

# Reducing radiation: Model shows hope for new standards worldwide

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The University of Ottawa Heart Institute (UOHI) is setting the stage in what could become a revolution in medical imaging in Canada as it announces striking results in radiation reduction for the diagnosis of cardiovascular disease. The announcement comes as UOHI is currently showcasing its expertise at the 2012 Canadian Cardiovascular Congress in Toronto.

As a result of an initiative that combines optimizing test protocols, state-of-the-art equipment, and high-tech software, two-thirds of the Ottawa Heart Institute's Nuclear Cardiology patients are currently receiving half the [radiation dosage](#) that they would normally get. [Radiation](#) reduction techniques have been achieved across all types of radiation-based [cardiac imaging](#)—nuclear, CT and PET. The Heart Institute is one of only a handful of centres in Canada with the in-house expertise to evaluate and clinically apply such advances across these technologies. UOHI is confident that all of its patients will receive lower amounts of radiation, and even less by early next year.

The American Society for Nuclear Cardiology has challenged the nuclear cardiology community to reduce radiation exposure below 9 millisieverts (mSv) by 2014. The techniques being employed at the Heart Institute regularly reduce exposure to 5 mSv, and often much less, putting UOHI well ahead of the game. This figure has not bottomed out as efforts will continue to minimize radiation wherever possible.

"Our clinicians are taking a much more critical look at who they are

testing with radioactive methods and making decisions based upon risk and necessity which will only expose patients to radiation who truly need the test," said Dr. Benjamin Chow, Co-Director of Cardiac Radiology at the University of Ottawa Heart Institute. These responsible practices, along with a judicious use of technology, could revolutionize cardiac imaging in Canada."

The benefits of this effort include reduced radiation dosages for patients, greater flexibility for tailoring tests for patients, and, in some cases, reduced demand placed on radioisotopes. For younger patients, for example, radiation exposure poses greater risks because they have more years in which cancer could develop. So minimizing their dosage is a high priority. In the case of older patients whose lives may be threatened by an immediate cardiac condition, the benefit would outweigh the small risk of developing cancer later in life.

UOHI also uses a combination of powerful and effective tools that enable better diagnosis of cardiovascular problems. The cadmium zinc telluride camera system used for nuclear imaging is a significant innovation and was implemented by Dr. Glenn Wells, Medical Physicist in Nuclear Cardiology. The Heart Institute was one of the first centres in the world with this technology in 2009, and it had a major impact on reducing radiation in perfusion SPECT scans, by far the most common cardiac imaging test.

The introduction of PET cameras in the late 1990s, which provide much more detailed imagery with much lower levels of injected isotopes, has also had an impact on reducing [radiation exposure](#). The use of such cameras in Canada is still uncommon but increasing.

Software is another critical part of imaging, turning the scanner data into coherent two- or even three-dimensional pictures of what is found in a patient's body. The Heart Institute has helped commercial developers

evaluate and improve new advanced software packages for both PET and SPECT scanners that maintain image quality while using less radioactive isotopes.

Over the years, radiation has become a concern for our society, yet often we do not realize the significant benefit of highly accurate diagnostic techniques which may require very low amounts of medical radiation. "Careful and appropriate selection of the right test for the right patient balancing benefit and risk enables optimal patient care," said Dr. Terrence Ruddy, Director of Nuclear Cardiology, University of Ottawa Heart Institute. Experts at the University of Ottawa Heart Institute have demonstrated the tremendous capabilities of these techniques, and the equally tremendous strides that have been made in applying them responsibly.

Provided by University of Ottawa

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