



The Hip Fracture Epidemic

In Canada, over 20,000 seniors suffer hip fractures annually and this number will rise dramatically unless strategies for prevention are discovered and implemented. Over 90% of hip fractures are caused by falls.

About 20% of those who suffer a hip fracture die within 12 months.

About 50% of those who suffer a hip fracture lose their independence. Indeed, hip fractures are a leading cause of entry into residential care facilities.

The annual direct hospital cost of treating hip fractures is \$1 billion in Canada, and \$180 million in BC. Hip fractures also exert a tremendous emotional burden on patients and their family members.

Strengthening Bones and Preventing Falls

Because hip fracture results from falls onto brittle femurs (hip bones) CHH researchers are pioneering falls prevention strategies for vulnerable seniors and focusing on ways of improving bone strength across the lifespan. The CHH is the first research centre in the world to use this double-barreled falls prevention and bone strength approach to hip fracture prevention. Collaboration between bioengineers and clinician-scientists ensures that studies are both relevant and innovative. CHH research on bone strength is directed by UBC Professor **Heather McKay**. Bone density peaks around age 22, and then declines steadily with age. Through the "Healthy Bones" and "Action Schools! BC" programs in BC elementary schools, CHH researchers discovered that targeted exercise programs enhance bone density in children and adolescents. Follow-up studies are examining how this translates to stronger bones and reduced fracture risk with aging. CHH research is also leading to better methods for determining bone strength through medical imaging (using CT or

MRI) of the architectural arrangement and density of bone. CHH research on fall prevention is directed by UBC Associate Professor **Karim Khan**. To guide intervention strategies, hospital emergency departments need quick but accurate techniques for identifying the cause of falls in seniors. By partnering with the Vancouver Coastal Health Authority in a multidisciplinary Falls Follow-Up Clinic, CHH researchers are creating a national template for diagnosing the cause of falls and directing patients to innovative exercise-based interventions. This state-of-the-art service is being evaluated in clinical trials. CHH research on injury biomechanics is directed by SFU Associate Professor and Canada Research Chair in Kinesiology and Engineering Science **Stephen Robinovitch**. Using a unique instrumented safe movement environment, CHH researchers are improving techniques for characterizing balance and understanding the mechanics of falls, and designing fracture prevention products such as wearable hip protectors and energy-absorbing floors. Guiding research into sociocultural factors that influence hip fracture outcome is UBC Professor **Anne Martin-Matthews**, a sociologist-gerontologist who also heads CIHR's Institute of Aging.

Innovative Laboratories for Hip Fracture Prevention

Bone Imaging
Safe Movement Environment
Mobile Laboratory

Innovative approaches for Hip Fracture Prevention

BC Hip Registry
Falls Follow-Up Clinic
Exercise Intervention for Adolescents and Seniors
Transdisciplinary Teams