





# ***Mobility Workshop***

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Dr. Karenn Chan  
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# PRESENTER DISCLOSURE

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- **Presenters:** Jennifer Russill and Dr. Karenn Chan

- **Relationships with commercial interests:**

- **Grants/Research Support:** None
- **Speakers Bureau/Honoraria:** none
- **Consulting Fees:** None
- **Other:**

**Jennifer-** Employee of Alberta Health Services

**Karenn-** Employee of University of Alberta

## DISCLOSURE OF COMMERCIAL SUPPORT

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- **This program has received financial support from Alberta Health in the form of a grant.**
- **This program has received in-kind support from Alberta Health Services, Alzheimer's Society of Alberta and Northwest Territories, University of Alberta in the form of human resource capacity.**
- **Potential for conflict(s) of interest:**
  - No conflicts of interest



## MITIGATING POTENTIAL BIAS

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- The content of the presentations were reviewed by a subset of the organizing committee to mitigate any potential bias.







# Objectives

What are you going to learn?



# OBJECTIVES

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- Learn about assessment for mobility in the elderly
- Learn about effective interventions for mobility and falls prevention
- Learn about driving assessment in the context of dementia.







# **Factors Affecting Mobility**

**Physical**

**Psychological**

**Environment**

# TYPICAL MOBILITY ASSESSMENT

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- History
- Physical Exam
- Musculoskeletal Assessment
- Neurological Deficits
- Functional Assessment



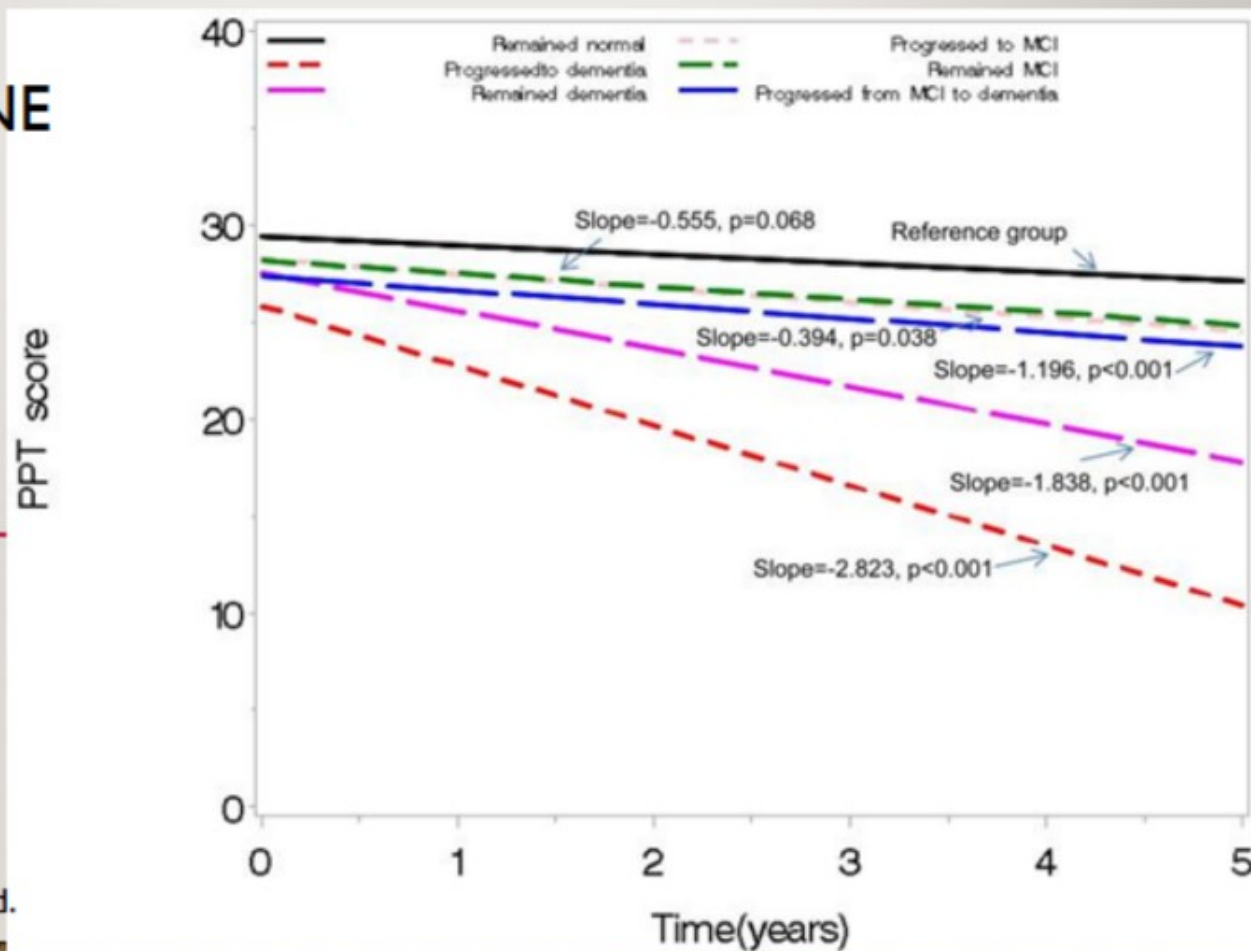
# HISTORY

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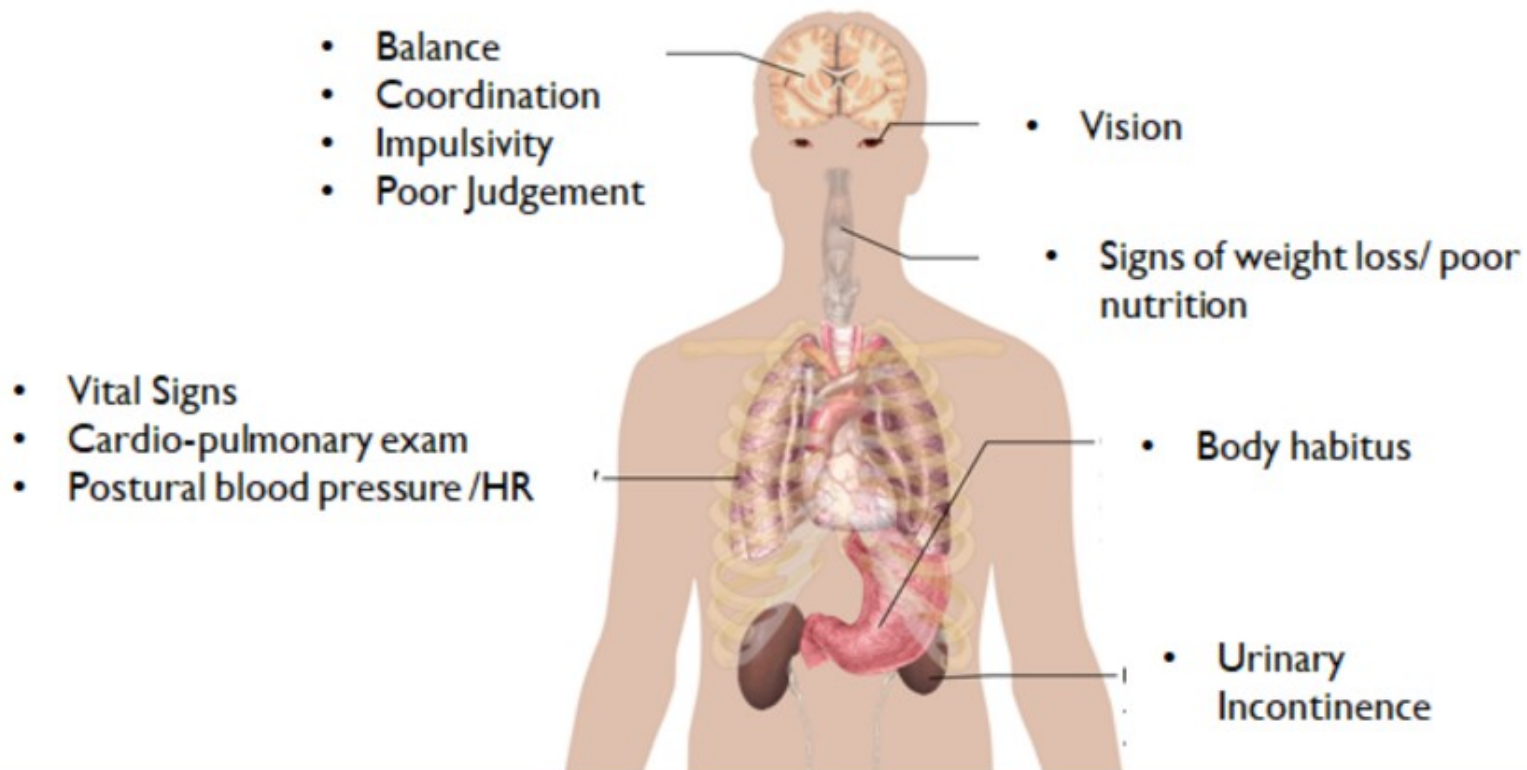
- Usual activity level and recent changes
- Time period of changes
- Relevant medical conditions
- Pain
- Medications
- Falls
- Psychological factors

# Physical Factors affecting mobility

# NATURAL DECLINE OF MOBILITY IN DEMENTIA



Tolea et al. 2016. AlzDisAssocDisord.







- Pain
- Swelling/Edema
- Peripheral Neuropathy
- Skin/ Nails
- MSK- strength, joint deformities, ROM
- Gait Abnormalities

# Psychological Factors Affecting Mobility

# PSYCHOLOGICAL FACTORS

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- Fear
- Depression
- Motivation, Apathy
- Insight
- Beliefs about “exercise”

# Environmental Factors



# ENVIRONMENTAL CONSIDERATIONS

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## Equipment

- Bathroom: raised toilet seat, toilet arm rest, wall grab bar, clamp-on grab bar, Superpole, tub lift
- Bedroom: bed rail, Superpole
- Other living areas: Superpole
- Walking aids: 2-wheeled walker, 4-wheeled walker, walker/wheelchair, cane
- Non-ambulatory: wheelchair, scooter

# EQUIPMENT RESOURCES

## Loan

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- Lending Cupboard
- Canadian Red Cross Health Equipment Loan Program (HELP)
- AHS Health Equipment Loan (rural centres)

## Permanent

- Alberta Aids to Daily Living (AADL)
- Residential Access Modification Program (RAMP)
- Veterans Affairs Canada
- Non-Insured Health Benefits – First Nations and Inuit coverage
- Home Adaptations for Seniors' Independence
- Seniors Home and Adaptation and Repair Program (SHARP)

# ENVIRONMENTAL CONSIDERATIONS

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## Home barriers

- Stairs
- Hallways
- Bathrooms
- Clutter
- Pets

# ENVIRONMENTAL CONSIDERATIONS

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## Factors influencing community mobility

- Weather conditions
- Endurance
- Self-imposed limitations
- Supports – during the trip and once they arrive



# ENVIRONMENTAL CONSIDERATIONS

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- Transportation options
  - Driving
  - Public transit
  - Taxis
  - Private transportation
- Independence with car transfers





# **How to Assess Mobility In the Office**

# FUNCTIONAL ASSESSMENT

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- Lying <-> sitting
- Sitting <-> standing
- Transfers
- Walking
- Romberg test
- Turning 360°
- Walk and turn head
- Pick up object from the ground
- Reach for object above

# TIMED UP AND GO (TUG)

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- Patient sits in an armchair
- Stand up, walk 3m (10 feet)
- Turn around, return to chair and sit
- Usual walking aid is permitted
- Start timing when standing is initiated
- Stop timing when sits in chair

## Scoring

≥12 seconds = increased risk of falls



# GAIT SPEED

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- In older adults, gait speed is a powerful predictor of
  - Survival, Disability
  - Hospitalization, Institutionalization
  - Dementia
  - Falls
- Self-selected walking speed is the most energy-efficient and minimizes the metabolic cost
- Ability to increase walking speed is a sign of functional reserve and indicates the patient can meet changing demands of an activity

Fritz 2009



## HOW TO MEASURE- GAIT SPEED

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- If space is limited, can complete gait speed over a 6-metre distance
- Time the central 4m with 1m acceleration and deceleration on either end
- Calculate gait speed

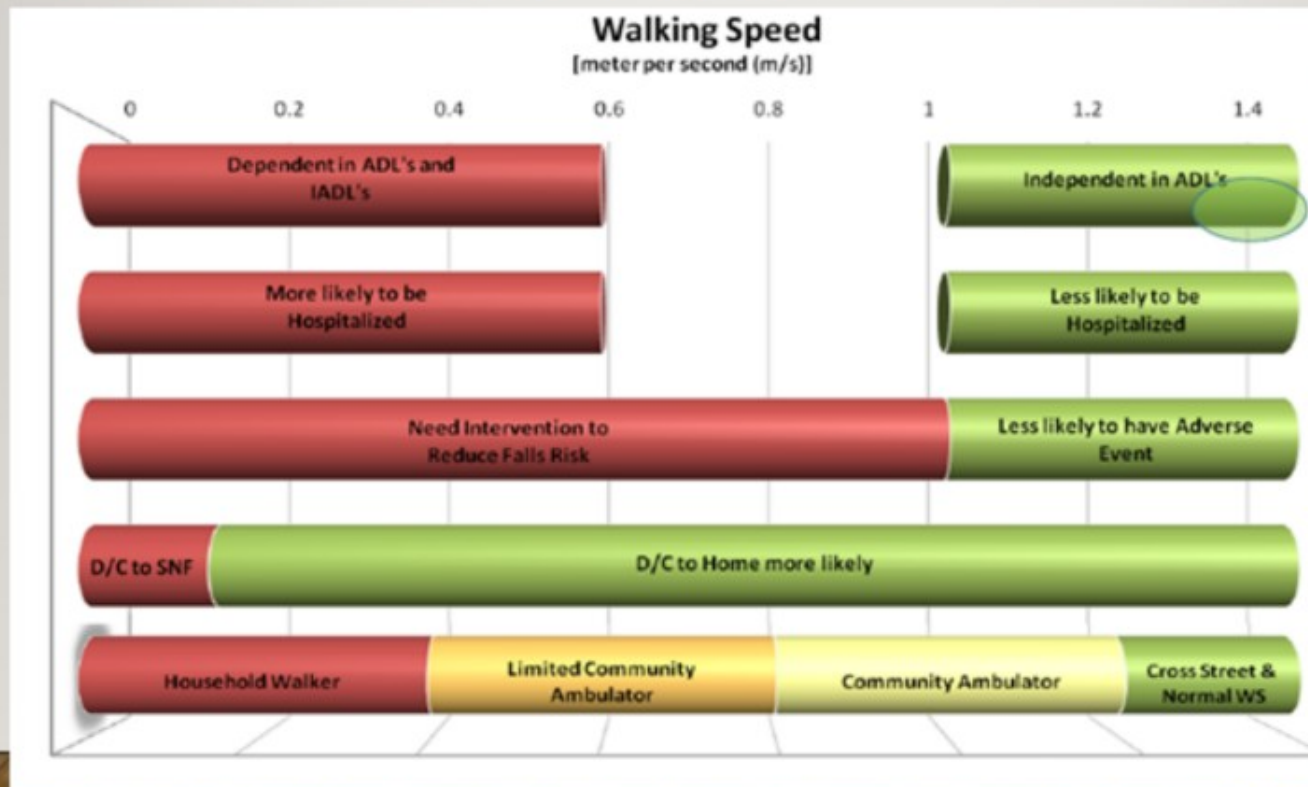
$$\frac{4\text{m}}{\text{time (sec)}} = \text{gait speed in m/sec}$$

# CUT POINTS: ADVERSE OUTCOMES FOR AGING ADULTS



Abellan Van Kan 2009

# GAIT SPEED IS PREDICTIVE OF OUTCOMES



Fritz and Lusardi 2009

# COMMUNITY MOBILITY

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- Community ambulation: “independent mobility outside the home”
- Minimum gait speed is 0.4 m/sec, Ideal is 0.8 – 1.2 m/sec
- Critical gait Speed to cross 2 lanes of traffic (8m) = 1.14 m/s
- Critical gait speed to cross 4 lanes (16m) = 1.33 m/s
- Distances can vary from 50 - 675m one-way Williams Andrews

2010

# WHEN TO REFER TO OTHER DISCIPLINES?

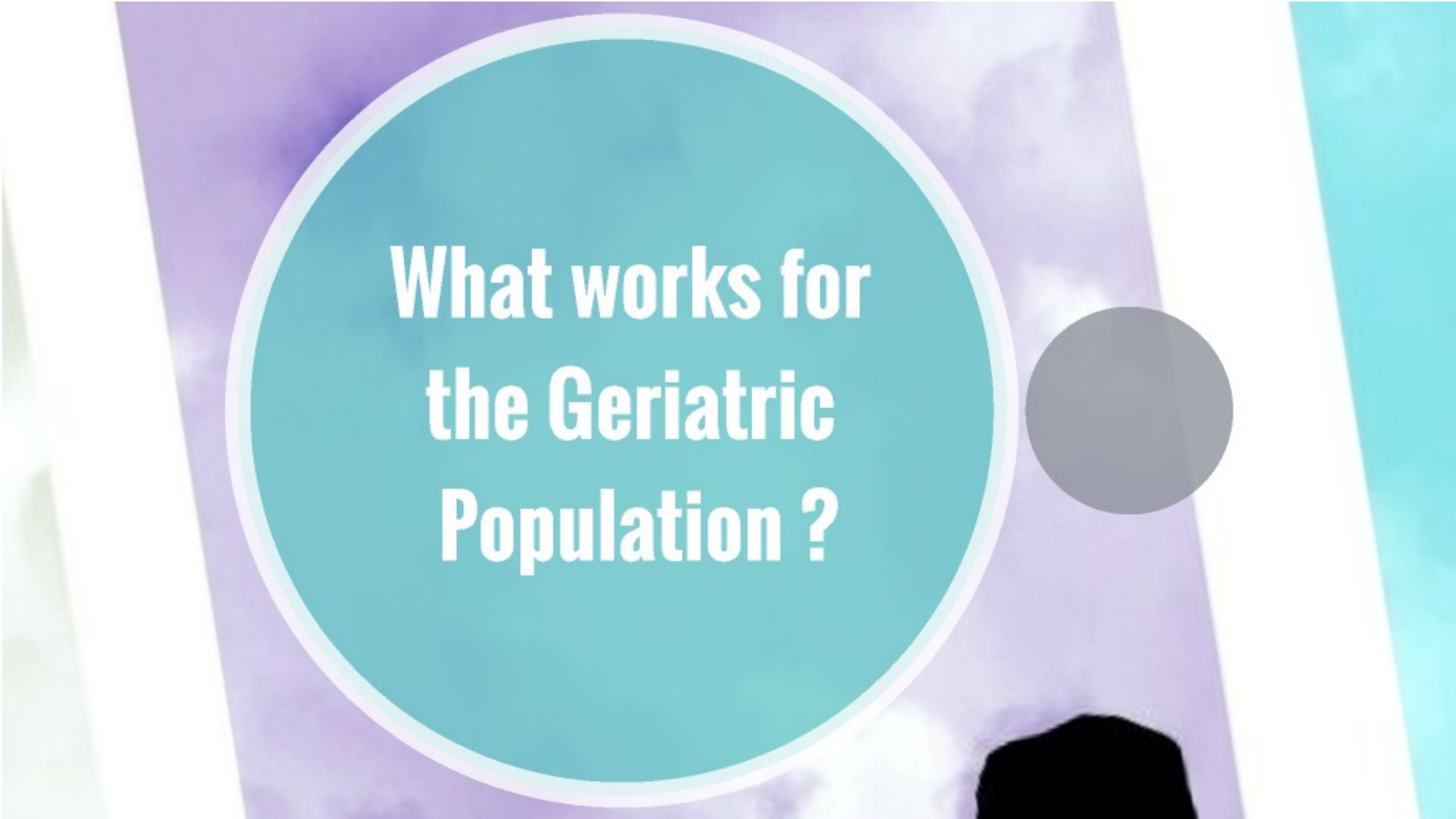
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- Balance abnormalities
- Neurological concerns
- Musculoskeletal weakness
- Joint range of motion limitations
- Coordination, sensation, perception deficits
- Change from baseline function
- Falls
- Unmanaged pain
- Need for assistive devices

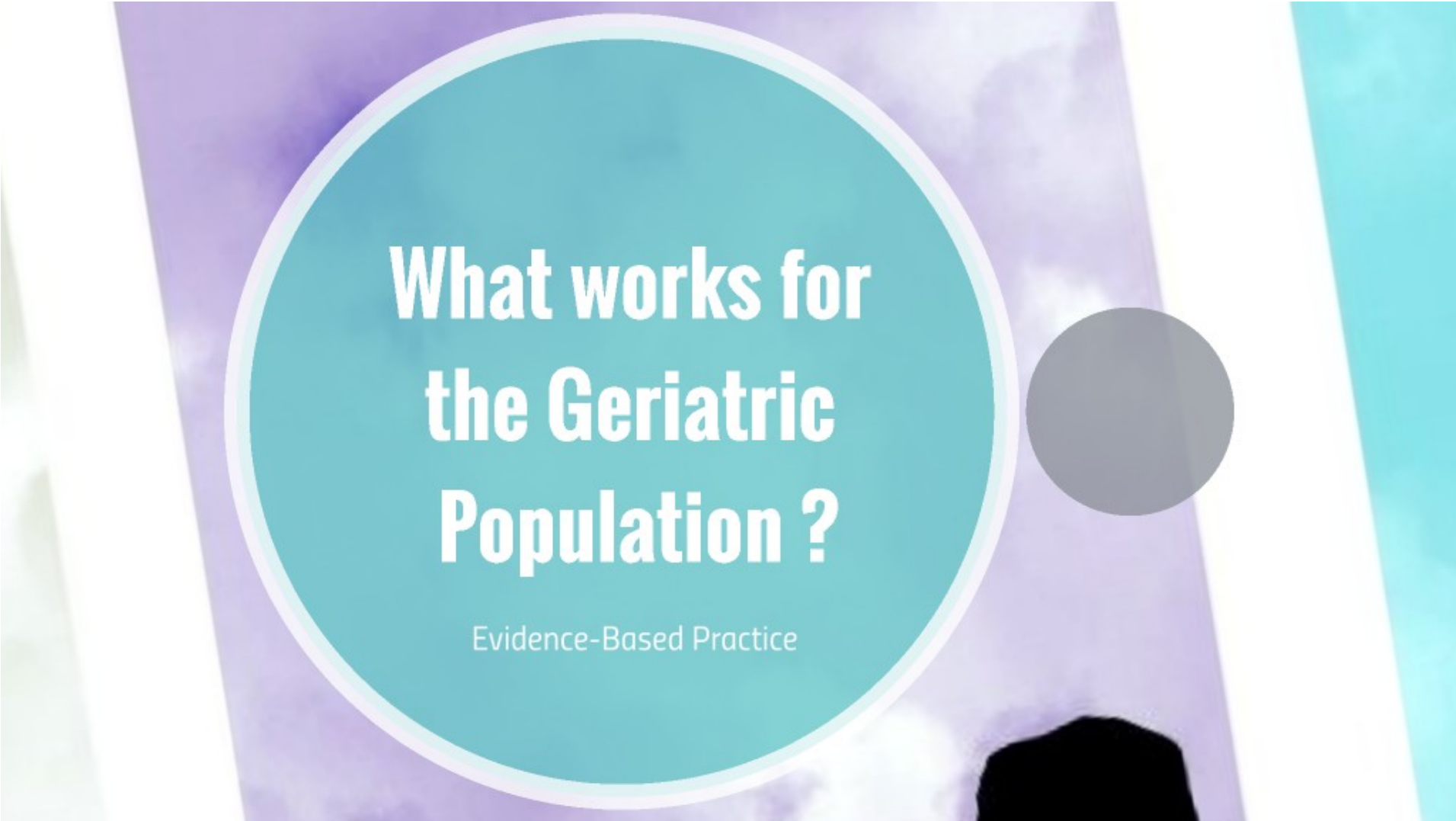








# **What works for the Geriatric Population ?**



# **What works for the Geriatric Population ?**

Evidence-Based Practice

# PRINCIPLES OF REHABILITATION

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- Set SMART, patient-centred goals
  - **Specific, Measurable, Attainable, Realistic/Relevant, Time-based/Trackable**
- Treat primary disabilities and optimize treatment of underlying conditions
- Prevent secondary disabilities and complications of decreased mobility
- Emphasize functional improvements
- Optimize the environment
- Team collaboration

# MEDICAL CLEARANCE FOR EXERCISE

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- CSEP endorsed: General Activity Questionnaire (GAQ—replaces PARQ and PARQ+)  
[http://www.csep.ca/CMFiles/publications/GAQ\\_CSEPPATHReadinessForm\\_2pages.pdf](http://www.csep.ca/CMFiles/publications/GAQ_CSEPPATHReadinessForm_2pages.pdf)
- GAQ Reference Document  
[http://www.csep.ca/CMFiles/publications/GAQ\\_ReferenceDoc\\_2pages.pdf](http://www.csep.ca/CMFiles/publications/GAQ_ReferenceDoc_2pages.pdf)
- Others: PARQ+ and ParMedX [http://eparmedx.com/?page\\_id=79](http://eparmedx.com/?page_id=79)
- Postural blood pressure

# TYPES OF EXERCISE PROGRAMS

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- Balance
  - Otago
  - Fallproof
  - Tai Chi
- Strengthening
  - Body weight
  - Resistance bands/tubing
  - Weights
- Aerobic/Endurance
- Flexibility
- Interval training
- Multi-component



# OTAGO EXERCISE PROGRAM

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- A set of lower extremity strengthening and balance exercises designed to prevent falls
- Individually prescribed and delivered at home
- Twice weekly exercises plus walking program
- Four levels of progression
- 35% reduction in the number of falls and the number of injuries from falls, particularly in those over age 80 who have fallen in the past year

Robertson 2002



# FALLPROOF

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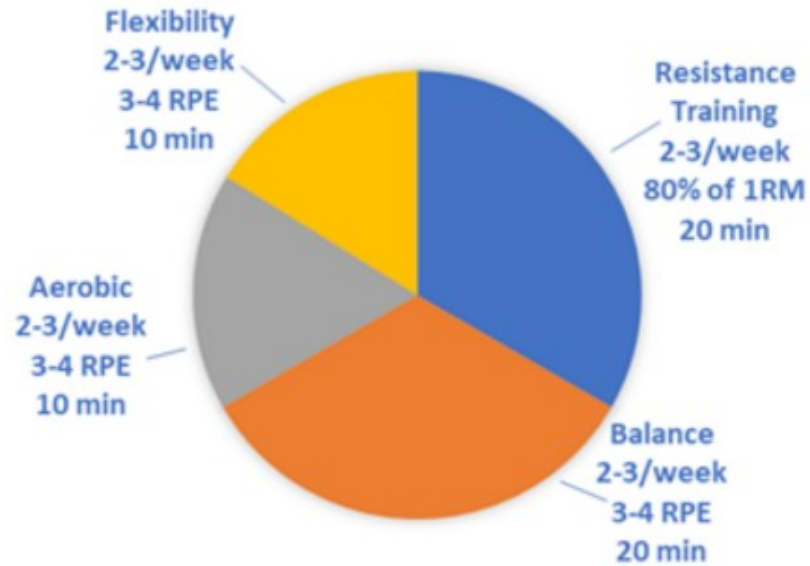
- For older adult with a moderate risk of falls
- Integrates balance, strength, flexibility, and endurance exercises using multiple systems
- Demands of the task are gradually increased to challenge but not exceed the limits of the participant
- 60 minute classes, twice weekly for 24 weeks
- Delivered by a certified instructor in a group setting (about 12 participants) with individualization
- Has been proven to significantly improve sensory integration and reception, balance, lower body strength, functional mobility, and balance-related self-confidence

Trueblood 2007

# EXERCISE PRESCRIPTION

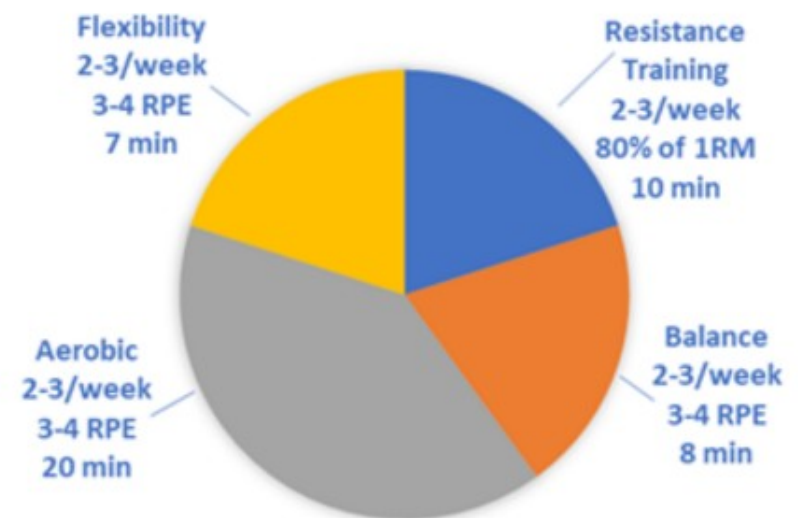
## PRE-FRAIL

TOTAL ACCUMULATED TIME 60 MIN/SESSION



## FRAIL

TOTAL ACCUMULATED TIME 45 MIN/SESSION



## WHAT THE RESEARCH SAYS

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- Minimum of 50 hours to positively influence falls risk
- Individualized multi-component plans seem to be most successful in improving function (aerobic, resistance, balance, and flexibility)
- Resistance exercise can increase muscle strength and mass even in the very aged
- Walking programs can be an adequate form of aerobic exercise for patients with dementia
- The ideal opportunity for improvement is in pre-frail or mildly frail patients

Sherrington 2016

# WHERE EXERCISE PROGRAMS ARE DELIVERED

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## Community Programs

- Senior Centre
- Recreation/Leisure Centres
- Facility Living
- Adult Day Programs

## Individualized Programs

- Physiotherapist
- Kinesiologist
- Multidisciplinary Clinics
- Home Care



# CONSIDERATIONS FOR PATIENTS WITH DEMENTIA

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- Consider one-on-one assistance
- Groups may not be viable
- May be able to teach a family member or friend to assist
- If following instructions is difficult, focus on functional movements
- Exercise and walking programs can be a good outlet for excess energy

## POOR REHABILITATION POTENTIAL

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- Unable to follow one-step command
- Patients for whom improved mobility increases risks of wandering or falls
- Frequent falls or high falls risk related to non-modifiable causes
- Uncontrolled pain
- Unmanaged behaviours
- End-stage dementia with inability to complete BADLs





A graphic featuring a large pink circle with a white border in the center. Inside the circle, the words "Falls Prevention" are written in white, bold, sans-serif font. The background is split vertically: the left side is a purple sky with white clouds, and the right side is a blue sky with white clouds. In the foreground, there are black silhouettes of two people. The person on the right is wearing a grey cap.

# Falls Prevention

# FALLS

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- Falls account for **85%** of all injury-related hospitalizations among Canadian seniors<sub>1</sub>
- Seniors with dementia experience falls at nearly double the rate as seniors without dementia (11.6 vs 5.9 per 100 person years)<sub>2</sub>
- For seniors not living in long-term care facilities, females are **3.9** times more likely to fall than males<sub>2</sub>
- Mortality for males is about double the rate for females<sub>2</sub>
- The rate at which Alberta seniors die from falling more than doubled in the period 2000-2013<sub>2</sub>

1. Public Health Agency of Canada report, 2011

2. Health Trends Alberta reports, January and September 2015

# FALLS AND DEMENTIA

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- Dementia increases the risk of falling by impairing judgment, visual perception, mobility, and recognition and avoidance of hazards
- Patients may forget their usual mobility devices or how to use them safely (e.g. walker or wheelchair brakes)
- Motor planning deficits can increase as dementia progresses
- Impaired decision-making and insight may increase risky behaviour

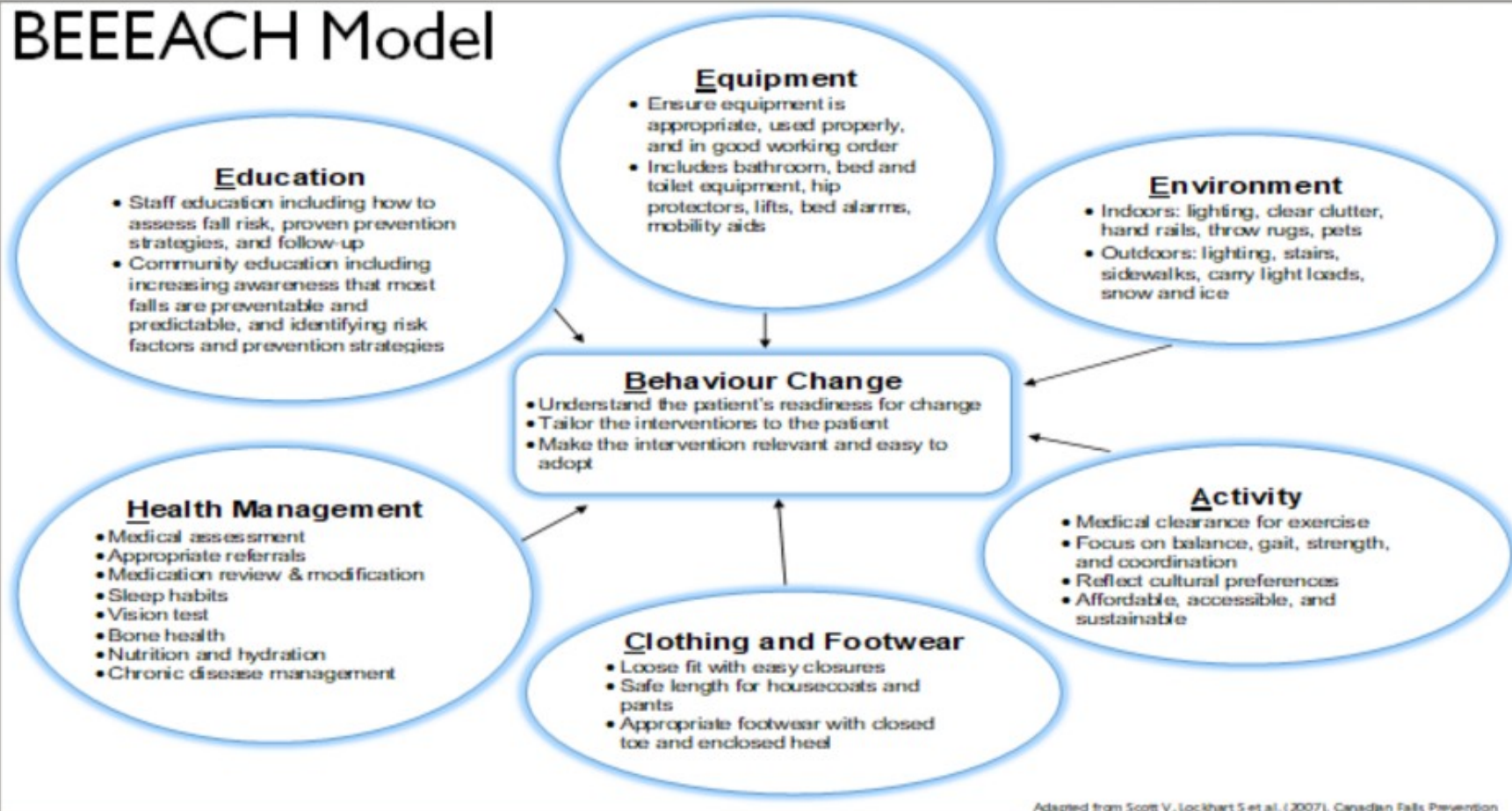


# EFFECTIVE STRATEGIES FOR FALLS PREVENTION

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# BEEEEACH Model



Adapted from Scott V, Lockhart S et al. (2007). Canadian Falls Prevention Curriculum. Vancouver, BC: BC Injury Research & Prevention Unit.





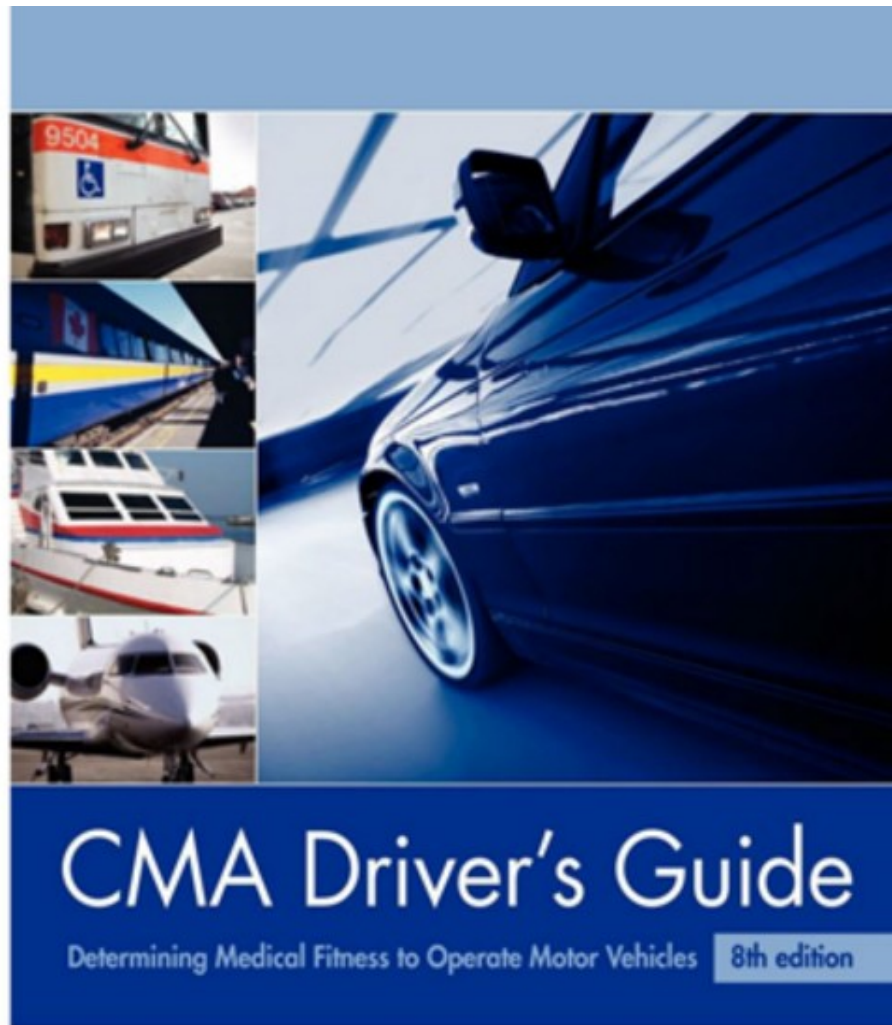
# **Driving Assessment and Dementia**

## DEMENTIA AND DRIVING FACTS

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- 30% of people drive when given diagnosis of dementia
- On average an Alzheimer's patient will drive 3 years after diagnosis
- Physician reporting of a potentially unfit driver is mandatory in most provinces
  - except AB, NB, and QC (discretionary)







## CMA GUIDELINES

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- Patients with mild dementia should be reassessed for driving every 6-12 months
- Recommended that more than one cognitive screening tool be used
- Cognitive screening alone cannot determine driving fitness
- There is insufficient evidence to support making licensing decisions based on computerized testing

## CMA POSITION STATEMENT

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- Moderate to severe dementia is a **contraindication** to driving.
- Moderate dementia defined as inability to perform
  - >= **2 IADLS** (medication, banking, shopping, telephone or cooking) , OR
  - >= **1 BADL** (eating, dressing, bathing, toileting, transfers)

## 4 QUESTIONS TO ASK YOURSELF (CMA)

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- 1. Given the results of your assessment, would you get in the car with the patient driving?
- 2. Given the results of your assessment, would you let a family member get in a car with the patient driving?
- 3. Given the results of your assessment, would you want to be crossing a street in front of a car with the patient driving?
- 4. Given the results of your assessment, would you want to have a loved one to be crossing a street in front of a car with the patient driving?

# AN APPROACH TO ASSESSING FITNESS TO DRIVE

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# 10 MINUTE OFFICE BASED DEMENTIA AND DRIVING CHECKLIST

(Based on Clinical Opinion and Experience not Evidence. Development lead by and copyright held by Dr. W. Dalsatz).

The checklist can take 10 minutes or less to complete as it is not necessary to complete all 10 items if it is obvious the patient is unsafe to drive based on early items.

## PROBLEM

- ☐ 1. **Dementia Type**  
Generally Lewy body dementia (fluctuations, hallucinations, visuospatial problems) and Frontotemporal dementia (if associated behaviour or judgment issues) are usual.
- ☐ 2. **FUNCTIONAL IMPACT of the Dementia** - According to CHA guidelines Usually if:  
- impairment of more than 1 instrumental ADLs due to cognition  
(GAF 40 + SHAFT: Shopping, Housework/Hobbies, Accounting, Food, Telephone / Tools)  
- OR impairment of 1 or more Personal ADLs due to cognition (FADDS - DRAFT: Dressing, Eating, Ambulation, Grooming, Hygiene)
- ☐ 3. **Family Consensus** (ask in a room separate from the patient)  
Family feels safe/unsafe (ask: safe family has recently been in the car with the person driving)  
\* The grand daughter question - "Would you feel it was safe if a 3 year old grand daughter was in the car alone with the person driving (often different response from family's answer to previous question)  
Generally if the family feels the person is unsafe they are unsafe. If the family feels the person is safe, the person may still be unsafe as family may be unaware or may be protecting patient.
- ☐ 4. **Visuospatial** (drawing a person/desk/drawing numbers)  
If major abnormalities - likely unsafe
- ☐ 5. **Physical inability to operate a car** (often a "physical" reason is better accepted)  
Medical/Physical concerns such as musculoskeletal problems, weakness/multiple medical conditions (neck pain, problems in the use of steering wheel/pedals), cardiac/neurologic (epilepsy "spells")
- ☐ 6. **Vision/Visual Field**  
Significant problems including visual acuity, field of vision.
- ☐ 7. **Drugs** (if associated with side effects: drowsiness, slow reaction time, lack of focus)  
Alcohol/Barbiturates/Narcotics/Neuroleptics/Sedatives  
Anticholinergics-antiparkinsonian/muscle relaxants/psychic/antihistamines/OTC/antimetabolites/antipsychotics/antiparasitics/antipneumonia/antibiotics

## PROBLEM

- ☐ 8. **Trailmaking A/B** (available at [www.aggnet.com](http://www.aggnet.com))  
Trailmaking A - Usually < 2 minutes or 2 or more errors  
Trailmaking B - Usually < 2 minutes and < 2 errors (0 or 1 error)  
Usually < 3-5 minutes or 2 errors (consider qualitative dynamic information regarding ICDW the test was performed: drowsiness/attention/accuracy or panic attacks/impulsivity or perseverative behaviour (lack of focus/multiple corrections/forgetting instructions/inability to understand test etc.)  
Usually < 5 minutes or 3 or more errors
- ☐ 9. **Ruler Drop Reaction Time test** (Accident Analysis & Prevention 2007)  
FNCU: 100% = 100/10. The bottom end of a 12" ruler is placed between thumb and index finger (1/2" apart) let go and person tries to catch ruler  
(normal = 6-8"/abnormal = 2 failed trials)
- ☐ 10. **Judgment/Insight** (Ask the patient)  
What would you do if you were driving and saw a ball roll out on the street ahead of you?  
With your diagnosis of Dementia, do you think at some time you will need to stop driving?

## CONCLUSION:

Safe Unsafe Unsure

Report to Provincial Register

Report to Provincial Register

Report to Provincial Register

Report to Provincial Register

Report to Provincial Register

Report to Provincial Register

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<http://www.rgpeo.com/en/health-care-practitioners/resources/driving.aspx>



## PROBLEM



1. **Dementia Type:**  
Generally Lewy Body dementia (fluctuations, hallucinations, visuospatial problems) and Frontotemporal dementias (if associated behaviour or judgment issues) are unsafe.



2. **FUNCTIONAL IMPACT of the Dementia** - According to *CMA guidelines* **Unsafe** if:  
- impairment of more than 1 Instrumental ADLs due to cognition  
(IADLs = SHAFT: Shopping, Housework/Hobbies, Accounting, Food, Telephone / Tools)  
- OR impairment of 1 or more Personal ADLs due to cognition (PADLS = DEATH: Dressing, Eating, Ambulation, Transfers, Hygiene)



3. **Family Concerns:** (ask in a room separate from the person)  
Family feels safe/unsafe (make sure family has recently been in the car with the person driving)  
\* The grand daughter question - Would you feel it was safe if a 5 year old grand daughter was in the car alone with the person driving (often different response from family's answer to previous question)  
Generally if the family feels the person is unsafe they are unsafe. If the family feels the person is safe, the person may still be unsafe as family may be unaware or may be protecting patient.



4. **Visuospatial:** (intersecting pentagons/clock drawing numbers)  
If major abnormalities – likely unsafe



5. Physical inability to operate a car (often a “physical” reason is better accepted):  
Medical/Physical concerns such as musculoskeletal problems, weakness/multiple medical conditions (neck turn, problems in the use of steering wheel/pedals), cardiac/neurologic (episodic “spells”)



6. Vision/Visual Fields:  
Significant problems including visual acuity, field of vision.



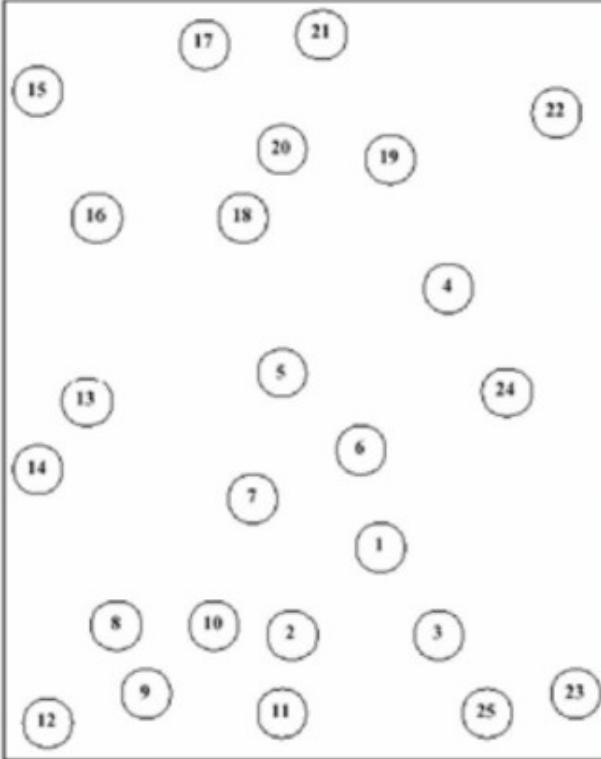
7. Drugs: (if associated with side effects: drowsiness, slow reaction time, lack of focus)  
Alcohol/Benzodiazepines/Narcotics/Neuroleptics/Sedatives  
Anticholinergic–antiparkinsonian/muscle/relaxants/tricyclics/antihistamine(OTC)/antiemetics/antipruritics/antispasmodics/  
others

## PROBLEM

- ☐ 8. Trailmaking A&B: (available at [www.rgpeo.com](http://www.rgpeo.com) )  
Trailmaking A - Unsafe = > 2 minutes or 2 or more errors  
Trailmaking B - Safe = < 2 minutes and < 2 errors (0 or 1 error)  
Unsafe = 2-3 minutes or 2 errors: (consider qualitative dynamic information regarding HOW the test was performed: slowness/hesitation/anxiety or panic attacks/impulsive or perseverative behaviour /lack of focus/multiple corrections/forgetting instructions/inability to understand test etc.)  
Unsafe = > 3 minutes or 3 or more errors
- ☐ 9. Ruler Drop Reaction Time test (Accident Analysis & Prevention 2007; 39(5): 1056 – 1063): The bottom end of a 12" ruler is placed between thumb and index finger (1/2" apart) let go and person tries to catch ruler (normal = 6-9"/abnormal = 2 failed trials)
- ☐ 10. Judgment/Insight (Ask the person):  
What would you do if you were driving and saw a ball roll out on the street ahead of you?  
With your diagnosis of Dementia, do you think at some time you will need to stop driving?

COMPLETION TIME  
>2 MIN  
OR  
>=2 ERRORS SUGGEST  
UNSAFE DRIVER

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Trail Making Test Part A	
Patient's Name: _____	Date: _____
	

COMPLETION TIME  
>3 MINS  
OR  
>=3 ERRORS SUGGESTS  
UNSAFE DRIVER

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**Trail Making Test Part B**

Patient's Name: \_\_\_\_\_ Date: \_\_\_\_\_

The diagram shows a sequence of 12 numbered circles (1-12) and 12 lettered circles (A-L) arranged in a non-linear pattern. The sequence starts at 'Begin 1' and ends at 'End L'.

Sequence of circles: 1 (Begin), 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12 (End).

Lettered circles: A, B, C, D, E, F, G, H, I, J, K, L.



## Considerations in Fitness to Drive

- ☐ History of driving accidents or near-accidents\*
- ☐ Family member concerns\*
- ☐ Trails A & B – for ‘task switching’, visuospatial and executive function
- ☐ Clock draw – for visuospatial and executive function
- ☐ Pentagons/cube– for visuospatial function
- ☐ Cognitive test scores – maybe
- ☐ CMA guidelines – inability to independently perform  
2 instrumental ADLs or 1 basic ADL

\*ask patient and family member separately

*The Centre for Family Medicine FHT Memory Clinic*

<b>C</b>	<b>Cognition</b>	Dementia, delirium, depression, executive function, memory, judgment, psychomotor speed, attention, reaction time, and visuospatial function
<b>A</b>	<b>Acute or fluctuating illness</b>	Delirium, seizures, Parkinson disease, and syncope or presyncope (cardiac ischemia, arrhythmia, postural hypotension)
<b>N</b>	<b>Neuromusculo-skeletal disease or neurological effects</b>	Speed of movement, speed of mentation, level of consciousness, stroke, Parkinson disease, syncope, hypoglycemia, hyperglycemia, arthritis, cervical arthritis, and spinal stenosis
<b>D</b>	<b>Drugs</b>	Drugs that effect cognition or speed of mentation, such as benzodiazepines, narcotics, anticholinergic medications (e.g., tricyclic antidepressants, antipsychotics, oxybutynin, dimenhydrinate), and antihistamines
<b>R</b>	<b>Record</b>	Patient or family report of accidents or moving violations
<b>I</b>	<b>In-car experiences</b>	Patient or family descriptions of near accidents, unexplained damage to car, change in driving skills, loss of confidence or self-restriction, becoming lost while driving, others refusing to be driven by patient, need for assistance of a copilot (particularly concerning would be the need for cues to avoid dangerous situations that could result in a crash), and other drivers having to drive defensively to accommodate changes in the patient's driving skills
<b>V</b>	<b>Vision acuity</b>	Visual field defects, glare, contrast sensitivity, comfort driving at night
<b>E</b>	<b>Ethanol use</b>	Physician's opinion regarding whether ethanol use is excessive and whether alcohol is imbibed before driving

Canadian Medical Association. Determining fitness to operate motor vehicles:  
CMA Driver's Guide, 9th ed. Ottawa, 2017

POTENTIALLY UNSAFE DRIVER?

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# REPORTING CONCERNS ABOUT A DRIVER

- The report must include the following information:
- 

- Date of complaint
- Full name of unsafe driver
- Address of unsafe driver
- Unsafe driver's licence number, if known
- Birth date or approximate age of unsafe driver, if known
- Specific concerns about the driver describing why they are a safety risk
- Any known medical or physical conditions that may affect safe driving
- Name, signature and phone number of the complainant
- The complainant should indicate whether they wish the information submitted to be held in confidence

Alberta Transportation, Driver Fitness and Monitoring

Fax: 780-422-6612 E-mail: [Driver.Fitness@gov.ab.ca](mailto:Driver.Fitness@gov.ab.ca)

<https://www.transportation.alberta.ca/2561.htm>

## YOUR REPORTING IS CONFIDENTIAL

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- In accordance with Section 60.1 of the *Traffic Safety Act*, information received relating to unsafe drivers remains confidential and is not disclosed. As per Section 17 of the *Freedom of Information and Protection of Privacy Act*, the circumstances and/or actions surrounding the subject of your complaint will not be disclosed.







# *Questions?*

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## REFERENCES

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## QUESTIONS?

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- Special Thanks To:
  - Jonah Saringo
  - Lynsey Hermary



