

# Towards Consensus on Essential Components of Physical Examination in Primary Care-based Memory Clinics\*



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\*Previously presented as an abstract at the 35th Annual Scientific Meeting of the Canadian Geriatrics Society, Montreal, April 2015.

<https://doi.org/10.5770/cgj.21.296>

## ABSTRACT

### Background

Primary care-based memory clinics were established to meet the needs of persons with memory concerns. We aimed to identify: 1) physical examination maneuvers required to assess persons with possible dementia in specialist-supported primary care-based memory clinics, and 2) the best-suited clinicians to perform these maneuvers in this setting.

### Methods

We distributed in-person and online surveys of clinicians in a network of 67 primary care-based memory clinics in Ontario, Canada.

### Results

90 surveys were completed for an overall response rate of 66.7%. Assessments of vital signs, gait, and for features of Parkinsonism were identified as essential by most respondents. There was little consensus on which clinician should be responsible for specific physical examination maneuvers.

### Conclusions

While we identified specific physical examination maneuvers deemed by providers to be both necessary and feasible to

perform in the context of primary care-based memory clinics, further research is needed to clarify interprofessional roles related to the examination.

**Key words:** dementia, assessment, interprofessional, consensus, examination

### Introduction

The rising prevalence of Alzheimer's disease and related dementias (ADRD) is a major global health system challenge. <sup>(1)</sup> Enhancing health-care system capacity to provide effective early diagnostic and management services is essential to mitigate the impact of ADRD on patients, caregivers, and health-care systems. <sup>(2,3)</sup> In light of a shortage of geriatric specialists, primary care-based memory clinics (PCMCs) are being established across Canada and other jurisdictions to assess persons with cognitive concerns. <sup>(4-11)</sup> In Ontario, interdisciplinary assessments in PCMCs support ADRD management in primary care, while identifying and referring individuals who require specialist attention. Initial evaluations suggest that PCMCs can provide timely assessment, lead to a high degree of satisfaction among referring physicians, patients, and caregivers, and streamline access to a specialist. <sup>(9-11)</sup>

The management of patients with complex chronic conditions such as ADRD in primary care is facilitated by access to allied health professionals and specialist support, time-based physician remuneration, and care processes that provide sufficient time for patient assessment and care planning. <sup>(12,13)</sup>

Nevertheless, time, human resources, and remuneration limitations continue to impose important constraints on chronic disease management in primary care settings. In particular, the diagnosis of ADRD requires a potentially lengthy clinical assessment that includes a detailed history from patients and collateral sources, and psychometric testing.<sup>(14)</sup> Clinical practice guidelines also recommend that the assessment of a person with cognitive impairment include a physical examination to identify the presence of features specific to particular diagnoses or that might inform management decisions.<sup>(15,16)</sup> However, descriptions of what constitutes an appropriate physical examination vary widely, with guidelines ranging from vague (e.g., “look for any focal neurological signs”<sup>(17)</sup>), to detailed—and even exhaustive.<sup>(18)</sup> Furthermore, recent studies of telemedicine ADRD assessment raise questions about the value of the physical examination.<sup>(19,20)</sup>

In the resource-constrained primary care context, it is important to identify which, if any, physical examination maneuvers are required to inform the differential diagnosis or management decisions such as referral to a specialist for further assessment.<sup>(21)</sup> In the context of a larger study to obtain consensus among PCMC clinicians and specialists on a Quality Assurance framework for dementia care,<sup>(22)</sup> we sought to identify which physical examination maneuvers are essential to ADRD diagnosis and management. We also explored perceptions about which clinicians are best suited to perform specific components of the physical examination.

## METHODS

We searched PubMed, Web of Science, Scopus, JAMAevidence, ProQuest, and websites of non-profit and governmental organizations such as the Alzheimer Society of Canada and the National Institutes of Health, to identify literature relating to the physical examination of persons with cognitive impairment. Search terms included Dementia, Physical Examination, Neurological Examination, Diagnosis, Physical Assessment, Guidelines, and Review.

Based on this review, we designed a survey (please see Appendix 1) asking participants to rank physical and neurological examination components as essential (informs assessment and management), discretionary (potentially useful but not essential), or unnecessary to the diagnostic process. The survey also asked participants to identify which health-care providers involved with the PCMC (referring clinicians, PCMC physicians, and/or interprofessional health providers such as nurses and occupational therapists) should be most responsible for the execution of each examination component.

We distributed the survey to 112 family physicians (PCMC MDs) and 23 geriatricians supporting a network of 67 PCMCs in Ontario. Participants completed the survey either in-person during an annual Continuing Medical Education day for PCMCs<sup>(23)</sup> or online. We distributed a weblink to

the online survey via email to all PCMC team members and supporting specialists.

Respondent characteristics (years in practice, location of practice: urban, rural, rural and remote, mixed urban and rural) and open text comments, if any, were collected. We calculated the proportion of respondents who ranked each physical examination maneuver as “essential,” with emerging consensus recognized when  $\geq 60\%$  of rankings were “essential”. Chi-squared and Fisher’s exact tests were used to investigate differences between PCMC MD and specialist responses. We used  $p < .01$  as a stringent threshold for significance to reduce the risk of false positives created by multiple comparisons. We also determined the frequency with which each health-care provider (or providers) was identified as best suited to perform a specific maneuver. We used SAS software version 9.4 (Cary, NC, U.S.A.) for statistical analyses. Summative content analysis was used to analyze and present open text comments.<sup>(24)</sup> This study was approved by University of Waterloo Office of Research Ethics.

## RESULTS

### Literature Review

We identified numerous physical examination components relevant to assessments of persons with cognitive impairment which we categorized by system and summarized in Table 1 (please see Appendix 2 for complete reference list).

### Respondents

Of 135 surveys distributed, 90 were completed for an overall response rate of 66.7%. Response rates were greater among PCMC physicians (69.6%) than specialists (39.1%). Respondents had extensive clinical practice experience (Table 2); the majority were family physicians ( $n=78$ ), eight of whom had a Care of the Elderly certification from the College of Family Physicians of Canada; approximately half (53.3%) of the respondents practiced in urban settings.

### General Physical Examination

Consensus emerged on four general physical examination maneuvers deemed essential: orthostatic vitals (76%), assessment of hygiene (72%), pulse (70%), and assessment of nutritional status (66%) (Figure 1). Others were ranked as discretionary, with the exception of an abdominal examination, which most respondents considered unnecessary. There were no significant differences between PCMC MD and specialist rankings. Seventy-six percent of PCMC MDs and 89% of specialists suggested that interprofessional health providers be involved in assessing vital signs. Referring clinicians were considered best suited to perform the general physical examination, except for assessments of nutrition, bruising, and hygiene, for which PCMC MDs were considered most suited.

TABLE 1.  
Categories and components of the physical examination

	<i>Category</i>	<i>Components</i>
<i>General Physical Examination</i>	Vital signs	Heart rate, respiratory rate, orthostatic vitals
	Chest	Auscultation
	Cardiovascular	Jugular venous pressure, cardiac auscultation, edema
	Abdomen	Presence of masses or organomegaly, tenderness
	Other	Malnutrition, bruising, hygiene
<i>Neurological Examination</i>	Cranial nerves	Facial movement asymmetry, extraocular movements, pupillary response, optic discs
	Primitive reflexes	Frontal release signs
	Motor (pyramidal)	Weakness, spasticity, hyperreflexia, Babinski/extensor plantar responses
	Motor (extrapyramidal)	Tremor, cerebellar findings, rigidity/cogwheeling, facial masking, bradykinesia
	Sensory	Glove and stocking numbness, decreased distal proprioception, Romberg's test
	Gait	Any gait disturbance, spastic gait, Parkinsonian gait, turning proficiency

TABLE 2.  
Characteristics of respondents; N = 90

	<i>Role</i>		
	<i>PCMC MD</i> ( <i>n</i> =78)	<i>Supporting Specialist</i> ( <i>n</i> =9)	<i>Unspecified</i> ( <i>n</i> =3)
Mean Years in Clinical Practice	17.6±12.5	16.8±8.6	7.7±10.7
Practice Setting (%)			
Urban	48.7	88.9	66.7
Rural	29.2	11.1	0
Rural and remote	2.6	0	33.3
Mixed (rural and urban)	19.2	0	0
Lack of respondent response	0.3	0	0

## Neurological Examination

The majority of respondents ranked eight of 21 neurological examination components relating to features of Parkinsonism or gait as essential, but only those pertaining to gait assessment exceeded the threshold for consensus (Figure 2). Specialists were more likely to rate maneuvers to assess pyramidal function as essential, whereas PCMC MDs were more likely to rate these as discretionary. With the exception of gait assessment, respondent opinions were divided as to which health-care provider should perform specific assessments (Figure 3). Interprofessional health providers were most frequently identified as best suited to assess gait. On the other hand, cranial nerves, pyramidal, and sensory assessments were more likely to be designated to referring clinicians by PCMC MDs than by specialists, who considered these the purview of PCMC MDs. Respondents were more likely to identify PCMC MDs as most responsible for a primitive reflex and extrapyramidal assessment.

## Open-Text Comments

Twenty-eight participants provided additional comments relating to physical examinations. Thirteen of these comments related to barriers to conducting examinations, with eight citing lack of time to complete a physical examination as part of the memory clinic assessment. Furthermore, six participants desired better communication between PCMCs and referring clinicians, with many suggesting that a standard template be created to document examination findings. There were 10 comments surrounding the overall usefulness of physical examination, with only four endorsing them as important. Others considered most aspects of the examination outside of the scope of PCMC MDs, citing resource and time constraints as the main determinants.

## DISCUSSION

This survey of primary care and specialist physicians involved with PCMCs suggests that the most important physical

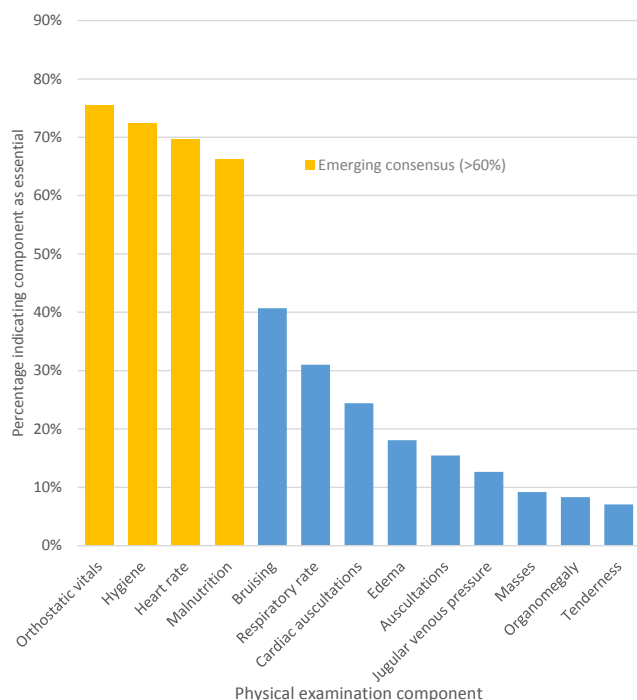
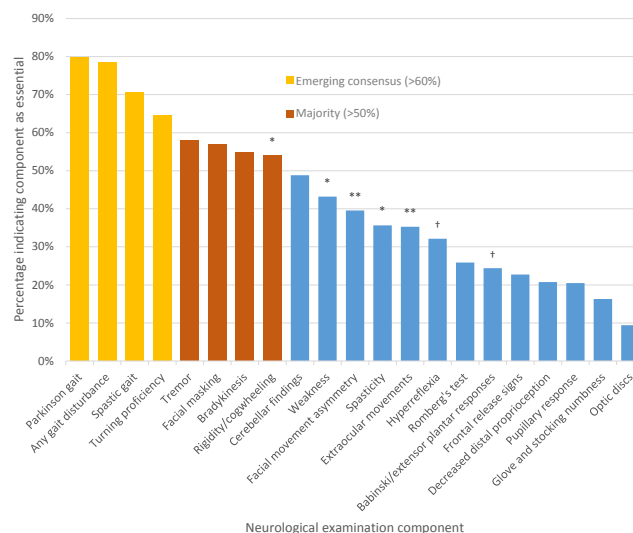


FIGURE 1. Percentage of respondents indicating each general physical examination component as “essential”; there were no significant differences between PCMC physicians and specialists’ responses

examination maneuvers in the evaluation of patients with cognitive impairment are the assessment of vital signs, gait, and examination for features of Parkinsonism. Specialists considered examination of the pyramidal system as essential, whereas PCMC MDs considered these discretionary. There was little consensus about which provider is best suited to perform specific maneuvers.

PCMCs can play an important role in the community care of persons with dementia, including streamlining access to specialists for patients requiring additional assessment for complex or unusual presentations. In the context of limited resources and complex care processes, physical examination maneuvers with little value to the assessment and management of persons with cognitive impairment should be discarded.<sup>(25)</sup> According to Bayes’ theorem, a clinically valuable maneuver must allow for meaningful revisions of initial probability estimates to inform management decisions, such as the referral to specialists of patients with unusual neurological features.<sup>(26)</sup>

PCMCs in Ontario aim to improve access to ADRD care in the most appropriate setting, such that most patients can receive timely diagnosis, management, and interprofessional team-based care within primary care, with the most complex cases, usually requiring a more detailed physical examination, referred to and assessed by specialists. Small case series of telemedicine ADRD assessments by specialist geriatricians reinforce the notion that the physical examination often contributes minimally to a diagnosis.<sup>(19)</sup> However, the deliberate performance of specific “high-yield” physical examination



\* Significant difference between PCMC physicians (PCMC MDs) and specialists’ responses,  $p < .01$ .

\*\* Significant difference between PCMC MDs and specialists’ responses,  $p < .001$ .

† Significant difference between PCMC MDs and specialists’ responses,  $p < .0001$ .

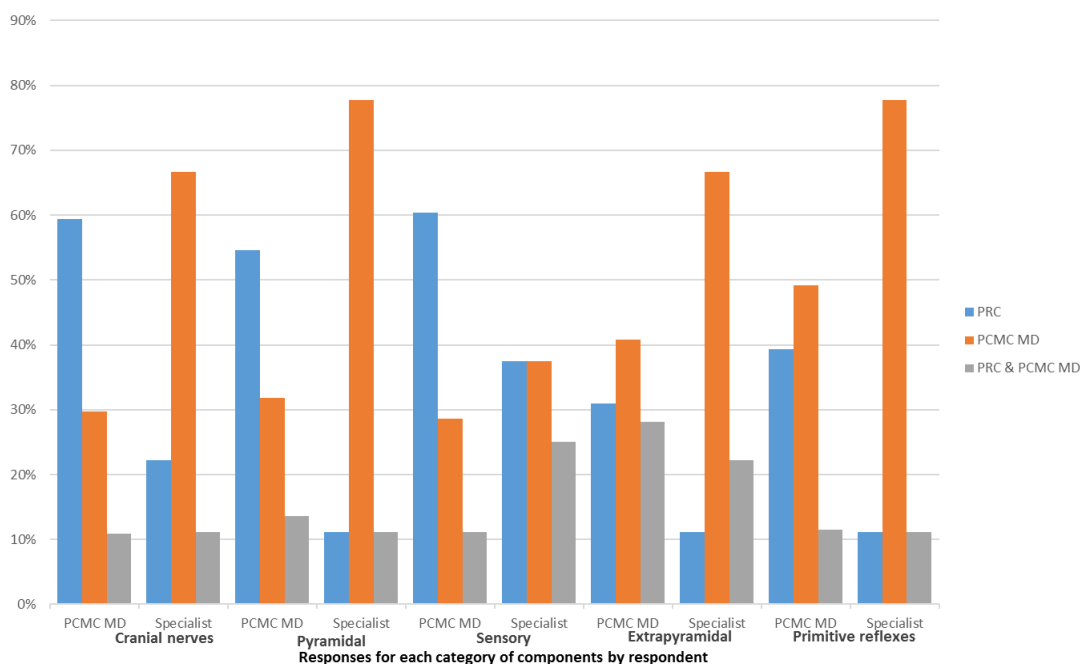
FIGURE 2. Percentage of respondents indicating each neurological examination component as essential

maneuvers has the potential to reduce the need for diagnostic tests and imaging.<sup>(26)</sup>

An important consideration is the erosion of clinical skills in physical<sup>(26)</sup> and neurological<sup>(27)</sup> examinations, which has been documented among physicians and other professionals<sup>(28)</sup> who may have limited confidence and ability to perform and interpret necessary examination maneuvers, and may thus not recognize their potential importance.<sup>(26,27,29)</sup> We have previously shown that close integration of specialists within PCMCs can serve as a means to increase capacity, and this could apply to training related to a standardized physical examination.<sup>(22,30)</sup> Furthermore, the lack of agreement among respondents regarding which providers are best suited for specific assessment components mirrors our previous results regarding the integration of PCMCs within the broader health system, and the related need for clarity on mutually understood roles among all clinicians across the system.<sup>(22)</sup>

### Limitations

Certain limitations of this work must be emphasized. There was a low response rate from specialists compared to PCMC MDs, so overall results are more reflective of PCMC MD perceptions. The exclusion of other health-care professionals precludes commenting on the applicability of findings to settings with access to other disciplines. In addition, our findings may not be applicable to other ADRD primary care models that do not triage the most complex patients to specialists, which is a



PRC = primary referring clinician to PCMC; PCMC MD = PCMC physician.

FIGURE 3. Designated providers by neurological examination component, as identified by survey respondents

standard feature of PCMCs in Ontario. Lastly, though a formal systematic literature review was not conducted to identify all possible physical examination components in the assessment of persons with suspected AD/DR, the review of published guidelines and compendiums likely identified examination maneuvers potentially most relevant to PCMC MDs.

## CONCLUSIONS

This study has found that most PCMC MDs and specialists consider that the assessment of gait, vital signs (including orthostatic vitals), and features of Parkinsonism is sufficient for most patients being assessed for possible AD/DR in the context of a PCMC. Disagreement existed between specialists and PCMC physicians regarding assessment of the pyramidal system. There was no consensus on which provider should be responsible for specific physical examination maneuvers. Optimal and efficient care of seniors with complex conditions requires greater system integration, and a shared and mutually agreed upon understanding among providers of tasks, roles, and accountability. Greater integration of PCMC clinics and specialists will not only facilitate capacity building, but also permit further research to elucidate the clinical utility of specific physical examination components in the assessment of persons with cognitive impairment.

## ACKNOWLEDGEMENTS

This study was supported by funding from the Alzheimer Society of Canada.

## CONFLICT OF INTEREST DISCLOSURES

VB receives salary support from CIHR, Conestoga College, and Schlegel Villages. DS served on an advisory board for Eli-Lilly in 2013. We have no other conflicts of interest to declare.

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## APPENDICES

## APPENDIX 1: Physical examination survey presented to participants

Please rate the extent to which you consider that each element of the physical examination is essential/important to the diagnostic process in primary care-based memory clinics, using the following scale: *Essential, Discretionary, Unnecessary*. In addition, please indicate who should be responsible for completing the element (PRC = primary referring clinician—family physician/nurse practitioner; MC MD = memory clinic physician; IHP = interprofessional health provider).

<i>Elements of the Physical Examination</i>		<i>Essential (Informs Diagnosis and Management)</i>	<i>Discretionary (Potentially Useful But Not Essential)</i>	<i>Unnecessary</i>	<i>Responsibility</i>
<i>General Physical Examination</i>					
Vital signs	• Heart rate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> PRC
	• Respiratory rate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> IHP
	• Orthostatic vitals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> MC MD
Chest	• Auscultation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> PRC <input type="checkbox"/> MC MD
Cardiovascular	• Jugular venous pressure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> PRC
	• Cardiac auscultation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> MC MD
	• Edema	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Abdomen	• Masses	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> PRC
	• Organomegaly	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> MC MD
	• Tenderness	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Other	• Malnutrition	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> PRC
	• Bruising	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> MC MD
	• Hygiene	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<i>Neurological Examination</i>					
Cranial Nerves	• Facial movement asymmetry	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> PRC <input type="checkbox"/> MC MD
	• Extra-ocular movements	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	• Pupillary response	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	• Optic discs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Primitive reflexes	• Frontal release signs (palmomentary, snout, glabella tap)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> PRC <input type="checkbox"/> MC MD
Motor (Pyramidal)	• weakness	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> PRC
	• spasticity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> MC MD
	• hyper-reflexia	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	• Babinski/extensor plantar responses	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Motor (Extrapyramidal)	• Tremor	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> PRC
	• Cerebellar findings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> MC MD
	• Rigidity / Cogwheeling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	• Facial masking	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	• Bradykinesia	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Sensory	• Glove and stocking numbness	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> PRC <input type="checkbox"/> MC MD
	• Decreased distal proprioception	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	• Romberg's test	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

<i>Elements of the Physical Examination</i>	<i>Essential (Informs Diagnosis and Management)</i>	<i>Discretionary (Potentially Useful But Not Essential)</i>	<i>Unnecessary</i>	<i>Responsibility</i>
Gait	<ul style="list-style-type: none"> <li>• Any gait disturbance <input type="checkbox"/></li> <li>• Spastic gait <input type="checkbox"/></li> <li>• Parkinsonian Gait <input type="checkbox"/></li> <li>• Turning proficiency <input type="checkbox"/></li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/></li> <li><input type="checkbox"/></li> <li><input type="checkbox"/></li> <li><input type="checkbox"/></li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/></li> <li><input type="checkbox"/></li> <li><input type="checkbox"/></li> <li><input type="checkbox"/></li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> PRC</li> <li><input type="checkbox"/> IHP</li> <li><input type="checkbox"/> MC MD</li> </ul>

Are you able to identify any additional elements of the physical examination that should be considered part of a standardized physical examination protocol in primary care memory clinics?

Do you have any additional comments to make about the physical examinations?

*Demographic Information: Tell us about yourself!*

Which of the following best describes you:

- Family physician working in a primary care memory clinic  
 Family physician with Care of the Elderly certification?  
 Specialist supporting a memory clinic

How many years have you been working in clinical practice?

\_\_\_\_\_ years

Which of the following best describes your practice setting?

- Urban setting     Rural setting     Rural & remote setting     Mixed urban & rural setting

APPENDIX 2: Categories and components of the physical examination

	<i>Category</i>	<i>Components</i>	<i>Guideline(s) Indicating Components</i>
<i>General physical examination</i> <sup>(5-15)</sup>	Vital signs <sup>(16,17)</sup>	Heart rate, respiratory rate, orthostatic vitals <sup>(18)</sup>	Third Canadian Consensus Conference on Diagnosis and Treatment of Dementia <sup>(1)</sup> , European Federation of Neurological Societies (EFNS) <sup>(2)</sup> , Ministry of Health Singapore (MOHS) <sup>(3)</sup> , Clinical Research Center for Dementia of South Korea (CRCDSK) <sup>(4)</sup>
	Chest	Auscultation	
	Cardiovascular	Jugular venous pressure, cardiac auscultation, edema	
	Abdomen	Presence of masses or organomegaly, tenderness <sup>(19)</sup>	
	Other <sup>(20)</sup>	Malnutrition, bruising, hygiene	
<i>Neurological examination</i> <sup>(6-8,10,14,17,18)</sup>	Cranial nerves <sup>(16,21)</sup>	Facial movement asymmetry, extraocular movements, pupillary response, optic discs	EFNS, MOHS
	Primitive reflexes	Frontal release signs	MOHS
	Motor (pyramidal) <sup>(16,22,23)</sup>	Weakness, spasticity, hyperreflexia, Babinski/extensor plantar responses <sup>24</sup>	EFNS, MOHS
	Motor (extrapyramidal) <sup>(16,22)</sup>	Tremor, cerebellar findings, rigidity/cogwheeling, facial masking, bradykinesia	EFNS, MOHS, CRCDSK
	Sensory <sup>(16,20,1)</sup>	Glove and stocking numbness, decreased distal proprioception, Romberg's test	EFNS, MOHS
	Gait <sup>(20,23)</sup>	Any gait disturbance <sup>(24)</sup> , spastic gait, Parkinsonian gait, turning proficiency	EFNS, MOHS



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