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CaMos
Canadian Multicentre Osteoporosis Study
Étude Canadienne multicentrique sur l'ostéoporose

BONE HEALTH *for life*

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Message from
Dr. David Goltzman, CaMos Co-Principal Investigator

Dr. David Goltzman

Last year we applied for a new research grant from the federal government (The Canadian Institutes for Health Research or CIHR) to begin the next phase of our study. In May we were informed that the CaMos application ranked 5th in a competition group of 97 applications. CaMos, being a multicentre study with nine regional centres across Canada, that follows a substantial group of participants, we requested a large grant to cover our costs. Unfortunately, although 14 grants in the competition group were funded, the funds set aside for large grants were exhausted before the CaMos application could be funded. The federal government decided to award the CaMos study a small grant and we were invited to apply again in the Fall 2017 competition, which we recently completed.

This past year we have continued to analyze the information collected and to publish the results in leading scientific journals in the field of osteoporosis, bone metabolism, genetics, imaging, quality of life and nutrition. You will find all the CaMos scientific publications (over 150) posted on the camos.org website.

The CaMos study has succeeded beyond anything we could have expected and has become a landmark in osteoporosis research in Canada and internationally. I thank all of our participants for your enthusiastic support and the CaMos team for your hard work and devotion, which has made this all possible. ◆

The CaMos Bone Quality Study (BQS) Progress and Follow-up

DR JONATHAN D. ADACHI, *PRINCIPAL INVESTIGATOR AND DIRECTOR FOR THE HAMILTON CAMOS CENTRE*

Dr. Jonathan Adachi

We would like to thank the over 800 women from across 6 CaMos sites who agreed to participate in the CaMos BQS. We are now in the 4th year of follow-up and we recently analyzed data from the first 3 years. Using CT imaging and questionnaire information, we demonstrated that lower volumetric bone density at the wrist and ankles consistently predicted fractures. In addition, a larger separation between the small struts of bone inside the wrist called trabeculae was also associated with fractures. Comparisons were made between images acquired on two different kinds

(see **Bone Quality**, page 2) ➤

➤ (**Bone Quality** from page 1)

of small-scale CT scanners: one that yields lower resolution, single-slice images, but each scanner and each scan is cheaper; and another with higher resolution that generates 110 image slices within a similar time frame, but each unit and each scan costs more. Both scanners use equally low levels of radiation (less than half the radiation of a bone density (DXA) scan), but measurements made on the lower resolution scanner were just as good as those from the higher resolution scanner in predicting fractures. These results suggest the potential for repurposing older CT scanners for obtaining more detailed scans yielding three-dimensional structural information to better estimate fracture risk. ◆

Recent CaMos Publications

Comparative Analysis of the Radiology of Osteoporotic Vertebral Fractures in Women and Men: Cross-Sectional and Longitudinal Observations from the Canadian Multicentre Osteoporosis Study (CaMos)

Dr. Brian Lentle

We compared two methods for osteoporotic vertebral fracture (VF) assessment on lateral spine radiographs, the Genant semiquantitative (GSQ) technique and a modified algorithm-based qualitative (mABQ) approach. We evaluated 4465 women and 1771 men aged ≥ 50 years, from the CaMos cohort, with available X-ray images at baseline. Women had more prevalent and incident VFs in comparison to the men as defined by mABQ but not as defined by GSQ. In using both methods, presence of VF were associated with lower bone mineral density. Presence of VF at baseline were also found to be predictors of future non-vertebral major osteoporotic fractures using both methods although the mABQ defined VF were more highly associated with future fracture than when defined by GSQ. We therefore concluded that defining VF by mABQ is preferred to the use of GSQ for clinical assessments.

Reference: Lentle BC, Berger C, Probyn L, Brown JP, Langsetmo L, Fine B, Lian K, Shergill AK, Trollip J, Jackson S, Leslie WD, Prior JC, Kaiser SM, Hanley DA, Adachi JD, Towheed T, Davison KS, Cheung AM, Goltzman D; CaMos Research Group. Comparative Analysis of the Radiology of Osteoporotic Vertebral Fractures in Women and Men: Cross-Sectional and Longitudinal Observations from the Canadian Multicentre Osteoporosis Study (CaMos). J Bone Miner Res. 2017 Jul 19. doi: 10.1002/jbmr.3222

Dietary Patterns in Men and Women are Simultaneously Determinants of Altered Glucose Metabolism and Bone Metabolism.

Dr. Lisa Langsetmo

This study was conducted to evaluate if diet has an effect on glucose metabolism and on bone metabolism, in the CaMos cohort. We assessed dietary patterns (Prudent [fruit, vegetables, whole grains, fish, and legumes] and Western [soft drinks, potato chips, French fries, meats, and desserts]) from a food frequency questionnaire. We analyzed the blood samples for measures of glucose metabolism (glucose, insulin and insulin resistance) and bone metabolism (markers of bone formation and resorption, as well as serum vitamin D and parathyroid hormone).

The Prudent diet was associated with favorable effects on glucose metabolism (lower insulin and insulin resistance) and bone metabolism (lower bone resorption in women; higher serum vitamin D in men). The Western diet was associated with deleterious effects on glucose metabolism (higher glucose, insulin, and insulin resistance) and bone metabolism (higher bone formation and lower serum vitamin D in women; higher bone resorp-

(see **Publications**, page 3) ➤

➤ (**Publications** from page 2)

tion in men). In summary, a Prudent diet was associated with lower metabolic risk suggesting that it is a potential target for reducing fracture risk.

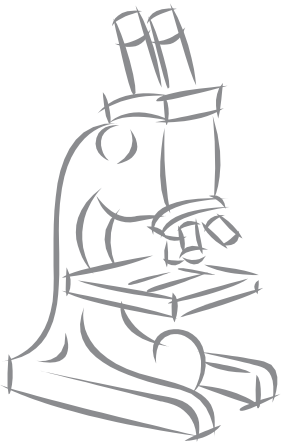
Reference: Langsetmo L, Barr SI, Dasgupta K, Berger C, Kovacs CS, Josse RG, Adachi JD, Hanley DA, Prior JC, Brown JP, Morin SN, Davison KS, Goltzman D, Kreiger N. Dietary Patterns in Men and Women are Simultaneously Determinants of Altered Glucose Metabolism and Bone Metabolism, Nutrition Research, 2016 April:36(4):328–336.

Population-Wide Impact of Non-Hip Non-Vertebral Fractures on Mortality

Non-hip and non-vertebral (NHNV) fractures account approximately for two-thirds of all fragility fractures. Our objective was to quantify the population-wide impact of NHNV fractures on mortality.

We studied 5526 women and 2163 men aged ≥ 50 years from 1995-2013. There were 1672 fragility fractures followed by 388 deaths. NHNV accounted for ¾ of the fractures. We estimated that out of 800 women, one death was attributable to a NHNV fracture, compared with one death in 2000 women attributable to hip or vertebral fracture. The study highlights the important contribution of NHNV fractures on mortality because many NHNV fracture types, except for the most distal fractures, have serious adverse consequences that affect a significant proportion of the population.

Reference: Tran T, Bliuc D, Adachi JD, Berger C, van den Bergh J, Eisman JA, van Geel T, Geusens P, Goltzman D, Hanley DA, Josse RG, Kaiser SM, Kovacs CS, Langsetmo L, Prior JC, Nguyen TV, Center JR. Population-wide impact of non-hip non-vertebral fractures on mortality, J Bone Miner Res. 2017 September:32(9):1802–1810. ◆



Regional News

New Co-Director of the Toronto Centre

Dr. Andy Kin On Wong

Dr. Andy Kin On Wong has been appointed as a new Co-Director of the Toronto CaMos Centre. In this capacity he joins Dr. Angela Cheung, who has now assumed the role of Director, and Dr. Robert Josse, now Co-Director, who served as Director for many years with great distinction.

Dr. Wong is an Assistant Professor of Epidemiology at the Dalla Lana School of Public Health at the University of Toronto. He is also appointed as Assistant Scientist at the University Health Network (UHN). He received his PhD in Medical Sciences with specialization in imaging science at McMaster with Dr. Jonathan D. Adachi and completed his postdoctoral fellowship with Dr. Angela Cheung at UHN training on epidemiology and biostatistics. Dr. Wong was awarded the Vanier award in 2011 for his leadership in the CaMos Bone Quality Study. He has since become the director of this investigation that examined over 800 women across 6 CaMos sites to study CT-derived bone microarchitecture information and how it can predict incident fractures. He continues to lead this study while dovetailing a secondary project related to muscle quality in these participants. Dr. Wong is currently affiliated with the Arthritis Program and Joint Department of Medical Imaging at UHN where his primary research interest is investigating postmenopausal women with knee osteoarthritis. Specifically, he will study imaging correlates of knee pain in those with elevated fracture risk; and will determine imaging-related predictors of successful knee arthroscopies. ◆

Celebrating excellence

The Canadian Geriatrics Society recognizes leading Canadian investigator for outstanding contribution to the health care of older adults in Canada.

Dr. Alexandra Papaioannou Co-Director of the Hamilton Regional Centre, was awarded the prestigious Ronald Cape Distinguished Service Award for 2017. Dr. Papaioannou has developed clinical practice guidelines on osteoporosis and preventing fractures in long term care. Dr. Alexandra Papaioannou is a Professor of Medicine at McMaster University in the Division of Geriatric Medicine and a Geriatric Medicine Specialist at Hamilton Health Sciences - St Peter's Hospital. Dr. Papaioannou holds a joint appointment in the Division of Rheumatology and is an associate member in the Department of Clinical Epidemiology and Biostatistics, and Medical Sciences. ◆

Dr. Alexandra Papaioannou

Congratulations

2017 Osteoporosis Canada CaMos Fellowship Award Recipient – Dr. Evelyn Wong

Dr. Evelyn MM Wong completed a Doctor of Medicine from McMaster University, Internal Medicine and Endocrinology at UBC, and is currently enrolled in the UBC Clinician-Investigator Program and is a Metabolic Bone Disease fellow with Dr. Angela MW Cheung at University Health Network. She is completing her Master's in Clinical Epidemiology and Health Care Research at the University of Toronto.

Evelyn is thankful for the OC-CaMoS fellowship as it will grant her the ability to bring her project to fruition. Her project is entitled "Serum pentosidine levels in women with or without atypical femur fractures: Developing pentosidine as a bone health biomarker". Her additional mentors for this project are Drs. JC Prior, RG Josse, JD Adachi, and G Tomlinson.

The goal of this project is to develop a method to accurately measure pentosidine levels as a marker of bone health and use this method to examine for differences in serum pentosidine levels between patients with AFFs and controls and to establish normative data in the CaMoS population. This project will serve as a catalyst and platform to establish serum pentosidine as a biomarker for bone fragility. ◆

Dr. Evelyn MM Wong

Thank you to our funding partners

Amgen Canada Inc.
Canadian Institutes of Health Research (CIHR)
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