above the cutoffs on both scores).

DELAYED RECALL		(MIS)	Has to recall words	LEG	COTTON	SCHOOL	TOMATO	WHITE	Points for UNCUED recall only	____ / 5
Memory Index Score (MIS)	X3		WITH NO CUE	[]	[]	[]	[]	[]		
	X2		Category cue							
	X1		Multiple choice cue						MIS = ____ / 15	

Julayanont P et al. Montreal Cognitive Assessment Memory Index Score (MoCA-MIS) as a Predictor of Conversion From Mild Cognitive Impairment to Alzheimer's Disease. 2014 Apr;62(4):679-84. doi: 10.1111/jgs.12742

Patient Cognitive Testing: St. Louis University Mental Status Examinations (SLUMS)

Department of Veterans Affairs

1. What day of the week is it?
 2. What is the year?
 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.
 6. How much did you spend?
 7. How much do you have left?
 6. Please name as many animals as you can in one minute.
 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.
 9. This is a clock face. Please put in the hour markers and the time at ten minutes to eleven o'clock.
 10. Please place an X in the triangle.
 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.

TOTAL SCORE

Department of Veterans Affairs SAINT LOUIS UNIVERSITY

HIGH SCHOOL EDUCATION		LESS THAN HIGH SCHOOL EDUCATION	
27-30	Normal	25-30	Normal
21-26	MNCD*	20-24	MNCD*
1-20	Dementia	1-19	Dementia

* Mild Neurocognitive Disorder

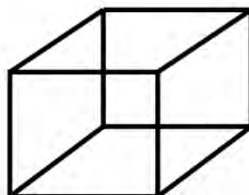
Tariq SH et al. Comparison of the Saint Louis University Mental Status Examination and the Mini-Mental State Examination for Detecting Dementia and Mild Neurocognitive Disorder—A Pilot Study. *Am J Geriatr Psychiatry*. 2006 Nov;14(11):900-10.

Patient Cognitive Testing: Rowland Universal Dementia Assessment Scale (RUDAS)

- 10-15 minutes to administer
- Sensitivity: 89%; Specificity: 98%
- Less affected by education, language, culture
- Tests praxis
- Not as well studied

Storey et al. The Rowland Universal Dementia Assessment Scale: A multicultural cognitive assessment scale. *Int Psychogeriatr*. 2004; 16: 13-31

Item	Max Score
<p>Memory</p> <p>1. (Instructions) I want you to imagine that we are going shopping. Here is a list of grocery items. I would like you to remember the following items which we need to get from the shop. When we get to the shop in about 5 mins. time I will ask you what it is that we have to buy. You must remember the list for me. Tea, Cooking Oil, Eggs, Soap Please repeat this list for me (ask person to repeat the list 3 times). (If person did not repeat all four words, repeat the list until the person has learned them and can repeat them, or, up to a maximum of five times.)</p> <p>Visuospatial Orientation</p> <p>2. I am going to ask you to identify/show me different parts of the body. (Correct = 1). Once the person correctly answers 5 parts of this question, do not continue as the maximum score is 5.</p> <p>(1) show me your right foot1 (2) show me your left hand1 (3) with your right hand touch your left shoulder1 (4) with your left hand touch your right ear1 (5) which is (indicate/point to) my left knee1 (6) which is (indicate/point to) my right elbow1 (7) with your right hand indicate/point to my left eye1 (8) with your left hand indicate/point to my left foot1</p> <p>Praxis</p> <p>3. I am going to show you an action/exercise with my hands. I want you to watch me and copy what I do. Copy me when I do this ... (One hand in fist, the other palm down on table - alternate simultaneously.) Now do it with me: Now I would like you to keep doing this action at this pace until I tell you to stop - approximately 10 seconds. (Demonstrate at moderate walking pace)</p> <p>Score as: Normal = 2 (very few if any errors; self-corrected, progressively better; good maintenance; only very slight lack of synchrony between hands) Partially Adequate = 1 (noticeable errors with some attempt to self-correct; some attempt at maintenance; poor synchrony) Failed = 0 (cannot do the task; no maintenance; no attempt whatsoever)</p> <p>Visuoconstructional Drawing</p> <p>4. Please draw this picture exactly as it looks to you (Show cube on back of page) (Yes = 1)</p> <p>Score as: (1) Has person drawn a picture based on a square?1 (2) Do all internal lines appear in person's drawing?1 (3) Do all external lines appear in person's drawing?1</p> <p>Judgment</p> <p>5. You are standing on the side of a busy street. There is no pedestrian crossing and no traffic lights. Tell me what you would do to get across to the other side of the road safely. (If person gives incomplete response that does not address both parts of answer, use prompt: "Is there anything else you would do?") Record exactly what patient says and circle all parts of response which were prompted.</p> <p>.....</p> <p>Score as: Did person indicate that they would look for traffic? (YES = 2; YES PROMPTED = 1; NO = 0)2 Did person make any additional safety proposals? (YES = 2; YES PROMPTED = 1; NO = 0)2</p>	<p>.....5</p> <p>.....2</p> <p>.....3</p> <p>.....4</p>
<p>Memory Recall</p> <p>1. (Recall) We have just arrived at the shop. Can you remember the list of groceries we need to buy? (Prompt: If person cannot recall any of the list, say "The first one was 'tea'". (Score 2 points each for any item recalled which was not prompted—use only 'tea' as a prompt.)</p> <p>Tea2 Cooking Oil2 Eggs2 Soap2</p> <p>Language</p> <p>6. I am going to time you for one minute. In that one minute, I would like you to tell me the names of as many different animals as you can. We'll see how many different animals you can name in one minute. (Repeat instructions if necessary). Maximum score for this item is 8. If person names 8 new animals in less than one minute there is no need to continue.</p> <p>1. 5. 2. 6. 3. 7. 4. 8.</p> <p>TOTAL SCORE =8 /30</p>	<p>.....8</p> <p>.....8</p> <p>/30</p>



Patient Cognitive Testing in a COVID Environment

- Not all clinical services are easily translated into a virtual environment.
- Many variables: internet connection speeds, camera quality, privacy, and access to a distraction-free environment.

Cognitive Testing: COVID

Table 1 Summary of Telemedicine Cognitive Measures

Measure	Scores	Recommended Modality	Convergence With In-Person Assessments
Brief Test of Adult Cognition ^a	Six subscale z-scores create composite score	Telephone or video	Convergent validity with neuropsychology assessment ^a
Cognitive Telephone Screening Instrument	Six weighted subtest scores	Telephone or video	Convergent validity with MMSE ⁸
MMSE	0 to 30	Video	ICC = 0.91 ²
MoCA-Telehealth	0 to 30	Video	ICC = 0.93 ⁵
MoCA-Telephone	0 to 22	Telephone or video	Comparable to TICS ¹⁰
TICS	0 to 41	Telephone or video	Convergent validity with MMSE, with T-scores available for direct comparison ⁷

Abbreviations: ICC, intraclass correlation coefficient; MMSE, Mini-Mental State Examination; MoCA, Montreal Cognitive Assessment; TICS, Telephone Interview for Cognitive Status.

^aThis measure is presently for research purposes only.

Hantke NC, Gould C. Examining Older Adult Cognitive Status in the Time of COVID-19. *J Am Geriatr Soc.* 2020. <https://doi.org/10.1111/jgs.16514>

Cognitive Testing: Telephone Interview for Cognitive Status (TICS)

Item	Item response	Scoring criteria	Max. score	Item score
1. Please tell me your full name.		1 point for correct first name (or nickname) and 1 point for correct last name	2	
2. What is today's date? <small>Probe for month, date, year, day of week, and season if any not provided spontaneously (e.g., What day of the week is it? or What season is it?).</small>		1 point each for precisely correct month, date, year, day of the week, and season (e.g., a hot day in early June is not summer)	5	
3. Where are you right now? <small>Probe for house number, street, city, state, and zip code if any not provided spontaneously (e.g., What number is that? What is your zip code?).</small>		1 point each for correct house number, street, city, state, and zip code (5-digit zip code is sufficient); if examinee is in a facility with no house number (e.g., hospital, nursing home), the name of the facility may be substituted for the house number.	5	
4. Please count backward from 20 to 1. <small>If examinee makes an error, ask him or her to try again.</small>		2 points if completely correct on first trial 1 point if completely correct on second trial	2	
5. I am going to read you a list of 10 words. Please listen carefully and try to remember them. When I am done, tell me as many of the words as you can, in any order. Ready? The words are (pause) cabin, pipe, elephant, chest, silk, theater, watch, whip, pillow, giant. (Pause.) Now tell me all the words you can remember. <small>The words should be read at approximately one word every 2 seconds. No repetitions of the word list are permitted.</small>		1 point for each correctly recalled word 0 points for incorrect responses, repetitions, or intrusions	10	

Item	Item response	Scoring criteria	Max. score	Item score
6. I would like you to take the number 100 and subtract 7. (Pause for a response.) Now keep subtracting 7 from the answer until I tell you to stop. No further prompts or repetitions are given, except to "keep going." Stop the examinee after five serial subtractions.		1 point for each correct subtraction (do not infer awareness of incorrect responses, but allow subtractions to be made from the last response. For example, "93, 86, 79, 72" would be awarded 3 points.	5	
7. What do people usually use to cut paper? (Pause for a response.) How many things are in a dozen? (Pause for a response.) What do you call the prickly green plant that lives in the desert? (Pause for a response.) What animal does wool come from?		1 point each for "scissors" or "shears" 1 point for "12" 1 point for "cactus" 1 point for "sheep" or "wool"	4	
8. Please repeat this after me: "No ifs, ands, or buts." (Pause for a response.) Now, please repeat this after me: "Methodist Episcopal." <small>No variations of the phrases are permitted.</small>		1 point for correct repetition 1 point for correct repetition	2	
9. Who is the President of the United States right now? (Pause for a response.) Who is the Vice-President? <small>Both first and last names must be correct. If only the last name is given, credit for the full name.</small>		1 point for current president's full name 1 point for current vice-president's full name	2	
10. With your finger, tap five times on the part of the phone you speak into. <small>If the TICS is being administered in person, the examinee should be asked to tap on the table rather than on a telephone receiver.</small>		2 points if five taps are clearly heard 1 point if fewer more than or fewer than 5 taps are heard 0 points if no taps are heard	2	
11. I am going to say a word and I want you to give me its opposite. For example, if I said "hot," you would say "cold." <small>(Pause for a response.)</small> What is the opposite of "west"? <small>(Pause for a response.)</small> What is the opposite of "generous"?		1 point for "east" 1 point for "cheap," "stingy," "tight," "unkind," "greedy," "mean," "meager," or other correct antonyms	2	

TICS Total score
Total possible points = 41

Brandt J, Spencer M, Folstein M. The telephone interview for cognitive status. *Neuropsychiatry Neuropsychol Behav Neurol.* 1988;1:111-117

Patient Cognitive Testing: Sweet 16

- Entirely verbal administration
- 2 minutes to administer
- 8 item orientation, 3 item repetition & recall, backwards digit span
- Total score is 16
- Score < 14 is abnormal
- Sensitivity of 80% and specificity of 72%
- Positive likelihood ratio = 2.7; Negative likelihood ratio = 0.28

Fong TG et al. Development and Validation of a Brief Cognitive Assessment Tool: The Sweet 16. *Arch Intern Med.* 2011;171(5):432-437. doi:10.1001/archinternmed.2010.423

Cognitive Test: MoCA Telephone Test

- Total score of 22.
- Score of ≥ 19 is normal.

MEMORY		FACE	VELVET	CHURCH	DAISY	RED	POINTS	
Read list of words, subject must repeat them. Do 2 trials, even if 1st trial is successful. Do a recall after 5 minutes.		1st TRIAL					NO POINTS	
		2nd TRIAL						
ATTENTION		Subject has to repeat in the forward order. [] 2 1 8 5 4					___/2	
Read list of digits (1 digit / sec.).		Subject has to repeat in the backward order. [] 7 4 2						
Read list of letters. The subject must tap 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	___/3	
		4 or 5 correct subtractions: 3 pts, 2 or 3 correct: 2 pts, 1 correct: 1 pt, 0 correct: 0 pt						
LANGUAGE		I only know that John is the one to help today. []					___/2	
Repeat:		The cat always hid under the couch when dogs were in the room. []						
Fluency: Name maximum number of words in one minute that begin with the letter F.		[] _____ (N ≥ 11 words)					___/1	
ABSTRACTION		[] train - bicycle					___/2	
Similarity between e.g. orange - banana = fruit		[] watch - ruler						
DELAYED RECALL		FACE	VELVET	CHURCH	DAISY	RED	___/5	
Memory (MIS) X3		[]	[]	[]	[]	[]		
Index X2		Category cue					NO POINTS	
Score X1		Multiple choice cue						
ORIENTATION		[] Date	[] Month	[] Year	[] Day	[] Place	[] City	___/6
© Z. Nasreddine MD		www.mocatest.org						
Administered by: _____		Add 1 point if ≤ 12 yr edu					TOTAL	___/22
		MIS: /15 (Normal $\geq 19/22$)						

Cognitive Test: MoCA 5 min Test

- Total score is 15.
- Score of ≥ 11 is normal.

MONTREAL COGNITIVE ASSESSMENT (MoCA®)							
Mini - Version 2.1 English							
				Name :		Date of birth :	
				Education :		DATE :	
				Sex :			
MEMORY/ATTENTION		COAT	NOTEBOOK	JUICE	VIOLIN	SQUARE	POINTS
Read list of words, subject must repeat them. Do 2 trials, even if 1st trial is successful.	1ST TRIAL						NO POINTS
	2ND TRIAL						
LANGUAGE FLUENCY							
Name a maximum number of words in one minute that begin with the letter T. 0 points for 0 to 2 words 1 point for 3 to 5 words 2 points for 6 to 9 words 3 points for 10-13 words 4 points for 14 words or more	_____		_____				____/4
	_____		_____				
	_____		_____				
	_____		_____				
	_____		_____				
ORIENTATION							
	[] Date	[] Month	[] Year	[] Day	[] Location	[] City	____/6
RECALL		COAT	NOTEBOOK	JUICE	VIOLIN	SQUARE	
Subject must remember the words.	Has to recall words WITH NO CLUE	[]	[]	[]	[]	[]	____/5

Diagnostics: Laboratory

- Laboratory Tests
 - Complete blood cell (CBC)
 - Basic metabolic panel (BMP)
 - Liver function test (LFT)
 - Thyroid stimulating hormone (TSH)
 - Vitamin B12
 - ?RPR or MHA-TP
 - ?HIV

Diagnostics: Neuroimaging

- One structural scan (either CT or MRI) should be done at least once
 - Rule out intracranial causes (e.g., masses, subdural hematoma, etc...).
 - MRI: smaller strokes, cerebellar/posterior disease, hippocampal volume
 - MRI in early stage dementia might appear 'normal'
 - Looking for localized atrophy, white matter change, microhemorrhages
- ¹⁸F-fluorodeoxyglucose (FDG) positron emission tomography (PET) scan [FDG PET]
 - Measures glucose uptake of neurons and glial cells
 - A normal FDG PET virtually excludes a diagnosis of neurodegenerative disease
 - AD: temporoparietal and posterior cingulate
 - FTD: anterior or asymmetric, or both
 - Medicare covers for the differential diagnosis of FTD and AD

Diagnostics: Amyloid PET

- Amyloid imaging
 - PET with ligands for A β allowing detection of in vivo amyloid plaques
 - Ligands: florbetapir, florbetaben, and flutemetamol (¹⁸F compounds)
 - Ligands have very high accuracy for cortical amyloidosis
 - Not commonly used in clinical practice
 - Out-of-pocket costs can range upwards of \$4000, typically not covered by insurance
- Diagnostic value is more exclusionary (i.e., a high negative predictive value)
 - Brain amyloidosis is necessary but not sufficient for diagnosis of Alzheimer's
 - Up to 35% of cognitively healthy people older >60y have + amyloid PET scans*

*NL Marchant, BR Reed, CS DeCarli, et al. Cerebrovascular disease, beta-amyloid, and cognition in aging. *Neurobiol Aging*, 33 (2012), p. 1006

Diagnostics: Neuropsychological Testing

- 3-4 hours of history and cognitive testing
- Much more information about the specific domains affected
- Can compare scores to age and education-adjusted norms
- Indicated in cases of:
 - early or mild symptom presentation
 - for differential diagnosis, determination of nature and severity of cognitive functioning
 - Development of appropriate treatment plan: identifies strengths and weaknesses for patients

Non-Pharmacologic Interventions

- Regular appointments for support
- Caregiver and patient support groups
- Exercise can improve physical function, mood, fall risk
 - 2x/week group exercise in studies
- 10 sessions of OT improved daily functioning and caregiver competence
- Weak evidence for cognitive rehab

Graff MJ L et al. Community Occupational Therapy for Older Patients With Dementia and Their Care Givers: Cost Effectiveness Study. 2008 Jan 19;336(7636):134-8.

Pharmacologic Interventions

- Acetylcholinesterase inhibitors (AChEI's)
- Memantine
- NO indications for the following:
 - Ginkgo biloba
 - Vitamins B, E, C, omega-3 fatty acids
 - Estrogen
 - NSAIDS

AChEI's: Benefits

- Modest benefits on cognition, behavior, ADL's in AD, vascular, mixed, Lewy body, Parkinson's (worsens FTD)
- May help delay SNF placement, may help with behavioral disturbance
- Approved for treatment of mild to moderate; might help later
- Shared decision making with family about whether these are helping

AChEI's: Side Effects

- GI side effects in 20-30% (nausea, diarrhea, anorexia, mild weight loss); more common with galantamine
- Bradycardia: doubles risk of hospitalization for bradycardia; CI in sick sinus, baseline bradycardia; caution with beta blockers and CCB
- Evening dosing of donepezil can interfere with sleep.
- Discontinuation rate 40-60% by 18 weeks, mostly due to side effects.

Campbell NL et al. Adherence and Tolerability of Alzheimer's Disease Medications: A Pragmatic Randomized Trial. *J Am Geriatr Soc.* 2017 Jul;65(7):1497-1504.

Memantine

- NMDA receptor antagonist
- Modest benefits in moderate-severe disease
 - cognition in AD
 - Cognition and behavior in vascular dementia
- Evidence mixed for memantine + AChEI
- Main side effect is dizziness, some reports of increased agitation
- Shared decision-making

AChEI's: Choice of Drug

- Donepezil has least GI side effects, easiest titration (5mg → 10 mg)
- Galantamine has most GI side effects, most extended titration
 - Contraindicated in end stage kidney and liver disease
- Rivastigmine is transdermal and has FDA indication for Parkinson's dementia

Patient characteristics	Caregiver experiences	Possible interventions
Mild dementia (MMSE 20-30)		
Forgetfulness, word-finding problems, trouble with multistep instructions May have social withdrawal, depression, anxiety	Fearful about diagnosis and the future Helping with planning, remembering, finances	Diagnose dementia and any coexisting mood disorder Complete ACP Counsel about driving Consider medications
Moderate dementia (MMSE 10-20)		
More language impairment, trouble with IADL's, some ADL's, driving, complex tasks May wander, leave stove on Beginning of paranoia, fearfulness	Increasing burden of care Frustration with deficits Increasing vigilance Poor sleep, depression, anxiety, resentment, grief	Refer to caregiver support groups, driving eval Begin discussions about getting more help in the home Monitor caregiver for depression, fatigue
Severe dementia (<10)		
Physical manifestations: weakness, gait impairment, dysphagia Marked difficulty with ADL's Paranoia, delusions, agitation	Increasing burden of care Severe fatigue Caregiver medical complications Guilt	Consider transition to hospice Close support of caregiver; encourage time away, close f/u with their own PCP

Merel SE et al. Palliative Care in Advanced Dementia. Clin Geriatr Med 2014

Functional Assessment Staging (FAST) Scale

Severity	Stage	Assessment
Adult w/o cognitive decline	1	No difficulties, either subjectively or objectively.
Normal older adult w/ very mild memory loss	2	Complains of forgetting location of objects. Subjective word finding difficulties.
Early dementia	3	Decreased job function and organizational capacity.
Mild	4	Decreased ability to perform complex tasks.
Moderate	5	Requires assistance in choosing proper clothing.
Moderately severe	6A	Requires assist w/ dressing.
	B	Requires assist w/ bathing.
	C	Requires assist w/ toileting.
	D	Urinary incontinence.
	E	Fecal incontinence.
Severe	7A	Speech limited to ½ dozen different words or fewer.
	B	Speech limited to single intelligible word.
	C	Non-ambulatory.
	D	Unable to sit up independently.
	E	Lack of social smile.
	F	Unable to hold head up.

When to Refer to Hospice

- FAST stage 7a AND significant comorbidity OR disease related complication
- Dysphagia, febrile episode, pneumonia
- Significant infection preceding 12 months
- 10% weight loss in six months
- Recurrent hospitalizations
- Stage 3 or greater pressure sores, contractures

Summary

- Cognitive impairment is a geriatric syndrome with possibly many contributing factors.
- Utilize a standardized tool in screening and testing for cognitive impairment in patients.
- Utilize a standardized tool in obtaining corroborating history from informants.

Resources

- Alzheimer's Association
 - 24/7 Helpline: (800) 272-3900
- Area Agencies on Aging (AAA)
 - <https://www.n4a.org/>
 - Local AAA
- Dementia Action Collaborative. Dementia Road Map: A guide for family and care partners.
 - <https://www.dshs.wa.gov/sites/default/files/AL TSA/stakeholders/documents/AD/Dementia%20Road%20Map%20-%20A%20Guide%20for%20Family%20and%20Care%20Partners.pdf?=648b6>