Integrating evidence to tell the evaluation story

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Day 2 – Afternoon

Goals of the workshop

- To present an intermediate and critical review of the main qualitative and quantitative lines of evidence currently used in evaluations

- To align these lines of evidence with the nature of the questions posed

- To review how to draw the lines of evidence into a coherent evaluation "story"

Outline of the workshop

Day 1 Morning – Creating the evaluation plot

Day 1 Afternoon – Adding characters

Day 2 Morning – Editing, assessing, interpreting

Day 2 Afternoon –Telling the story

Telling the value for money story

- **Value for money = bang per buck**

- **Cost-benefit/Cost-effectiveness measures are the most direct measures of VFM**
  - Summative ratios of value
  - Measuring the intangible
  - Limits of CEA/CBA

- **Integrating evidence**
  - Assessing the relative strength of information
  - When one line of evidence dominates – case study of FIMCLA
  - Interleaving evidence – back to the matrix

Disclaimer

CBA and CEA are decision aids; they are not the decision. These methods can help organize decisions, and the logic of analysis may reveal hidden benefits and hidden costs, but the outputs from this method are never the only input to a policy decision.

Any decision on a program, policy, or investment will always involve questions of ethics, intrinsic values, political considerations, etc., in addition to the economic calculus.

As always, the devil is in the details and the assumptions also bite.

Value for money

- VFM is the priority activity in public and private health policy.

- VFM = "bang per buck" or "buck per bang"

  VFM = [benefits – cost] = net benefits

- Key questions:

  o *Do the benefits exceed the costs?*

  o *What set of programs, interventions, and policies produces the greatest set of net benefits?*

  o *What are the bad (negative VFM) ideas?*

- Techniques from economics such as **cost-effectiveness** and **cost-benefit** offer useful tools for identifying and ranking VFM in health programs and policy.

Value for money

Are we doing the right thing?

Relevance

Are we doing it well?

Performance

Economy reflects the unit cost of engaging in *activities*, such as trainee assessment, case planning for clients, or creating and managing a health clinic.

Example: Cost of developing courseware (wages + overhead + materials)
Example: Cost of setting up flu clinics (location, staff training, media, notifying vulnerable groups)

Efficiency is the unit cost of all the activities needed to produce an output.

Example: Cost per nurse graduate (number of grads divided by the total program cost)
Example: Cost per *potential* flu shot (before any shots are actually given)
Example: Cost of awarding a dollar to third party delivery for screening program

Effectiveness (also termed cost-effectiveness) is the cost of obtaining one unit of outcome.
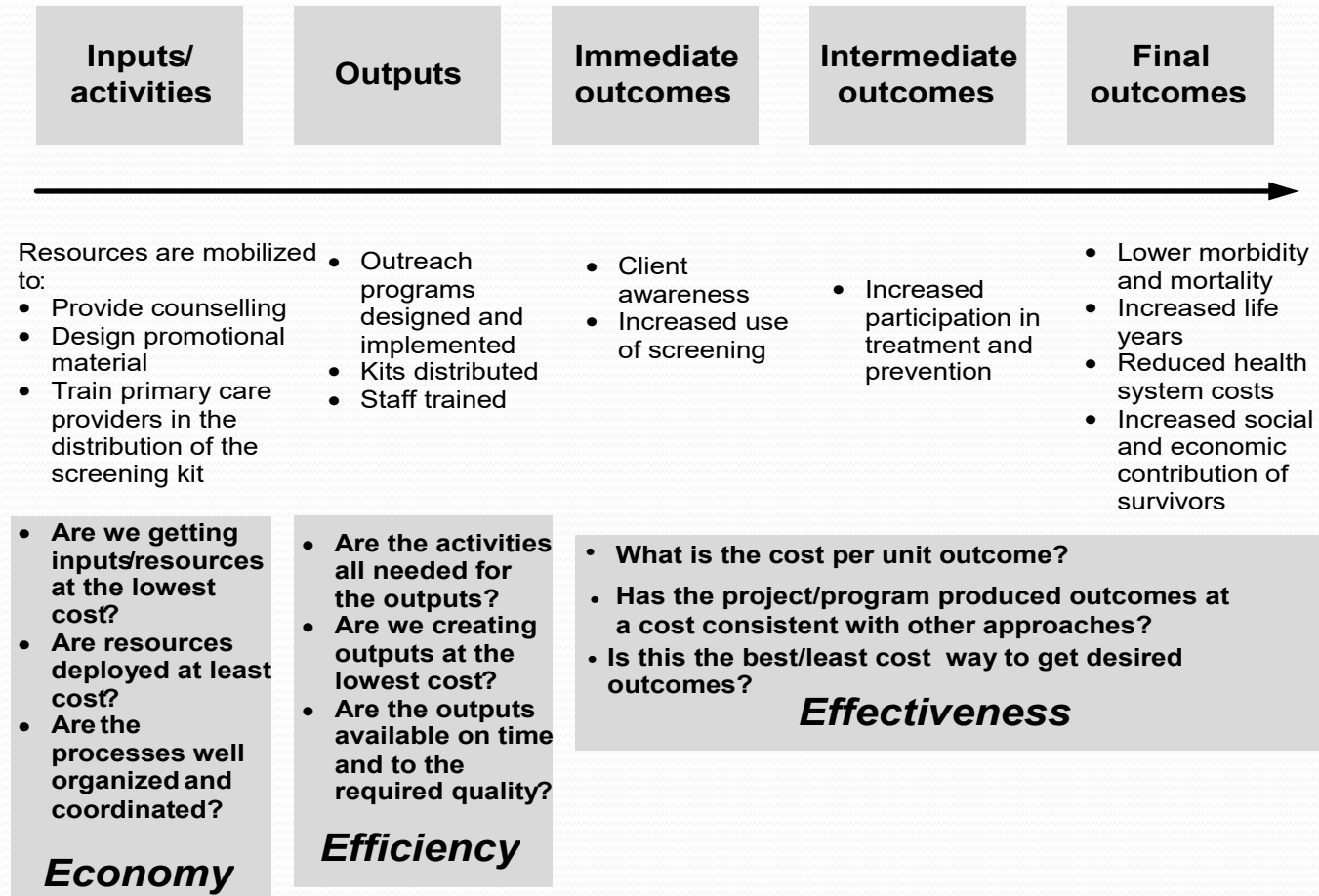
Example:
- Number of flu shots (immediate)
- Reduction in the incidence of flu as a result of a vaccination promotion program (longer-term)

Example:
- Increase in screening incidence (short-term)
- Increase in five-year survival rate for Stage 2 breast cancers (long-term)

Results chain for a health screening program

Inputs/ activities	Outputs	Immediate outcomes	Intermediate outcomes	Final outcomes

Resources are mobilized to:
- Provide counselling
- Design promotional material
- Train primary care providers in the distribution of the screening kit

- Outreach programs designed and implemented
- Kits distributed
- Staff trained

- Client awareness
- Increased use of screening

- Increased participation in treatment and prevention

- Lower morbidity and mortality
- Increased life years
- Reduced health system costs
- Increased social and economic contribution of survivors

- **Are we getting inputs/resources at the lowest cost?**
- **Are resources deployed at least cost?**
- **Are the processes well organized and coordinated?**

Economy

- **Are the activities all needed for the outputs?**
- **Are we creating outputs at the lowest cost?**
- **Are the outputs available on time and to the required quality?**

Efficiency

- **What is the cost per unit outcome?**
- **Has the project/program produced outcomes at a cost consistent with other approaches?**
- **Is this the best/least cost way to get desired outcomes?**

Effectiveness

Outcomes

Typical health outcomes:

- increase in quality adjusted life years (QALY)

- avoided costs

- extension of life

- reduction of mortality

- reduction of morbidity

- recovered productivity (earning power and working life)

Measuring intangibles

- Quality of life

- Value of life

- Willingness to pay (environment)

Cost-utility analysis
Subjective valuation of benefits
using Health-Related Quality of Life

Cost-utility analysis (CUA) uses self-report data (e.g., surveys, focus groups) to measure quality of life and outcome (years of life after medical treatments).

- Many treatments do not restore perfect health.

- Subjective measures score perceived health out of 10: health-related quality of life (HRQL) and QALY.

- Therefore, if patients score their quality of life as .6 (60% of perfect health), then for one year, the patient has .6 QALY, and outcomes are valued at 60%.

HRQL for a patient compared to healthy person		
	Patient	**Healthy**
Loss of arm	.7	1
Loss of leg	.6	1
Incontinence	.5	1
Chronic severe pain	.4	1
Loss of use of both arms/legs	.3	1

Measurement of the value of life

- *Preference weighting* combines many attributes of health into a single score. Techniques such as factor analysis are common to create a single index of HRQL.

- *Large health surveys* offer the benefit of large samples to isolate specific subpopulations, but often have restricted dimensions of health.

Methods for valuation of life:

- willingness to pay for insurance

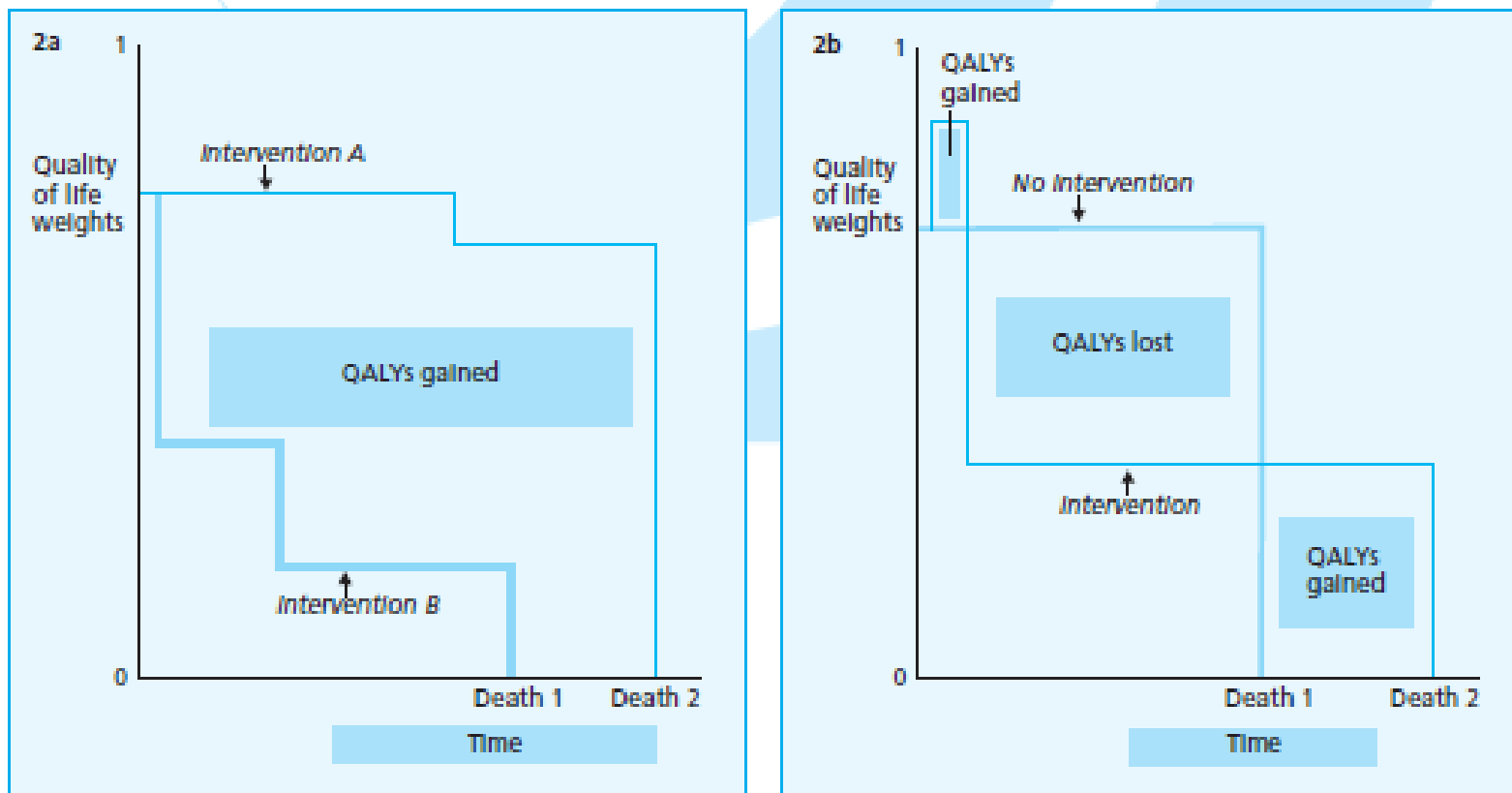- discounted present value of expected lifetime earnings

- wage differential for hazardous jobs

Figure 2a. Comparison of two different treatments. Figure 2b. Comparison between treatment and non-treatment of a condition with a poor prognosis

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http://www.medicine.ox.ac.uk/bandolier/painres/download/whatis/QALY.pdf

Problems with HRQL

- The HRQL scales are complex

- People are remarkably adaptable; HRQL scores tend to improve.

- Issues in HRQL:

  - age affects how people think about health

  - disease stage affects perceived HRQL

  - nature of the intervention (many wish to avoid chemo, may opt for surgery as opposed to extended treatment)

Economic valuation in health care

Cost analysis: This is the most elemental of all economic analyses of health interventions.

Example: Calculating the laparoscopic gall surgery (sum of HR, supplies, direct patient care, share of overhead and costs to patient … including time)

Cost minimization: Two or more options for producing identical outcomes are compared with a selection of least cost approaches. This approach only examines direct costs to payers, and does not often include consequences to patients, adverse outcomes, or indirect costs.

Example: Comparing costs of laparoscopic gall surgery with conventional surgery

Cost-effectiveness: Compares the ratio of results to costs for two or more options.

Example: Comparing cost per unit outcome of laparoscopic gall surgery with conventional surgery

Incremental cost-effectiveness ratio
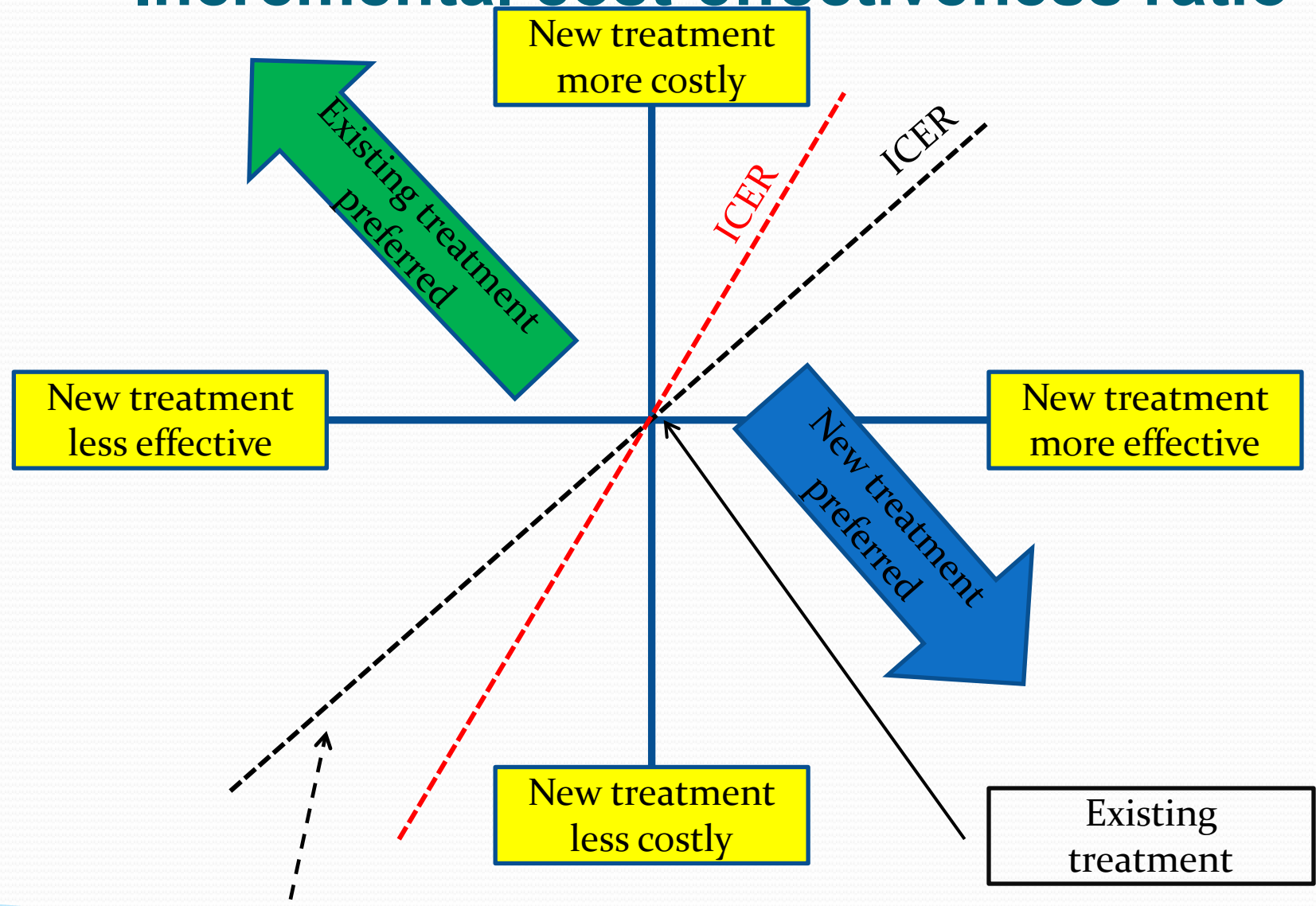
$$ICER = (Cost_a - Cost_b)/(Result_a - Result_b) = \Delta Cost / \Delta Result$$

Economic valuation in health care

- **Cost-utility analysis:** Reflects the subjective value of the outcome, such as the extension of an additional year of life as some level of "quality" (QALY)

- **Cost benefit:**
  - CEA does not place a money value on the result.
  - CBA provides a method for determining the "total social worth" of an investment.
  - Unlike CEA, which requires at least two alternatives, CBA can be applied to a single investment.

- **Challenges to CBA:**
  - Valuing results (e.g., lives saved) presents conceptual challenges
  - Aversion to using money to measure the social value of outcomes

CEA, CUA, and CBA compared

CEA

| Outcomes (outputs, inputs) |
| (actual changes measured in natural units, not $) |
| ───────────────────────────────── |
| **Cost of outcome ($)** |

CUA

| Subjective value of outcomes |
| (subjective value of outcomes - adjusted natural units, not $) |
| ───────────────────────────────── |
| **Cost of outcome ($)** |

CBA

| Monetary value of net change to welfare |
| of *all* outcomes for *all* stakeholders ($) |
| ───────────────────────────────── |
| **Social cost ($) (tangible and intangible)** |

CBA, CEA, and CUA compared

	CBA	CEA	CUA
Scope	Global – multiple outcomes valued	Local – single output/outcome	Local – single output/outcome
Unit of measure for outcome	Money equivalent	Natural	Utility or perceived value of outcome
Time frame	Extended	Immediate/short-term	Immediate/short-term
Primary decision purpose	Prospective	Retrospective	Retrospective
Application	Outcomes or impacts only	Activities-outputs-outcomes	Adjusted cost-effectiveness
Reference	No reference needed	At least one alternative	At least one alternative

CEA, CUA, and CBA

- **CEA** is a specific calculation of the costs needed to produce a unit change in one measurable indicator (input, output, or outcome).

- **CUA is an extension of CEA**, and places a subjective valuation on the measured outcome indicator. This is the quality adjusted life year (QALY).

- **CBA** measures the net change of all outcomes for all stakeholders by using a ratio of social benefits to social costs. The term "social" encompasses all private costs to all economic agents as well as the external benefits and costs associated with that activity.

**CUA depends on measuring QALYs (complex)
CBA measures social gains and social costs (very hard)
CEA recommended**

Cost-effectiveness analysis
Outputs and outcomes must be strategic
(and valid and reliable)

- **Outputs and outcomes should reflect the core goals of the program:**
  - An output/outcome selected for CEA should be selected to reflect the activity of a program.
  - Outputs often replace outcomes in CEA because they are easier to measure.

- **Outputs and outcomes must be strategic:**
  - A single output/outcome, if used alone, must represent a central goal of the program.

- **Variation in a strategic outcome should correlate with other results:**
  - Increases in that output/outcome should also correlate with other outcomes.

Cost-effectiveness analysis example – vaccination programs for at-risk groups

Outputs include the creation of vaccination sites or alternative delivery (e.g., pharmacies, places of work, physician offices, shopping malls).

The delivery approach with the lowest cost of organizing per potential vaccination delivered is the most cost-effective in terms of *outputs.*

Outcomes include:
- the number vaccinated
- reduction in sick days
- avoided deaths

The delivery approach with the lowest number of sick days per dollar cost is the most cost-effective in terms of *outcomes*.

Case example: HPV vaccination for girls (Application of discounting)

- This is a partial ("economist's") model.

- It assumes that the benefit of disease prevention is the avoidance of lost working time.*

- Preserved income is the only benefit of health policy.

- Cumulative discounted wages (income) represent the economic value of a life.

- Life tables and cancer incidence models support the prediction of when death will occur.

- There are no other costs in this model.*

- The costs of illness and then recovery (time off due to illness, direct costs of treatment, indirect costs of caregiver time) are not included.*

HPV vaccination

- Believed to provide protection against 80% of the HPV viruses that cause cervical cancer.

- The model assumes 100% efficacy.*

- Cervical cancer is a low incidence cancer that manifests itself (first cases) when women are in their late twenties.

- Probability of contraction believed to be a function of sexual activity.

- Vaccinations are given at age 12 and cost $300.

- Unclear whether a booster is needed.

- First death occurs at age 20 (according to life tables).

- In the 2008 cohort of Alberta girls age 12 (n=21,993), 13 are expected to die from cervical cancer between 2008 and 2045.

- The "benefits" of the vaccination are the wages for these women calculated between time of death and age 50.

Key issues on HPV vaccination

- What outcomes could be monitored?

- What other costs need to be included in the model?

- If you were the Minister of Health, what evidence would you need to:
  - cancel the program?
  - extend vaccination to boys (who carry HPV, but clearly do not get cervical cancers)?

- How does HPV vaccination differ from vaccination for an infectious disease?

Insert

- C:\Personal\Personal\CEA - Health - Calgary\Copy of Cervical_Cancer_Vaccine.xls

- (Note this may require a separate handout in separate ledger sheet)

- C:\Personal\Personal\CEA - Health - Calgary\Discounting_V2.pptx

- (Bind separately – print as 2 slides/page back to back.

# Integrating evidence

Key steps

1. Assess the relative strength of each line of evidence

2. Align the evidence to the questions it most directly and accurately informs

   - Do not use key informant data to validate outcomes or cost effectiveness

3. Use qualitative data/analysis to explain and interpret

4. Use quantitative data/analysis to measure impact, extent, and contribution

5. The evaluation matrix is the template for the evaluation

   - Use focussed questions that have one indicator

   - Use one data source for each indicator

   - Discard weak lines of evidence, unless they are the only source (adding a weak, unreliable information source to a strong, reliable measure invariably weakens the conclusion)

Farm Improvement and Marketing Cooperative Loan Act

- **Loan guarantee** to farmers and marketing co-ops (beginning farmers excluded)

- FIMCLA-guaranteed loans are available to:
  - Farmers who are actively engaged in farming for the purpose of earning a profit in Canada at the time the loan is requested and own or have a leasehold interest in the farmland where he/she/it is currently performing a farming activity
  - FIMCLA defines a farmer as "an individual, partnership, corporation, or cooperative association that is engaged in farming in Canada."

- Loans are repayable with interest fixed at 1% above prime

FIMCLA registrations/applicants per fiscal year
1988-2003
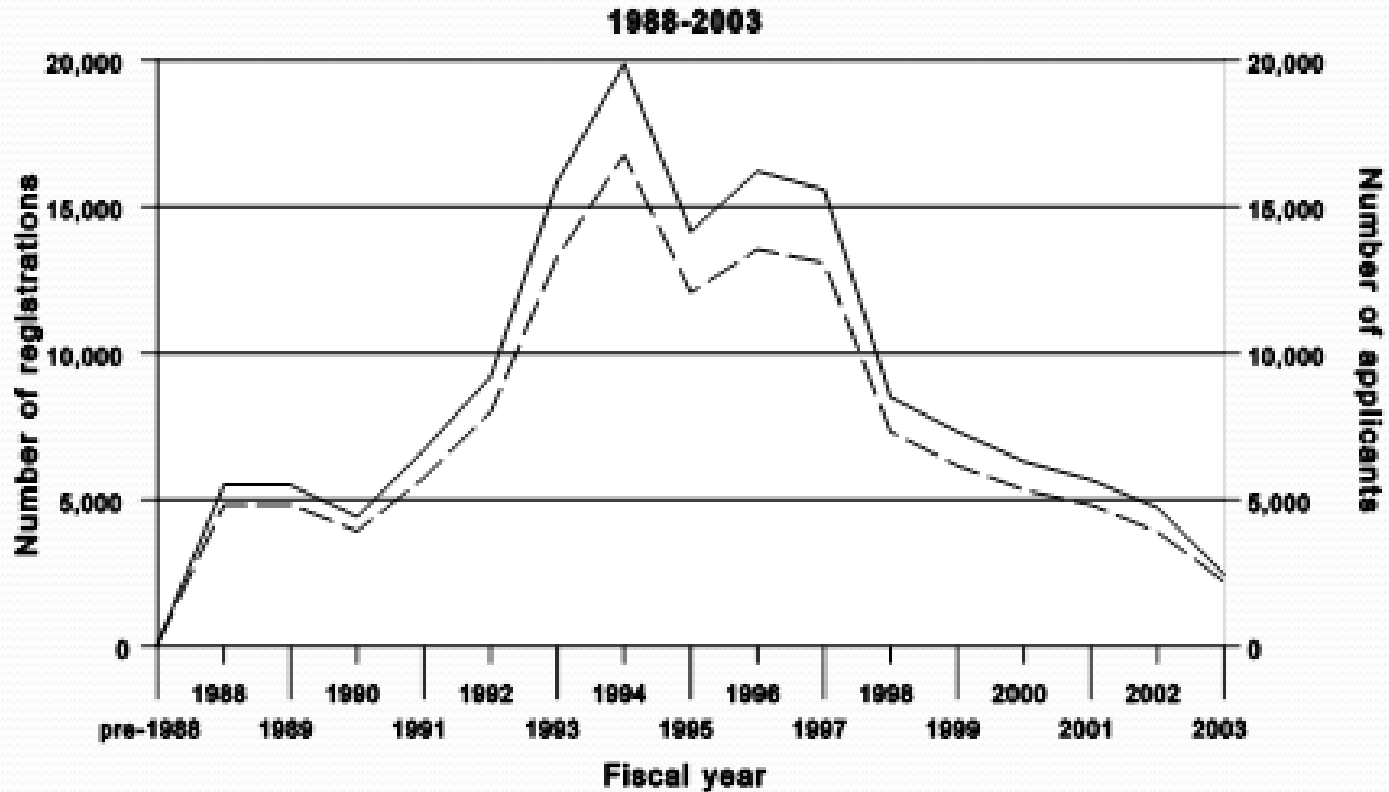
This chart captures the essence of the program --- it had become a solution in search of a problem

All the other lines of evidence (survey of farmers, interviews, etc.) served to explain this decline in need