Session B: The Evidence Revolution

Partnering to accelerate best care, best health, best value

Des partenariats pour offrir de meilleurs soins, être en meilleure santé, optimiser les ressources
Evidence Development and Policy: The Ontario Evidence Revolution

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Chief Scientific Officer MaRS Excellence in Clinical Innovation and Technology Evaluation Program (EXCITE)
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Summary of Presentation on Ontario’s Application of Evidence-Based Analysis

• Defining the issue
• System-wide approach to evidence development and translation to policy
• Evidence
  o Identifying effective and cost-effective single technologies
  o Addressing uncertainty in decision making due to low quality evidence (Field evaluations)
  o Pre-market application of evidence (MaRS EXCITE) – the alternative to post market evaluation?
  o Identifying the best investment into disease conditions and health states (Mega-analysis)
  o Bending cost and diffusion curves
  o Finding obsolescence (Appropriateness)
  o Shaping health funding models (Quality based funding)
Realities of Market-Driven Approach

• Imbalance between fiscal constraint and increased product line:
  ➢ 66-76% of the growth in real medical spending
  ➢ Choices becoming tougher
  ➢ Public perception that “new is better”
  ➢ Enthusiasm to profile through early adoption
  ➢ Short market exclusivity for industry could drive aggressive marketing
From Pill-Popping to Bionic Man

<table>
<thead>
<tr>
<th>Condition</th>
<th>Example Drugs Used</th>
<th>Non-drug technologies as adjunct or replacement to drugs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ventricular arrhythmias</td>
<td>Amiodorone</td>
<td>Implantable cardiac defibrillator</td>
</tr>
<tr>
<td>Atrial fibrillation</td>
<td>Digoxin, coumadin, ca+ channel blockers</td>
<td>Endocardial ablation</td>
</tr>
<tr>
<td>Obesity</td>
<td>Lipase inhibitors, appetite suppressants</td>
<td>Bariatric surgery</td>
</tr>
<tr>
<td>Depression</td>
<td>Antidepressants</td>
<td>Deep brain stimulation</td>
</tr>
<tr>
<td>Parkinsons</td>
<td>L-Dopa</td>
<td>Deep brain stimulation</td>
</tr>
<tr>
<td>Acute MI</td>
<td>Thrombolysins</td>
<td>Coronary stents (primary angioplasty)</td>
</tr>
<tr>
<td>Hypertension</td>
<td>Various</td>
<td>Renal denervation</td>
</tr>
<tr>
<td>End-stage heart failure</td>
<td>Inotropic drugs</td>
<td>Bridge to transplantation and destination ventricular assist devices</td>
</tr>
</tbody>
</table>
## Non-Drug Technologies (NDT) Displacing Other NDTs

<table>
<thead>
<tr>
<th>Condition</th>
<th>Example Existing NDT</th>
<th>NDT as Adjunct or Replacement to Existing NDT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stress urinary incontinence</td>
<td>Colposuspension</td>
<td>Mid-urethral slings</td>
</tr>
<tr>
<td>Brain aneurysms</td>
<td>Surgical clipping</td>
<td>Endovascular coil embolisation</td>
</tr>
<tr>
<td>Coronary artery disease</td>
<td>Coronary angiography</td>
<td>64-slice CT angiography</td>
</tr>
<tr>
<td>Cervical cancer screen</td>
<td>Cytological examination</td>
<td>HPV testing/Immunization</td>
</tr>
<tr>
<td>Repair of aneurysms</td>
<td>Surgical repair</td>
<td>Endovascular graft repair</td>
</tr>
<tr>
<td>Degenerative lumbar discs</td>
<td>Spinal fusion</td>
<td>Artificial lumbar discs</td>
</tr>
<tr>
<td>Fracture non-union</td>
<td>Autologous bone graft</td>
<td>Osteogenic Protein 1®</td>
</tr>
<tr>
<td>Dysfunct. uterine bleeding</td>
<td>Hysterectomy</td>
<td>Endometrial ablation</td>
</tr>
</tbody>
</table>
Ontario’s Evidence Revolution: Commitment to Evidence in Healthcare

Development of EBA Capacity and OHTAC 2003 to Present:

Ontario Excellent Care for All Act (2010)
The people of Ontario and their Government:
• Will ensure that healthcare providers are supported to plan for and improve the quality of care they deliver based on the best available scientific evidence. (HQO formed to promulgate quality based on evidence)

Drummond Report (2012)
• (Health care) Policies should be based on evidence that provides guidance on what services, procedures, devices and drugs are effective, efficient and eligible for public funding

Ontario Government Budget (2012)
• Evidence will drive decisions on funding new and existing procedures. The government is committed to funding only those services that are supported by medical evidence.
• The government will accelerate the evidence-based approach to care by building on the mandate of Health Quality Ontario (HQO)
HQO/OHTAC Associated Structures & Linkages

MOH/Cabinet → HQO Board → MOHLTC/Health System/AWG

Physicians Schedule of Benefits

LHINs – Implementation: Hospitals, Community Agencies, etc...

MOHLTC with GIS

OHTAC Implementation Committee

Requests

Knowledge Transfer

Stakeholder Engagement

Field Evaluations

- Technology evaluation PATH, THETA, ICES
- Safety evaluation Usability Lab

Outcomes Tracked by MOHLTC with GIS

Evidence Development & Standards HQO

Expert Panels

PATH (McMaster Univ.)

THETA (Univ. of Toronto)

Intermediate care
- Cardiac
- Arthritis
- PET
- Diabetes
- OCDM
- Aging
- Wound care
- COPD
- Stroke
- CT Angiography

Professional, public, and industry feedback loop
Decision Framework Used by OHTAC

<table>
<thead>
<tr>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Overall Clinical Benefit</td>
</tr>
<tr>
<td>- Effectiveness and safety</td>
</tr>
<tr>
<td>2. Consistency with Societal/Ethical Values</td>
</tr>
<tr>
<td>3. Value for Money:</td>
</tr>
<tr>
<td>- ICER</td>
</tr>
<tr>
<td>- Cost utility</td>
</tr>
<tr>
<td>- Acceptability curves</td>
</tr>
<tr>
<td>- Cost consequence</td>
</tr>
<tr>
<td>4. Feasibility of Adoption into the Health System</td>
</tr>
</tbody>
</table>
>110 Single Technology Analyses by MAS, PATH & THETA

92% Conversion to Policy

2010 (to July 2010)
- 64-Slice Computed Tomographic Angiography for the Diagnosis of Intermediate Risk Coronary Artery Disease
- Cancer Screening With Digital Mammography for Women at Average Risk for Breast Cancer, Magnetic Resonance Imaging (MRI) for Women at High Risk: An Evidence-Based Analysis
- Cardiac Magnetic Resonance Imaging for the Diagnosis of Coronary Artery Disease
- Clinical Utility of Vitamin D Testing
- Endovascular Laser Treatment for Varicose Veins
- Extracorporeal Lung Support Technologies: Bridge to Recovery and Bridge to Lung Transplantation in Adult Patients
- Magnetic Resonance Imaging for the Assessment of Myocardial Viability
- Non-Invasive Cardiac Imaging Technologies for the Assessment of Myocardial Viability
- Non-invasive Cardiac Imaging Technologies for the Diagnosis of Coronary Artery Disease
- Population-Based Strategies for Smoking Cessation
- Positron Emission Tomography (PET) for the Assessment of Myocardial Viability
- Single Photon Emission Computed Tomography for the Diagnosis of Coronary Artery Disease
- Solid Organ Transplantation for End Stage Liver Failure in persons with HIV
- Stress Echocardiography for the Diagnosis of Coronary Artery Disease
- STRESS Echocardiography with Contrast for the Diagnosis of Coronary Artery Disease
- Use of Contrast Agents with Echocardiography in Patients with Suboptimal Echocardiography

2009
- Airway Clearance Devices for Cystic Fibrosis
- Diabetes Strategy Evidence Platform
- Fenestrated Endovascular Grafts for the Repair of Juxtarenal Aortic Aneurysms
- Intravascular Lenses for the Treatment of Age-Related Cataracts
- Intravascular Comal Ring Implants for Comal Thinning Disorders
- Optical Coherence Tomo. for Age-Related Macular Degeneration & Diabetic Macular Edema
- Oral Appliances for Obstructive Sleep Apnea
- Phakic Intravascular Lenses for the Treatment of Low to High Retractive Errors
- Point-of-Care International Normalized Ratio (INR) Monitoring Devices for Patients on Long-term Oral Anticoagulation Therapy
- Prevention and Management of Chronic Pressure Ulcers
- Screening Methods for Early Detection of Colorectal Cancers and Polyps
- Specialized Multidisciplinary Community-Based Care (SMCC) Series
- Ultraviolet Phototherapy Management of Moderate-to-Severe Psoriasis

2008
- Aging in the Community
- Aging in the Community: Summary of Evidence-Based Analyses
- Behavioural Interventions for Urinary Incontinence in Community-Dwelling Seniors
- Caregiver- and Patient-Directed Interventions for Dementia
- Limbal Stem Cell Transplantation
- Prevention of Falls and Fall-Related Injuries in Community-Dwelling Seniors
- Social Isolation in Community-Dwelling Seniors
- The Falls/Fractures Economic Model in Ontario Residents Aged 65 Years and Over (FEMOR)

2007
- Anal Dysplasia Screening
- Low-Density Lipoprotein Apheresis
- Multidetector Computed Tomography for Coronary Artery Disease Screening in Asym. Pop
- Scintimammography as an Adjunctive Breast Imaging Technology
- Screening Mammography for Women Aged 40 to 49 Years at Average Risk for Breast Cancer

2000
- Ablation for Atrial Fibrillation
- Advanced Electrophysiological Mapping Systems
- Artificial Disc Replacement for Lumbar and Cervical Degenerative Disc Disease
- Carl S. Bricker Award for Intracranial Anomalies
- Energy Delivery Systems for Treatment of Benign Prostatic Hyperplasia
- Enhanced External Counterpulsation (EECP)
- Extracorporeal Photopheresis (ECP)
- Functional Brain Imaging
- Gastric Electrical Stimulation
- Hydrophilic Catheters
- In Vitro Fertilization and Multiple Pregnancies
- Intravascular Ultrasound to Guide Percutaneous Coronary Interventions
- Metal-on-Metal Total Hip Resurfacing Arthroplasty
- Minimally-Invasive Total Knee Replacement
- Negative Pressure Wound Therapy
- Optimum Methadone Compliance Testing
- Polysomnography in Patients with Obstructive Sleep Apnea
- Portable Bladder Ultrasound
- Routine Eye Exams
- Ultrasound Imaging for Abdominal Aortic Aneurysm
- Utilization of DXA Bone Mineral Densitometry in Ontario

2005
- Bariatric Surgery
- Deep Brain Stimulation in Parkinson's Disease and Other Movement Disorders
- Sacral Nerve Stimulation for Urinary Urgency Incontinence, Urgency-Frequency, Urinary Retention, and Fecal Incontinence
- Spinal Cord Stimulation for Neuropathic Pain
- Multi-Detector Computed Tomography Angiography for Coronary Artery Disease
- Osteogenic Protein-1 for Long Bone Nonunion
- Intrathecal Baclofen Pump for Spasticity
- Physiotherapy Rehabilitation After Total Knee or Hip Replacement
- Total Knee Replacement
- Intra-Articular ViscoSupplementation with Hyaluronan G-F 20 To Treat Osteoarthritis of the Knee
- Hyperbaric Oxygen Therapy for Non-Healing Ulcers in Diabetes Mellitus
- Arthroplasty for Total Hip and Knee Replacement
- Biventricular Pacing (Cardiac Resynchronization Therapy)
- Implantable Cardioverter Defibrillators (ICD)
- Technologies for Osteoarthritis of the Knee
- Positron Emission Tomography for the Assessment of Myocardial Viability
- Air Cleaning Technologies
- Endovascular Repair of Descending Thoracic Aortic Aneurysm
- Automated External Defibrillators

2004 (and prior)
- Balloon Kyphoplasty
- Biophysical Index Monitor
- Bone Anchored Hearing Aid (BAHA)
- Bone Morphogenetic Proteins and Spinal Surgery for Degenerative Disc Disease
- Computed Tomographic Colonography
- Computer-Assisted Surgery Using Telemanipulators
- Endovascular Repair of Abdominal Aortic Aneurysm
- Functional Cardiac Magnetic Resonance Imaging in the Assessment of Viability and Perfusion
- Gamma Knife
- Intracoronary Radiation: An Evidence-Based Analysis
- Islet Transplantation
- Left Ventricular Assist Devices
- Neonatal Screening of Inborn Errors of Metabolism Using Tandem Mass Spectrometer
- Patient Monitoring System for MRI (PDF)
- Primary Angioplasty for the Treatment of Acute ST-Segment Elevated Myocardial Infarction
- Piroxicam Finger Joint Implant
- Radio Frequency Ablation for Primary Liver Cancer
- Repetitive Transcranial Magnetic Stimulation for the Treatment of Major Depressive Disorder
- Small Bowel Transplant
- Thermal Balloon Endomoral Ablation for Dysfunctional Uterine Bleeding (TBEA)
- Video Laryngoscopy for Tracheal Intubation
- Wireless Capsule Endoscopy

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E.G. Mid-urethral Slings for Stress Urinary Incontinence

Number of procedures

- Midurethral slings
- Colposuspension
- Combined

OHTAC Recommendation

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Tracking by Geographic Information Systems
Hysterectomy for Dysfunctional Uterine Bleeding 2010/2011
Rate ratio: rate of hysterectomies by residence compared to provincial average

Legend
Rate Ratio (# LHINs)
- 0.10 to < 0.75 (4)
- 0.75 to < 0.90 (2)
- 0.90 to < 1.10 (1)
- 1.10 to < 1.30 (2)
- 1.30 to 4.19 (5)

FY 2010/2011 Ontario Rate = 19.95 per 100,000
Dealing with Uncertainty: Field Evaluation Studies

• Post-market assessment of technology performance in the real world through primary data gathering

• Improves decision making prior to long-term commitment through appropriate adoption

• Designed to inform policy and funded by government

• Alternative is passive diffusion and intuitive decision making

<table>
<thead>
<tr>
<th>TECHNOLOGY (N)</th>
<th>CENTRE/ UNIT</th>
<th>TYPE OF STUDY</th>
<th>REASON FOR FIELD EVALUATION</th>
<th>RESULT</th>
<th>POLICY DECISION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drug eluting stents (DES) (21,000)</td>
<td>PATH with ICES, CCN, cardiologists</td>
<td>Pragmatic registry</td>
<td>Generalizability of RCT evidence and cost effective analysis</td>
<td>Only effective if high risk for re-stenosis</td>
<td>30% conversion to DES (90% in U.S.A.)</td>
</tr>
<tr>
<td>Endovasc. abd. aortic aneurysm repair (EVAR) (160)</td>
<td>PATH and single AHSC</td>
<td>Prospective observational</td>
<td>Safety assessment of endoleak</td>
<td>No endoleak. Cost effective for high surg. risk only</td>
<td>Increased funding to high surg. risk</td>
</tr>
<tr>
<td>Oncotype Dx (Ongoing) &gt;1500</td>
<td>OCOG</td>
<td>Observation</td>
<td>Uncertainty re-impact on treatment decision &amp; ↑ OOC demand</td>
<td>Ongoing</td>
<td>Definitive funding will in part be predicated on results</td>
</tr>
<tr>
<td>64-slice CT angiography (CTA) v coronary angiography (CA) (350)</td>
<td>PATH (12 cardiologists&amp; radiologists in 4 AHSCs)</td>
<td>CAD referred for CA also have CTA</td>
<td>Uncertainty re-generalizability</td>
<td>Different sensitivity compared to published data</td>
<td>Limit CT angiography to patients in whom coronary angiography is not possible</td>
</tr>
<tr>
<td>TECHNOLOGY [PET Studies] (N)</td>
<td>OVERSEEN BY</td>
<td>TYPE OF STUDY</td>
<td>REASON FOR FIELD EVALUATION</td>
<td>RESULT</td>
<td>POLICY DECISION</td>
</tr>
<tr>
<td>-----------------------------</td>
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</tr>
<tr>
<td>PET for head and neck cancer (400)</td>
<td>OCOG</td>
<td>Prospective cohort (Tested in same patient)</td>
<td>PET in pre surgery assessment post radiation</td>
<td>Adversely affects decision making</td>
<td>Not insured</td>
</tr>
<tr>
<td>PET staging locally advanced NSCLC (310)</td>
<td>OCOG</td>
<td>RCT</td>
<td>Clinical utility in radical treatment decisions</td>
<td>Reduced futile chemo</td>
<td>Insured service</td>
</tr>
<tr>
<td>PET for staging NSCLC (322)</td>
<td>OCOG</td>
<td>RCT</td>
<td>Resolve inconsistencies to inform funding</td>
<td>Reduced futile thoracotomy</td>
<td>Insured service</td>
</tr>
<tr>
<td>PET for staging breast cancer (320)</td>
<td>OCOG</td>
<td>Prospective cohort (Tested in same patient)</td>
<td>Compare PET to sentinel lymph node biopsy</td>
<td>No improvement</td>
<td>Not insured</td>
</tr>
<tr>
<td>PET for pre-liver metastatectomy in colon cancer (400)</td>
<td>OCOG</td>
<td>RCT</td>
<td>Utility in surgical decision making</td>
<td>Adds 3% accuracy to CT</td>
<td>Not insured</td>
</tr>
<tr>
<td>6 PET registry studies (1,700)</td>
<td>ICES</td>
<td>Prospective observational</td>
<td>Compliance with indications</td>
<td>Completed October 2009</td>
<td>Insured services</td>
</tr>
</tbody>
</table>
Impact of PET Expected Management of Patients With Cancer: CMS National Oncologic PET Registry

Hillner B E et al. JCO 2008;26:2155-2161

- 22,975 studies (83.7% PET/CT) from 1,178 centers
- Effect of PET on treatment decisions without understanding impact on patient outcomes!

<table>
<thead>
<tr>
<th>Indication</th>
<th>Post-PET</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planned biopsy</td>
<td>Avoided in 70%</td>
</tr>
<tr>
<td>Treatment</td>
<td>Change in type 8.7%</td>
</tr>
<tr>
<td></td>
<td>Change in goal 5.6%</td>
</tr>
<tr>
<td>Treatment or non-Treatment</td>
<td>More likely to lead to treatment 28.3% v 8.2% (OR 3.4 (CI 3.2-3.6))</td>
</tr>
<tr>
<td>Overall change in management</td>
<td>36.6%</td>
</tr>
</tbody>
</table>
“Something is Rotten in the State of Denmark”  
- *Hamlet*, Act 1, Scene 4

- Does HTA truncate the full spectrum of evidence required to inform decision making? (Is HTA passé?)

- RCTs assess efficacy compared to a gold standard within a “perfect world.” How do we deal with generalizability/external validity?
Life-Cycle Diffusion Curve (Pre-Market Evidence Based Analysis)

- Systematic review
- Cost-Effectiveness (CE)
- Effectiveness
- Horizon
- Develop
- Test

Efficacy
Safety
Value (CE)
Affordability
Ethical & societal
Post market conditions

Uncertainty
R & D

Investment
Regulation

Obsolescence
Diffusion
Unconditional Yes
Unconditional No

TIME
Key Steps in the EXCITE Process

SME and MNE Industry

Apply

Review by OHTAC subcommittee

Prioritization and Selection by EXCITE Board

Evaluation by EXCITE Methodological Centres

MOHLTC and Broader Health System

Communication re - accrual, safety, and recommendations for improvement
Mega-Analysis – Application of Evidence to Disease Conditions and Health States

• Mega-analyses to date:
  – Osteoarthritis of the knee MAS (2005)
  – Cardiac viability MAS (2005)
  – Aging in the community MAS/PADH (2008)
  – Colon cancer screening MAS/PADH (2008)
  – Diabetes MAS/PADH (2009)
  – Cardiac diagnostic tests MAS/THETA (2010)
  – COPD MAS/PADH (2011)
  – Optimized Chronic Disease Management MAS/PADH/THETA (2012)
  – Appropriateness EBAs MAS/PADH/THETA (2012)

• Micro-economic decision analytic models
  – Ontario Cardiovascular Model THETA (2009)
  – Ontario Wound Prevention & Care Models THETA (2010)
  – Ontario Arthritis Model PATH (2011)
  – Ontario COPD Model PATH (2011)
  – Ontario Optimized Chronic Disease Management PATH/THETA (2012)
## Diabetes Mega-Analysis

<table>
<thead>
<tr>
<th></th>
<th>Multidisciplinary Program</th>
<th>Insulin Pumps for Type 2</th>
<th>Behavioural Interventions</th>
<th>Bariatric Surgery</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\Delta$ HbA1c</td>
<td>-1.02%</td>
<td>-0.14%</td>
<td>-0.44%</td>
<td>-2.70%</td>
</tr>
<tr>
<td>$\Delta$ Costs (in billions)</td>
<td>$5.623$</td>
<td>$8.010$</td>
<td>$0.212$</td>
<td>$1.573$</td>
</tr>
<tr>
<td>$\Delta$ QALYs</td>
<td>290,424</td>
<td>4,222</td>
<td>5,957</td>
<td>100,196</td>
</tr>
<tr>
<td>$$/QALY$ gained</td>
<td>$19,869/QALY</td>
<td>$1.9M/QALY</td>
<td>$36,226/QALY</td>
<td>$15,697/QALY</td>
</tr>
<tr>
<td>$\Delta$ IHD</td>
<td>15,265</td>
<td>201</td>
<td>446</td>
<td>2,757</td>
</tr>
<tr>
<td>$\Delta$ MI</td>
<td>40,882</td>
<td>562</td>
<td>521</td>
<td>13,839</td>
</tr>
<tr>
<td>$\Delta$ Heart Failure</td>
<td>8,563</td>
<td>462</td>
<td>595</td>
<td>31,137</td>
</tr>
<tr>
<td>$\Delta$ Stroke</td>
<td>14,074</td>
<td>361</td>
<td>372</td>
<td>8,957</td>
</tr>
<tr>
<td>$\Delta$ Amputation</td>
<td>13,180</td>
<td>201</td>
<td>372</td>
<td>2,997</td>
</tr>
<tr>
<td>$\Delta$ Blindness</td>
<td>6,180</td>
<td>281</td>
<td>521</td>
<td>4,179</td>
</tr>
<tr>
<td>$\Delta$ Renal Failure</td>
<td>819</td>
<td>-8</td>
<td>74</td>
<td>17</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>Technology</th>
<th>Decision Without Evidence</th>
<th>Decision with Evidence</th>
<th>Annual Cost-Saving</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>*Drug-eluting stents</td>
<td>$58M</td>
<td>$38M</td>
<td>$20M</td>
<td>Approve only for high risk</td>
</tr>
<tr>
<td>*PET Scanning</td>
<td>$160M</td>
<td>$10M</td>
<td>$150M</td>
<td>Based only on clinical utility</td>
</tr>
<tr>
<td>*CT Angiography</td>
<td>$50M</td>
<td>$5M</td>
<td>$45M</td>
<td>Approved when coronary angio not possible</td>
</tr>
<tr>
<td>PSA Screening</td>
<td>$250M</td>
<td>$0M</td>
<td>$250M</td>
<td>Includes downstream costs</td>
</tr>
<tr>
<td>Breast cancer screening 40-49</td>
<td>$27M</td>
<td>$0</td>
<td>$27M</td>
<td>Assumes 40% uptake and 10% biopsy rate for average risk</td>
</tr>
<tr>
<td>Vitamin D testing</td>
<td>$70M</td>
<td>$10M</td>
<td>$60M</td>
<td>Do not approve for average risk</td>
</tr>
<tr>
<td>Infusion pumps for type 2 diabetes</td>
<td>$150M</td>
<td>$0</td>
<td>$150M</td>
<td>Cost ineffective. Amortised over 5 years assuming 25% uptake</td>
</tr>
<tr>
<td>Intra-articular hyaluronic acid</td>
<td>$63M</td>
<td>$0</td>
<td>$63M</td>
<td>Ineffective</td>
</tr>
<tr>
<td>Monofocal v multifocal lenses for cataract Sx</td>
<td>$86M</td>
<td>$0</td>
<td>$86M</td>
<td>Minimal advantage</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>$915M</strong></td>
<td><strong>$63M</strong></td>
<td><strong>$852M</strong></td>
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Other Initiatives Underway

• Optimizing Chronic Disease Management - to inform policy on a community based health system that optimizes patient outcomes, system efficiencies and hospitalisation rates

• Quality Based Funding based on evidence based best practice for episode of care in hospitals for heart failure, COPD and stroke admissions

• OHTAC Appropriateness Working Group (Using evidence to carve out $150M from health system attributed to obsolescence)
Speakers

• Shirlee Sharkey, CEO St. Elizabeth Home Health Care
• Naushaba Degani, Clinical Epidemiologist, HQO

• Dr. Dorothy Pringle, Professor Emeritus, Lawrence S. Bloomberg Faculty of Nursing, University of Toronto
• Imtiaz Daniel, Strategist, HQO

• Dr. Charles Wright, Professor Emeritus, Department of Health Care and Epidemiology, University of British Columbia
• Bronwen McCurdy, Clinical Epidemiologist, HQO
Optimizing Chronic Disease Management in the Community (Outpatient) Setting

Shirlee Sharkey, President and CEO, St. Elizabeth Home Health Care

Naushaba Degani, Clinical Epidemiologist, HQO
Background

- **Provincial legislation**: *Excellent Care for All Act* (ECFAA), focuses on improving the quality and value of the patient experience through the application of evidence-based health care. The four central principles are: patient centred care, continuous quality improvement, evidence-based care and support of improvements through policy levers.

- **Organizational mandate**: Under the mandate as established by ECFAA, HQO is exploring ways to reduce inappropriate hospitalizations and improve chronic disease management for select chronic conditions.

- **Advisory committee direction**: OHTAC advises that the hospitalization rate for chronic diseases is a surrogate measure of quality of outpatient or community-based care for people with chronic conditions.

- **Premise for the mega analysis**: Timely and effective outpatient management of chronic conditions can prevent the onset of complications, reduce the risk of acute episodes, prevent hospitalizations, improve clinical and health status and reduce associated mortality.

*This is the first attempt by any jurisdiction to develop a broad based evidentiary platform on which to inform public policy regarding a comprehensive approach to community based healthcare services.*
The Question

What evidence-based services are effective and cost-effective to optimize chronic disease* management in the community (outpatient) setting?

Outcome measures:

- Hospital utilization (admissions, readmissions, lengths of stay (LOS), emergency department utilization, admissions to long-term care facilities)
- Survival / mortality
- Health-related quality of life / functional status
- Disease-specific clinical measures
- Patient satisfaction

*Limited to the following conditions: COPD, CAD, CHF, atrial fibrillation, diabetes, stroke, chronic wounds and also including multiple chronic conditions/multi-morbidity
Mega Analysis Methodology
Strategy for Analysis

• Complete an initial scoping of the literature. Identify drivers and potential interventions for review.

• Strike Expert Advisory Panel to assist in selection of appropriate drivers / interventions and to contextualize the evidence for Ontario. Panel includes:
  - Policy makers
  - Researchers
  - Care providers
<table>
<thead>
<tr>
<th>Expert Panel Members</th>
<th>Affiliation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Chair:</strong> Shirlee Sharkey</td>
<td>Saint Elizabeth Home Health Care</td>
</tr>
<tr>
<td>Theresa Agnew</td>
<td>Primary care nurse practitioner, East End Community Health Centre</td>
</tr>
<tr>
<td>Onil Bhattacharyya</td>
<td>St. Michael’s Hospital; University of Toronto; ICES</td>
</tr>
<tr>
<td>Arlene Bierman</td>
<td>St. Michael’s Hospital; University of Toronto; ICES</td>
</tr>
<tr>
<td>Susan Bronskill</td>
<td>University of Toronto; ICES</td>
</tr>
<tr>
<td>Catherine Demers</td>
<td>Faculty of Health Sciences, McMaster University</td>
</tr>
<tr>
<td>Alba Dicenso</td>
<td>School of Nursing, McMaster University</td>
</tr>
<tr>
<td>Nick Kates</td>
<td>Health Quality Ontario – QI; McMaster University; Hamilton Family Health Team</td>
</tr>
<tr>
<td>Wendy Levinson</td>
<td>University of Toronto; University Health Network</td>
</tr>
<tr>
<td>Raymond Pong</td>
<td>Centre for Rural and Northern Health Research and Northern Ontario School of Medicine, Laurentian University</td>
</tr>
<tr>
<td>Fredrika Scarth</td>
<td>Ministry of Health and Long-Term Care</td>
</tr>
<tr>
<td>Michael Schull</td>
<td>Sunnybrook Health Sciences Centre; University of Toronto; ICES</td>
</tr>
<tr>
<td>Moira Stewart</td>
<td>Centre for Studies in Family Medicine, University of Western Ontario</td>
</tr>
<tr>
<td>Walter Wodchis</td>
<td>University of Toronto; HSPRN; THETA</td>
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</tbody>
</table>
Mega Report Elements

• Conduct individual evidence-based analyses

• Partner with PATH and THETA to conduct economic analysis

• Partner with CHEPA to conduct qualitative analyses on patient centredness and vulnerability as these concepts relate to chronic diseases and interventions under review

• For the final report, re-aggregate interventions and include input from the expert panel and findings from the economic and qualitative analyses
Scoping
Trajectory

- Stable in the Community
  - At risk for becoming unstable
- Unstable in Community
- Hospitalized
- Urgent care/Emergency care
- Long Term Care

From hospitalization to unstable in the community likely risks readmission or ED use.
Drivers

- Health Technologies
- Demographics / patient characteristics
- Lifestyle and self-management
- Community-based step up/step down care
- Other services

Community optimized care
Interventions
<table>
<thead>
<tr>
<th>Interventions under review</th>
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</thead>
<tbody>
<tr>
<td><strong>Health technologies</strong>: review of previous MAS EBAs (past five years) to identify technologies that are consistent with overall mega analysis objectives</td>
</tr>
<tr>
<td><strong>Specialized Community Based Care (Intermediate Care)</strong>: Is specialized community based care (multidisciplinary care) effective at reducing health resource utilization and improving patient outcomes compared to usual care?</td>
</tr>
<tr>
<td><strong>Transitional Care</strong>: Are transitional care bundles (e.g., support services, follow-up activities and other interventions that span pre-hospital discharge to the home setting) effective at reducing health resource utilization and improving patient outcomes compared to standard care alone?</td>
</tr>
<tr>
<td><strong>Continuity of Care</strong>: Does continuity of care with a physician or a health care team improve patient outcomes, satisfaction and reduce health service utilization?</td>
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<tr>
<td><strong>Lifestyle modification/self management</strong>: What is the effectiveness and cost-effectiveness of self-management support interventions compared to usual care for persons with chronic conditions?</td>
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<tr>
<td><strong>Advanced Access</strong>: Does access to same-day appointments with a physician (primary care or specialist) improve patient outcomes, satisfaction and reduce health service utilization?</td>
</tr>
<tr>
<td><strong>In-home care</strong>: What is the effectiveness and cost-effectiveness of care delivered in the home (e.g. in-home care) compared to no home care, usual care or care received outside of the home (e.g. in a health care setting)?</td>
</tr>
<tr>
<td><strong>Cardiac Rehabilitation</strong>: What is the effectiveness and cost-effectiveness of community cardiac rehabilitation programs for management of coronary artery disease?</td>
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<tr>
<td><strong>Screening for depression/anxiety</strong>: What is the impact of screening for depression and/or anxiety among adults with chronic diseases on their (chronic) disease-specific outcomes and health service utilization?</td>
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<tr>
<td><strong>Electronic Tools for health information exchange</strong>: What is the impact of electronic tools on patient outcomes when utilized to improve information continuity and care coordination of adults with chronic diseases?</td>
</tr>
<tr>
<td><strong>Specialized nursing care</strong>: What is the evidence (and role) for specialized nursing practice in comparison to usual care in improving patient outcomes and health system efficiencies for chronic disease management in the primary care setting?</td>
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<td>EBA</td>
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<tr>
<td>Previous EBAs</td>
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<tr>
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<td>Self management (Stanford model)</td>
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<tr>
<td>Screening and management for depression</td>
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Economic Analysis

- We identified a cohort of patients for each of the following chronic conditions: diabetes, COPD, CHF, CHD (using established ICES algorithms)
- Using a longitudinal study design, we followed patients from their first date of hospitalization or physician visit (incidence index) following a diagnosis of one of these chronic conditions from 2006 to 2011
- Clinically significant effect size obtained from the literature review were applied to the outcomes and costs (as appropriate)
- Where quality of life (QoL) was reported in the clinical literature (pre- and post-intervention), the incremental difference was used to estimate incremental cost per QALY gained
- Where QoL was not reported, estimated incremental costs will be reported
Quality Based Funding: Translating Evidence into Episodes of Care

Dorothy Pringle OC RN PhD FCAHS
Professor Emeritus, LS Bloomberg Faculty of Nursing, University of Toronto
Chair, AMS Inc. Board of Directors

Imtiaz Daniel PhD MHSc CMA
Strategist, Quality-Based Funding, Health Quality Ontario
Presentation Outline

- Background & Purpose of QBF
- Key Elements of the QBF Episode of Care
- Description of expert panels
- Process for developing care pathways
- Examples of the modules
What is Driving Quality-Based Funding?

• Major government strategy to shift hospital funding to a greater share of ‘patient-based’ funding, using combination of aggregate Health Based Allocation Model (HBAM) allocation funding and ‘Quality Based Procedure’ reimbursement

• Initial focus is on hospital-based care, the goal of ‘bundling’ payments for broader episodes of care

• For 2012/13, HQO is developing bundles for stroke, congestive heart failure and chronic obstructive pulmonary disease
Key Elements of the QBF Episode of Care

• Apply a framework to assess evidence within the episode, building on HQO’s Evidence-Based Analysis (EBA) process and the OHTAC model

• Draw on interdisciplinary expertise to map care trajectory

• Develop a clinical pathway to map out the patient’s journey through the episode of care, with key interventions and clinical trajectories

• Apply a decision analytic tree structure to the episode pathway to incorporate probabilities and decision nodes

• Combine all the above to generate the hybrid episode model: pathways, evidence and decision analytics
Expert Panels & Chairs at HQO

• Steering Committee: Dorothy Pringle
• Congestive Heart Failure: Drs. David Alter & Douglas Lee
• COPD: Drs. Charles Chan & Chaim Bell
• Stroke: Dr. Mark Bailey & Ms. Christina O’Callaghan
• Expert Panel Members include
  o Patients, Specialists (Cardiologists, Neurologist, Neurosurgeon, Internist, Intensivists, Respirologists), Family Physicians, Pharmacists, Occupational Therapists, Physiotherapists, Speech Language Pathologists, Nurses, Decision Support Managers, Scientists, representative from the MOH and other Agencies
  o HQO Staff – Clinical epidemiologists, health economists, methodologists, project manager and coordinators
1. Define the patient cohorts for analysis

2. Define the appropriate episode of care in each cohort

3. Based on evidence, recommend clinical best practices and pathways

4. Develop cross-Ontario episode of care analysis based on the defined episode

5. Recommend achievable ‘best practice’ benchmarks

6. MOHLTC to develop a bundled cost for the ‘best practice’ episode of care

The requested deliverables can be seen as ‘Phase I’ within a larger body of work to develop a ‘best practice’ cost for an episode of care.

Phase I
To be developed by HQO for Nov. 30, 2012

Phase II
Rapid Evidence Review Process

1. Research Question
2. Literature Search
3. Is there an SR?
   - No
     - Review of primary studies (RCT, Obs.) adjusting selection criteria as necessary
   - Yes
4. Rate SR with AMSTAR
5. Did SR use GRADE?
   - Yes
     - Did SR GRADE outcomes of interest for RR?
     - Yes
     - Report Results
   - No
     - Obtain primary studies from SR with outcomes of interest
     - GRADE Outcome(s) Max 2
     - Report Results
6. Did SR GRADE outcomes of interest for RR?
   - Yes
     - Summarize results
COPD pathway model

Mild Exacerbation

- Usual medical care (in ED / outpatient)
  - N = 19,337
  - P = .447
- Assess recovery
- Treatment fails
  - Go to usual medical care (inpatient)

Moderate Exacerbation

- Usual medical care (inpatient)
  - N = 23,878
  - P = .553
- Assess recovery
- Treatment fails
  - Go to ventilation (NPPV or IMV)

Severe Exacerbation

- NPPV
  - N = 773
  - P = .018
- Assess recovery
- Treatment fails
  - Go to IMV

- IMV
  - N = 1,051
  - P = .024
- Assess recovery
- Treatment fails
  - End of life care

Legend
- Care module
- Assessment node
- Pathway endpoint

Patient presents at hospital with suspected exacerbation of COPD

N = 43,215
P = 1.0
Current Status

• All 3 panels on target for meeting Nov 30 deadline for model development, decision nodes, care trajectories

• Issue for all 3: transitional care to community for assessment, monitoring, rehabilitation etc., influences target lengths of stay.

• Lack of information about care processes for most team members: nurses, physical & occupational therapists, nutritionists, pharmacists etc.

*BUT* great start & lots more to do, for example, extend the process to community care
The Importance of Assessing Appropriateness as a CQI Issue in Health Care

Charles J. Wright, MD, MSc, FRCS(C,E,Ed)
Chair, Ontario Health Technology Advisory Committee
Bronwen McCurdy, Clinical Epidemiologist, HQO
The Dimensions of Quality

Safety - Competence - Acceptability - Access

Efficiency - Effectiveness - Appropriateness - Continuity

COST
Inappropriate care = poor quality care

• Unnecessary repetition of tests
• Routine testing
• Lack of beneficial health outcome
  – Note: PROM
• Risk of adverse events
• Waste of precious resources
• Cost
  – Cost/effectiveness ratio
  – Opportunity cost
“Gentlemen, we are out of money. We shall have to think.”

Sir Earnest Rutherford addressing the assembled staff of the Cavendish Laboratory in Cambridge, 1919
First, a few history lessons

- Prolonged bed rest after childbirth or surgery
- Blood transfusions in relatively minor surgery
- Radical mastectomy for breast cancer
- Routine tonsillectomy
- Routine post-menopausal estrogen therapy
- Routine bone density measurement (and consequent therapy)
- Routine vitamin D testing
- Routine episiotomy in childbirth
Questionable Services in Current Practice:

- Prescriptions
- Diagnostic tests
- Admission to hospital
- Length of stay
- Therapies
- Procedures
- Surgery
- Follow-up visits
- Screening procedures
- Psychiatric diagnoses
- End-of-life care
I’ve been advised to ask if any of these drugs is right for me.
Patterns of Health Care in Ontario

Editors
C. David Naylor
Geoffrey M. Anderson
Vivek Goel

ICES: The Institute for Clinical Evaluative Sciences in Ontario
Survey finds striking disparities in rate of surgical procedures

Indicators are no measure of cities' ability to deliver health care

JEN ROSS
The Globe and Mail, Toronto

The first attempt at collecting national statistics on Canada's health-care system has revealed striking differences in the rate of hip replacements, knee replacements, and hysterectomies across different cities.

Quebec City was in the best standing across the country when it came to cesarean sections, having the lowest rate — 14.6 per cent of all deliveries. Victoria had the highest, at 26.4 per cent.

It was the first time national figures for hip replacements were released, and they showed that the rate for hip replacements in Canada's largest cities was much higher than in smaller cities.

The difficulty comes in explaining why these disparities exist.

Peter Coyte, professor of health economics at the University of Toronto, spent five years investigating Ontario's patient outcomes of knee and hip procedures.

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COUNTING PROCEDURES

Rates at which various medical procedures were performed in 1996-1997 in selected cities

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Victoria</th>
<th>Vancouver-Richmond</th>
<th>Edmonton</th>
<th>Saskatoon</th>
<th>Sudbury</th>
<th>Montreal</th>
<th>Quebec City</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hip replacements (rate per 100,000 people)</td>
<td>69.7</td>
<td>47.4</td>
<td>80.0</td>
<td>95.3</td>
<td>56.5</td>
<td>30.4</td>
<td>31.7</td>
</tr>
<tr>
<td>Knee replacements (rate per 100,000 people)</td>
<td>53.6</td>
<td>42.7</td>
<td>98.9</td>
<td>96.8</td>
<td>64.9</td>
<td>26.2</td>
<td>26.6</td>
</tr>
<tr>
<td>Hysterectomies (rate per 100,000 people, women aged 20+)</td>
<td>576</td>
<td>293</td>
<td>479</td>
<td>540</td>
<td>784</td>
<td>358</td>
<td>523</td>
</tr>
<tr>
<td>Cesarean sections (percentage of deliveries)</td>
<td>26.4</td>
<td>21.6</td>
<td>16.4</td>
<td>16.8</td>
<td>22.2</td>
<td>18.8</td>
<td>14.6</td>
</tr>
</tbody>
</table>

Source: Canadian Institute for Health Information (CIHI)
The Creation, Diagnosis and Treatment of Non-Disease
TWO OF US BELIEVE IN MULTIPLE PERSONALITY DISORDER. ONE OF US DOESN'T.
SPEED BUMP

By Dave Coverly

ATTENTION-DEFICIT DISORDER
Clinic

Help

Wan
'Acupuncture may work for a while Mr Tidworth. Any quack treatment may work for a while. But only true scientific medical practice can keep a person alive forever.'
We are not alone

• UK – National Institute for Clinical Excellence (NICE)
• Spain – 2006 law
  • to eliminate services “that lack efficiency, effectiveness, or have an unfavourable risk-benefit ratio”
• Vancouver Coastal Health
  • Priorizing proposals for disinvestment and re-allocation
• MAS/OHTAC (now within Health Quality Ontario)
  • Extensive range of recommendations on health services and technologies – to implement, to implement with conditions, or not to implement (2004-2012)
• American Board of Internal Medicine – “Choosing wisely”
• US Preventive Services Task Force
• Canadian Task Force on Preventive Health Care
• Cochrane Collaboration
“There is substantial overuse, under use, and misuse of medical care. Interventions that are of little value are commonly overused; care that is effective is commonly underused; and care that is of unproven value is frequently misused.”

- J. Wennberg
'Knowledge is what we have before someone works out it's wrong.
HQO’s Appropriateness Initiative
Proposed Definition - Appropriateness

- Appropriateness relates to the use and non-use of an intervention through evidence of effectiveness, economic implications and other health system impacts.
Systematic Framework

- **Identify**
  - Systematic identification process
- **Prioritize**
  - Prioritization tool
- **Validate**
  - Validate prioritized candidates with experts
- **Assess**
  - Systematic Review
  - Economic Analysis
- **Rec**
  - OHTAC recommendations

Low hanging fruit
Low Hanging Fruit Identification

• Candidates identified by OHTAC’s Appropriateness Working Group members

• American Board of Internal Medicine Foundation’s Choosing Wisely List

• American College of Physicians’ List of 37 overused internal medicine screening and diagnosis tests

• Other nominations (Ontario hospitals)
Prioritization Process for Low Hanging Fruit

10 criteria to evaluate candidate interventions

1. Disease burden
   - Is the disease prevalence high or low?
   - Does the disease have a high or low impact on morbidity and mortality?

2. Rate of diffusion
   - Has there been a substantial change in the rate of diffusion in Ontario?

3. Volume
   - Is this a high volume technology in Ontario?
Prioritization Criteria

4. Cost Burden
   – If the intervention was delisted or access restricted, would this lead to substantial savings to the Ontario health system?

5. Comparative Effectiveness
   – Are there alternative options that are equally or more effective than the intervention?

6. Safety Concerns – Current Use
   – Are there important safety concerns for the patient, health care provider or environment associated with the current use of the intervention?

7. Safety Concerns – Delisting
   – If the intervention was delisted or access restricted, are there important safety concerns?
Prioritization Criteria

8. Societal / Ethical
   – Is delisting or restricting access to the intervention inconsistent with societal and/or ethical values or preferences?

9. Alignment
   – Has more than 1 stakeholder from Ontario and/or other jurisdictions identified the intervention as being used inappropriately?

10. Feasibility of Implementation
    – If recommendations were made to delist or restrict access to the intervention, is it feasible to implement the required changes in the Ontario health care system?
Evidence-Based Analysis Methods

- Full evidence-based analysis
- Rapid reviews
- Expert consultations

Contextualization by expert panels
Topics Currently Under Review

• Community-based laboratory testing
  – Aspartate aminotransferase (AST)
  – Chloride
  – Ferritin
  – Folate
  – Lipids
  – Parathyroid hormone
  – Serum protein electrophoresis
  – Vitamin B12

• Other
  – Annual health exams
  – Arthroscopic lavage for osteoarthritis of the knee
Appropriateness Moving Forward

• Ongoing OHTAC initiative
• Collaboration with health system partners
  – Ontario Medical Association
  – Council for Academic Hospitals of Ontario
  – Ontario Hospital Association
  – Ontario College of Family Physicians
Council of Academic Hospitals of Ontario

Adopting Research to Improve Care (ARTIC)

Presented to

Health Quality Transformation 2012

Prepared by

Karen Michell, Executive Director

Council of Academic Hospitals of Ontario

October 23, 2012
Vision:
Improving lives for a stronger Ontario through the integration of health research, education, and specialized care.

Mission:
As key partners in the health care system, the CAHO community will harness our collective research and innovation strengths to advance world-leading patient care and a sustainable health care system.

Values:
• Leadership
• Collaboration
• Innovation
• Quality

Strategic Foci:
• Enable the rapid movement of research evidence into practice to improve quality
• Advance the stability of and investment in the health research enterprise in CAHO hospitals
Challenge:
Ontario has yet to realize the full potential of sharing best practices and systematizing efforts to move research evidence into practice to improve quality & patient care.

Goal:
CAHO’s ARTIC program creates the pathway, in our own backyard, to systematically move evidence-based research into practice.
2012/13 Transitions in Care Focus:
• To be announced

2011/12 CAHO ARTIC Projects:
• Mobilization of Vulnerable Elders in Ontario (MOVE ON ARTIC Project)
• Antimicrobial Stewardship Program in Intensive Care Units (CAHO ASP Project)

2010/11 CAHO ARTIC Projects:
• HandyAudit ARTIC Project
• Canadian C-Spine Rule (CCR ARTIC Project)
Value of *Implementation* Focus

- **Use Evidence to Drive Quality Improvement:** Each ARTIC Project is expected to reduce system costs, increase efficiencies and improve patient outcomes.

- **Facilitating Collaboration:** CAHO’s ability to coordinate and encourage collaboration across sites facilitates problem solving and shared learning, building communities that champion sustainable QI.

- **Building Capacity for Change:** ARTIC provides the resources and support to facilitate change management to ensure successful scale-up of projects. Seeking partners for provincial scale-up.

- **Alignment with MOHTLC Policies/Programs:** An “Evidence Implementation Pathway for Ontario” has the future potential to partner with IDEAS, support QBPs and OHTAC recommendation implementation.