Health Technology Assessment (HTA) 101
If a man is offered a fact which goes against his instincts, he will scrutinize it closely, and unless the evidence is overwhelming, he will refuse to believe it. If, on the other hand, he is offered something which affords a reason for acting in accordance to his instincts, he will accept it even on the slightest evidence. The origin of myths is explained in this way.

-Bertrand Russell, mathematician, & philosopher (1872 - 1970)
Canadians value our health care system

The Canadian Press | November 25, 2012

OTTAWA -- Canadians, it seems, love their universal health care.

A new national poll…examined the pride Canadians place in a list of more than a dozen symbols, achievements and attributes.

The online survey … found universal health care was almost universally loved, with 94 per cent calling it an important source of collective pride -- including 74 per cent who called it “very important.”

http://www.ctvnews.ca/canada/poll-canadians-are-most-proud-of-universal-medicare-1.1052929
For immediate distribution – November 4, 2009

NEWS RELEASE

90% of Canadians support public health care

New poll for Policy Options examines our attitudes to universal health care

Montreal – Nine Canadians in ten remain supportive of universal health care, and seven Canadians in ten think Barack Obama is on the right track in pursuing health reform in the United States, according to a new Nanos Research poll conducted exclusively for Policy Options.

“These numbers are way beyond any margin of error,” notes pollster and Policy Options Contributing Writer Nik Nanos. “There are very few, if any, pillars of Canadian public policy of which Canadians approve as strongly as the principle of universal health care, which has been with us since it was first adopted by the Pearson government in the 1960s.”

Fully 89.9 percent of Canadians support universal health care, and within those two response groups, the vast majority, 79.9 percent or four Canadians in five, give their
But gaps affect one-third of Canadians, poll shows

Ottawa, Aug. 7, 2012 – More than one-third of Canadians have gone or have had a family member go without needed health care because of insufficient insurance coverage, a new poll indicates.

The gap ….is highest among those in Atlantic Canada, lower-income earners, women, and those who are self-employed, work part time or are unemployed.

“Our medicare system that covers only physician and hospital care was designed when these were the most important forms of treating patients,” said Dr. John Haggie, president of the CMA. “Public health coverage has not kept up with medical advancements that see more and more Canadians being treated through advanced surgical treatments and new pharmaceuticals.”

http://www.cfhi-fcass.ca/NewsAndEvents/NewsReleases/NewsItem/12-08-09/79805a0a-305d-4efa-94a0-3283b4d0572.aspx
Canada health spending to reach $211B in 2013

October 29, 2013—Canada will spend roughly $6,000 per person on health care this year.

11.2% GDP

Total health spending growth has slowed each year since 2011. It is expected to rise by 2.6% in 2013—less than half the average growth of 7% per year between 2000 and 2010.

What is the money being spent on?

Drugs

~16% of total spending on health
~$35 billion (up 2.4% from 2012)

Physicians

~15% of total spending
~$31.4 billion

Hospitals

~30% of total dollars spent on health
~$62 billion (up 2.6% from last year)
Why is health spending increasing?

Compensation for health care professionals

More, newer, costly health care services

Overall population is aging
The public/private split

The public sector pays for about 70% ($148 billion) of health care in Canada.

The remaining 30% ($63 billion) comes from private sources such as health insurance and individuals’ out-of-pocket expenses.

This split has been fairly consistent since 1997
What do we want from our health care system?

sustainable

provides most appropriate health care

when it’s needed, where it’s needed,

regardless of ability to pay….

doesn’t bankrupt future generations …. 

doesn’t come at the expense of education, environment, transportation, justice…or higher taxes?
What’s the problem?
What can help us solve this problem?

Health Technology Assessment (HTA)
(Health) technology assessment … is a multidisciplinary field of policy analysis. It studies the medical, social, ethical, and economic implications of development, diffusion, and use of health technology.

- From INAHTA (International Network of Agencies for Health Technology Assessment); www.inahta.net
What is HTA? (II)

“…systematic evaluation of properties, effects, and/or impacts of health care technology. It addresses the direct, indirect, intended and unintended consequences … Its main purpose is to inform technology-related policymaking in health care. HTA is conducted by interdisciplinary groups using explicit analytical frameworks drawing from a variety of methods.”

- From Health Technology Assessment international (HTAi); www.htai.org
The Role of HTA

Supporting evidence-informed decisions across the lifecycle of a technology

Innovation and R&D  Adoption  Ongoing assessment  Appropriate Use  Obsolescence/Reassessment
The Role of HTA

- Reliable and timely provision of (synthesized, appraised) evidence:
  - **Is it safe?**
  - For whom does it work and when?
  - Is it better than what we already have/do?
  - Does it provide value for money?
  - Can we afford it? Can we afford not to?
  - What’s the trade-off?
  - **What else** needs to be considered?
For whom?

- Government policy and decision makers
- Public drug plan managers
- Regional health authorities
- **Hospitals and other health care facilities**
- Health professionals
- Patients
Challenges to Using Evidence

- Different decisions to be made
  - To start doing something? To stop doing something? To change something we’re already doing? To evaluate how it’s going?
  - What is the desired outcome?
    - Clear *a priori* objective(s)
    - From whose perspective(s)?
    - Implications – for policy, for practice
    - Time horizon
    - Evaluation mechanism
  - All are legitimate – but who decides?
Challenges to Using Evidence

- Different decisions to be made
- Different definitions of evidence
“Evidence, broadly construed, is anything presented in support of an assertion. This support may be strong or weak. The strongest type of evidence is that which provides direct proof of the truth of an assertion. At the other extreme is evidence that is merely consistent with an assertion but does not rule out other, contradictory assertions, as in circumstantial evidence.”

~Wikipedia
Challenges to Using Evidence

• Different decisions to be made
• Different definitions of evidence
• Different sources of evidence
Lots of sources of evidence
Challenges to Using Evidence

- Different decisions to be made
- Different definitions of evidence
- Different sources of evidence
- Different “levels” – or weightings – of evidence
Different “levels” of evidence
Challenges to Using Evidence

• Different decisions to be made
• Different definitions of evidence
• Different sources of evidence
• Different “levels” – or weightings – of evidence
• Differential availability (e.g., grey literature) of evidence
It's time all clinical trial results are reported.

Patients, researchers, pharmacists, doctors and regulators everywhere will benefit from publication of clinical trial results. Wherever you are in the world please sign the petition:

Thousands of clinical trials have not reported their results; some have not even been registered.

Information on what was done and what was found in these trials could be lost forever to doctors and researchers, leading to bad treatment decisions, missed opportunities for good medicine, and trials being repeated.

All trials past and present should be registered, and the full methods and the results reported.

www.alltrials.net
Challenges to Using Evidence

• Different decisions to be made
• Different definitions of evidence
• Different sources
• Different “levels” – or weightings – of evidence
• Differential availability (e.g., grey literature)
• Different conclusions – who to believe? when?
Who to believe? What is the truth?

A Decade of Reversal: An Analysis of 146 Contradicted Medical Practices

Mayo Clinic Proceedings; Vol 88, Issue 8, August 2013, Pages 790–798

Objective: To identify medical practices that offer no net benefits.

Results: ....Of the 363 articles testing standard of care, 146 (40.2%) reversed that practice, whereas 138 (38.0%) reaffirmed it.

Conclusion: The reversal of established medical practice is common and occurs across all classes of medical practice. This investigation sheds light on low-value practices and patterns of medical research

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• Different decisions to be made
• Different definitions of evidence
• Different sources
• Different “levels” – or weightings – of evidence
• Differential availability (e.g., grey literature)
• Different conclusions – who to believe? when?
• Different kinds of evidence – clinical, ethical, social, economic
Challenges to Using Evidence

- Different decisions to be made
- Different definitions of evidence
- Different kinds/sources
- Different “levels” – or weightings – of evidence
- Differential availability (e.g., grey literature)
- Different conclusions – what to believe?
- Different “comfort levels” with uncertainty
Goldilocks Principle
Level of comfort with Uncertainty

HIGH DEGREE OF UNCERTAINTY

VERY IMPORTANT DECISIONS TO MAKE

STRESS

BEHAVIORGAP.COM

MIND THE GAP
(Dis)comfort with uncertainty vs. Realities of Real World Decision making

Value of Information (VOI) Analysis

...is the amount a decision maker would be willing to pay for (more) information prior to making a decision.

Before concluding “More research is needed...”

...would an investment to get more (better?) evidence translate to a “better” (or more certain) decision?
Challenges to Using Evidence

- Different decisions to be made
- Different definitions of evidence
- Different kinds/sources
- Different “levels” – or weightings – of evidence
- Differential availability (e.g., grey literature)
- Different conclusions – what to believe?
- Different “comfort levels” with uncertainty

- And evidence, while necessary, is not sufficient!
Principal Stakeholders in Canadian Health Care

Federal Government (regulators)

Federal government/Provinces/Territories (healthcare delivery)

Health authorities/hospitals (delegated purchasing decisions)

Health care professionals (health care delivery)

Public (recipient, user, purchaser)

Industry (designer, tester, manufacturer, information provider)
Values & preferences

“You’ll find there’s no right or wrong here. Just what works for you.”
Decision Making aka Evidence in Context

- Best available research evidence
- Environment and organizational context
- Population characteristics, needs, values, and preferences
- Resources, including practitioner expertise

Decision-making

[Diagram showing the interrelation of decision-making with evidence and context]
The story so far…

- Our health care system is important to Canadians
  - Demand/Need > $$
  - Gaps/inequities
  - Opportunity costs → choices
- People want things that work (and that offer value?)
  - “Evidence” should inform decisions
- Evidence is necessary but not sufficient.
  - Evidence comes in all shapes & sizes.
  - Sometimes it is there when you need it, sometimes it isn’t.
- Values & preferences of affected population must be considered
  - Evidence in context.
- Affected population is larger than you might think
  - Opportunity cost
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  - Can we **afford** it? Can we afford not to?
  - What’s the **trade-off?**
  - **What else** needs to be considered?
"On the other hand, Mr. Gersten, we did warn you of the drug's unusual side effects during a full moon."
HTA – one size does not fit all

- Agency/organization
  - Mandate/remit
  - Governance
  - Linkages to other groups/programs

- “Report”
  - Evidence in context

- Processes
  - Decision making framework(s)
HTA – one size can not fit all

“To be useful to decision makers, HTA must be tailored to the decision nodes of the health-care system and the needs and interests of decision makers at each of these nodes.”

The HTA Landscape: International
But...

...there are commonalities... in methods & in evidence-base.

So we need not (always) start from scratch.

And there is much to be learned/shared.
What goes into an HTA?

1. Priority Setting/Topic Selection
2. Research Question Formulation
3. Identifying the Relevant Primary Research
4. Collect and Appraise the Clinical Evidence
5. Economic Analyses: SR of existing EE; comparative cost effectiveness; impact on current budget and health systems (VALUE)
6. Evaluation of ELSI aspects
7. Summarize/disseminate findings (a la KT)
8. Recommendation/decision

3 natural ‘pockets’ of knowledge...

- Systematic Reviews & Meta-analysis
- Economic Evaluation
- Additional aspects

CADTH
Define a focused 4-part review question (Patient, Intervention, Comparison and Outcome)

- Use filters for specific study designs (e.g., PubMed Clinical Queries filters, and Cochrane Filter (RCTs))

- Review guidelines on systematic reviews, and prepare a protocol

- Run searches on all relevant databases and sources

- Save all citations (titles/abstracts) in a reference manager

- Document search strategies that were employed

- These citations are ready for first screen (N)

- Reviewer 1 screens all titles/abstracts and makes selections for second screen

- Reviewer 2 screens all titles/abstracts and makes selections for second screen

- Reviewers meet and resolve disagreements on citations they do not agree on

- The final number (N) selected after this process is ready for second screen (review of full-text articles)

- Get full texts of all articles identified for second screen (N)

- Articles considered eligible after full-text review (by two reviewers) is the final set of studies for inclusion (n)

- Studies included in the final analysis (n)

- Reviewer 1 extracts data (including quality assessment) from the final selected articles

- Reviewer 2 extracts data (including quality assessment) from the final selected articles

- Collect outcomes as cell values of a 2x2 table, if possible

- Contact authors for missing data, email authors short, structured questionnaires; reminders help!

- Software suggestions: Access, Excel

- Exploration of heterogeneity: graphical methods (e.g., Galbraith plots), subgroup analyses, and meta-regression

- Use QUOROM or MOOSE guidelines for report writing

- Enter data into database manager software

- Import and analyse using software

- Conduct study characteristics

- Generate forest plots of effect measures

- Check for heterogeneity

- Pool effect measures if heterogeneity is not a concern

- If heterogeneity is found, identify sources of heterogeneity

- Consider subgroup and sensitivity analyses

- Explore possibility of publication bias

- Interpret, discuss results and write the report:

  - Discuss applicability of results and limitations of the review
  - Make recommendations for practice or policy, and research

- Search directly or via reference manager, avoid language restrictions at this stage; involves a librarian

- Need clear inclusion and exclusion criteria

- Software suggestions: EndNote, Reference Manager, ProCite

- Screen via Reference Manager software; avoid printing citations at this stage

- This process takes time; use many overlapping approaches to get full articles; request authors via email

- Excluded from the final analysis (n)

- Consider blinded data extraction (hiding author names, etc.)

- Quality criteria will depend on the study design; see Table 4

- Software suggestions:

  - Stata, SAS, RevMan,
  - Comprehensive Meta-analysis, MetaWin, WesayMA, MetaDisc

  - Check for heterogeneity Chi-squared or I-squared tests; these tests have low power; consider a conservative p value of <0.10 for significance

  - You made it! Celebrate!!!
Rapid Responses/Reviews

- “Rapid review,” “mini-HTA”
  - Tailored to individual needs
    - Question(s) & timeline
    - More focused than traditional HTA
    - Methods “less rigorous”
**Example: CADTH’s Rapid Response Program**

**Tailored Approaches**

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<th>RR L1 (1-3 d)</th>
<th>RR L2 (~6 wk)</th>
<th>RR L3 (~16 wk)</th>
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Economics

• **Fundamentals concepts:**
  
  • Why consider economics?
    ▪ Value for money
  
  • Opportunity cost
    ▪ Finite budget means choices & trade-offs
  
  • Different types of evaluations
    ▪ Informed by outputs from clinical SR/MA
    ▪ ICER? ICUR? QALY?
  
  • Budget impact
    ▪ Can we afford this?
Additional Considerations

• ELSIs - Ethical/Legal/Social implications
  • + Environmental/Training/Organization of Care Issues

• Who’s involved & how?
  • In deciding what technologies are subjected to HTA (& when)
  • In determining the scope of the review
  • In conducting the review
  • In determining how recommendations/decisions are made
  • In making the recommendation/decision
  • In implementing the decision

  Tend to be quite Context specific
Common Challenges (I)

- Technological innovation
- Fiscal realities
- Evidence-base
  - Quantity & quality
  - Residual uncertainty
- HTA methodology
  - Faster (& cheaper)
  - New approaches
    - Rapid reviews
    - Qualitative research
Common Challenges (II)

- **Capacity**
  - Need > Demand > Supply

- **Evidence**-informed, contextualized decisions
  - “Globalize the evidence, localize the decision.”

- **Stakeholder interests**
  - Inclusivity, balance, transparency, timeliness

- Inertia…and constant change

- Measuring impact/ROI
COUNTERTHINK

RAISE YOUR HAND IF YOU HAVE ANY FINANCIAL CONFLICTS OF INTEREST IN THIS DECISION...

FDA DRUG DECISION PANEL

CONCEPT-MIKE ADAMS - ART-DAN BERGER - WWW.NATURALNEWS.COM
The Forecast: Building on our EBM roots

- View challenges as opportunities

  - ↑ demand for evidence-informed decision-making
    - ↑ demand for high quality, timely HTA
      - Clinical, economic, financial, ethical, social
    - ↑ attention to qualitative factors
    - ↑ transparency, inclusivity & engagement
      - “Nothing about us, without us.”
    - ↑ co-operation & collaboration
Opportunities & Resources

HTAi: hta.org
  • Hospital-based HTA ISG
INAHTA: inahta.net
CADTH: cadth.ca
  • CADTH Annual Symposium
    • April 6-8 2014 National Capital
  • “The Exchange”
    • Network of HTA producers
    • Includes hospital-based groups (e.g. HiTEC at LHSC, MUHC TAU)

SMDM & ISPOR
EQUATOR
PROSPERO
Cochrane & Campbell
A Future for Health Technology Assessment

- Relevance/Quality/Impact
- Evidence is:
  - Necessary.
  - defined broadly.
  - trustworthy.
  - being shared in a timely manner.
- Expertise/experiences are shared & leveraged.
- Processes are:
  - aligned with best practice.
  - Transparent, inclusive and efficient.
  - Viewed by all as being reasonable and fair.
HTA...

...can help support evidence-informed decisions

...at all stages of a health technology’s lifecycle

...by bringing together the best available evidence

...relating to the clinical, social, ethical & economic implications of a decision surrounding the use of a technology

... as compared to the alternatives

...in a transparent and reproducible manner.