Doha, Qatar
The International School
on Research Impact Assessment
"Learning to assess research with the aim to optimise returns"

Define Success Indicators

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Learning Outcomes

- Understand how to generate and select a balanced set of key indicators focused on program purpose
- Select key success indicators that link to impacts of interest to stakeholders
- Knowledge of relevant impact tools required for practical application

Overview

1. Different types of indicators
2. Use the logic model as a tool for identifying indicators and highlight relevant impact measurement tools
3. Review program context considerations to focus measurement
4. Review the science behind indicator selection

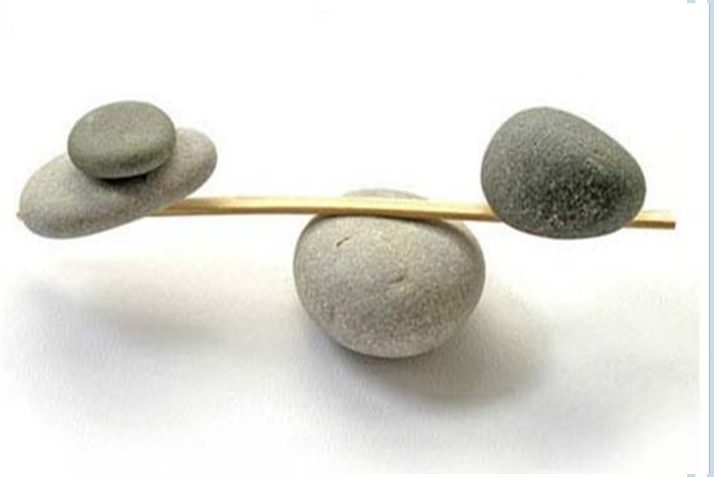
MEASUREMENT

"What gets measured gets managed"

Source: Peter Drucker

INDICATORS OF SUCCESS

- Establish the evidence to answer stakeholder questions about the program's performance
- Can tell a brief, convincing performance story about what the program has (not) achieved, especially when a balanced set of indicators is used



Assessment Questions

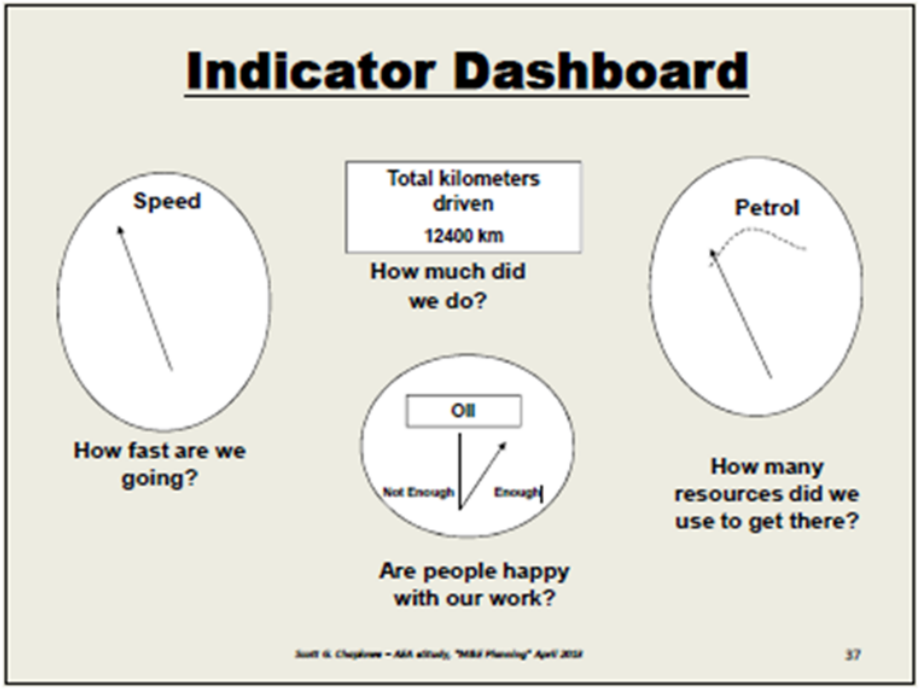
What do stakeholders want to know?

Indicators

How will we know it?

INDICATORS

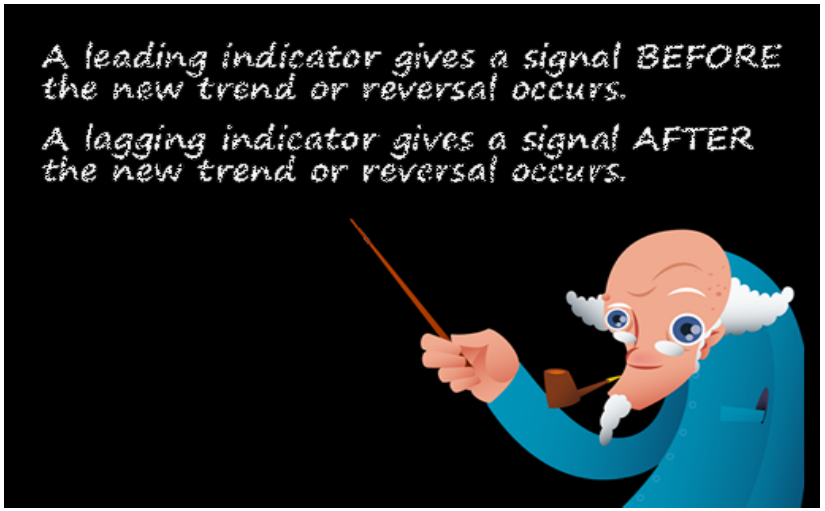
- An indicator is a variable that measures a phenomenon of interest*
  - Quantitative indicators have a unit of measure (*metrics*)
    - a number, percent, ratio, etc.
  - Indicators can also be qualitative
    - the extent to which a program is improving



*World bank ISRIA glossary. Image from source: Chaplowe, S. (April 2013) *Monitoring and Evaluation (M&E) Planning for Projects/Programs*. AEA eStudy

Types of Indicators

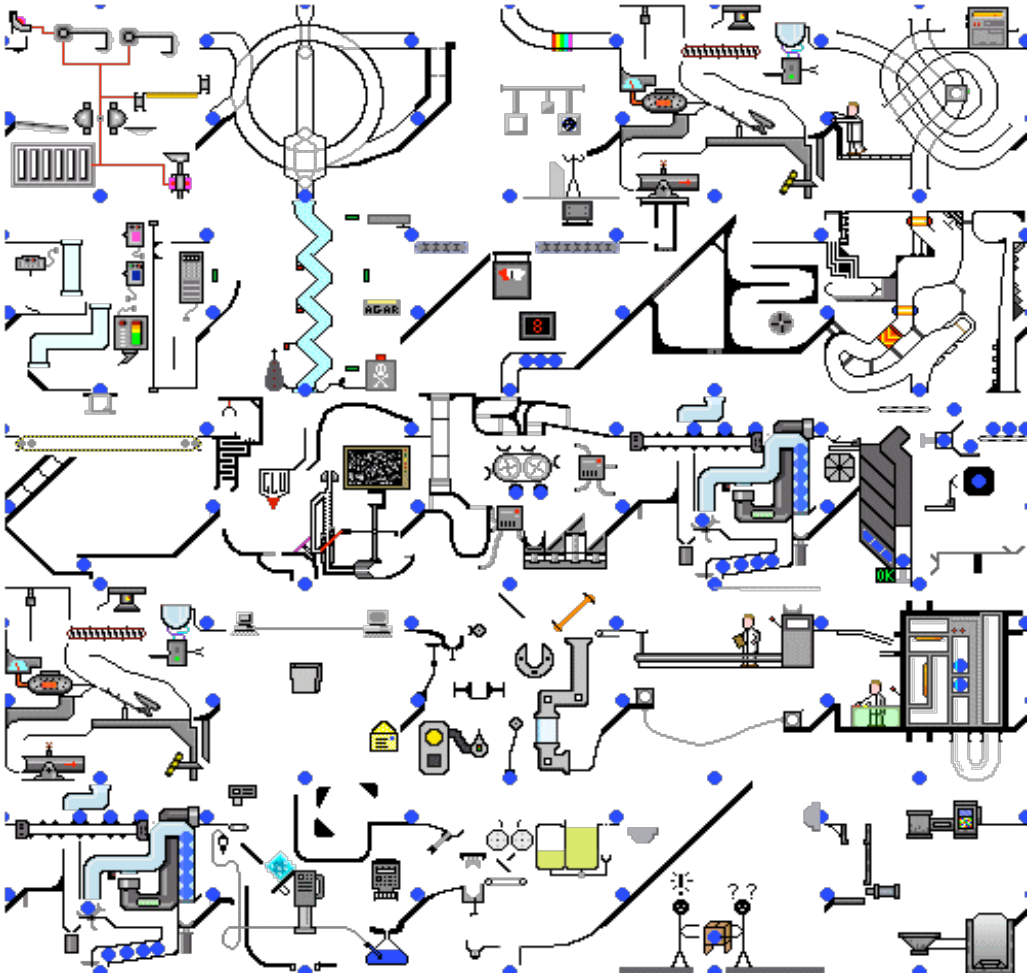
- Indicators can be either leading or lagging



Characteristics of leading indicators	Characteristics of lagging indicators
• Input oriented	• Output oriented
• Hard to measure	• Easy to measure
• Easy to influence	• Hard to influence or improve
• E.g., daily referral volumes	• E.g., average referral to admission cycle times

Using the logic model as a tool for Identifying indicators

Program as a System



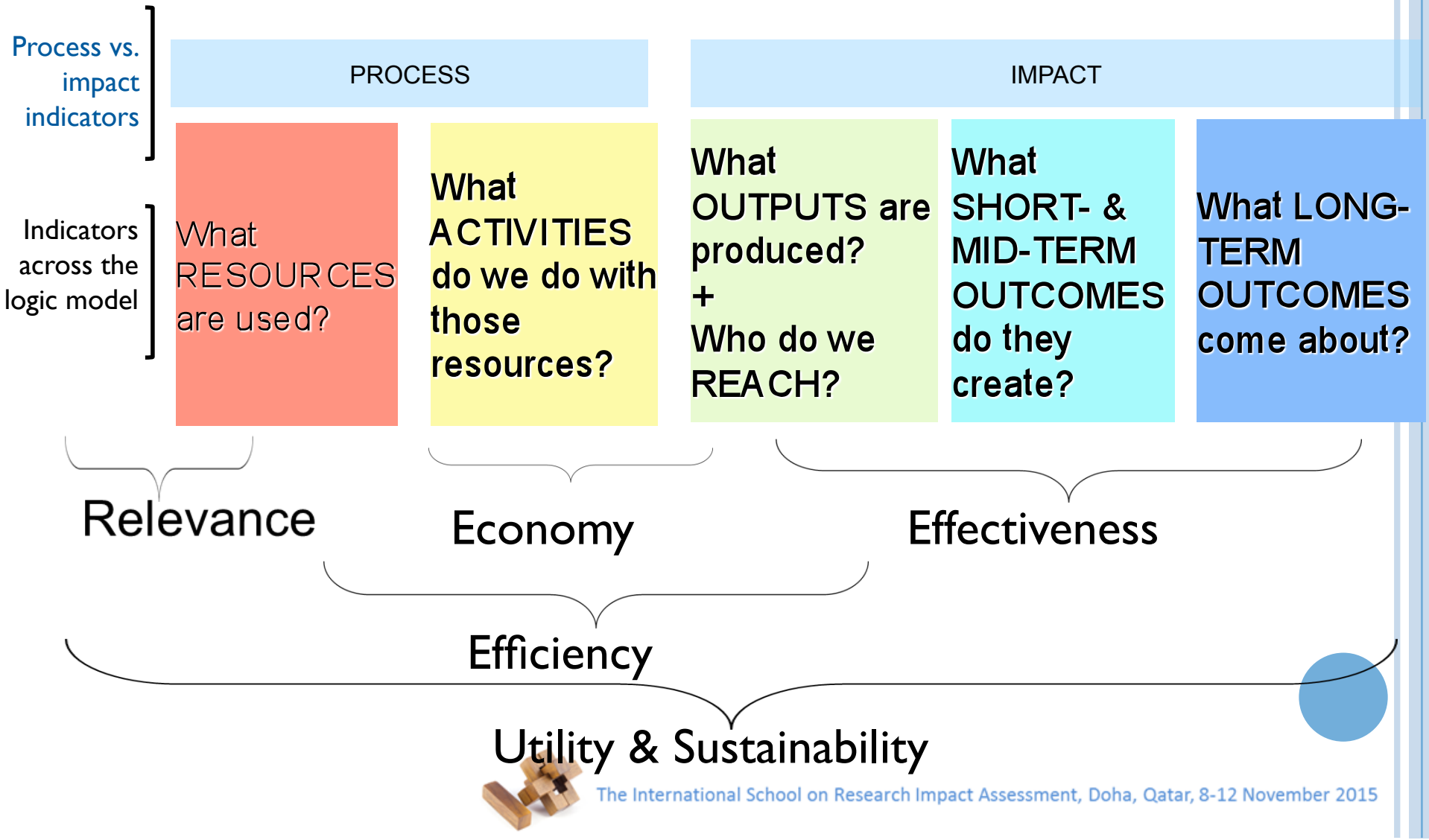
Criteria for Success

Example of Criteria:

1. Relevance
2. Economy
3. Efficiency
4. Effectiveness
5. Utility
6. Sustainability

Tip: Focus on criteria of interest to the program

Logic Model and Indicators



Questions and Indicators Across the Logic Model

Example

	PROCESS			OUTCOMES/IMPACT	
Indicators across the logic model	What RESOURCES are used?	What ACTIVITIES do we do with those resources?	What OUTPUTS are produced? + Who do we REACH?	What SHORT- & MID-TERM OUTCOMES do they create?	What LONG-TERM OUTCOMES come about?
	# Staff $ used # partners	# Sessions held Quality criteria	#,% attended per session Certificate of completion	#,% demonstrating increased knowledge/skills	#,% demonstrating improvements Types of improvements

Types of Outcomes

- # of patients discharged from hospital is an output
- % who are capable of living independently is an outcome
- Outcomes what results for individual, families, communities

SHORT *Learning* Changes in	MEDIUM *Actions* Changes in	LONG-TERM *Conditions* Changes in
• Awareness • Knowledge • Attitudes • Skills • Opinion • Aspirations • Motivation • Behavioural Intent	• Behaviour • Decision making • Policies • Social action	• Conditions • Social (well-being) • Health • Economic • Civic • Environmental

Practical Considerations for Generating Indicators

Focus of the Assessment

- Assessment and program purpose
- Impacts of interest to the stakeholders
  - Impact categories of interest
  - What success looks
- Assessment questions of primary interest to the stakeholders

Tip: Start with the end in mind

Learning Activity 1

- Work in groups at your table, and use the indicators from the "Indicators of Success" Exercise 1 envelope
- Follow the instructions
  - Agree on what indicators best map to the 5 impact categories
  - Discuss in your group
  - Why indicators selected are the best for each category
  - Rationale for why you removed any specific indicators
- 15 minutes

Program Contextual Factors

- Research system
- Field
- Institution
- Department or programme
- Research group
- Project
- Researcher

- Level of application
- Program maturity and focus
  - New → mature
  - Formative → summative assessment
- Time lag from research to achieve wider impact
- Program attribution/contribution

Source: Measuring Research: A guide to research evaluation frameworks and tools. Rand-Europe, 2013

Attribution and Contribution

TIME LAGS (SHORT TO LONG)

DIRECT CONTROL			DIRECT INFLUENCE	INDIRECT NFLUENCE
What RESOURCES are used?	What ACTIVITIES do we do with those resources?	What OUTPUTS are produced? + Who do we REACH?	What SHORT- & MID-TERM OUTCOMES do they create?	What LONG-TERM OUTCOMES come about?

Internal to Program

External to Program

Other Practical Considerations

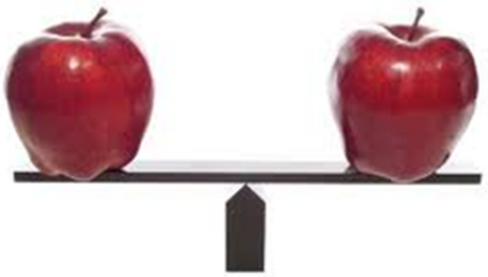
- Organizational alignment
- Mandatory requirements
- Baseline and benchmark data
- Reference to:
  - Recommended indicators from research literature
  - Existing indicators (e.g., indicator libraries) and indicator selection panels
  - Existing measurement and decision support tools
  - Leverage and identify common indicators with partners

Example

Baseline and Benchmark Data

- Econometric Indicators

NAPRHO Indicator	CAHS Indicator
E3 Patents	• Number of patents licensed
E4 Licensing	• Licensing returns ($)
E5 Spin-offs	• Valuation of spin-out companies ($)
E9 Employment	• Economic rent
E10 Educational impacts	• Graduated research students in health related subjects
NAPHRO Added Indicators	
E1 Provincial share of national and other funding	
E2 Federal-level funding success rates	
E6 Pharmaceutical R&D spending	
E7 Biotechnology R&D spending	
E8 R&D GDP	



Research Literature: Systematic Review

Example

Indicators	# of studies
Number of publications	38
Number of citations	27
Impact factor	15
Research funding	10
Degree of co-authorship	9
H-index	5

Source: Patel VM, Ashrafian H, Ahmed K, Arora S, Jiwan S, et al. (2011) How has healthcare research performance been assessed? A systematic review. Journal of the Royal Society of Medicine 104(6): 251–261 [PMC free article]

Example

INDICATOR LIBRARIES

CAPACITY BUILDING

	Indicator	Description	Level of Application	Category	Pillars that indicators are relevant to
PERSONNEL	Graduated research students in health-related subjects	* Numbers of graduated PhD/ MSc/MD, year on year * Should be able to disaggregate to subjects, gender, etc.	* Not recommended at the individual level * Can be used at institutional level * Most useful provincially or nationally	* As an aspiration we would also like to track the success of training programs in producing outstanding scientists and the progress that all research graduates make	All pillars

Source: CAHS, Canadian Academy of Health Sciences. (2009) *Making an Impact: A Preferred Framework and Indicators to measure Returns on Investment in Health Research*. Ottawa, ON: CAHS.

Existing Measurement Tools and Solutions

Example

A number of tools and organizations that include Impact research indicators:

- Altmetrics
- Elsevier
- Researchfish
- Thomson Reuters
- Snowball Metrics
- UberResearch

To name but a few……

IMPACTS: RESEARCHFISH INDICATORS

Example

Capacity Building	Advancing Knowledge	Informing Decision Making	Health Impacts	Economic and Social Benefits
Further funding	Publications	Influence on policy, practice, products, patients and the public	Medical interventions and clinical trials*	Intellectual property & licensing*
Research tools and methods	Collaborations and Partnerships	Engagement activities		Spin outs*
Research databases and models		Software and technical products		
Use of facilities and resources		Artistic & creative products		
Next destination and skills				
Awards and recognition				

THE SCIENCE BEHIND INDICATOR SELECTION

Indicator Selection Criteria

- Attractiveness
  - Validity
  - Relevance
  - Behavioural impact
  - Transparency
  - Coverage
  - Recency
  - Methodological soundness
  - Replicability
  - Comparability
- Feasibility
  - Data availability
  - Cost of data
  - Compliance costs
  - Timeliness
  - Attribution
  - Avoids gamesmanship
  - Interpretation
  - Well-defined

Source: CAHS, Canadian Academy of Health Sciences. (2009) *Making an Impact: A Preferred Framework and Indicators to measure Returns on Investment in Health Research*. Ottawa, ON: CAHS.

FABRIC Criteria for Selecting Balanced Indicator Sets

- **F**ocused on the organization's objectives
- **A**ppropriate for the stakeholders who are likely to use the information
- **B**alanced to cover all significant areas of work performed by an organization
- **R**obust enough to cope with organizational changes (such as staff changes)
- **I**ntegrated into management processes
- **C**ost-effective (balancing the benefits of the information against collection costs)

Source: CAHS, Canadian Academy of Health Sciences. (2009) *Making an Impact: A Preferred Framework and Indicators to measure Returns on Investment in Health Research*. Ottawa, ON: CAHS.

Delphi Technique

- Delphi exercises are a structured way to collect large amounts of qualitative information from experts in fields relevant to the issue(s) being examined
- Delphi exercises use ranking, scoring and feedback to arrive at consensus. Delphi characteristics
  - Structured information flow
  - Regular feedback
  - Anonymity of participants
- Used to develop and select performance indicators in health settings
- RAND/UCLA Appropriateness Method

Example

Indicator Selection Table

TABLE 1. HOW TO SELECT INDICATORS

INTENDED RESULTS	PERFORMANCE INDICATORS	CLASSIFICATION OF INDICATORS						TOTAL SCORE	SELECTED
		A	B	C	D	E	F		
Impact	If any -								
Outcome 1	Indicator 1 Indicator 2...	[Rate 1 per satisfied criteria]							
Output 1	Indicator 1 Indicator 2...								

Select the 2 to 3 indicators with best score

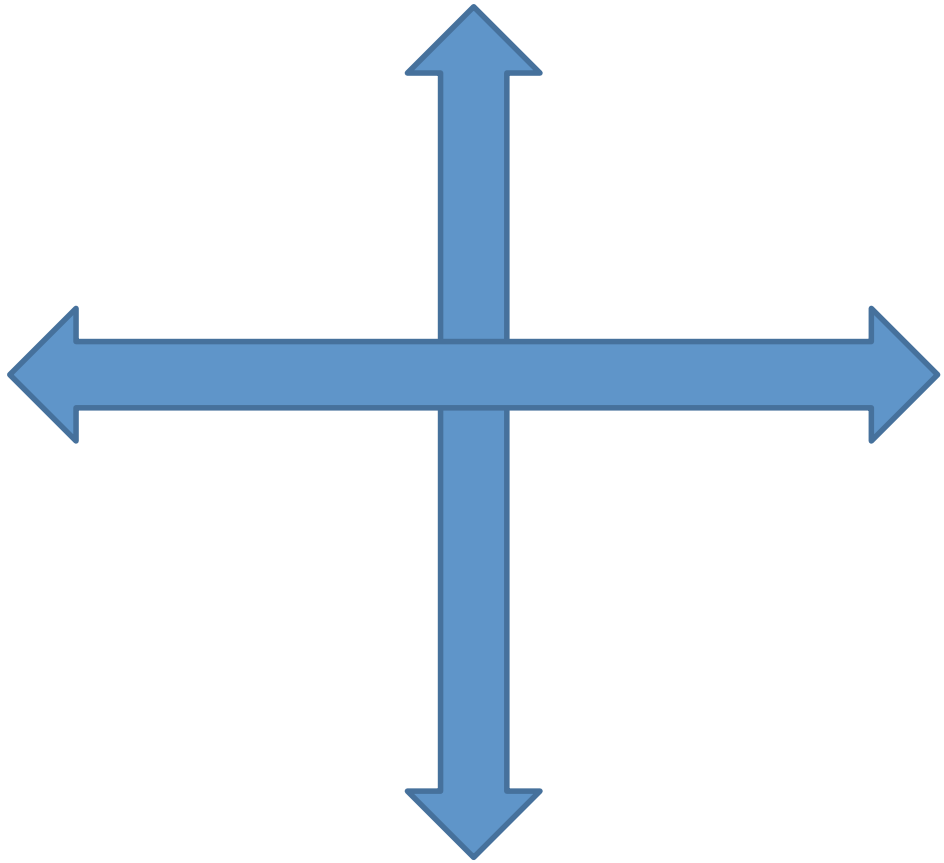
A = the meaning of the indicator is clear
B = data are easily available
C = the effort to collect the data is within the power of the project management and does not require experts for analysis
D = the indicator is sufficiently representative for the total of the intended results (outcome or output)
E = the indicator is tangible and can be observed
F = the indicator is difficult to qualify but so important that it should be considered (proxy indicator)

Source: http://web.undp.org/evaluation/documents/HandBook/ME-Handbook.pdf

INDICATOR MATRIX

[Criteria] +

[Criteria] -



[Criteria] +

[Criteria -]

Example

Logic Model: Data Collection Matrix

Logic Model	Assessment Questions	Indicators	Data Sources
Outcomes	Are we building research capacity in our jurisdiction?		
Item # from logic model	Q1: Are we developing highly qualified research personnel in our province?	# of graduated students per year (MSc, PhD, MD-PhD)	Statistics Canada
	Q2: Is the infrastructure being built to support personnel?	$/% invested in infrastructure programs	Financial management system
	Q3. Are we leveraging additional capacity for the province through attracted funding?	Total "additional funding" attracted ($)	Researchfish

Cautions and Considerations

Cautions	How to Mitigate
○ Not measuring something because it isn't available	○ Identify aspirational indicators and develop alternatives
○ Using isolated indicators may bias impressions	○ Use a balanced set
○ Measuring too many things	○ Selecting key set
○ Use of too narrow a set	○ Balance across key impacts
○ Use only lagging indicators	○ Balance with leading indicators
○ Double counting	○ Look at contribution bundles
○ Focus on the indicator	○ Focus on the program change

Getting to impact

"Measuring what matters"

Key Messages

- Engage stakeholders in defining success and understand impacts of interest
- A program logic model can be a useful tool to guide your measurement system and software application tools for data collection
- Choose indicators that address assessment questions, are balanced and appropriate to the program context
- Use specific criteria to select key indicators
  - Indicator selection requires time and care
- Make sure the indicator is not driving success

RECOMMENDED READING AND RESOURCES

- Evaluating Outcomes of Publicly-Funded Research, Technology and Development Programs: Recommendations for Improving Current Practice AEA Research, Technology and Development (RTD) Topical Interest Group (TIG) Paper (2014 October) https://higherlogicdownload.s3.amazonaws.com/EVAL/271cd2f8-8b7f-49ea-b925-e6197743f402/UploadedImages/RTD%20Images/FINAL_RTD_Paper_20150303.pdf
- Bibliometrics: The Leiden Manifesto for research metrics (2015 April) http://www.nature.com/news/bibliometrics-the-leiden-manifesto-for-research-metrics-1.17351
- The Metric Tide: Report of the Independent Review of the Role of Metrics in Research Assessment and Management (2015 July) http://www.hefce.ac.uk/pubs/rereports/Year/2015/metrictide/Title,104463,en.html