

# **Designing evaluations to measure economy and efficiency**

Presentation to Veterans Affairs Canada –  
Evaluation Directorate

**Part 1 – Foundations of evaluating economy and efficiency**

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# Workshop goals

- Review Treasury Board policy, standard and directive on evaluations
- Focus on performance, especially CI5 (efficiency and economy) with some reference to CI4 (outcomes)
- Present conceptual and empirical foundations of economy and efficiency
- Illustrate the methods
- Apply the concepts to planned Veterans Affairs programming

# Presentation outline – February 19

1. Conceptual foundations of CI5
2. The results chain and logic models
3. Typical questions for CI5
  - a. Economy
  - b. Operational Efficiency and
  - c. Allocative Efficiency
4. Scoping CI5 evaluations
5. Overview of approaches to analysis of economy and efficiency

# Treasury Board Performance Issues for Evaluation

## **Core Issue 4 (CI4) Achievement of Expected Outcomes**

Assessment of progress toward expected outcomes (including immediate, intermediate and ultimate outcomes) with reference to performance targets and program reach, program design, including the linkage and contribution of outputs to outcomes

## **Core Issue 5 (CI5) Demonstration of Efficiency and Economy:**

Assessment of resource utilization in relation to the production of outputs and progress toward expected outcomes

— *Directive on the Evaluation Function (2009), Annex A*

# 1. Conceptual Foundations of CI5

CI5 has caused the most important conceptual and empirical challenges for program evaluation

## Key definitions

- **Economy:** Minimizing the use of resources. Economy is achieved when the cost of resources used approximates the minimum amount of resources needed to achieve expected outcomes.
- **Efficiency:** The extent to which resources are used such that a greater level of output is produced with the same level of input, or a lower level of input is used to produce the same level of output. The level of input and output could be increases or decreases in quantity, quality or both.
- **Effectiveness:** The extent to which a program is achieving expected outcomes.

— *Policy on Evaluation (2009)*

# Challenges in using these definitions

The Treasury Board definitions offer a high-level perspective, but present challenges for the evaluator:

1. The terminology overlaps. The term “outcomes” occurs in both the concept of economy and effectiveness.
2. Definitions appear to be tautologies (Efficiency).
3. The definition of economy and effectiveness together resembles what economists defined as “cost-effectiveness.”
4. The relationship between input, output, and outcomes is not defined.
5. Conceptual linkages exist between CI4 and CI5 – analysing efficiency and economy (CI5) does require some recognition of outcomes.

# The landscape of public programs and policies

- **Social marketing to promote a goal** (articulation of goal or intent; guidance on preferred behaviour, ... )
  - Health information (e.g., anti-smoking campaigns)
  - Consumer information (e.g., financial literacy)
- **Expenditures on goods and services:**
  - *Direct resource commitments* on goods (e.g., public housing, vaccination, pension payments ...)
  - *Direct resource commitments* on services (e.g., EI training benefits, weather forecasts)
  - *Tax expenditures* (e.g., exemptions and credits induce changes in behaviour/spending by lowering the effective cost)
  - *Grants/contributions/contracts* with third parties to perform services (e.g., grants and contributions to First Nations to deliver education and health on reserve)
- **Legislation/regulation** (e.g., smoking bans, Criminal Code)
  - Legislation requires formal political assent (Parliament), modifiable by the courts (decisions and common law)
  - Regulations can be amended by administrative ruling
  - Requires collateral research, engagement, and enforcements services



# Tools that guide the assessments of...

## Results chains

- Capture the “production” processesu that transform inputs into outputs through a series of activities

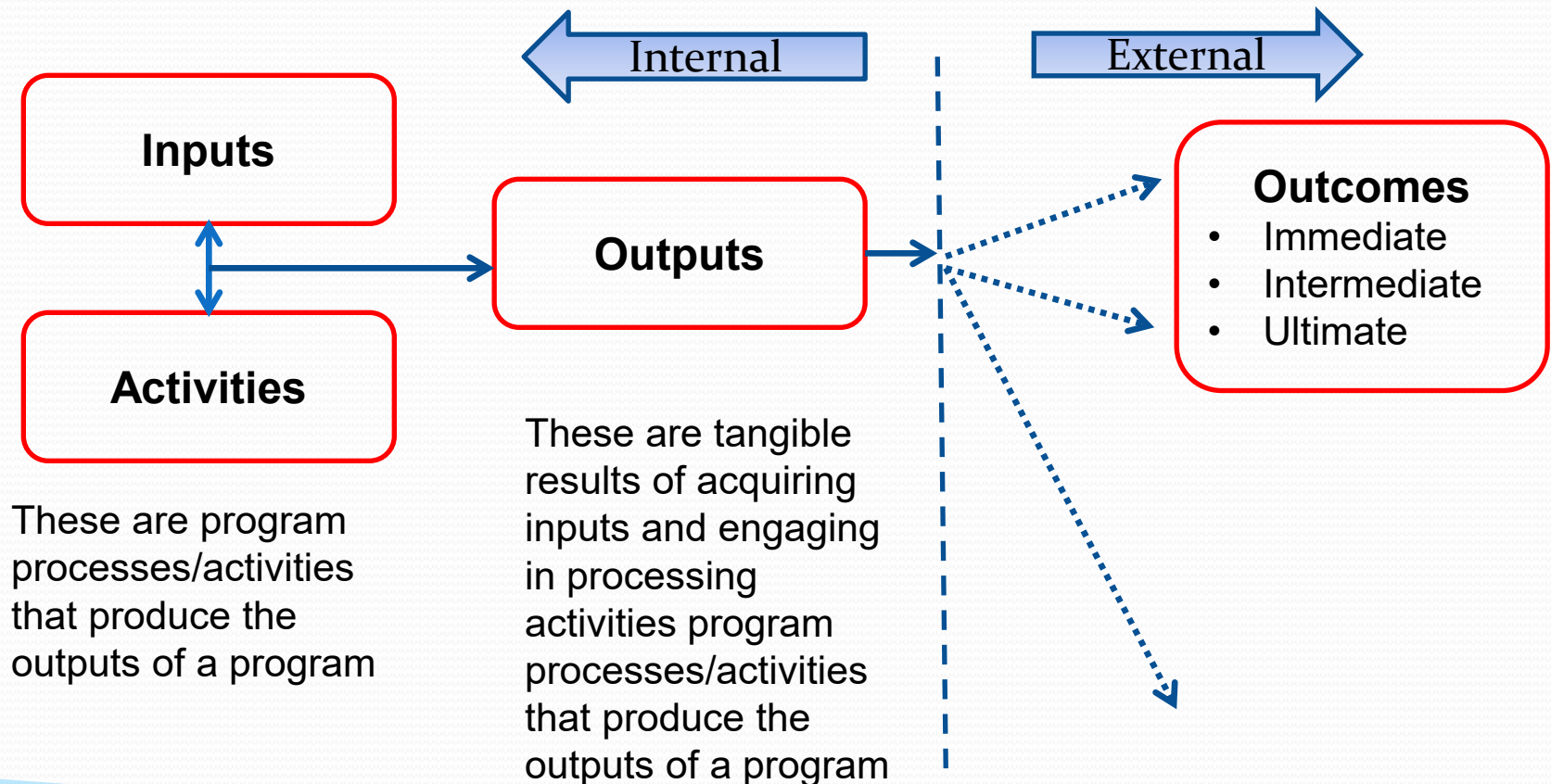
## Logic models

- Present the structure of the results chainsu that comprise a program
  - ***Business process maps*** support the analysis of implementation
  - ***Theories of change*** explain how outputs of sufficient quality and delivered on time, will realize the intended outcomes

## **2. Results chains and logic models**

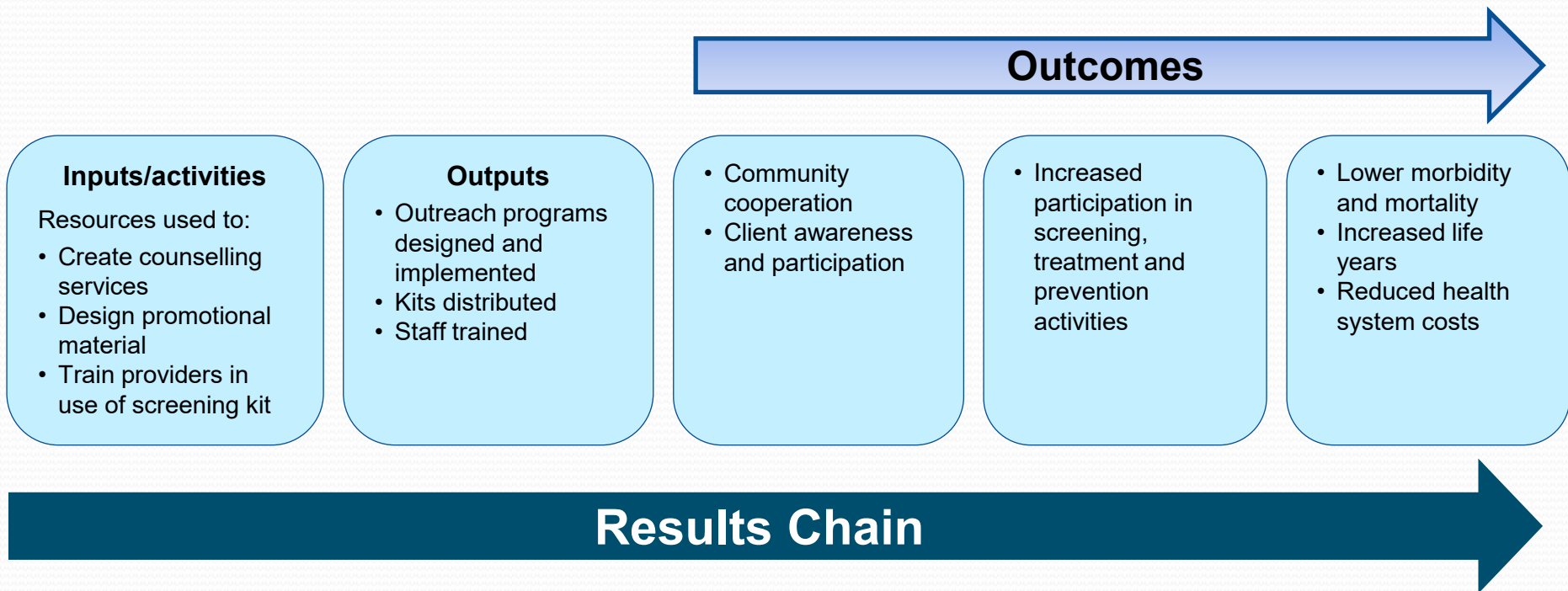
# Mapping the program/policy Inputs, outputs and outcomes

- The first step in any evaluation is to create a results chain that maps inputs
- This resembles a “factory” production process

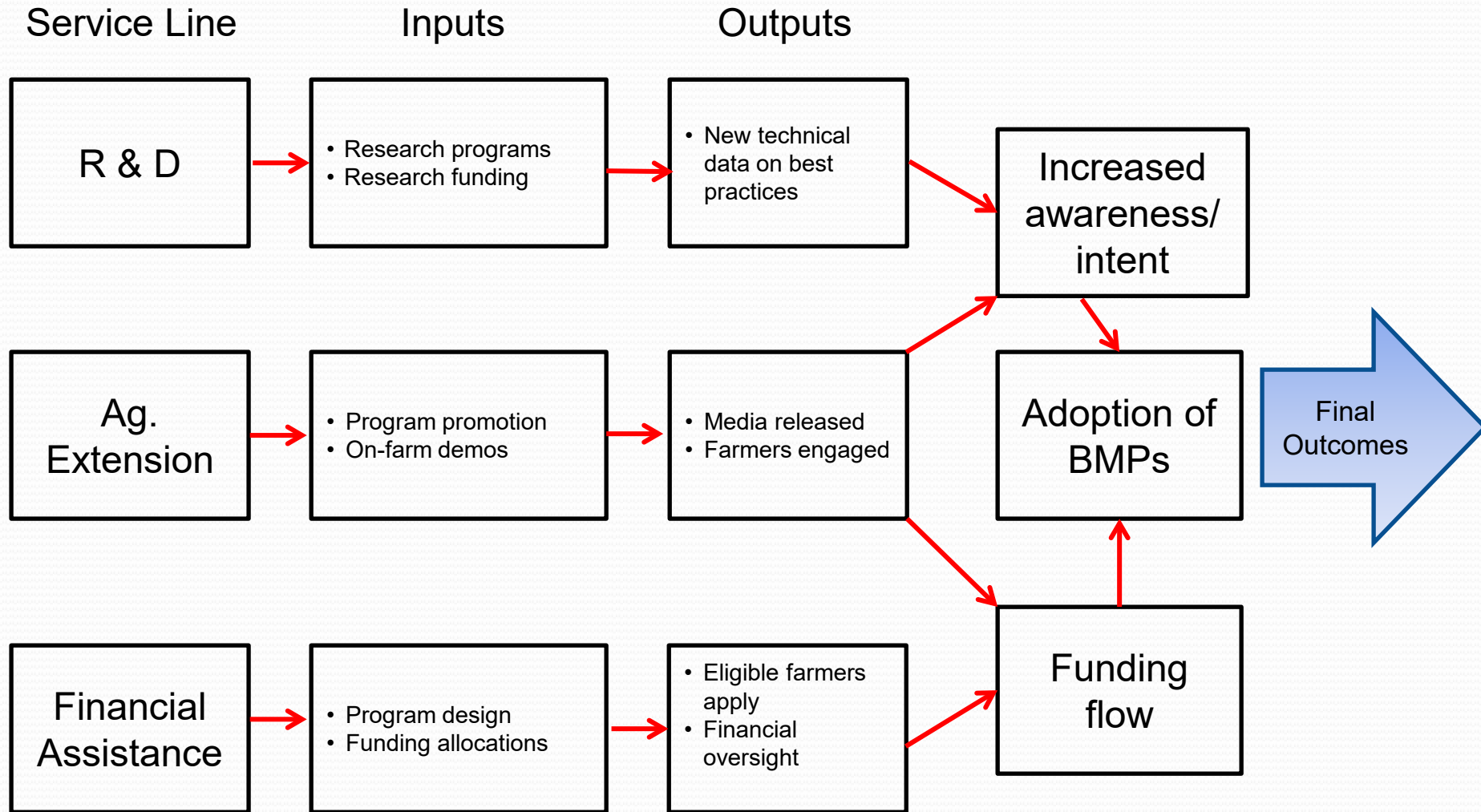


# Example 1: A FN Health Screening Program

The federal government contracts with FN health agencies to deliver health screening for a range of diseases (e.g., kidney disease). The theory of change is that early detection will lead to a range of treatments that avoid more serious and costly future treatments (intermediate outcome) and social/economic benefits associated with longer and healthier lives.



## Example 2: Agro-environmental programming



# The three Dimensions of CI5

## Dimension

## Focus of the CI5 evaluation

Economy

### **Optimization of business processes**

- Q1 – How well did the program select/acquire inputs to support activities to product the outputs (unit input cost minimization)?
- Q2 – Does the program manage its resources and production activities economically (least cost consistent with quality and on-time creation of outputs)?

Operational Efficiency

### **Minimizing the Cost of Outputs**

- Q1 – Is the cost per unit output minimized?
- Q2 – Are the outputs of sufficient quality/timing to support the realization of immediate outcomes?

Allocative Efficiency

### **Minimizing the cost of outcomes**

- Q1– Can we attribute the outputs to the outcomes (theory of change)? This is where CI4 links to CI5
- Q2 – What is the cost per unit outcome? This is the traditional cost-effectiveness question.

# Example 1: A FN Health Screening Program

## Outcomes

### Inputs/activities

- Resources used to:
- Create counselling services
  - Design promotional material
  - Train providers in use of screening kit

### Outputs

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

- Community cooperation
- Client awareness and participation

- Increased participation in screening, treatment and prevention activities

- Lower morbidity and mortality
- Increased life years
- Reduced health system costs

## Results Chain

### Economy

- Are we getting qualified staff at the lowest cost?
- Do we have the resources to provide sufficient training?
- Are the costs of travel minimized?
- Are we managing the costs of screening kits?

### Operation Efficiency

- Are the kits distributed in a timely manner?
- Are enough staff trained?

### Allocative Efficiency

- What is the cost per client screened?
- What is the cost per “premature” death avoided?
- What is the value of extended life year?

## Economy: Definition

- Focus on the optimization (including minimization) of inputs
- How well did the program select inputs to support program success and prudent use of resources?

### **Example – training**

- Cost of developing courseware  
(wages + overhead + materials)

### **Example – logistics of implementation**

- Cost of setting up flu clinics  
(location, staff training, media) and notifying vulnerable groups



# Operational Efficiency: Definition

- Focuses on relationship between resources consumed and outputs
- How well are inputs being used and converted into outputs?

## **Example – health training**

- Cost per nurse graduate  
(number of graduates divided by the total program cost)

## **Example – vaccination**

- Cost per potential flu shot  
(before any shots are actually given)

## **Example – Grants and contributions**

- Cost of awarding a dollar to third-party delivery for a screening program

# Allocative Efficiency: Definition

- Focus on relationship between resources consumed and outcomes
- Were the resources consumed reasonable for the outcomes achieved in light of context, priorities, and/or alternatives?

## **Example (Vaccination)**

- Cost per flu shots delivered (immediate outcome)
- Cost per unit reduction in flu cases as a result of a vaccination promotion program (longer-term outcome)

## **Example (Third-Party Delivery of Cancer Screening)**

- Cost per incremental screening incidence (immediate outcome)
- Cost to raise the five-year survival rate for Stage 2 breast cancers (longer-term outcome) attributable to early detection

## **3. Typical questions for CI5**

## Economy: Typical Application

- Programs that require significant material or service inputs
- Programs that have suspected opportunities for optimizing of inputs, or have challenges in terms of input costs
- Programs that have a range of business processes and logistics supporting service and outputs
- Programs just starting with implementation challenges and where program fidelity matters

# Economy: Examples of Questions

## **Input processes and costs**

- Are the program processes understood by the evaluator?
- What were the costs of the inputs used for each of the results chains or service lines?
- How do these compare with targets (i.e., budgeted costs) set by the program? Were these compared with other programs or with other comparators (benchmarks)?

## **Input optimization**

- Has management acquired the inputs at the lowest cost, consistent with the required quality, quantity, appropriateness and timeliness?

## **Context, risks and assumptions**

- Did external events, contextual issues, risks or other assumptions compromise, assist or otherwise affect the processes that influenced the timing, quality, quantity, or appropriateness of the required inputs?

# Operational Efficiency: Typical Application

- Programs that are not yet expected to produce outcomes
- Established programs that plan to redesign their delivery mechanisms
- Programs that have known challenges in terms of output production
- Programs with a strong theory of change that links outputs to outcomes

# Operational Efficiency: Examples of Questions

- How do unit output costs compare with those in other similar programs or benchmarks?
- What are the differences between planned and actual spending for these outputs? What explains this difference, if any?
- Were the costs of outputs “reasonable” or “explainable” in light of the program context and external events? Why or why not?
- Were the outputs produced of a quantity or quality required to achieve of required outcomes?

# Allocative Efficiency: Typical Applications

- Established programs that have existed long enough to achieve measureable outcomes, at least at the immediate level
- Evaluations where two or more program models (either real or hypothetical, or between programs or within the same program) with the same or similar outcomes need to be compared
- Programs where program delivery has remained unchanged and prior evaluations and audits indicate no operational issues
- Programs where a counterfactual exists that supports good attribution and measures of net impact



# Allocative Efficiency: Examples of Questions

- Were the resources consumed reasonable for the outcomes achieved in light of context, priorities, and/or alternatives?
- Have we realized the expected or required results, given the resources used and in the context of what can reasonably be expected?
- Did we use the best approach for reaching the results?

## 4. Scoping CI5 Evaluations

# Creating the frame for CI5 assessments

The main shift in federal evaluation since the policy is to move away from the simplistic assessment of cost per outcome to an analysis along the results chain.

- Attribution has proved very complex, especially for federal programs
- Large resource consumption without results has mandated analysis of the “black box.”

## Understanding the black box

Evaluators need to understand how a program works to assess its economy and efficiency.

- Business processes are now important
- Preliminary interviews and document review support the detailed understanding of activities, roles and responsibilities, systems involved, technologies, partners, etc.
- Choose a perspective (next slide)

## Choose a Perspective for CI5

- What are the specific purposes of the evaluation (e.g., how will it be utilized)? What are the information needs of the intended users?
- At what stage is the program in its development?
- How complex is the program/initiative?
- What is the risk profile of the program?
- Are there known or suspected concerns about efficiency or economy? (internal and external audits are helpful)
- Do reliable and valid performance data exist?
- What type of program cost data is available, and what can be collected as part of the evaluation? (see next slide)

## Identification of Program Cost Data

- Assessments of economy and efficiency should ideally involve the comparison of inputs, outputs, and outcomes against costs
- Costing information derives from:
  - Government costs (operational, capital, costs for services from other departments, non-administrative disbursements); and
  - Non-government costs (e.g., contracted services, compliance costs)
- Availability of detailed cost information (e.g., per program, activity, output or outcome) is a common challenge
- Some options for identifying program cost data include time-use surveys, projections based on budgets, interviews with management, and internal audits

# Economic Cost Concepts

- **Opportunity cost** – the cost of what is given up or the value of the next best option
  - The opportunity cost of taking this workshop is the loss in doing the next best alternative
  - One of the opportunity costs of going to school is the income that is foregone
  - The opportunity cost of mitigating climate change by subsidies for wind power technologies is the value of the alternative uses for the funds
- **Direct (tangible) costs** – the cost of resources (goods and services) expended on the program
- **Variable costs** – costs that vary program activity (staff)
- **Fixed costs** – cost that exist even without program activity (rent)
- **Indirect cost** – the time spent by program participants in accessing a service (e.g., patient time spent in waiting when services are restricted)
- **Intangible costs** – pain and suffering, morale (not usually included in a cost-effectiveness analysis)
- **Cost frames** – individual, institutional, government, society

# Seven-Step Approach to Purposeful Costing

1. **Cost purpose:** What is the purpose for which the cost information will be used?
2. **Cost object:** What is being targeted for costing (e.g., an activity, output, service or immediate outcome)?
3. **Cost base:** Which costs are relevant to the cost purpose and object(s)?
4. **Cost classification:** Which costs can be identified directly with the cost object(s) and purpose, and which costs are less direct (such as the cost of supporting activities)?
5. **Cost assignment:** What are the appropriate methodologies for assigning the costs to the cost object(s)? The methods chosen should be reasonable and cost-effective in light of the purpose of the cost information.
6. **Calculate, validate and confirm:** Apply the costing methodologies, validate the calculations and assumptions, and confirm that the results respond to the cost purpose defined in Step 1.
7. **Sign-off:** Sign-off by CFO for Treasury Board submissions and MCs or underlying internal sign-off as designed by departments to meet their own needs.

— *Guide to Costing* (2008)

## Financial statements do not represent *economic cost*

- Program budgets and typical accounting statements typically do not include all the costs associated with a project
- FTE's only capture costs at the department level – not the service line
- Most departmental program budgets exclude the cost of overheads, such as rent and utilities
- Senior management time is often not included in the program's costs.
- Staff often work on multiple projects
- Public accounting for capital costs may allocate the entire cost to one year, or amortize them, or may not include these costs at all
- A program budget may be a small element of a departmental budget



## **5. Overview of approaches to analysis of economy and efficiency**

## Types of Approaches

- **Descriptive approaches:** Provide empirical data with qualitative context to understand cost drivers
- **Mixed quantitative/qualitative approaches:** Build theories and test actual resource utilization against a counter-hypothetical, observations or alternative
- **Cost-comparative approaches:** Test resource utilization with a counterfactual

# Overview of Some Analytical Approaches

## **Descriptive analysis**

- Ratio of operating to total costs (grants and contributions)
- Variance analysis
- Trend analysis
- Management interviews and document review to hypothesized

## **Mixed quantitative/Qualitative approaches**

- Benchmarking
- Business Process Mapping and Analysis

## **Cost comparatives**

- Cost-Effectiveness Analysis (CEA)
- Cost-Benefit Analysis (CBA) and Partial Cost-Benefit Analysis (PCBA)

## Descriptive analysis (1)

- A trend is useful as a comparison to history
  - An increasing trend of growing cost per client needs to be explained
  - Be sure to adjust any monetary value for inflation and seasonality
- Program context will be important to support the cost narrative
- Comparing programs to each other or over time, will often produce intense “kick-back”
- Management interviews are important, but present the quantitative data to interviewees for reaction and comment
- It is usually a waste of time to ask a manager whether his/her program is efficient... better to get their reaction to facts

## Descriptive analysis (2)

### Variance analysis

- Compare planned (budgeted) to actual spending
- Identify variances and search for explanations
  - Projects or aspects of projects not implemented
  - Poor acquisition of inputs (e.g., inappropriate or low-quality inputs lead to inappropriate and low-quality outputs)
  - Governance/management issues
  - Poor planning (e.g., budget planning)
  - Capacity constraint on key inputs
  - Resource diversion due to competing priorities
- Corporate history is important, but becoming increasingly challenging to secure

# Benchmarking (1)

- Systematic comparisons of program input/outputs/costs
- Also compares overall administrative cost ratios versus a known standard or best practice
  - Benchmarks should come from comparable programs (e.g., in terms of size and type)
  - Ideally it involves an exchange of information between (among) “benchmarked entities”)
- Benchmarking of the ratio of administrative cost to total disbursement is a useful indicator for assessing economy and operational efficiency for most G&Cs programs because comparators often can be identified
- A target “efficient practice” could be identified in consultation with key stakeholders if it is not possible to find a benchmark

## Benchmarking (2)

- The analysis should identify a rationale for potential variances and determine what, if any, effect these have had on the production of outputs and/or the achievement of outcomes
- Possible reasons for cost variations:
  - The nature and complexity of delivery processes, program context, size, and target population
  - The program life cycle (e.g., program implementation and expansion require additional resources)
- Whether or not cost variations are reasonable depends on the program context
- If the comparison using public data, then it is little more than a descriptive comparison

## Benchmarking (3)

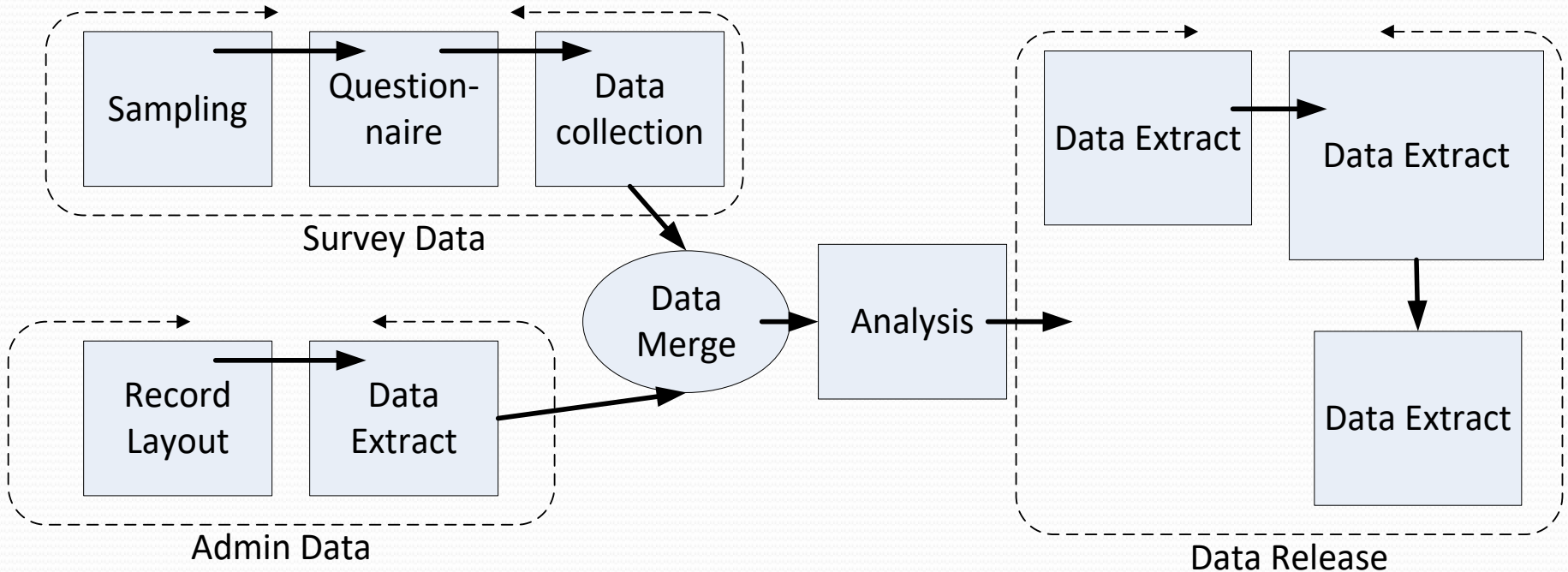
- Purpose-based costing (with activities or outputs as cost objects) can also be used to investigate why costs are higher or lower than the benchmark (or target)
- Using activities or outputs as cost objects allows evaluators to identify the following:
  - Costs of service lines (e.g., program components) within a unit (e.g., a program)
  - Costs of activities within each service line and across service lines
  - Indirect or overhead costs that are not specific to a unit or service line
  - The relative value of service lines in relation to activities or outputs



# Business Process Mapping and Analysis

- Identify/map key production processes and analyze them to determine whether any challenges (e.g., bottlenecks) are inhibiting the achievement of outputs
- Can be used to identify cost variations in support of benchmarking
  - Process maps may or may not be costed
- Interviews with staff can explain where challenges exist and explain why plans were not followed
- Signs of inefficiencies include the following:
  - Inappropriate, inefficient, over-resourced or superfluous activities, or existence of downtime
  - Existence of alternatives to lower costs

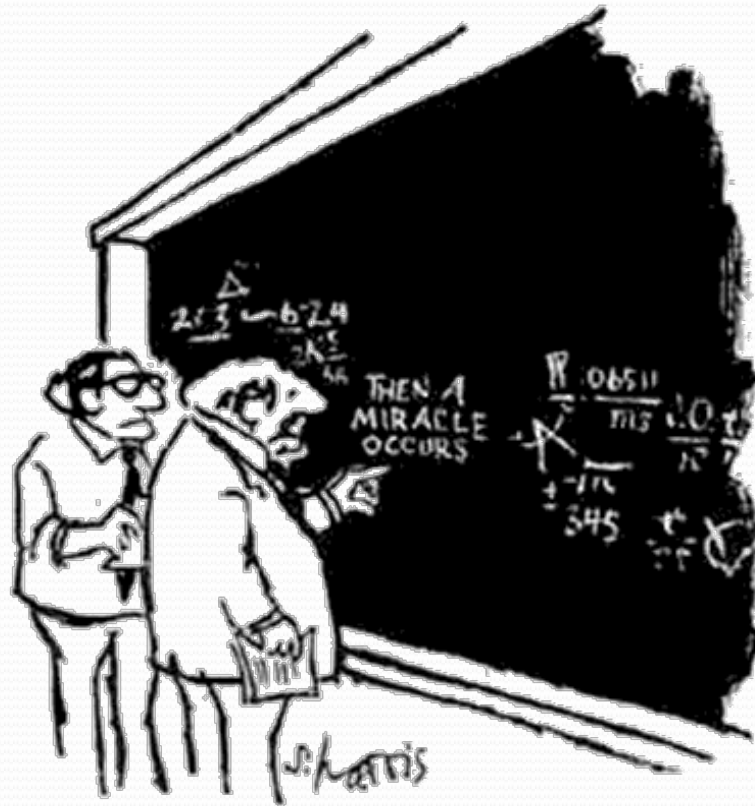
# Example - Statistics as a business process



Three broad processes exist:

1. Survey and administrative data combine as the sources of data
2. Data analytics create the information
3. Reporting and dissemination create series that in turn support further interpretive analysis

Each link represents a transformation that involves resources (staff time)  
In this way BPM supports the analysis of efficiency and economy



"I THINK YOU SHOULD BE MORE EXPLICIT  
HERE IN STEP TWO."

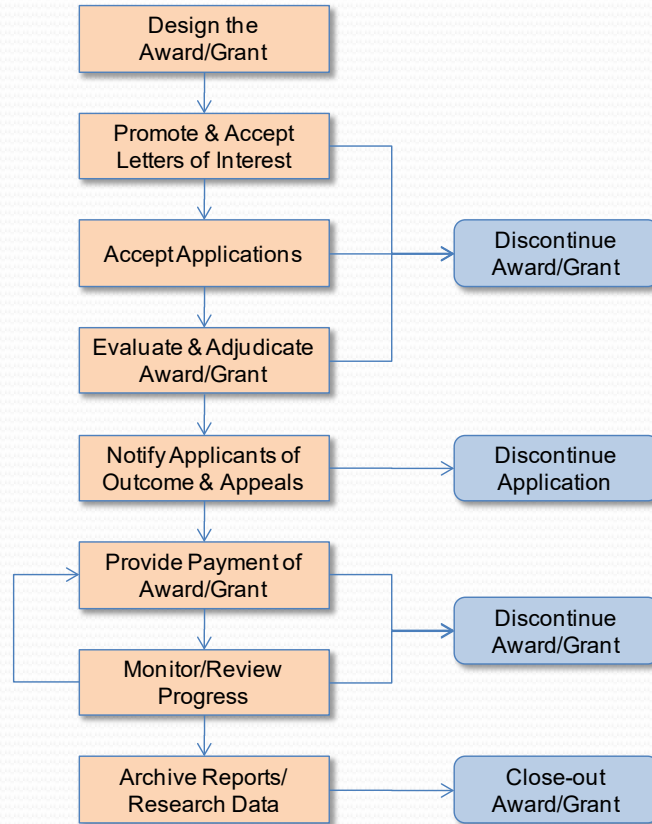
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# Grant Program Activities

## Program Awards/Grants Process

**Direct Program Activities**



**In-Direct Program Support Activities**

Provide Program Support (President, VPs, Communications, Common Administrative Services)

## Example: BPM of a Research Grants Program

Each activity is a discrete step in the production of the output (i.e., research grants)

## Cost-Effectiveness Analysis (CEA)

- Refers to the comparative assessment of costs per “unit” of outcome (a cost-effectiveness ratio) between two or more program elements (or sub-units of a program)
- Assumes that outcomes are similar and strategic (central to the strategic outcomes), for example:
  - Measures of reading level (early childhood development)
  - Delivery mode of mammograms delivered (primary health program)
- Measures operational efficiency or allocative efficiency, depending on the nature of the results:
  - Operational efficiency (outputs): Numbers of training contracts negotiated
  - Allocative efficiency (outcomes): Numbers of trainees who gain employment; social assistance costs avoided

## Cost-Benefit Analysis (CBA)

- Essentially an assessment of all the outcomes valued in dollars in relation to all program costs
- Challenge is usually the conversion of outcomes into dollars
  - Sometimes, outcomes have market value that evaluators must seek through additional research in literature and grey literature
  - Economists also use assumptions to fill information gaps and projections
- Often subject to debate (e.g., using social benefits, benefits abroad, projections)
- Few evaluations will have the resources to execute a complete cost-benefit analysis

# Partial Benefit-Cost Analysis (PBCA)

- Partial benefit cost-analysis isolates a key element of the program to identify key cost/benefits components
- Often used to simply determine whether a program generates enough benefits to justify the cost of the program
- Can be defined in two different ways:
  1. Includes **total costs** but only a **sub-set of benefits** (e.g., benefits generated by the most successful research projects), and results cannot be generalized to the whole population funded by the program
  2. Includes only a **subset of the costs and benefits** (e.g., cost of vaccination divided by the value of time lost from work)
- Sometimes, benefits generated by 10 to 20 per cent of projects can justify the entire investment
- If the cost of the program exceeds the value of a major benefit by a wide margin, it may be sufficient to question the entire program

## Example: Training Program (1)

- Evaluation of a training program for disadvantaged workers to increase participation in the labour market
- Key elements of the results chain include the following:
  - Activities and outputs
    - Development of courseware
    - Determination of eligibility
    - Identify delivery options (contracted training, in-house training)
    - Delivery of training
    - Placement services
  - Outcomes
    - Number of trained workers
    - Number placed in work (hours of paid labour)
    - Reduction in social assistance and EI benefits



## Example: Training Program (2)

- Economy
  - Cost per trainee accepted
  - Cost per seat (common measure of training costs among contractors — measured by competitive tender)
- Operational efficiency
  - Cost per trainee enrolled (may also be an immediate outcome)
  - Cost per trainee graduated (may also be an immediate outcome)

## Example: Training Program (3)

- Allocative efficiency
  - Cost per trainee placed in a job
  - Cost per incremental hours of employment
  - Cost per dollar of social assistance avoided
- Counterfactual (controls)
  - Social assistance clients not in training
  - Later cohort of trainees

# Instructions for afternoon

## 1:30pm – 2:30pm

- Review the program logic for each
  - Page 5 and 6 of Annex offers some perspective on the Financial Benefits program
  - But none of the prior evaluations have included logic models)
- Create verbal description of the transitions from inputs to activities and activities to outputs in the two program
- Develop the results chain(s), and if more than one, select the most material
  - largest budget,
  - most strategic for program mission,
  - one known by management to be experiencing failure,
  - the component having the longest time since last full review...

## 2:45pm – 4:15pm

- What are the outputs and outcomes?
- What is the business process for creating outputs?
- What is the theory of change?
- 15 minute presentation (Note I expect that work will continue on this on Friday)