

Editorial

DR. DAVID GOLTZMAN, CAMOS CO-PRINCIPAL INVESTIGATOR, MONTREAL



CaMos is well into the year-10 follow-up with interviews and testing. This is an extremely important phase and it could not have happened without your continued commitment and dedication. The newest group to join the study, the Youth Cohort, is currently being recalled for the year 2 follow-up interview and testing.

The International Osteoporosis Foundation held its annual meeting in Toronto in June 2006. There was much interest in the data that CaMos is producing. CaMos researchers presented their preliminary work on the following research:

- *Is there an osteoporosis care gap in Canada? (people with osteoporosis who are not being treated)*
- *Is the bone density of the average woman or man different in different regions of Canada?*
- *Are Canadians getting enough calcium and vitamin D?*
- *There are now different ways of classifying who is at risk of having a fracture. How do they compare?*

This work will be completed in the near future and will be submitted to medical journals for publication and shared with you in future newsletters.

In this issue of the **CaMoscope**, Dr. Jerilynn Prior describes a new way of using bone density results to predict who is likely to break a bone. Dr. Brent Richards studied the effect of COX2 (cyclooxygenase-2) inhibitors (medications that are used to treat arthritis) on bone mineral density. Ms. Suzette Poliquin reports some interesting facts about the data which illustrates the size and depth of our study. Dr. Jerilynn Prior answers a question from a young participant about osteoporosis and broken bones and Dr. Alexandra Papaioannou responds to a question from an older participant regarding a low bone density result. The behind-the-scenes section is back with a description

of the CaMos imaging centre.

What's coming up? Be on the lookout for those green questionnaires...we'll be continuing to send them to you. ♦

We've been busy, and so have you!

SUZETTE POLIQUIN
COORDINATING CENTRE, MONTREAL

Between 1995 and 1997, we sent out 80,000 letters to households in 9 centres across Canada to introduce the CaMos investigation to them. From that number, we recruited 6539 women and 2884 men whose ages ranged from 25 to 103 years.

In the first five years of the CaMos investigation we did:

- 19,868 interviews
- 17,978 bone densities
- 11,843 back x-rays
- 8,411 ultrasounds
- 1,738 blood tests.
- 36,698 green follow-up questionnaires
- 1,164 participants reported broken bones

Now in Year 10, we have 72% of the original cohort still being followed: 4818 women and 1960 men. We have a world record for excellent rates of follow-up! **Thanks to all of you!**

Latest addition to the CaMos family

We sent out 35,813 letters to recruit young men and women aged 16 to 24 in the same 9 centres as the older group.

527 young women and 474 young men became part of the study between 2004 and 2006.

The year one follow-up is expected to be complete by early summer 2007 and the year two follow-up interview is on going. At the year-2 follow-up, a face-to-face interview is being conducted, bone mineral density is measured and blood and urine testing is being performed in some centres. ♦



Can we predict who will break a bone?



DR. JERILYNN PRIOR
VANCOUVER CENTRE DIRECTOR

There are many ways to identify individuals at high risk for osteoporosis-related fractures. In order to determine the best treatment options, it is important to take into account the presence of individual risk factors. Some of these are for example increasing age, being in menopause, having a low body weight, a family history of osteoporosis, a previous low trauma fracture, treatment with prednisone (steroid use) and low bone density measurements.

The Dual Energy X-Ray Absorptiometry (DXA) is a tool for measuring bone mineral density (BMD). The DXA uses two x-ray beams with differing energy levels to scan a person's bones. One beam is absorbed by soft tissue and the other by bone tissue. When the soft tissue is subtracted from the total of both, what is left reflects the mineral in bone.

CaMos data for men and women participants aged 50 years and over, plus information from similar population-based studies in Japan, Sweden, Great Britain, France and the USA (to mention a few) have contributed to important new information about estimating risks for fractures. We now know enough to try to predict your 10-year fracture risk.

Your bone density T-Score¹, plus your age can be used to predict whether your fracture risk over the next 10 years is low (less than 10%), moderate (10-20%) or high (more than 20%).

The Canadian Association of Radiologists has published guidelines for reporting bone mineral density in Canada using this 10 year "absolute fracture risk"² calculation.³ You should know that all kinds of low trauma fractures are being predicted except for those of the spine.

Figure 1 and **2** show how BMD T-score and age are related to absolute fracture risk. We cannot use the same graphs for men and women, even if their T-score and age are the same because the absolute fracture risk proves to be quite different and significantly higher for women. Each graph has age increasing from

left to right and BMD T-score getting worse from top to bottom. The lower the T-score, the worse the BMD.

Let's take an example. If you are a 65-year old **man** with a T-score of -2.5 , your risk for non-spine fracture over 10 years will be low (see the * on *Figure 2*). However if you are a 65-year old **woman** with a bone density T score of -2.5 , your 10-year fracture risk lies between moderate and high. (See the * on *Figure 1*).

The risk of fracturing over a ten-year period would be increased further if you had a fragility fracture (a bone that has broken with little or no trauma) after the age of 40 or if you used steroid medication for more than three months.

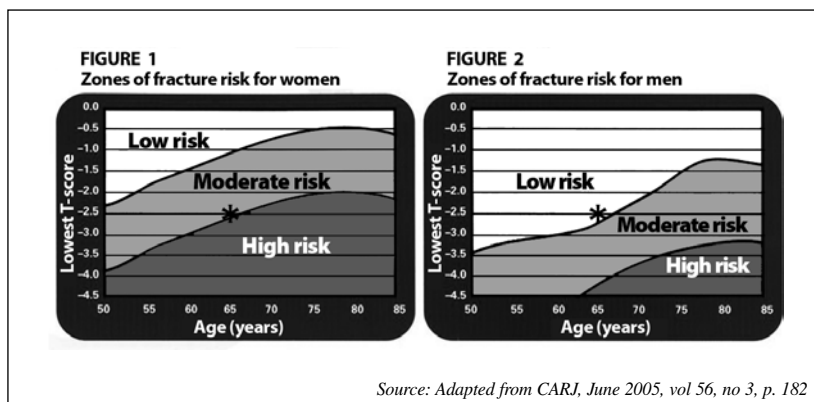
In some cases, doing a bone density test is not required to help us determine the type of treatment needed. For example, a very slim and frail woman aged 75, who just had a hip fracture with a minor fall, would have a high fracture risk based upon her age, her past fracture and her low weight. She would need treatment to decrease the risk for breaking her other hip. In this situation, the bone density measurement may primarily help her doctor follow how she is responding to therapy and indicate if her risk for a future fracture is decreasing.

We are now working towards a system that will help us quantify the importance of risk factors for fractures (such as falling, weakness, use of steroid drugs) and are adding them together with bone density to produce a fracture likelihood calculator. With data from CaMos and other similar studies from around the world, this approach (of using proven risk factors for fracture) will enhance the clinical usefulness of bone density and improve the prevention of fracture in the future. ♦

¹T-score values are a way of expressing the difference of an individual's bone density from those in the accepted normal range. This range is compiled from data collected from people of the same sex, but aged 20 to 30 years, because this is the period in our lives when bones are the strongest.

²This is the likelihood of having an osteoporotic fracture over the next 10 years.

³Siminoski K, Leslie WD, Frame H et al, (2005) Recommendations for bone mineral density reporting in Canada. *Can.Assoc.Radiol.J.* 56, 178-188.



Source: Adapted from *CARI*, June 2005, vol 56, no 3, p. 182

Question and Answer

Q: *I am an 87-year old woman. My study results were low, but at my age, what can you expect? Is there any point in showing the results to my doctor?*



Dr. Alexandra Papaioannou
Hamilton Centre
Co-Director

A: Yes, you should discuss your results with your doctor. Appropriate treatment can be given at any age. It is important to be sure you get enough Vitamin D for your health. That means ensuring you receive at least 800 IU of Vitamin D a day. (It is thought now that Vitamin D may reduce episodes of falling.) We know that our osteoporosis medications reduce the risk of hip fracture in people including those older than 87 years of age based on the results of clinical drug trials for osteoporosis. As physicians it is our aim to keep our patients as healthy, independent and mobile as possible, at all ages. ♦

Ask CaMos your questions!

We'd love to answer them in upcoming issues, please send them to us either by mail at our coordinating centre address (687 Pine Avenue West, Room E1.64, Montreal, Quebec, H3A 1A1) or by e-mail to: info@camos.org

What's new from CaMos?

The effect of cyclooxygenase-2 (COX-2) inhibitors on bone mineral density



DR. BRENT RICHARDS
CAMOS COLLABORATOR

You may have heard of COX-2 inhibitors. They are anti-inflammatory medicines used to treat arthritis. These medications, commonly marketed under the brand names Celebrex and Vioxx achieved infamy when it was discovered that they likely increased the risk of heart attacks in some people. We were interested in knowing whether these medications altered bone mineral density (BMD). It is possible that exercise related bone gain may be brought about by processes similar to inflammation, and because these medications reduce inflammation, they may also prevent the bone gain that normally results from weight bearing exercise.

To further study these ideas we analyzed data from 4,780 menopausal women and men over 50 from the CaMos cohort and found that:

- In menopausal women not using estrogen therapy, COX-2 inhibitor use was associated with an increased BMD
- However, in men, the use of COX-2 inhibitors was associated with a lower BMD.

YOUTH QUESTION

DR. JERILYNN PRIOR
VANCOUVER CENTRE DIRECTOR

Q: *When I was 16, I slipped and broke my wrist playing street hockey. I'm tall (six feet), and am always playing a lot of sports. I'm a very healthy guy! Why would I break my arm? Does this mean I'm getting osteoporosis?*

A: At age 16 your bone strength has not peaked and that may make you more prone to fracture. Healing usually occurs very quickly. In other words, teens grow fast as they mature. At this time of maximum growth, fractures at the ends of the arms and legs are common. We think that the bone grows longer more quickly than it is able to deposit minerals and become strong. However, fractures also heal faster because the bones are growing. This does not mean that you are getting osteoporosis.

CaMos will help us answer questions such as:

- At what age does peak bone strength occur?
- Do all bones reach peak bone strength at the same age?
- How can we ensure that teenagers achieve the highest peak bone strength of which they are individually capable?

Suggestions: *I would make sure you get three good food sources of calcium every day* (milk, cheese, yogurt, calcium-fortified orange juice, soy or rice beverage). Given that sunshine doesn't provide Canadians with sufficient Vitamin D from October through March, you might also want to take an ordinary multiple vitamin that will give you the 400 IU of Vitamin D a day that you need. In the meantime, carry on playing street hockey! Exercise along with nutrition are vital to build strong bones over the teenage and young adult years.

This new and important information provides insights into the bone changes that may be related to inflammation and anti-inflammatory drugs. ♦

Reference : Richards JB, Joseph L, Schwartzman K, Kreiger N, Tenenhouse A, Goltzman D; For the Canadian Multicentre Osteoporosis Study (CaMos). The effect of cyclooxygenase-2 inhibitors on bone mineral density: results from the Canadian Multicentre Osteoporosis Study. *Osteoporos Int.* 2006 Sep;17(9):1410-9.

Behind the scenes

CaMos Imaging

All of you who are participating in CaMos have been asked to have bone density measurements (DXA), many also had x-rays, and some of you had bone ultrasound measurements. You may wonder where these results end up?

Each regional centre across the country sends all DXA and x-ray data to the Imaging Centre located in Quebec City. The ultrasound data are sent to the Saskatoon Centre. These data are then processed and stored for use by the CaMos researchers as described below.

DXA imaging

The DXA data are sent as an electronic file, usually on CD's. These files have two parts, an image of the bone that was examined (hip or spine) and information on that exam, such as your CaMos ID number, date of the measurement, date of birth, etc. All information is pooled into a central database that is accessible to all the CaMos researchers enabling them to use it to write research papers.

All of the DXA data are "cleaned". This means we make sure that the vertebrae included in the data have not had a fracture, or lots of arthritis (calcium in discs and ligaments). A fractured or crushed vertebrae is not used in our assessment as it will misleadingly appear stronger (more dense), because it has the same amount of mineral in its smaller compacted area.

X-rays

X-ray images are sent to the Quebec Imaging Centre. They are provided either on regular film or in electronic form, depending on the equipment

available at the Centre where the x-rays were taken. Many newer machines don't use film, they save the x-ray images directly as electronic data which can then be viewed on a computer screen.

If x-rays arrive as a regular film, we convert them to an electronic image using a scanner which is like a photocopying machine. The x-ray images are analyzed to see which vertebrae are fractured. All the x-ray data are then stored in a database, which can then be accessed by the CaMos researchers.

Ultrasound

Ultrasound technology does not take "pictures" of your bones like X-rays or DXA machines do. Ultrasound emits sound waves that travel through your flesh and "bounce" off your bones. The machine records speed of sound (SOS) for the ultrasound wave that passes through your bone. This will tell researchers something about the strength of your bones but not how dense they are.

The Saskatoon centre receives the electronic records from the CaMos centres in Calgary, Saskatoon, Kingston, Hamilton, Quebec. The data are stored in the database in an easily accessed format, which can then be used by the CaMos researchers.

We have learned that comparing ultrasound results to DXA is not very useful since the two machines measure different bone characteristics. However, when the relationship between the number of broken bones and ultrasound measurements was examined, it was found that ultrasound testing can predict who is likely to break bones. The goal is to develop this technology so that it can be used in the North or rural locations where more complex technology like DXA is not available. ♦



Imaging Centre in Quebec City

l. to r.: Martin Després, CaMos PACS administrator, Diane Bastien, Technologist, Louise Marcoux, technologist, Marc Gendreau, Coordinator



*Jola Thingvold
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