



# INTRODUCING

## Jennifer Koop

Jennifer is an Advanced Practice Nurse (APN) working at The Ottawa Hospital in the Division of Geriatrics, specializing in Dementia Care. She started her specialization in Geriatrics as a Geriatric Emergency Management Nurse conducting targeted geriatric assessments in the Emergency Department and connecting at risk older adults to further specialized geriatric care and services in the community. Next, she joined the In-patient Geriatric Medicine Consult Team providing recommendations for the care of admitted patients with geriatric concerns through comprehensive geriatric assessments. She completed her Master's in Nursing with a leadership focus and special interest in delirium and patient and family education. Currently, in her role as APN she is committed to improving clinical outcomes for people living with dementia through advanced nursing practice, program development, consultation, research, education, and leadership.



**RN, MN, GNC(C) Advanced  
Practice Nurse  
Dementia Care**

The Ottawa Hospital



# DEMENTIA

## COGNITIVE IMPAIRMENT

**Jennifer Koop**

Dementia Behavioural Support Team

The Ottawa Hospital





# LEARNING OBJECTIVES

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What is dementia?

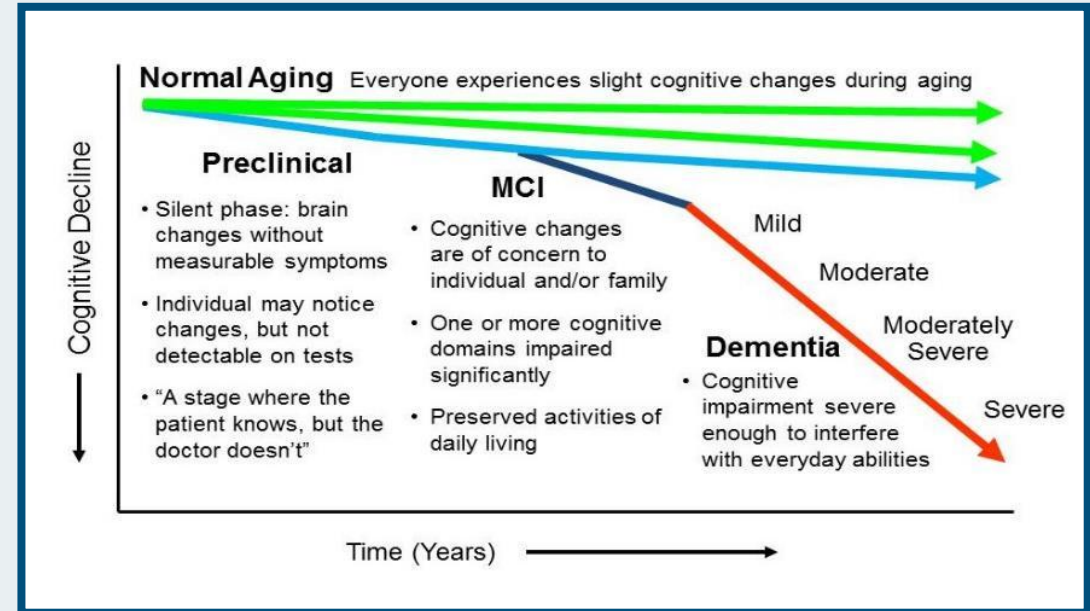
- Types
- Prevention
- Causes
- Assessment
- Diagnosis
- Progression
- Treatment

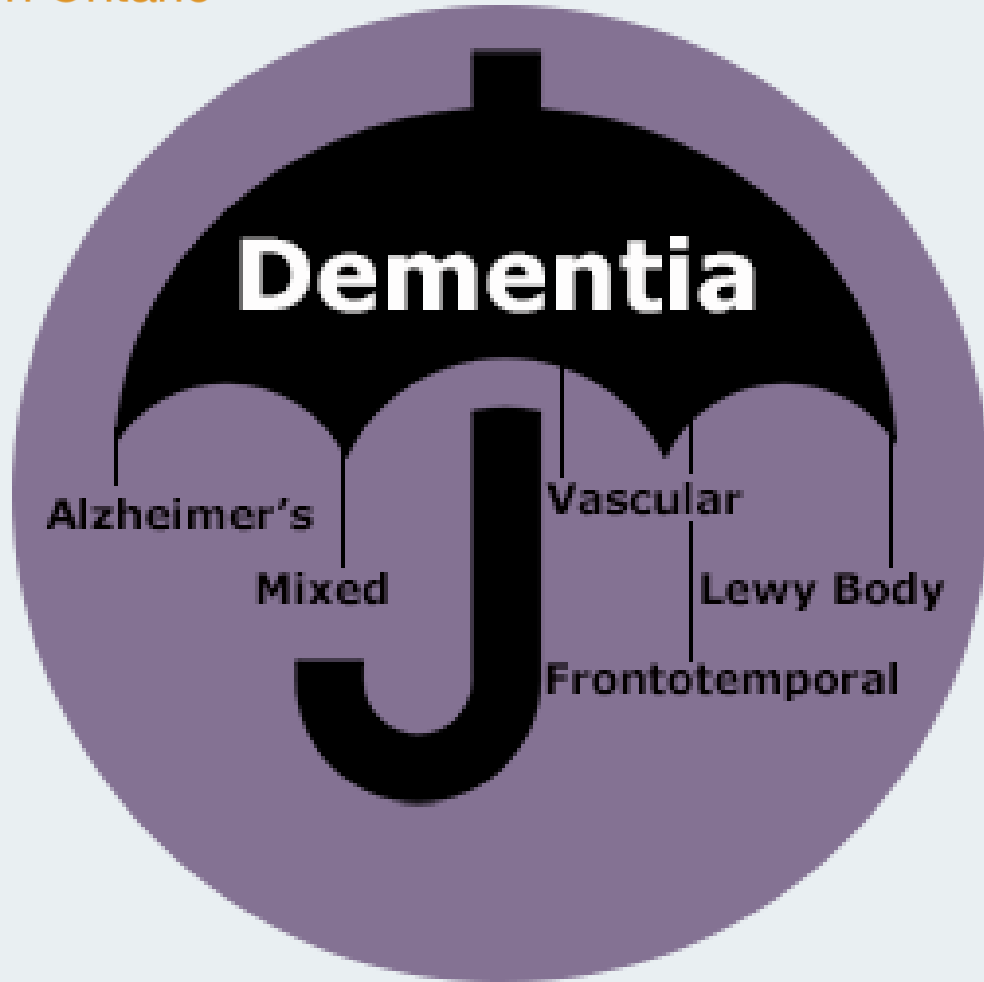


# WHAT IS DEMENTIA?

# NOT ALL MEMORY CHANGE IS THE SAME...

Normal Ageing	Mild Cognitive Impairment	Dementia
<ul style="list-style-type: none"> <li>Decrease in brain weight and blood flow</li> <li>Loss of some neurotransmitters</li> <li>Shrinking or death of neurons</li> </ul>	<ul style="list-style-type: none"> <li>Impaired memory when compared to others of same age &amp; education but function well</li> </ul>	<ul style="list-style-type: none"> <li>Gradual but continuous change in cognition that is seen over time</li> <li>Not due to other reversible cause</li> </ul>
<ul style="list-style-type: none"> <li>✓ No objective cognitive loss</li> <li>✓ No functional impairment</li> </ul>	<ul style="list-style-type: none"> <li>✓ Objective cognitive loss</li> <li>✓ No functional impairment</li> </ul>	<ul style="list-style-type: none"> <li>✓ Objective cognitive loss</li> <li>✓ Functional impairment</li> </ul>





**Neurocognitive Disorder =  
Cognitive Impairment**

**+**

**Impact on  
Daily Function**



# TYPES OF DEMENTIA

## Alzheimer's Disease

Gradual onset (months to years)  
Most common type (60-70%)

Impairment in 2 cognitive domains:

- Memory
- Language
- Visuospatial
- Executive function

## Vascular Dementia

Risk factors:

- Small vessel disease
- Often coexists with AD

Executive dysfunction and processing speed impacted early, while memory impacted later

Risk for overt stroke, gait problems/falls, urinary incontinence, cognitive and behavioural decline

## Mixed

Degenerative changes of AD and vascular changes co-exist

Common presentation is AD with vascular risk factors

## Frontotemporal Dementia

Middle aged onset

Personality and behaviour changes, apathy, disinhibition, executive dysfunction, perseveration, language changes

Relatively preserved memory, perception, spatial skills and praxis

## Dementia with Lewy Bodies

Fluctuating cognition, variation in attention and alertness with recurrent visual hallucinations and REM sleep disorder

Spontaneous motor features of Parkinsonism (falls, syncope)

Hypersensitivity to typical and atypical antipsychotics

# RISKS



Smoking



Diabetes



Lack of Physical  
Exercise



High blood  
pressure



Poor diet



Excessive  
Alcohol



Low cognitive  
engagement



Depression



Traumatic Brain  
Injury



Hearing Loss



Social Isolation



Air pollution



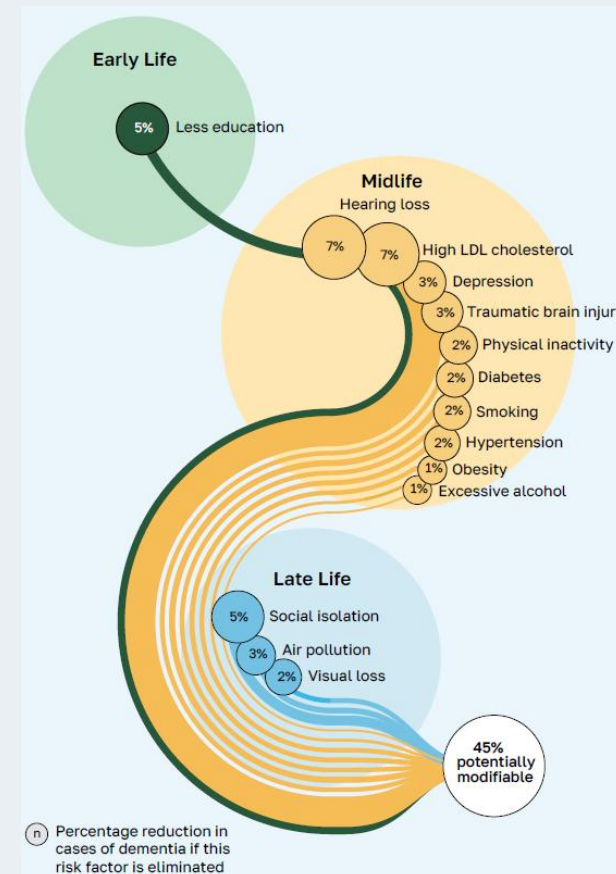
Obesity

# PREVENTION

1. Be physically active.
2. Avoid smoking and excessive alcohol consumption.
3. Track your numbers. Keep your blood pressure, cholesterol, blood sugar and weight within recommended ranges.
4. Stay socially connected.
5. Make healthy food choices. Eat a well-balanced and healthy diet that is rich in cereals, fish, legumes and vegetables.
6. Reduce stress.
7. Challenge your brain by trying something new, playing games, or learning a new language.
8. Take care of your hearing. Avoid being continuously exposed to loud sounds and wear a hearing aid if hearing does become a problem.
9. Lower your risk of falls. Consider installing handrails on all stairs and grab bars in bathrooms.
10. Reduce your exposure to air pollution, such as exhaust from heavy traffic

# INCREASED RISK OF DEVELOPING DEMENTIA RELATED TO 14 POTENTIALLY MODIFIABLE RISK FACTORS 2024 LANCET COMMISSION REPORT

Risk Factor	Relative Increased Risk of Developing Dementia
<b>Early life</b>	
Less education	60%
<b>Mid life</b>	
Hearing loss	40%
High LDL cholesterol	30%
Depression	120%
Traumatic brain injury	70%
Physical inactivity	20%
Smoking	30%
Diabetes	70%
Hypertension	20%
Obesity	30%
Excessive alcohol consumption	20%
<b>Later Life</b>	
Social isolation	60%
Air pollution	10%
Untreated vision loss	50%



From "Dementia Prevention, Intervention and Care: 2024 Report of the Lancet Standing Commission," by G. Livingston, J. Huntley, K. Y. Liu, S. G. Costafreda, G. Selbæk, S. Alladi, D. Ames, S. Banerjee, A. Burns, C. Brayne, N. C. Fox, C. P. Ferri, L. N. Gitlin, R. Howard, H. C. Kales, M. Kivimäki, E. B. Larson, N. Nakasujja, K. Rockwood, ... and N. Mukadam, 2024, *The Lancet*, 404(10452), 572–628, ([https://doi.org/10.1016/S0140-6736\(24\)01296-0](https://doi.org/10.1016/S0140-6736(24)01296-0)). Copyright 2024 by Elsevier.



# CAUSES

## Alzheimer's Disease

- Abnormal build-up of proteins in the brain
- Amyloid plaques and tau tangles which damage healthy brain cells and fibers connecting them
- Begin accumulating decades before symptoms occur
- Causes brain atrophy

## Vascular Dementia

- Damage to vessels supplying blood to the brain
- Following a stroke or series of mini-strokes
- Impacts problem solving, processing speed, focus and organization.
- Microangiopathic changes in the CT scan

## Lewy Body Dementia

- Abnormal balloon-like protein deposits called Lewy bodies
- Causes visual hallucinations, sleep disturbances, and fluctuations in attention and alertness
- Other signs are uncoordinated slow movement and parkinsonism

## Frontotemporal Dementia

- Degeneration of nerve cells and their connections in the frontal and temporal lobes of the brain
- Affecting personality, behaviour, and language skills

## Mixed Dementia

- Combination of different types of dementia
- Alzheimer's disease, vascular dementia and Lewy body dementia can occur at the same time and are risk factors for each other
- Can complicate diagnosis and treatment



# REVERSIBLE CAUSES OF COGNITIVE IMPAIRMENT

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- Delirium (Infections)
- Depression
- Medications (side effects, drug interactions, drug overdose)
- Alcohol and other drugs
- Concussions/head injury
- Thyroid conditions
- Metabolic disorders (dehydration, kidney failure, COPD)
- Heart disease
- Brain disease (ex. Tumours, normal pressure hydrocephalus)
- Dietary, vitamin and mineral deficiencies
- Environmental toxins

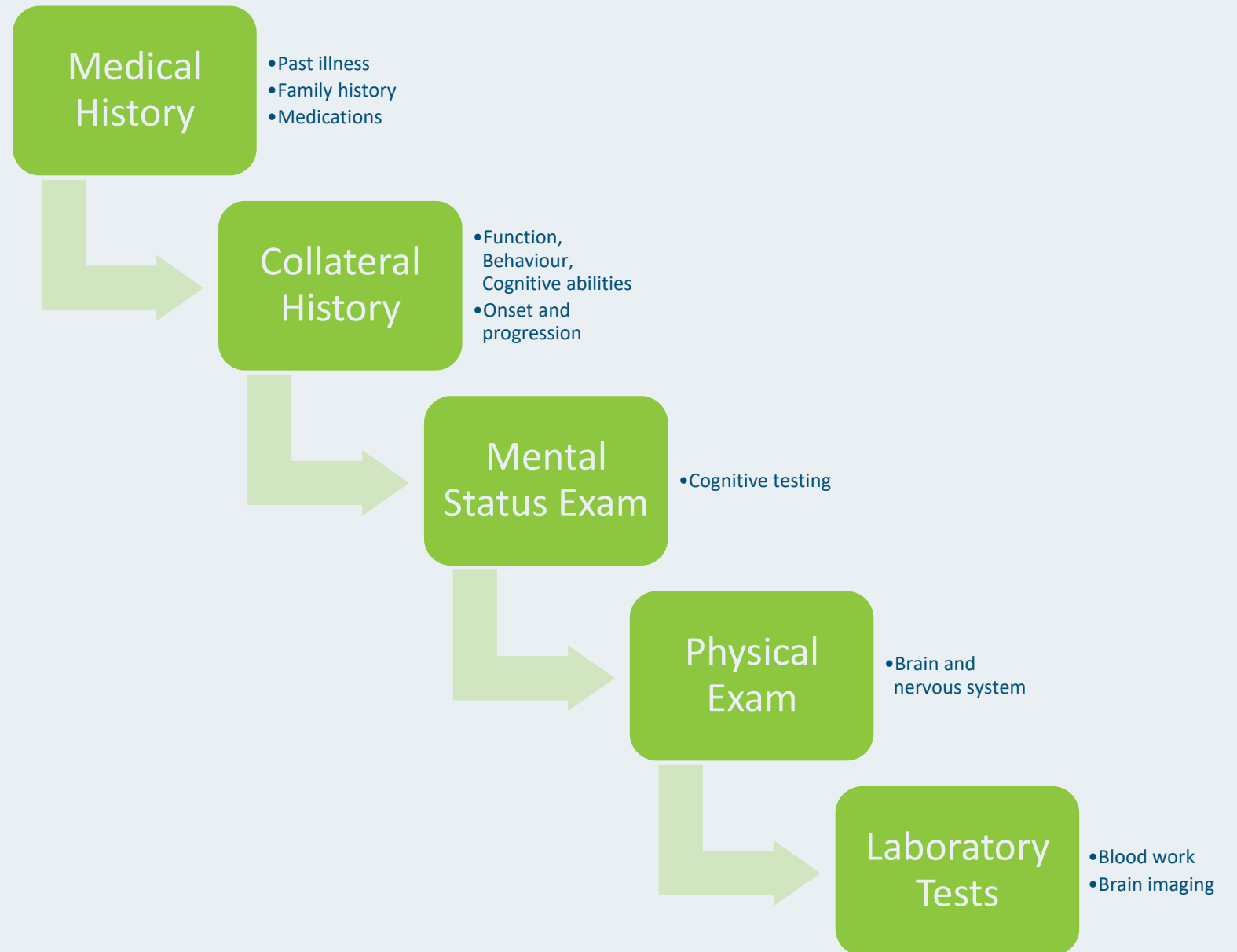


# 10 WARNING SIGNS





# PROCESS FOR DIAGNOSIS





# DEMENTIA ASSESSMENT: MUCH MORE THAN MEMORY LOSS

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- **ADLs/IADLs** – Functional ability to carrying out daily activities
- **Behaviour, personality, mood**
- **Cognitive Abilities** - memory, orientation, language, judgement and reasoning, concentration, ability to sequence tasks, and motor planning deficits



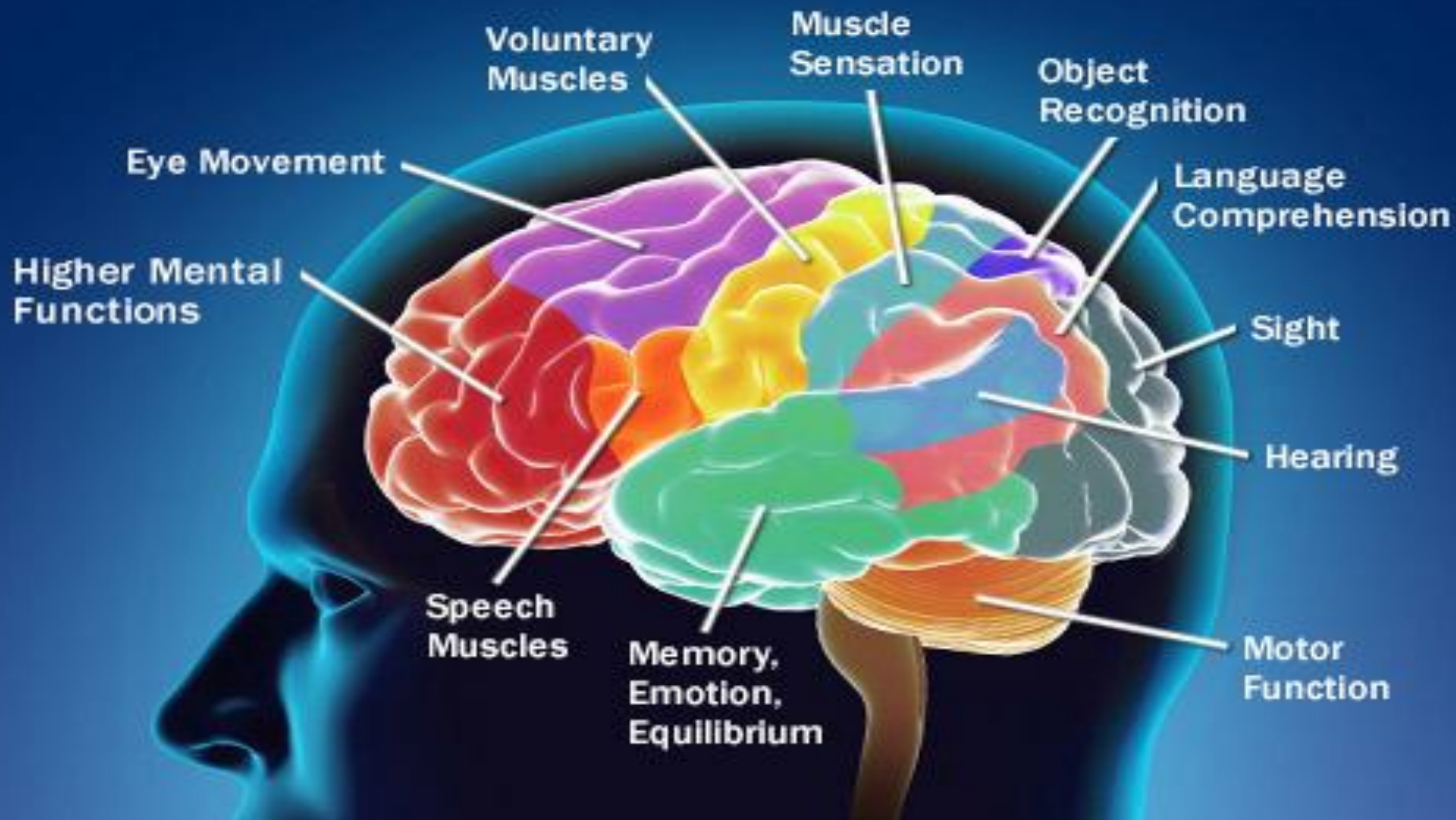
# ADLS & IADLS: FUNCTIONAL CHANGES

Instrumental Activities of Daily Living	Activities of Daily Living
Shopping e.g. purchasing clothing	Dressing
Transportation e.g. using a car, using a bus	Eating
Finances e.g. handling money, using a budget	Bathing
Cooking e.g. cooking and planning meals	Toileting
Cleaning e.g. laundry, keeping home tidy	Transferring
Medication e.g. taking medications as prescribed	Grooming
Communication e.g. using a phone	Ambulation



# BEHAVIOURAL CHANGES

- Apathy
- Anxiety
- Depression
- Frustration
- Agitation
- Aggression
- Temper outburst (shout, threaten)
- Disinhibition
- Hallucinations
- Delusions
- Impulsivity
- Food cravings for sweets





# COGNITIVE CHANGES





# COGNITIVE SCREENING TOOLS

- **Mini-Cog** (3 item recall & Clock Drawing Test)
- **Animal naming** (animals named in 1minute)
- **MMSE** (Mini-Mental State Examination or Folstein)
- **MoCA** (Montreal Cognitive Assessment)
- **Trails A & B**
- **RUDAS** (Rowland Universal Dementia Assessment Scale)
- **CAM** (Confusion Assessment Method)

N.B. There are many others.

Some are more appropriate depending on the setting and situation



## Mini-Mental Status Exam (MMSE)

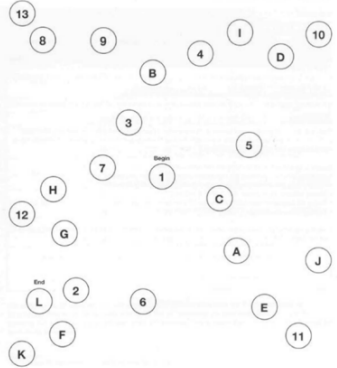
- Tests 5 areas: orientation, registration, attention and calculation, recall, and language (Folstein et al., 1975).
- There are 11 questions, maximum score of 30.
- Score <23 indicates cognitive impairment
- <https://www.parinc.com/Products/Pkey/238>

## Montreal Cognitive Assessment (MoCA)

- Assess several cognitive domains: short term memory, visuospatial abilities, executive functions, attention/concentration/working memory, language and orientation to time and place (Nasreddine et al., 2005).
- Maximum score is 30, Score <26 indicated cognitive impairment
- [www.mocatest.org](http://www.mocatest.org)



Trails B



Trails B

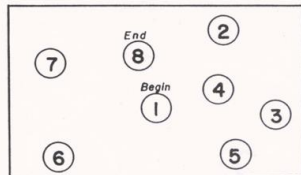
"On the paper are the numbers 1 through 13 and the letters A through L, scattered across the page. Starting with 1, draw a line to A, then to 2, then to B, and so on, alternating back and forth between numbers and letters until you finish with the number 13. I'll time how fast you can do this. Are you ready? Go."

If education or language is a concern, ask the patient to write down numbers 1-13 and letters A-L

TRAIL MAKING

Part A

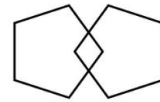
SAMPLE



MINI MENTAL STATE EXAMINATION (MMSE)

Name: \_\_\_\_\_  
 DOB: \_\_\_\_\_  
 Hospital Number: \_\_\_\_\_

One point for each answer	DATE:			
<b>ORIENTATION</b> Year Season Month Date Time Country Town District Hospital Ward/Floor	...../5	...../5	...../5	...../5
<b>REGISTRATION</b> Examiner names three objects (e.g. apple, table, penny) and asks the patient to repeat (1 point for each correct. THEN the patient learns the 3 names repeating until correct).	...../3	...../3	...../3	...../3
<b>ATTENTION AND CALCULATION</b> Subtract 7 from 100, then repeat from result. Continue five times: 100, 93, 86, 79, 65. (Alternative: spell "WORLD" backwards: DLROW).	...../5	...../5	...../5	...../5
<b>RECALL</b> Ask for the names of the three objects learned earlier.	...../3	...../3	...../3	...../3
<b>LANGUAGE</b> Name two objects (e.g. pen, watch). Repeat "No ifs, ands, or buts". Give a three-stage command. Score 1 for each stage. (e.g. "Place index finger of right hand on your nose and then on your left ear"). Ask the patient to read and obey a written command on a piece of paper. The written instruction is: "Close your eyes". Ask the patient to write a sentence. Score 1 if it is sensible and has a subject and a verb.	...../2	...../2	...../2	...../2
<b>COPYING:</b> Ask the patient to copy a pair of intersecting pentagons	...../1	...../1	...../1	...../1
<b>TOTAL:</b>	...../30	...../30	...../30	...../30



MMSE scoring

24-30: no cognitive impairment  
 18-23: mild cognitive impairment  
 0-17: severe cognitive impairment

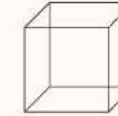
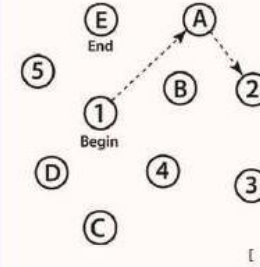


MoCA  
COGNITIVE ASSESSMENT

Version 8.1 English

Name: \_\_\_\_\_  
 Education: \_\_\_\_\_  
 Sex: \_\_\_\_\_  
 Date of birth: \_\_\_\_\_  
 DATE: \_\_\_\_\_

VISUOSPATIAL / EXECUTIVE

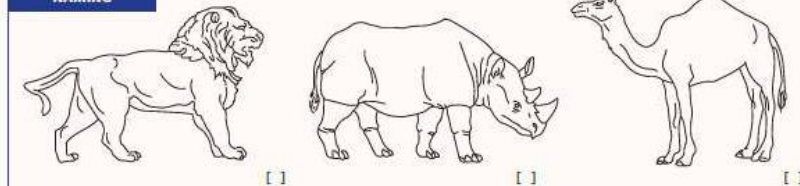


Copy cube

Draw CLOCK (Ten past eleven) (3 points)

POINTS

NAMING



MEMORY

Read list of words, subject must repeat them. Do 2 trials, even if 1st trial is successful. Do a recall after 5 minutes.

	FACE	VELVET	CHURCH	DAISY	RED	NO POINTS
1 <sup>st</sup> TRIAL						
2 <sup>nd</sup> TRIAL						

ATTENTION

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

Read list of letters. The subject must tap with his hand at each letter A. No points if ≠ 2 errors  
 [ ] F B A C M N A A J K L B A F A K D E A A A J A M O F A A B

Serial 7 subtraction starting at 100: [ ] 93 [ ] 86 [ ] 79 [ ] 72 [ ] 65  
 4 or 5 correct subtractions: 3 pts, 2 or 3 correct: 2 pts, 1 correct: 1 pt, 0 correct: 0

LANGUAGE

Repeat: I only know that John is the one to help today. [ ]  
 The cat always hid under the couch when dogs were in the room. [ ]  
 Fluency: Name maximum number of words in one minute that begin with the letter F. [ ] \_\_\_\_\_ (N≠11 words)

ABSTRACTION

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

DELAYED RECALL

(MIS)	Has to recall words WITH NO CUE	FACE	VELVET	CHURCH	DAISY	RED	POINTS FOR UNCLUED recall only
X3	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	MIS = ____/15
X2	category cue						
X1	Multiple choice cue						

ORIENTATION

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

© Z. Nasreddine MD

www.mocatest.org

Training and Certification are required to ensure accuracy.

MIS: /15  
 (Normal = 26/30)  
 Add 1 point if ≠ 12 yr edu

TOTAL \_\_\_\_/30



## DSM-5 Criteria For Major Neurocognitive Disorder

- A. Evidence of **significant cognitive decline** from a previous level of performance **in one or more cognitive domains** (complex attention, executive function, learning and memory, language, perceptual-motor, or social cognition) based on:
1. A **concern of the individual, a knowledgeable informant, or the clinician** that there has been a significant decline in cognitive function; **and**
  2. A **substantial impairment in cognitive performance**, preferably documented by standardized neuropsychological testing or, in its absence, another quantified clinical assessment



## DSM-5 Criteria For Major Neurocognitive Disorder

- B. The cognitive deficits **interfere with independence in everyday activities** (at a minimum, requiring assistance with instrumental activities of daily living such as paying bills or managing medications)
- C. The cognitive deficits **do not occur exclusively in the context of a delirium**
- D. The cognitive deficits are **not better explained by another mental disorder** (e.g. major depressive disorder, schizophrenia)



# STAGES OF ALZHEIMER'S DEMENTIA

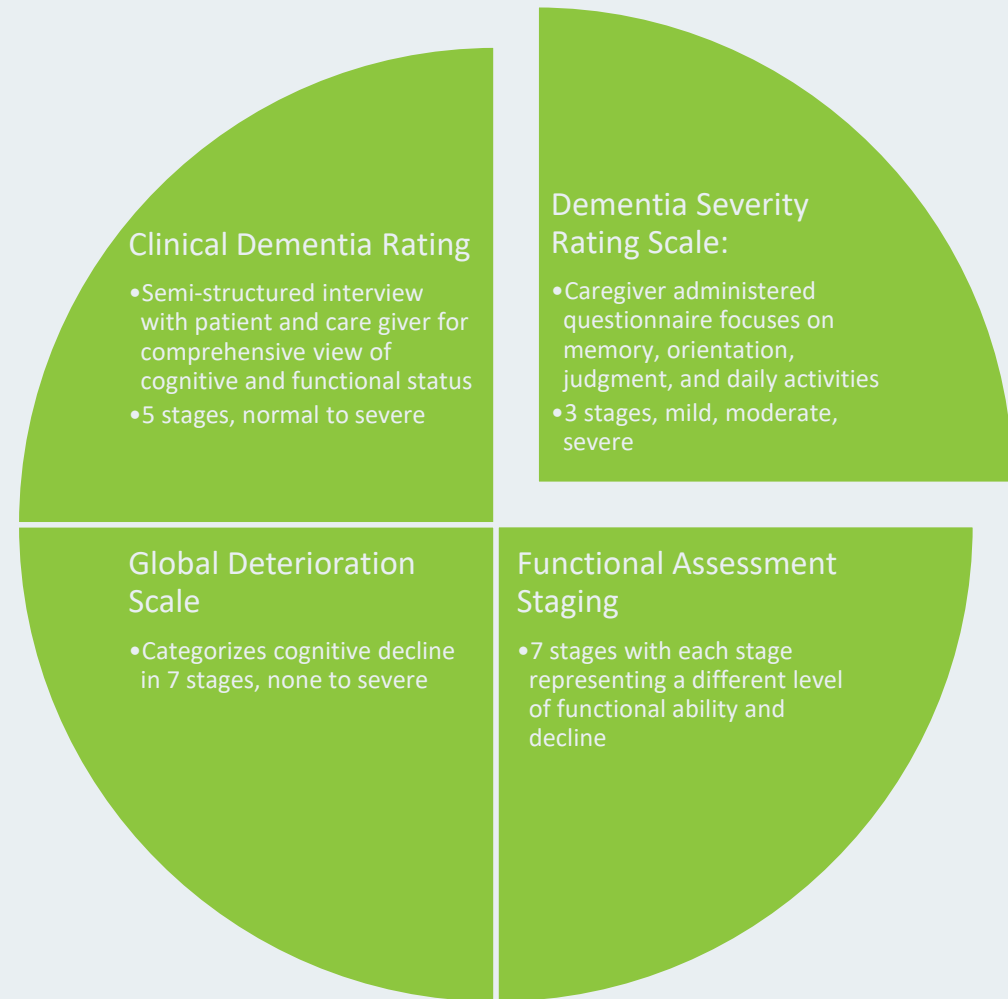
	Mild Stage	Moderate Stage	Advanced Stage
Mental Abilities	Mild memory loss (date/time) Difficulty learning Word finding	Further memory loss (recent and current events) Problems with language (productive and receptive) Problems with orientation Lack insight	Loss of recent memory, confusion about spouse and family Inability to understand and produce language
Behaviours	Withdraw from activities Physical restlessness	Anxiety, restlessness, and agitation Paranoia and delusions Neglecting hygiene, incontinence	Sleeping more Non-verbal communication Agitation and aggression
Physical Abilities	Usually, no change	Usually, no change	Inability to dress, bathe Incontinence (loss of control) Difficulty swallowing and eating Loss of ability to stand and walk
Mood and Emotion	Shifts in mood Anxiety (new fears) Apathy (disinterest in life) Depression (crying, sadness, fatigue) Passive (unable to make decisions) Irritable (easily upset, tips to anger) Panic attacks	Increased apathy Verbal and/or physical aggression Sexual disinhibition	Increased apathy and withdrawal More limited range of emotions Ability to respond to music, touch, familiar voices



# MEASURING PROGRESSION

## Benefits:

- Structured way to quantify severity of dementia symptoms
- Monitor disease progression
- Evaluate treatment effectiveness
- Some rely on observations from caregiver who are familiar with individual's daily activities, behaviours
- Practical tool for assessing cognitive decline in real-world setting
- Helps caregivers understand needs and plan appropriate care strategies/assistance





# DEMENTIA – TREATMENT

- Refer to appropriate clinicians, teams for further assessment (PCP, Geriatric Medicine, Geriatric Psychiatry, Allied Health, etc.)
- Pharmacotherapy: Cholinesterase inhibitors & Memantine - NMDA (N-methyl-D-aspartate) receptor antagonist
- Optimizing brain health and physical health
  - Management of chronic disease
  - Physical activity
  - Social activity
  - Mental stimulation
- Non-pharmacological approaches
  - Behavioural Supports (Aromatherapy, music therapy, pet therapy, message)
  - Functional Supports (Medication management, Home and Community Care, Day programs, Respite)
  - Safety considerations (driving, fire, elopement, fraud, medical alert buttons)
  - Caregiver support (education, planning support- Retirement Home, LTC, private care)

# MEDICATIONS APPROVED FOR DEMENTIA IN CANADA

- No treatment to cure irreversible types of dementia, only help manage symptoms
- Potential improvements: modest cognitive changes, subtle behaviour changes
- Potential Side effects:
  - Cholinesterase Inhibitors → GI symptoms, loss of appetite/weight loss, slow heart rate, dizziness, falls, headaches, nightmares/sleep disturbance
  - NMDA → Sedation, muscle cramps, headaches, fatigue, insomnia

## Cholinesterase Inhibitor

- Prevent breakdown of brain chemical acetylcholine (important for learning and memory)
- Treat all types of dementia, except frontotemporal and vascular, most effective in mild to moderate stages
- Drugs: Aricept – Donepezil, Reminyl ER – Glantamine, Exelon – Rivastigmine

## N-methyl-D-aspartate (NMDA) Receptor Antagonist

- Blocks the effects of too much glutamate which is a brain chemical that is released in excessive amounts when brain cells are damaged
- most effective in middle to late stages.
- Sometimes given in combination with cholinesterase inhibitors
- Drug: Ebixa – Memantine



# MEDICATION RECENTLY APPROVED IN CANADA: AMYLOID TARGETING THERAPIES



Tx for early Alzheimer's disease that targets and removes beta-amyloid from the brain



Monoclonal antibodies attach to beta-amyloid, marking it for removal by the immune system



Targeted action that slows disease progression and cognitive decline



IV drug therapy q2 weeks for lecanemab, and q4 weeks for donanemab

Andrew Frank, Chris Frank and Frank Molnar

Canadian Family Physician September 2024; 70 (9) 537-538; DOI: <https://doi.org/10.46747/cfp.7009537>



# IMPORTANCE OF DIAGNOSES

- Under Recognized
  - Misdiagnosis ranges from 25-90%
  - Often undetected until moderate to severe stage
- Client Rights
  - Dementia Bill of rights (Bell & Troxel 2013)
  - Canadian Charter of Rights for People with Dementia (2018)
- Inclusive of client and care giver
  - Shared decision making
  - Person-centred and goal oriented

## Social Benefits

Right/need to know

Social/financial planning

Client and care giver education

Safety

Advanced directives planning

Prevent care giver burn-out

## Medical Benefits

Identify those at risk

Option to participate in clinical trials

Address reversible causes

Manage risk factors

Treat other diseases

Initiate treatment

Compliance strategies

Crisis avoidance