

OHTAC E-Bulletin

Seeking the best health technologies for Ontario



In this issue

Computed Tomography Radiation Safety Issues
in Ontario

2

Technologies Currently Under Review

5

Previous OHTAC Recommendations

5

The OHTAC E-Bulletin is issued on a regular basis to provide you with updates on the latest committee recommendations.

Previous Medical Advisory Secretariat monographs and reviews and subsequent OHTAC recommendations are available on the OHTAC website, with links in each E-Bulletin issue.

Should you have any questions or additional information about any of these technologies, please submit it to the Medical Advisory Secretariat (MAS).

Contact Information:

Medical Advisory Secretariat,
Ontario Ministry of Health and
Long-Term Care
56 Wellesley Street West, 8th Floor
Toronto, ON, Canada M5S 2S3

Tel: 416-314-1092

Fax: 416-325-2364

TTY: 1-800-387-5559

Email: MASinfo@moh.gov.on.ca

Web: http://www.gov.on.ca/english/providers/program/mas/mas_mn.html



A summary of the Health Technology Policy Assessment by the Healthcare Human Factors Group and the OHTAC Recommendation

In April 2005, OHTAC reviewed and made recommendations for multi-detector CT angiography for coronary artery disease. The following was one of the recommendations made:

“The Ministry of Health and Long-Term Care request the University Health Network’s Usability Lab to test the use of 64-slice CT scanning under various circumstances and for various indications to determine how to best balance image quality for best patient management and radiation dose. The results of these testing parameters will form recommendations on the safe use of 64-slice CT for its various imaging uses, to be communicated to the Radiology community and hospital administrators in Ontario.”

To implement this recommendation, OHTAC requested that the Healthcare Human Factors Group, based at the University Health Network in Toronto, undertake a study to investigate appropriate radiation dose issues associated with CT, including methods that can be used to reduce radiation dose, standards for testing and inspection of CT scanners, and radiation issues associated with coronary CT angiography and dental CT.

The study involved an appraisal of radiation dose issues found in a literature review, a CT survey of 20 Ontario healthcare institutions with 64-Slice CT scanners (18 respondents), and interviews with CT experts

Key Findings

A summary of the important findings:

- CT is an increasingly used and useful imaging diagnostic
- CT radiation dose in patients is increasing (estimated to account for 10% of diagnostic exams but over 60% of total effective radiation dose).
- The effective radiation dose from a typical CT examination of the chest is approximately equivalent to three times the amount of natural background radiation that each Canadian receives per year.
- The cancer risk from 100 millisieverts (mSv) (equivalent effective radiation dose of 10 typical abdominal CT examinations) was estimated by the National Research Council to be one out of 100 people, and six out of 1000 people by the International Commission on Radiological Protection.
- Studies have found a 10-35% higher effective dose from multi-detector CT than single-slice CT.
- Low-dose CT can reduce radiation dose without compromising image quality
- The United Kingdom has had success with diagnostic reference levels (DRLs). DRLs can be used to identify institutions that consistently use higher radiation doses for the same clinical indications compared to other centres in the same region.
- Lack of comprehensive Ontario CT regulations, guidelines, and standards have led to significant variability in the frequency and methods of CT scanner testing.
- Patient shielding: types and amount of shielding varied between centres (Ontario survey).
- Dental CT uses cone-beam technology. This technology can provide more clinically useful information than panoramic radiography, but radiation dose can be 4-15 times higher than radiography.

Continued on page 3

OHTAC Recommendations

Below are the recommendations made by the UHN Healthcare Human Factors Group and endorsed by OHTAC:

General CT Radiation Dose Recommendations

- Establishment of a CT Radiation Safety committee consisting of experts to advise, oversee, and implement methods to promote CT radiation safety. The CT experts should include but not be limited to radiologists, medical radiation technologists, physicists, dentists, Ministry of Health and Long-Term Care representation, and CT scanner manufacturer representation.
- Amending the HARP Act and its regulations to include safety inspection of CT scanners.
- Updating the HARP Act and its regulations to include the operation, use, testing, and inspection of CT scanners. The new federal safety code will be available in 2007/2008, which will cover many aspects of CT, such as responsibilities and protection of owners, users, and operators of CT scanners, facility and equipment requirements, and quality assurance requirements. The new federal safety code may assist in setting the standards.

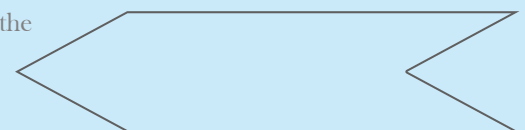
CT Scanner Testing and Inspection Recommendations

- Establishment of guidelines for proper methods of CT scanner acceptance testing and periodic quality control testing, similar to the detailed guidelines currently available by the X-ray Inspection Services for other diagnostic x-ray equipment. The guidelines should be developed by the X-ray Inspection Services in collaboration with other physicists, engineers, and CT scanner manufacturer representatives. These guidelines should supplement the proposed 2007/2008 federal safety codes that will cover items such as frequency of testing. Information from the practical guide on CT scanner testing, Information Leaflet No.1: CT Scanner Acceptance Testing, developed by the ImPACT group could be incorporated.
- Strengthening the existing resources for X-ray Inspection Services to provide field surveillance of CT scanners.

Radiation Dose Reduction Methods Recommendations

- Recommend development of methods (e.g. web-based repository) to help share best-practice CT protocols (and supporting data on adequacy of image quality) between healthcare institutions. Through protocol selection, radiation dose can be reduced in some cases by an order of magnitude without compromising image quality.
- Recommend collection and analysis of radiation dose information from institutions across Ontario on the various types of CT scans.
- Recommend development of diagnostic reference values. CT radiation dose data collected from institutions across Ontario can be used to set reference levels at say, 80th percentile of recorded radiation doses. Although existing reference values from countries such as the US and the UK could be adopted, it would be more meaningful for Ontario institutions to compare their CT radiation dose output with Ontario (or Canadian) reference values.
- Recommend establishment of specific guidelines on patient shielding for various types of CT scans.
- Recommend development of a training program for interventional radiologists on CT fluoroscopy. No such training program exists in Ontario. The training program should be developed by interventional radiologists who are experts in CT fluoroscopy, in collaboration with CT scanner manufacturers.

Continued on page 4



OHTAC Recommendations Continued

Coronary CTA Recommendations

- Establishment of guidelines on coronary CTA protocol parameters and techniques (e.g. prospective ECG gating) to minimize radiation exposure.

Dental CBCT Recommendations

- Establishment of stipulations for the installation of new CBCT scanners in Ontario (e.g. monitoring of frequency, purpose, and dose from the examinations). The existing HARP dental CT advisory committee could be instrumental in developing the stipulations.
- Development of training and continuing education requirements for operators of dental CBCT scanners (and dentists who interpret and order). The existing HARP dental CT advisory committee could be instrumental in developing the training and continuing education requirements. Training and continuing education programs could be developed in collaboration with educational institutions, such as the Michener Institute for Applied Health Sciences.

Additional OHTAC recommendations:

In addition to the recommendations made by the Healthcare Human Factors Group, OHTAC also recommends the following:

- Establishment of a process to examine the appropriateness of diagnostic modalities chosen for patients (e.g., accuracy versus risk) and explore the question of whether modalities should change to include safety issues.
- Define a process to allow the tracking and measuring of cumulative radiation exposure.
- The referral process for diagnostic imaging should be evaluated.
- Adherence to existing guidelines should be measured.

Implications

Diagnostic examinations are the largest source of man-made radiation exposure to the general population, contributing about 40% of the total annual worldwide exposure from all sources in industrialized countries like Canada. They are the second largest source of radiation exposure, with natural background radiation being the first. Radiation exposure from CT has been steadily increasing and is now by far the largest component of the total radiation exposure from diagnostic imaging.

The first recommendation has been put into effect, with the establishment of the new Diagnostic Imaging Safety Committee. The purpose of the committee is to provide a forum for the development of standards and best practice for Ontario patient safety in the use of MRI and CT

safety equipment. The committee will also develop and make recommendations to the Deputy Minister, Ministry of Health and Long-Term Care, concerning:

- Standards and best practices to minimize Ontario patient radiation exposure in diagnostic imaging technologies, particularly from diagnostic CT
- Effective methods for communicating best practices and safety standards for MRI and CT
- Methods for the monitoring and enforcement of these standards and best practices
- Safety education for providers of diagnostics
- Method of ensuring best practices respecting diagnostic imaging technologies on an on-going basis as new technologies emerge.❖

The full downloadable version of the **Healthcare Human Factors Group Report** can be found [here](#)

The **OHTAC recommendation** for this technology can be found [here](#)

Technologies Currently Under Review

Cardiac positron emission tomography	Hydrophilic Catheters
Electroanatomic cardiac mapping and ablative techniques	Energy Delivery Systems for treatment of Benign Prostatic Hyperplasia (BPH)
Intravascular coronary ultrasound	Routine Eye Exams
Metal-on-metal Hip Resurfacing	Bone Densitometry
Implantable Cardioverter defibrillator	In-Vitro Fertilization
Gastric Electrical Stimulation	Diagnostic Imaging
Functional Brain Imaging (includes Magnetic Resonance Spectroscopy and Magnetoencephalography)	Horizon Scanning: Nanotechnology
Methadone Compliance Testing	Optimal Health System Design for Screening
Breast Cancer Screening and Optimum Imaging Breast Technologies for Women 40-49 years of age	Optimum Imaging Breast Technologies for Women 40-49 years of age— Modalities other than Mammography
Integrated Health Technology Literature Reviews	
Heart failure	
Literature Reviews Being Updated	
Mid-Urethral Slings (February 2004)	Negative Pressure Wound Therapy (December 2004)

Previous OHTAC Recommendations

[Polysomnography in Patients with Obstructive Sleep Apnea](#)

[Portable Bladder Ultrasound](#)

[Artificial Disc Replacement for Lumbar and Cervical Degenerative Disc Disease](#)

[Magnetic Resonance Imaging \(MRI\) Environment Safety in Ontario](#)

[Extracorporeal Photophoresis \(ECP\)](#)

[Enhanced External Counterpulsation \(Update\)](#)

[Ultrasound Screening for Abdominal Aortic Aneurysm](#)

[Coil Embolization for Intracranial Aneurysms \(Update\)](#)

[Automated External Defibrillators](#)

[Interim Report on Drug Eluting Stents](#)

[Endovascular Repair of Descending Thoracic Aortic Aneurysm](#)

[Air Cleaning Technologies](#)

[Technologies for Osteoarthritis of the Knee \(Integrated Health Technology Policy Assessment\)](#)

[Biventricular Pacing \(Cardiac Resynchronization Therapy\)](#)

[Arthroscopic Lavage and Debridement](#)

[Hyperbaric Oxygen Therapy for Non-Healing Ulcers in Diabetes Mellitus](#)

June 2006

April 2006

April 2006

April 2006

March 2006

March 2006

January 2006

January 2006

December 2005

December 2005

November 2005

November 2005

October 2005

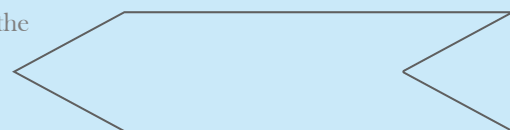
September 2005

September 2005

August 2005

Continued on page 6

OHTAC is envisaged as the first step in creating a single portal for providing advice to the Ontario Ministry of Health and Long-Term Care regarding the uptake, diffusion, and distribution of new health technologies. Find out more about OHTAC, its application process, and its recommendations [here](#).



<u>Interim Report on Endovascular Repair of Abdominal Aortic Aneurysm (EVAR)</u>	July 2005
<u>Intra-Articular Viscosupplementation With Hylan G-F 20 To Treat Osteoarthritis of the Knee</u>	June 2005
<u>Total Knee Replacement</u>	June 2005
<u>Intrathecal Baclofen Pump for Spasticity</u>	May 2005
<u>Osteogenic Protein-1</u>	April 2005
<u>Multi-detector Computed Tomography Angiography for Coronary Artery Disease</u>	April 2005
<u>Spinal Cord Stimulation for Neuropathic Pain</u>	March 2005
<u>Sacral Nerve Stimulation for Urinary Incontinence, Urgency-Frequency, Urinary Retention, and Fecal Incontinence</u>	March 2005
<u>Deep Brain Stimulation in Parkinson's Disease and Other Movement Disorders</u>	March 2005
<u>Bariatric Surgery</u>	January 2005
<u>Vacuum Assisted Closure Therapy for Chronic Wounds</u>	December 2004
<u>Balloon Kyphoplasty</u>	December 2004
<u>Thermal Balloon Endometrial Ablation for Dysfunctional Uterine Bleeding</u>	October 2004
<u>Primary Angioplasty</u>	September 2004
<u>Bispectral Index Monitor</u>	August 2004
<u>Radio Frequency Ablation for Primary Liver Cancer</u>	June 2004
<u>Repetitive Transcranial Magnetic Stimulation for Major Depressive Disorder</u>	June 2004
<u>Coil Embolization For Intracranial Aneurysms</u>	March 2004
<u>Pyrocarbon Finger Joint Implant</u>	March 2004
<u>Video Laryngoscopy for Tracheal Intubation</u>	March 2004
<u>Bone Morphogenetic Proteins and Spinal Surgery for Degenerative Disc Disease</u>	March 2004
<u>Artificial Discs for Cervical and Lumbar Spinal Surgery for Degenerative Disease</u>	March 2004
<u>Computer-Assisted Hip and Knee Arthroplasty: Navigation and Robotic Systems</u>	March 2004
<u>Computer-Assisted Surgery Using Telemanipulators</u>	March 2004
<u>Tension-free Vaginal Tape for Stress Urinary Incontinence</u>	February 2004
<u>Patient Monitoring System for MRI</u>	February 2004



OHTAC is envisaged as the first step in creating a single portal for providing advice to the Ontario Ministry of Health and Long-Term Care regarding the uptake, diffusion, and distribution of new health technologies. Find out more about OHTAC, its application process, and its recommendations [here](#).

To subscribe or unsubscribe to our bulletin, please contact us at the information below:



**Medical Advisory Secretariat,
Ontario Ministry of Health and Long-Term Care
56 Wellesley Street West, 8th Floor
Toronto, ON, Canada M5S 2S3**

Tel: 416-314-1092

Fax: 416-325-2364

TTY: 1-800-387-5559

Email: MASinfo@moh.gov.on.ca

Web: http://www.gov.on.ca/english/providers/program/mas/mas_mn.html