



**CGS Scientific Meeting 2015  
Pre-conference Consensus on  
Measures of Mobility and Cognition in Aging**

**Co-sponsored by CGS**

***"Canadian Consensus on Measures and Assessments  
in Mobility, Exercises and Cognition in the Elderly. From the CIHR-CCNA"***

**Thursday, April 16<sup>th</sup>, 2015**

**Salon H, Hotel Bonaventure, Montreal, QC**

Over the next 20 years, substantial increases in the number of Canadians 65 years of age and older are projected.<sup>1</sup> Increased life expectancy is often accompanied by disability, with a substantial portion of this disability arising from two major geriatric problems: mobility and cognitive impairments.<sup>2-4</sup> Walking is an important marker of mobility and there is evidence that older people usually walk slower than when they were younger. This gait slowing is often attributed to “normal” aging<sup>5</sup> although it has been demonstrated that slow gait velocity is a marker of preclinical diseases, future falls and disability.<sup>6-9</sup> Similarly, aging is associated with decreases in cognitive functioning and the development of dementia. It has been estimated that 10% of Canadians ages 65 and older meet the criteria for dementia and this prevalence increases to 35% in people over age 85.<sup>10-12</sup> Further, mobility and cognitive impairment appear to become more related as people age.<sup>13-15</sup> Specifically, gait slowing and dementia often co-exist in the same individual, both have been attributed to changes in specific brain regions<sup>16-19</sup> and both significantly contribute to an increased risk of falls and disability in older adults.<sup>20,21</sup>

Until recently, clinicians and researchers have evaluated and treated cognitive and mobility dysfunction in older individuals as separate problems. This approach has led to gaps in our understanding of the cognitive-motor interactions and of the potential underlying mechanisms that can affect pathways to disability in aging.<sup>2</sup>

There is an urgent need to develop a common framework among researchers in Canada to **i)** standardize clinical and research methodologies of measures and assessments in mobility and cognition in older adults **ii)** to better characterize the relationship between cognitive and motor changes with aging, comorbidities and neurodegeneration **iii)** to create a “core of measures and assessments” to be used in current and future studies in the field of aging.

Common measurements will also positively contribute to the prevention, management, and rehabilitation of the cognitive and mobility disability in older adults.

This consensus will cement the collaboration within the current team of researchers on “Mobility, Exercise and Cognition (MEC) Team” which belongs to the CIHR Canadian Consortium on Neurodegeneration in Aging (CCNA) initiative.

Participants will include a panel of experts who are members of the “CCNA CIHR Mobility, Exercise and Cognition Team” and an “ad hoc” external scientific advisory board committee.

***Our goal is to have common assessment protocols to support an integrated approach, for Canadian research centers, to study cognitive and mobility decline in seniors as a combined single entity.***

This will expedite research designs, standardization, and harmonization for mobility and cognition measures for the CCNA planning cohorts which will include 600 older individuals across Canada. Similarly, it will provide the basis for having common outcome measures for multi-site clinical trials to study novel interventions (combination of exercise, cognitive training, and cognitive medications) for preventing falls, fractures and cognitive decline in older Canadians. Our Consensus meetings will foster a forum for exchange of vanguard national and international health research knowledge in this emerging research area.

### **Structure**

In advance to this consensus meeting, a semi-structured consensus building methodology for obtaining feedback from the experts and from our advisory board was implemented to synthesize knowledge. The meeting itself is structured as a series of presentations based on the perusal consensus building methodology. In the end, a roundtable discussion will be held to reach a consensus on measures to be adopted.

The round table will also provide an opportunity for invited speakers and audience members to discuss and identify the most valuable measures to study the relationship between mobility and cognitive decline and their improvement after targeted intervention.

### **Objectives:**

1. Identify and establish valid common nomenclature and assessments for cognition/motor interaction research in older adult populations, which can also serve as outcomes measures.
2. Propose a set of “core mobility and cognitive tests” to assess cognitive and mobility interactions and to be used as outcomes for interventions.
3. Identify the best mobility assessment to be used as a complementary diagnostic tool for detecting dementia.
4. Identify the best cognitive assessment to be used as a complementary diagnostic tool for detecting seniors at risk of dysmobility, falls and fractures.
5. Identify cutting edge research being done by trainees across Canada, highlighted during the consensus session through posters presentations.
6. Foster national and international collaborations and data sharing based on the core assessment battery selected by consensus.

**Target audience for the abstract submission:**

Abstracts, to be presented as posters, on the topic of mobility and cognition are welcomed from post-doctoral trainees, junior faculty and co-investigators. Posters will be displayed during the lunch period. Twenty abstracts have been selected for poster presentations, of which one poster will be awarded the inaugural ***“CIHR-CCNA-CGS Mobility and Cognition Research Prize”***.

**Date and Place:**

Thursday April 16<sup>th</sup>, 2015  
Salon H, HOTEL BONAVENTURE, Montreal  
(venue hotel of the 2015 CGS Meeting  
8:00 to 16:30 hours.

Breakfast, coffee break and lunch will be provided. Wine and cheese will be served during CGS Reception at 17:30.

**Organization:**

Jennifer Whytock, Gait & Brain Lab (Jennifer.whytock@sjhc.london.on.ca)  
Manuel Montero-Odasso (Consensus Chair), Gait & Brain Lab (mmontero@uwo.ca)  
On behalf the CCNA Mobility, Exercise and Cognition (MEC) Team.

**Introductions and Main Lecture. Chaired by Manuel Montero-Odasso**

- 8:00 - 8:15**    **Registration and continental breakfast**
- 8:15 - 8:30**    **Welcome remarks**  
*Dr. Jose Morais (CGS President, 5min), Dr. Howard Chertkow (CCNA leader, 5min), Dr. Sandra Black (CCNA Theme 2 leader)*
- 8:30 - 8:35**    **Introduction**  
**Measures of Mobility and Cognition. A Theme and a Day.**  
*Dr. Manuel Montero-Odasso (Chair of the Consensus, 5 min)*
- 8:40 – 9:40**    **Main Lecture**  
**Dysmobility and the Relationship with Cognition. The value of gait speed.** *Dr. Stephanie Studenski (Keynote Speaker, 45min+15 Q&A)*
- 9:40-10:00**    **Coffee break**

**Morning sessions. Chaired by Richard Camicioli**

- 10:00 - 11:00**    **Mobility measures on aging pertinent to mobility and cognition**  
**General mobility measures.** *Dr. Richard Camicioli (25min+5Q&A)*
- Quantitative temporal and spatial measures of gait in older people and neurodegenerative diseases.**  
*Dr. Quincy Almeida (25 min+5Q&A)*
- 11:00 - 12:00**    **Gait and dual-tasking. A paradigm to explore the mobility and cognition in older people?**  
*Dr. Olivier Beauchet (25 min+5Q&A)*
- Cognitive considerations in the assessment and improvement of dual-task mobility and cognition in older people.**  
*Dr. Karen Li (25 min+5Q&A)*
- 12:00 -12:30**    **Imaging on mobility and cognition.**  
*Dr. Caterina Rosano (25min+5Q&A)*
- 12:30 - 13:30**    **Lunch & poster presentations from trainees/junior faculty**

**Afternoon sessions and Roundtable. Chaired by Louis Bherer**

**13:30 - 14:45 Exercise on Gait and Cognition**

*Presentation 1. **Impact of exercise on cognition and psychological well-being in older adults populations.** Drs. Sarah Fraser and Louis Bherer (30 min).*

*Presentation 2. **Targeted exercise training, cognition and mobility.** Dr. Teresa Liu-Ambrose (30 min).*

*(Q&A 15min)*

**14:45 - 16:30 Round table. Suggested outcome measures**

Moderator: Dr. Montero-Odasso

Members: Drs. Almeida, Doyon, Camicioli, Bherer, Liu-Ambrose, Morais, Li, Middleton, Muir- Hunter, Speechley, Burhan, Vasudev, McIlroy, Studenski, Rosano, Verghese, Beauchet and Hausdorff.

**17:30 You are invited the Canadian Geriatrics Society Reception**

**Saturday April 18, 17 to 1730, Westmount Room**

**Report on Consensus from Cognition and Mobility.**

Dr. Manuel Montero-Odasso

## References

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### Consensus Advisory Board

The following world experts in the area of mobility and cognition compose the Consensus Advisory Board:



**Stephanie A. Studenski (MD, MPH)**, is one of North America's foremost authorities and researchers on mobility, balance disorders and falls in older adults. She is the Directors of the Longitudinal Studies Section and the Baltimore Longitudinal Study on Aging at the National Institute on Aging . Trained as a nurse and a physician, she is board certified in internal medicine, rheumatology, and geriatrics, based on training at Duke University in North Carolina. She also completed a master's degree in public health at the University of North Carolina. With over 30 years of experience in aging research, her work

is focused on longitudinal studies and clinical trials involving community-dwelling older persons. As principal investigator of multiple research programs funded by National Institute on Aging, she works with multidisciplinary teams to examine aspects of mobility across the lifespan, with a special focus on the neural control of movement.



**Caterina Rosano (MD, MPH)**, is Director of Neuroepidemiology for the Department of Epidemiology at the University of Pittsburgh. Her background includes training in Geriatric Neuroepidemiology and Neuroscience. She has extensive experience integrating brain imaging techniques into large clinical epidemiologic studies. Her goal is to investigate the interactions and synergisms between brain structure and function in relation to the aging process and to identify the modifiable factors underlying this relationship. Dr. Rosano's work applies state-of the-art neuroimaging methods, structural and

functional magnetic resonance imaging, in large epidemiological studies to identify brain structures that affect locomotion in elderly individuals.



**Joe Verghese, (MB, BS)** is Neurology Professor and Director of the Division of Cognitive & Motor Aging in the Department of Neurology as well as Chief of Geriatrics in the Department of Medicine at the Albert Einstein College of Medicine. His research interest is the effects of disease and aging on mobility and cognition in older adults. He has several peer-reviewed publications and federally funded research grants in this area. His current projects include studying the influence of cognitively stimulating activities on reducing risk of dementia, global health studies in dementia, and cognitive control of gait and mobility.



**Olivier Beauchet, (MD, PhD)** is Professor of Medicine and Head of the Geriatrics Division, Department of Neuroscience, Angers University, France. He is also the Director of Angers Memory Clinic. He has earned the following academic degrees: MD (Neurologist, Internal Medicine, Geriatrician), MS in Neuropsychology, and PhD (Human Motricity and Handicap). Dr. Beauchet's research interest includes gait, balance, and cognitive disorders in the elderly, and vitamin D deficiency and its neurologic adverse effects. He is a

member on the Laboratory of Process of Thinking & Intervention, Faculty of Medicine, Angers University.



**Jeffrey Hausdorff, (PhD)** is a Lecturer in Medicine at Harvard Medical School, Professor in the Sackler Faculty of Medicine at Tel-Aviv University, and Director of the Laboratory for Gait and Neurodynamics at Tel-Aviv Sourasky Medical Center. Dr. Hausdorff's research attempts to provide new understandings into the mechanisms that contribute to gait and postural control as well as the causes of deficits associated with aging and neurological diseases. His work focuses on gait variability and fractal physiology, falls, virtual reality-based rehabilitation, and the interplay between motor and cognitive function.

He has received numerous awards for his work that integrates the fields of geriatrics, neurology, physiology and engineering. At the 2013 Annual Scientific Meeting of The Gerontological Society of America, he received the Excellence in Rehabilitation of Aging Persons Award.

### **CCNA Motor Exercise and Cognition Team Members**

**Quincy Almeida (PhD)**, Director, Movement Disorders Research & Rehabilitation Centre at Laurier University, has expertise in cognitive control of motor performance in Parkinson Disease (PD). He is the Parkinson's representative on the International Consensus Committee on Exercise Prescription for Chronic Conditions, has extensively research exercise rehabilitation strategies for motor and cognitive symptoms of PD.

**Amer M. Burhan (MBCbB, MSc)**, Chair of Geriatric Psychiatry, lead of the Therapeutic Brain Modulation (TBM) Lab, is bringing his expertise in TBM and mood markers as modulator of cognitive-motor interactions.

**Louis Bherer (PhD)** Team co-leader and Co-Chair, past Canadian Research Chair on Aging and the prevention of Cognitive Decline (CHIR) is now the Scientific Director of the PERFORM Centre (Concordia University) and chair in preventive health science research, and brings expertise in computer-based cognitive training and physical exercise intervention on cognitive performance.

**Richard Camicioli (MD)**, Director, Geriatric and Cognitive Neurology (University of Alberta) has expertise in the effects of motor and cognitive function on outcomes in aging, mild cognitive impairment and PD.

**Julien Doyon (PhD)**, Scientific Director, Functional Neuroimaging Unit, University of Montreal and Director, Quebec Bio-Imaging Network (QBIN), has expertise investigating, through imaging, the contribution of the neural substrates mediating learning processes.

**Sarah Fraser (PhD)**, Postdoctoral Fellow, McGill University, has expertise in assessing the interaction of cognition and gait in healthy aging, cardiac patients, and MCI using standardized dual-task protocols and portable neuroimaging during dual-task gait. She recently added qualitative research methods to her quantitative research skills.

**Susan Hunter (PT, PhD)**, assistant Professor of Physiotherapy, an expert on the interaction between balance, gait and cognition and has expertise in validating mobility assessment in cognitively impaired older adults.



**Karen Li (PhD)**, Full Professor, Department of Psychology, Associate Director, Centre for Research in Human Development, Director, Laboratory for Adult Development and Cognitive Aging (Concordia University) contributes expertise on cognitive aging, dual-task walking and balance, and cognitive remediation of mobility. She has experience on fitness and cognitive training to improve mobility in older adults with hearing loss.

**Teresa Liu-Ambrose (PT, PhD)**, Canada Research Chair in Physical Activity, Mobility, and Cognitive Neuroscience, is Director of the Vancouver General Hospital's Falls Prevention Clinic and scientist with the Djavad Mowafaghian Centre for Brain Health and the Centre for Hip Health and Mobility. Her research program focuses on defining the role of exercise to promote healthy aging, with a particular focus on cognitive and neural plasticity, as well as mobility.

**Laura Middleton (PhD)**, is an Assistant Professor in Kinesiology (University of Waterloo), scientist at the Heart and Stroke Foundation Centre for Stroke Recovery (Sunnybrook site). She has significant expertise regarding the epidemiology of exercise and cognitive function among older adults.

**José A. Morais (MD)**, Director of the Division of Geriatrics and Centre of Excellence in Aging and Chronic Disease, McGill University and President of the Canadian Geriatrics Society. His research work has been devoted to the interplay between nutrition and healthy and frail aging. He is one of the PIs of the Quebec Longitudinal Study on Nutrition and Successful Aging (NuAge).

**William McIlroy (PhD)**, Chair of the Department of Kinesiology (University of Waterloo) is Mobility Team Leader and co-leader of the Balance, Mobility and Falls Clinic at Toronto Rehab. His work has included both fundamental research exploring the determinants of balance and mobility in older adults. He has specific experience in running aerobic exercise trials with older adults with neurologic deficits.

**Manuel Montero Odasso (MD, PhD)**, CCNA team leader and Chair of the Consensus, is the Director of the Gait & Brain Lab (Western University). He is leading CIHR funded studies looking for early predictors of cognitive/mobility decline in older adults with MCI, and the effect of cognitive enhancers and Vitamin D in improving cognition, gait and balance for reducing falls. He has expertise in assessing the interaction of cognitive and gait decline in MCI and Dementia using standardized dual-task protocols.

**Mark Speechley (MA, PhD)**, is currently Professor and Undergraduate Chair in the Department of Epidemiology & Biostatistics at The University of Western Ontario, where he teaches epidemiology in the MD and BMSc programs. His research pursuits are in the areas of falls prevention & injury epidemiology, rehabilitation & musculoskeletal epidemiology and applied methodology (measurement, scale and index development and evaluation). His publications are on the application of epidemiologic methods, primarily to health issues faced by older adults.

**Akshaya Vasudev (MD)**, is an Assistant Professor in the Department of Psychiatry, Division of Geriatric Psychiatry and Department of Medicine, Division of Clinical Pharmacology at University of Western Ontario (UWO). He has expertise in assessing mood in older adults and his current areas of research interest include the neurobiology of late life depression and pharmacogenomics.