

Targeted Screening for Dementia

Dementia may be the most important health problem for the baby-boomer generation and healthcare system. As new disease-modifying drugs become available in the next decade, it will be critical to have strategies and mechanisms in place to diagnose dementia at its earliest, even preclinical, stage. These strategies include public and professional awareness, reorganization of primary care to facilitate enhanced roles of nurses and nurse practitioners, and targeted screening of high-risk seniors.

By William B. Dalziel, MD, FRCPC

The Alzheimer Society of Canada recently released *Rising Tide: The Impact of Dementia on Canadian Society*, which states:

- there are currently 500,000 Canadians with dementia;
- one in 11 Canadians older than 65 years has dementia;
- 50,000 Canadians younger than 60 years have dementia;
- one in four Canadians has a family member with dementia;
- one in two Canadians knows someone with dementia;
- and there will be 250,000 new cases of dementia in Canada in the next five years.

Dementia Presentation

Based on practice size and percentage of elderly patients, the average family physician has approximately

40 to 50 patients with dementia, and can expect eight to 10 patients to develop the condition each year. Yet more than half of all cases may go undetected in the primary-care setting¹ where dementia presents in four main scenarios:

1. A family member brings the patient to see their family physician with concerns about the patient's memory (95% specific for dementia), but the physician rules out delirium, depression, drug side effects and other reversible causes. Unfortunately, the average delay from first symptom to dementia presentation is more than two years.
2. Delirium either uncovers pre-morbid mild dementia or has incomplete resolution, which occurs in approximately 1/3 of all cases leading to dementia.
3. A health professional notices early warning signs or red flags (Table 1).
4. A targeted screening of high-risk but asymptomatic persons results in dementia presentation.

Would you Screen this Patient for Cognitive Impairment or Dementia?

Mr. AD is an 80-year-old male who has been your patient for 23 years. He has recently been diagnosed as hypertensive and is in for a BP check, which is 165/80 mmHg despite treatment with diuretics. He has no memory complaints or family history of dementia. Would you, as the family physician, screen the patient for cognitive impairment or dementia? How? In many cases, the patient would not be screened.

Principles to Justify Screening

Screening for cognitive impairment is justified based on common principles:

1. Dementia is common, present in 8% of people older than 65 years, and found in 35% of people older than 85 years.
2. It is the third most expensive disease, costing \$10 billion annually, and is the number-one cause of long-term-care institutionalization.
3. The screening test should have reasonable sensitivity/specificity.

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Suggested screenings include the memory impairment screen (MIS); a Mini-Cog test which is a three-item recall and clock drawing; and the Montreal Cognitive Assessment Test (MOCA) or the General Practitioner Assessment of Cognition (GPCOG).

4. The screening test should be short and take no more than five minutes. To stay within this time frame, it is suggested to conduct the MIS, the Mini-cog or the GPCOG.
5. There are treatments available to improve clinical outcomes:
 - a. treatment of vascular risk factors;
 - b. cholinesterase inhibitors (donepezil, rivastigmine, galantamine), gamma aminobutyric acid antagonists (memantine); and
 - c. caregiver education and support.

The biggest barriers to screening are the time restrictions and the belief that early detection has no benefits. As healthcare moves from solo primary-care practitioners to groups or teams, often other professionals (*i.e.*, nurse practitioners and nurses) can be much more involved in screening and cognitive assessment, sparing the physician’s time. Table 2 presents benefits of early recognition of cognitive impairment and dementia.

Mild Cognitive Impairment vs. Dementia

Early cognitive impairment (if beyond normal aging changes) is generally mild cognitive impairment (MCI), prevalent in 10% to 15% peo-

Table 1
Early Warning Signs of Dementia

- Frequent hospitalizations or visits to emergency room
- Confusion, delirium, sickness, surgery
- Poor historian, vague, repetitive questions and stories
- Changes in mood, personality or behavior
- Decreased social interaction
- Subacute change in function, dwindles
- Poor understanding or compliance with instructions
- Poor medication compliance leading to poor disease control such as chronic heart failure (CHF) and chronic obstructive pulmonary disease (COPD)
- Driving: accident, problems, tickets, family concerns
- Neglect (appearance, home, nutrition)

Table 2
Benefits of Early Recognition of Cognitive Impairment/Dementia

Social	Medical
<ul style="list-style-type: none"> • Right/need to know • Social/financial planning • Safety: compliance, driving, cooking • Advance directives, planning • Improving caregivers well-being with education & support delays the AD patient’s nursing home placement by 1.5 years² 	<ul style="list-style-type: none"> • Treat reversible cause/components • Risk factor treatment (BP, lipids, DM, etc.) • Compliance strategies for cooking and medications instructions (improve the care of other chronic diseases: BP, DM, CHF, COPD, etc.) • Cholinesterase inhibitor (CI) or memantine treatment • Crisis avoidance and contingency

ple older than 65 years, or dementia, prevalent in eight percent of people older than 65 years.

MCI is a construct of preclinical dementia, and often represents cognitive impairment which does not cause functional impairment like dementia. Ten to 15% of patients with MCI progress to dementia per year, but over a 10-year follow-up, approximately 30% do not. In the next five to 10 years when, hopefully, we have disease-modifying agents for demen-

tia and MCI, it will be important to have primary-care screening mechanisms in place to better identify MCI and early dementia. The benefits of the early detection of MCI include regular monitoring to rule out progression to dementia, treatment of vascular risk factors, and reassurance to the patient that this is not yet Alzheimer’s disease (AD).

The MOCA, available at www.mocatest.org, is significantly superior to the Folstein Mini-Mental

Table 3

Memory Impairment Risk Calculator

Age(years)	Number of Vascular Risk Factors			
	0	1	2	3 or more
65-69	2%	4%	8%	16%
70-74	4%	8%	16%	32%
75-79	8%	16%	32%	50%+
80-84	16%	32%	50%+	50%+
85 and over	32%	50%+	50%+	50%+

How to Use the Risk Calculator

1. Circle your age range on the left side of the Memory Impairment Risk Calculator above.
2. Check all your vascular risk factors below. On the risk calculator above, circle the number of vascular risk factors. Your RISK SCORE for memory impairment appears where the Age row and Risk Factors column intersect.

Vascular Risk Factors (Check Off All that Apply)

<input type="checkbox"/> High blood pressure	<input type="checkbox"/> Stroke or TIA (transient ischemic attack)	} # of Risk Factors <input type="text"/>
<input type="checkbox"/> Diabetes	<input type="checkbox"/> Angina or heart attack	
<input type="checkbox"/> High cholesterol	<input type="checkbox"/> Peripheral vascular disease	
<input type="checkbox"/> Obesity	<input type="checkbox"/> Atrial fibrillation	
<input type="checkbox"/> Sedentary (no exercise)	<input type="checkbox"/> Currently smoking	

What Should you do with your Risk Score

This table calculates the potential risk for memory impairment. Scoring higher risk (16% or more) means it is worth doing a “Memory Quick Screen” (it does not mean dementia or AD is present). Scoring low risk (less than 16%) means low likelihood of important memory problems, but if you have noticed significant changes in memory or functional ability to do things, the Memory Quick Screen should be done.

Status Examination (MMSE) in detection of MCI and early dementia, and takes no more than 10 minutes.

Should the Elderly be Screened for Cognitive Impairment?

There appear to be clinical benefits if elderly patients are screened for cognitive impairment and dementia. Yet screening is still disputed. The Canadian Consensus Guidelines (1998) state there is no evidence for or against screening. The American Academy of Neurology Guidelines

suggest screening is justified only in a high-risk subpopulation. Personally, I support the concept of targeted screening only for patients who have a high-risk of dementia. As prevalence increases, true positives increase and false positives decrease. To establish a high-risk subgroup, physicians should use the “Rule of Two.”

The Rule of Two

The greatest risk factor for dementia is age. People older than 65 years

have a 2% chance of being affected by dementia, their risk doubling every five years.³ Furthermore, each first-degree relative with a history of dementia doubles the risk to the patient. Each vascular risk factor also doubles the risk.⁴⁻⁶

The Memory Impairment Risk Calculator, as seen in Table 3, was developed for a pharmacist screening project in Ottawa. The elderly person calculates their own risk and, if their test indicates high risk

Table 4

Dalziel's Non-validated Two-minute Targeted Screening Test

Test	Domain(s) Assessed	Failure	Odds Ratio ^{8,9}
1. Three-item recall	Registration, short-term memory	0 or 1/3	3.1
2. Four-legged animals in 1 minute	Executive function, language	< 15	20.2
3. Clock drawing	Visuospatial and memory (numbers), executive function (hands)	Abnormal*	24.0

* Mild irregularities in number placement do not count as a failure.

(> 15%), they can hand the test to the pharmacist who will then conduct a two-minute screening test. Results with suggestions for further assessment are sent to the family physician. Other scenarios with high prevalence of dementia in which to consider targeted screening include post-stroke, post-delirium, post-first onset depression after 65 years, and entry into a retirement home.

Tests Used for Targeted Screening of High-risk Individuals

Brody's clinical review⁷ concluded: "It is recommended that general practitioners consider using the GPCOG, Mini-Cog, or MIS when screening for cognitive impairment or case detection." These tests are short (< 5 minutes), easy to administer, have been validated in general practice samples, and have reasonable classification rates compared to the Folstein MMSE.

In my clinical practice and teaching, I have added animal fluency (four-legged animal naming in one minute) to the Mini-Cog. This has not been validated, but animal

fluency, a good test of executive function, has been separately validated with an odds ratio of 20.2 if less than 15 animals are named in one minute. Table 4 presents the two-minute targeted screening test.

There are always concerns about the consequences of a false positive screen. If a high-risk elderly person screens positive, the consequences are a collateral history

Mr. AD's Assessment and Follow-up

Let us now return to the hypothetical 80-year-old man in your practice previously mentioned. Due to advanced age and hypertension, Mr. AD's overall risk of cognitive impairment or dementia is 32%. His Memory Quick Screen was 1/3 recall, he named nine animals, and his clock drawing showed the

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from a family member or friend for ABC symptoms. The ABC checklist (Table 5) with a Memory Quick Screen for cognitive problems include activities of daily living (A), behavior changes (B) and cognitive changes (C). If there are no ABC changes or symptoms, it is a false positive, and the general practitioner should follow up in one year. If there have been changes, comprehensive cognitive assessment is indicated.

most common early abnormality (hands on the clock drawn to 10 & 11). His wife was invited to the next office visit to review ABC changes. She said: "Now that you mention it, he has been getting more forgetful, a little irritable and apathetic. He's making mistakes with finances and is having trouble using the computer." Of note, family may often dismiss such changes as normal aging or unimportant.

Table 5

ABC Checklist for Cognitive Problems (if Memory Quick Screen is Positive)

	OK	Problem(s) with:	
1. ADLs	<input type="checkbox"/>	<input type="checkbox"/> Shopping <input type="checkbox"/> Finances <input type="checkbox"/> Hygiene/grooming <input type="checkbox"/> Hobbies/leisure <input type="checkbox"/> ↓ or problems in dressing/bathing	<input type="checkbox"/> Housekeeping <input type="checkbox"/> Cooking <input type="checkbox"/> Tools/appliances <input type="checkbox"/> Transportation <input type="checkbox"/> Needs more help/guidance
2. Behavior	<input type="checkbox"/>	<input type="checkbox"/> Apathy/↓ initiative <input type="checkbox"/> Anxiety <input type="checkbox"/> ↓ alertness/"tuned out" <input type="checkbox"/> Poor judgement/self control <input type="checkbox"/> Aggression	<input type="checkbox"/> Depression/moody <input type="checkbox"/> Hallucinations <input type="checkbox"/> Hiding/hoarding <input type="checkbox"/> Emotions labile/inappropriate <input type="checkbox"/> Agitation/anger
3. Cognition	<input type="checkbox"/>	<input type="checkbox"/> Repetition (stories, questions) <input type="checkbox"/> Word finding <input type="checkbox"/> Medication compliance (dosette) <input type="checkbox"/> Misplacing things <input type="checkbox"/> Confused in unfamiliar circumstances	<input type="checkbox"/> Forgetfulness <input type="checkbox"/> Orientation/gets lost <input type="checkbox"/> Focus/following <input type="checkbox"/> Reading/TV <input type="checkbox"/> Fails to recognize family/friends

Other observations (including duration/progression of problems):

Form should be filled out by patient and family/caregiver.

Conclusions

Targeted screening for seniors who are at high risk for cognitive impairment can facilitate earlier recognition of dementia. Treatment options used earlier can lead to improved outcomes. These include the use of spe-

cific antidementia drugs, treatment of vascular risk factors, strategies to improve adherence in other chronic diseases and enhanced support and education for caregivers.

With the aging demographics and society of specialists in dementia, the

predicted 250,000 new cases in the next five years indicate that the primary-care system will need to take a larger role of the early identification, diagnosis and management in the more straightforward cases of persons with dementia.

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