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About the E-Bulletin

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

In each E-Bulletin issue you will find brief summaries of technology reviews conducted on behalf of OHTAC by the Medical Advisory Secretariat.

The complete Health Technology and Policy Assessment (HTPA) reports for each technology review conducted by OHTAC, together with the accompanying recommendations, can be downloaded from the OHTAC website located [here](#).

Horizon Scanning: Nanotechnology

Issue

The Ontario Health Technology Advisory Committee (OHTAC) met on November 17, 2006 to review the current status of scientific developments in the field of nanotechnology (structures, devices or systems with a length scale of approximately 1 to 100 nanometres) including an assessment of the possible disruptive impact on health care services of this technology in the future.

Historically, nanotechnology products involving drug reformulation and contrast agents for imaging were developed approximately twenty years ago. Since these first generation nanodevices have been in use for several years, they were not considered the focus of this Horizon Scan report.

Second generation nanotechnologies currently under development are more sophisticated than first generation nanotechnologies due to novel molecular engineering that enables the devices be developed to target a specific problem (e.g. tumour), image, deliver a therapeutic agent and monitor a therapeutic effect in real time. Examples of second generation nanodevices include quantum dots for imaging, nanoshells that destroy tumour cells in the presence of a magnetic field, and multifunctional nanodevices that combine imaging and therapeutic capabilities all in a single device.

The Medical Advisory Secretariat (MAS) conducted a horizon scan review to determine:

- a) What is the current status of these multifunctional nanotechnologies and what is the projected timeline to clinical utilization?
- b) What are the systemic effects of nanotechnologies that target, image and deliver drugs – e.g., health human resources, training, new specialty?

Findings

Based on the MAS analysis and committee discussion, OHTAC found the following:

- The clinical use of separate imaging and therapeutic nanodevices is estimated to start occurring around 2010.
- The clinical use of combined imaging and therapeutic nanodevices is estimated to start occurring around 2020.
- Changes in the way disease is diagnosed, treated and monitored are anticipated.

Continued



About OHTAC

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](#).



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Website Survey – We are conducting a brief survey to find out more about who is accessing the MAS and/or OHTAC websites. We would greatly appreciate if you would take a moment to complete the [survey](#).

- The full extent of these potential changes during the next 10-20 years is presently unclear and unpredictable. Uncertainties that are sparsely or not addressed in the literature include:
- Long term stability and toxicology of nanodevices
- Cost-effectiveness
- Refinement of specific targeting
- Where does disease begin if therapy is applied before the symptoms have occurred?
- Effects on hospitals, physician/nurse training, creation/removal of specialties.

OHTAC Recommendations

Based on the above, OHTAC recommends that the Medical Advisory Secretariat (MAS) update its horizon scan of nanotechnology annually.

MAS will continue to monitor the literature and update accordingly. In addition, MAS has shared this information with the Division of Health Human Resources MOHLTC and will work closely with them as more information becomes available.

The full downloadable version of the OHTAC recommendation for this technology can be found [here](#)

The full downloadable version of this Health Technology Policy Analysis by the Medical Advisory Secretariat can be found [here](#).

About the Medical Advisory Secretariat

The mandate of the Medical Advisory Secretariat is to provide evidence-based policy advice on the coordinated uptake of new health technologies and health services in Ontario to the ministry and other government agencies.

Through systematic reviews of scientific evidence and consultation with experts in the medical community, the Medical Advisory Secretariat provides up-to-date evidence-based assessment and advice to government health care decision-makers about emerging health technologies and health services. The aim is to ensure that residents of Ontario have access to the best available new health technologies that will improve patient outcomes.

The Medical Advisory Secretariat also provides a secretariat function and evidence-based health technology policy analysis for review by the Ontario Health Technology Advisory Committee (OHTAC).

Subscription Information

The OHTAC E-Bulletin is published by the Medical Advisory Secretariat of the Ontario Ministry of Health and Long-Term Care.

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Implantable Cardioverter Defibrillators

Issue

Sudden Cardiac Deaths (SCD) are caused by the onset of fatal arrhythmias: ventricular tachycardia (VT) and ventricular fibrillation (VF). Approximately 80% of fatal arrhythmias are associated with ischemic heart disease. Management of VT and VF with antiarrhythmic drugs may have adverse effects. Due to this, other non-drug treatments have been explored.

An implantable cardiac defibrillator (ICD) is a battery-powered device that monitors heart rhythm and can deliver an electric shock to restore normal rhythm when potentially fatal arrhythmias are detected. Use of ICDs to prevent SCD in patients resuscitated from cardiac arrest or documented dangerous ventricular arrhythmia (secondary prevention) is an insured service in Ontario.

In 2003 the Medical Advisory Secretariat

conducted a health technology policy assessment on the prophylactic use (primary prevention of SCD) of ICDs for patients at high risk of SCD. The Medical Advisory Secretariat concluded that ICDs are effective for the primary prevention of SCD. Moreover, it found that a more clearly defined target population at risk for SCD that would be likely to benefit from ICDs is needed, given that the number needed to treat (NNT) is 13, and given that the per-unit cost of ICDs is \$32,000, which means that the maximum projected cost to Ontario is \$770 million (Cdn).

Accordingly, as part of an annual review and publication of more recent articles, the Medical Advisory Secretariat updated its health technology policy assessment of ICDs.

Findings

An updated systematic review of the literature to May 2005 by MAS concluded:

- Overall, there is evidence that ICDs are effective for the primary prevention of SCD. Each of the three studies examined showed that there was a statistically significant decrease in overall mortality for patients who prophylactically received an ICD versus conventional treatment in the respective study populations.

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OHTAC Mandate

Examine proposed health technologies in the context of existing clinical practice.

- Provide advice and recommendations to MOHLTC, practitioners and the broader health care system based on a systematic, objective, evidence-based technology assessment and taking into account economic, human resource, regulatory and ethical considerations
- Create a forum to maximize opportunities and prioritize the uptake and diffusion of new / emerging health technologies deemed to significantly improve patient outcomes and/or systems efficiencies relative to other existing or competing interventions.
- Outline implications for implementing OHTAC recommendations including the impact on the public, society, health care sectors and professions
- Provide advice regarding the field evaluation of technologies deemed to be potentially useful but for which there is inadequate existing quality evidence to support multi-million dollar, multi-year investments.
- Provide transparency regarding its recommendations and the analyses upon which these recommendations are made to Ontario's health care system

- The results of a more recent ICD trial (SCDHeFT, 2005) are not generalizable to the prevalent population in Ontario. The uncertainty around the cost estimate of treating the prevalent population with LVEF <30% in Ontario, the lack of human resources to implement such a strategy and the high number of patients who would be required to receive an ICD to prevent one SCD (number needed to treat: 13) calls for an alternative strategy that allows the appropriate uptake and diffusion of ICDs for primary prevention of patients at maximum risk for SCD defined by the most recent clinical trial (SCDHeFT 2005).
- The uptake and diffusion of ICDs for primary prevention of SCD should therefore be based on risk stratification through the use of appropriate screen(s) that would identify patients at highest risk who could derive most benefit from this technology.

OHTAC Recommendations

Based on the above, OHTAC recommended the following with regard to ICDs for primary prevention of SCD:

- Conditional and reviewable funding should be provided for up to 1,600 ICDs per year over the next 2 years to be used in a field evaluation in Ontario examining the use of ICDs for primary prevention of SCD. This would include the ICDs currently being used for the purposes of primary prevention. The field evaluation will explore/verify the wide QRS interval as a screen to risk stratify patients with ischemic heart failure who could derive most benefit from ICDs in the primary prevention of SCD. Since follow-up of patients in this evaluation would take an additional 1-2 years on completion of the study, this level of funding should apply until the final result of the study is available at which time definitive funding levels would be determined based on the evaluation of outcomes. The Ministry could consider funding ICDs for primary prevention of SCD only for patients with ischemic heart failure and a wide QRS interval without validation of this screen, but OHTAC believes that this approach will be challenged on methodological grounds referred to above.
- That the December 2004 report of the Primary Prevention ICD/CRT

Task Force be made available.

In accordance with the Primary Prevention ICD/CRT Task Force OHTAC further recommends:

- That hospitals funded to provide ICD services be expected to participate in the field evaluation and to collect and report ICD data to the database. Future funding for ICD implantation for primary prevention will be determined following the results of the field evaluation.
- That eligibility criteria for patients to receive an ICD for primary prevention includes only patients with an ejection fraction <30% and on optimized medical therapy.
- That the ministry support an ICD database for the purpose of monitoring utilization, patient characteristics, uptake and long-term outcomes.
- That ICDs be inserted at advanced arrhythmia centres with the involvement of a cardiac electrophysiologist. ICD centres must insert a minimum of 100 devices annually.

continued

- That the ministry revise the current ICD funding rate to reflect changes in practice, replacement devices and follow-up costs.
- OHTAC will appoint an expert panel that will report their final advice to OHTAC so that it may make recommendations regarding the integration of technologies to treat HF, excluding drugs.

Implications

To date, science is unclear about what type of person is most susceptible to having a first-time fatal heart rhythm that is correctable by an ICD.

The aim of the field evaluation is to identify patients at high risk of dying from a first-time fatal heart rhythm and who could derive the greatest benefit from ICD implantation.

The Ministry is currently in discussions with the study investigators to initiate the ICD field evaluation.

The field evaluation, which is engaging cardiologists from across the province, will identify high risk patients who could derive most benefit from this technology and make ICD implantation more feasible.

The December 2004 report of the Primary Prevention ICD/CRT Task Force is available [here](#).

The full downloadable version of the OHTAC recommendation for this technology can be found [here](#)

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Health Technologies

Technology encompasses interventions at all stages of health care, from primary prevention and early detection of disease and risk factors, to diagnosis, treatment, rehabilitation and palliative care.

Health technologies may include new and existing diagnostic and treatment-related medical devices and services, equipment and supplies; laboratory tests and clinical procedures used in any health services delivery settings.

Health technologies examined do not include pharmaceuticals or information technology systems.

Your Input Helps

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From Science to Policy

Information concerning the health benefits; economic and human resources; and ethical, regulatory, social and legal issues relating to the technology assist policy makers to make timely and relevant decisions to maximize patient outcomes.

Ontario Diabetes Economic Model

Background

Healthcare costs for the treatment of persons with diabetes in Canada amount to approximately \$9 billion annually. Diabetes is estimated to affect more than 734,000 Ontarians and this number is expected to increase to 1.2 million by 2010, with 90-95% having type 2 diabetes. In recognition of this burden and the potential to decrease it, one of the recommendations of the 2003 Diabetes Task Force was to identify a diabetes economic model that could be used to estimate the long-term cost-effectiveness of various diabetes interventions in Ontario.

Following a review of the published literature, it was decided that the United Kingdom Prospective Diabetes Study (UKPDS) Outcomes Model was to be adapted to the Ontario setting. The UKPDS Outcomes Model developed at Oxford University based on the results of a large prospective randomized trial (UKPDS), and predicts the lifetime occurrence of 7 diabetes-related complica-

tions (i.e. ischemic heart disease, myocardial infarction, heart failure, stroke, blindness, renal failure and amputation), death and associated healthcare costs. Ultimately, the model can permit the Ministry of Health and Long-Term Care to prioritize investments with respect to the treatment and management of diabetes.

Building this model through a MOHLTC funded collaboration between the Program for Assessment of Technology in Health (PATH) and Oxford University, the primary objectives were to:

- Adapt the UKPDS Outcomes Model to the Ontario setting
- Illustrate how the Ontario Diabetes Economic Model (ODEM) can be used to estimate the long-term costs and consequences of a diabetes management strategy by using data from an 18-month multidisciplinary primary care diabetes management program introduced in Sault Ste. Marie

Key Findings

- In collaboration with researchers at the Institute of Clinical and Evaluative Sciences (ICES), it was estimated that there were 734,113 patients with diabetes in the Ontario Diabetes Database (ODD) and over

1.39 million diabetes-related events. Linking the ODD to various administrative databases (e.g. CIHI) allowed for the measurement of healthcare resource utilization by people with diabetes in Ontario.

continued

Contact Information

Medical Advisory Secretariat
Ontario Ministry of Health and Long-Term Care

20 Dundas Street West, 10th Floor,
Toronto, ON, Canada,
M5G 2N6

Tel: 416-314-1092
Fax: 416-325-2364
Email: MASinfo@moh.gov.on.ca

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Subsequently assigning Ontario unit costs to this utilization permitted the adaptation of the UKPDS Outcomes Model to the Ontario setting, the ODEM. Generally, the total health-care cost of a complication in the year of the event was substantially higher than in subsequent years (e.g. cost of amputation in the first year was \$34,470 and \$4,721 in following years).

- The application of the ODEM using the results from a multidisciplinary primary care diabetes management

program introduced in Sault Ste. Marie predicted that improvements in short-term clinical outcomes (e.g. HbA1c, blood pressure) impact long-term costs of care by preventing complications and hospitalizations in later years. Results indicated that compared to no intervention, this diabetes program represents good value for money (i.e. incremental cost-effectiveness ratio of \$5,992 per Quality Adjusted Life Year (QALY) gained in the base case analysis).

OHTAC Recommendations

OHTAC makes the following recommendation:

- Obtain data sets from all existing and new diabetes programs for input into the model in order to test the effectiveness of these interventions.

Implications

The development of the Ontario Diabetes Economic Model described in this report provides policymakers with a vehicle for assessing the long-term economic benefits, in terms of health outcomes (i.e. life years gained and quality-adjusted life-years gained) and healthcare costs of diabetes interventions. In addition to the development of an Ontario-specific long-term diabetes economic model, there are a number of other important results from this report, two of which are:

- 1) the calculation of an estimate of the cost of treating diabetes in Ontario; and
- 2) a variety of cost estimates that may be readily translated into cost parameters for any type of economic model.

The full downloadable version of this PATH study report can be found [here](#).

2007

February [Screening Mammography](#)

2006

October [In Vitro Fertilization and Multiple Pregnancies](#)

August [Energy Delivery Systems for Treatment of Benign Prostatic Hyperplasia](#)

August [Gastric Electrical Stimulation](#)

July [Negative Pressure Wound Therapy](#) - Updated

June [Computed Tomography Radiation Safety Issues in Ontario](#)

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

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January [Coil Embolization for Intracranial Aneurysms \(Updated\)](#)

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December [Advanced Electrophysiologic Mapping and Catheter Ablation for the treatment of complex cardiac arrhythmias](#)

December [Positron Emission Tomography for the Assessment of Myocardial Viability](#)

December [Automated External Defibrillators](#)

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

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September [Biventricular Pacemakers \(Cardiac Resynchronization Therapy\)](#)

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

June [Arthroscopic Lavage and Debridement for Osteoarthritis of the Knee](#)

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June	Intra-Articular Viscosupplementation With Hylan G-F 20 for Treatment of Osteoarthritis Knee Pain
June	Physiotherapy Rehabilitation after Total Knee or Hip Replacement
May	Intrathecal Pumps for Baclofen Infusion for Spasticity
May	Interim Report on Endovascular Repair of Abdominal Aortic Aneurysms (EVAR)
April	Osteogenic Protein-1 for Long Bone Nonunion
April	Multi-Detector Computed Tomography Angiography for Coronary Artery Disease
March	Spinal Cord Stimulation for the Management of Neuropathic Pain
March	Sacral Nerve Stimulation for the Management of Urge Incontinence, Urgency-Frequency, Urinary Retention and Fecal Incontinence
March	Deep Brain Stimulation in Parkinson's Disease and Other Movement Disorders
January	Bariatric Surgery

2004

December	Balloon Kyphoplasty
December	Vacuum-assisted closure (V.A.C. therapy) for chronic wounds (Updated : please see July 2006 Recommendation)
October	Thermal Balloon Endometrial Ablation for Dysfunctional Uterine Bleeding (TBEA)
September	Primary Angioplasty
August	Bispectral Index Monitor
June	Repetitive Transcranial Magnetic Stimulation (rTMS) for the Treatment of Major Depressive Disorder
June	Radiofrequency Ablation for hepatocellular carcinoma or primary liver cancer
May	Indication for Positron Emission Tomography Imaging of a Single Pulmonary Nodule
March	Pyrocarbon Finger Joint Implants
March	Endovascular Coil Embolization for the Treatment of Intracranial Aneurysm (Updated : please see January 2006 Recommendation)
March	Computer assisted Surgery using Telemanipulators
March	Computer assisted Hip and Knee Arthroplasty : Navigation and Robotic Systems
March	Video-assisted Laryngoscopy for Tracheal Intubation
February	Bone Morphogenetic Proteins and Artificial Disc use in spinal surgery for degenerative disc disease
February	Patient Monitoring System for Magnetic Resonance Imaging (MRI)
February	Tension-free Vaginal Tape for Stress Urinary Incontinence in Women (Updated : please see February 2006 Recommendation)