Overview and Best Practices in Understanding and Interpreting Cost Data

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HEIST Workshop: Introduction to Economic Evaluation in Global Health

HEIST

Health Economic Impact Studies for Translation

Recognition

- This presentation was prepared as part of the Global Health Cost Consortium and the World Bank Group.
- Special thanks go to Willyanne DeCormier Plosky and Lori Bollinger (Avenir Health) and Lorna Guinness (LSHTM).

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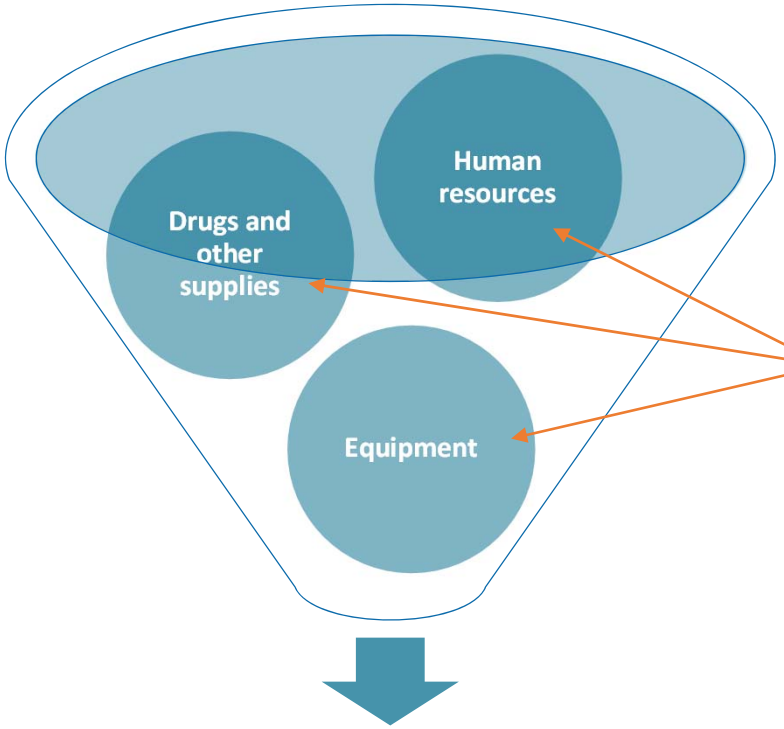
Questions we'd like to help answer
What do we mean by cost?
What do we use cost data for?
What makes a good quality cost estimate?
How can I understand if analysis of the cost estimate was done properly?
What is the Unit Cost Study Repository?
Where can I find more information?

What do we mean by cost?

What are costs?



Amount
Price

Costing places a value on the total resources used to produce a [health] service

Output

(e.g., per test, per visit, per person treated per year)

Types of costs?

Financial Costs represent the ***actual expenditure*** on goods and services purchased.

- Used for budgeting; cost projections; expenditure reviews; affordability/ budget impact analyses

Economic Costs are defined as the *opportunity cost* or ***the value of resources used*** *to produce something*

- Whereas financial costs report expenditures, economic costs include the value of all resources used
- The **value** includes the value of donated goods, space, airtime, labor and subsidies
- Used for efficiency analyses; economic evaluation; budgeting/replication when context and conditions change

The difference between economic and financial costs

TB active case finding

	Financial cost	Economic cost
Staff nurse who lives in free nursing accommodation	Monthly salary plus transport allowance	Market price for nurses at national level plus transport allowance plus value of the accommodation
Lay volunteer	None	Value of time in next best alternative
Syringe	Price paid for syringe	Market price for syringe
Patient coming in for clinical assessment	Transport cost, meals on the way to the clinic, childcare cost	Opportunity cost of patient's time spent in transport and at clinic
Xpert diagnostic kit	Price paid	Full unsubsidised price including any distribution and tariff costs.
Computer - donated	None	Market price of computer

Cost Measures

Total Costs (TC): represent the cost of producing a service

e.g., the total cost of active TB case finding at clinic A

Average costs/unit costs: total cost per unit of output (or TC/Q) with output being measured in different ways

e.g., the cost per person contacted; or the cost per person tested

Marginal cost: the additional cost of producing one more unit of output (looking within a service or project)

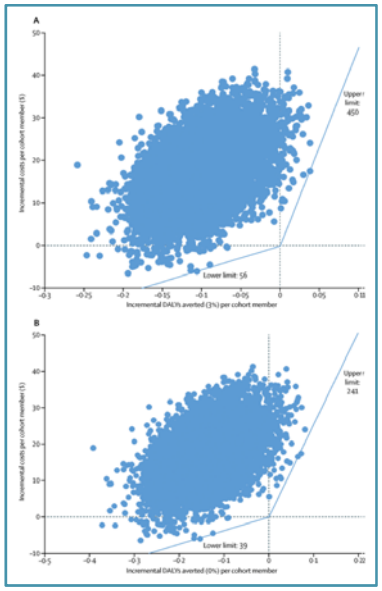
e.g., the cost of testing one more person or the cost or carrying out one more test

Incremental cost: additional cost of adding a new service or project

e.g., the additional cost of adding active case finding to the current TB clinic services

What do we use cost data for?

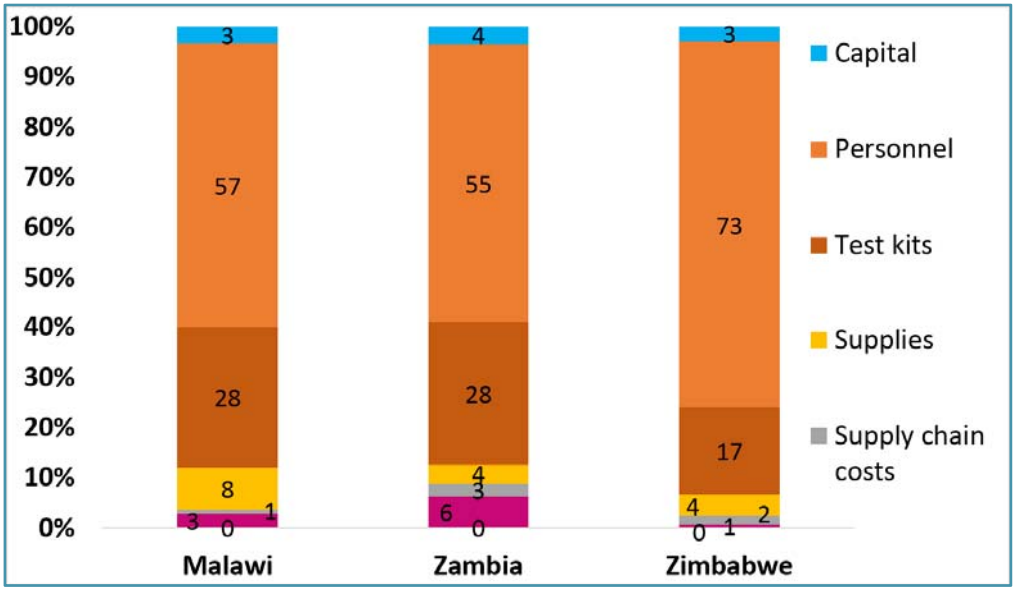
1. Cost-effectiveness — Xpert for TB diagnosis



Reference [1]

2. Disaggregated costs

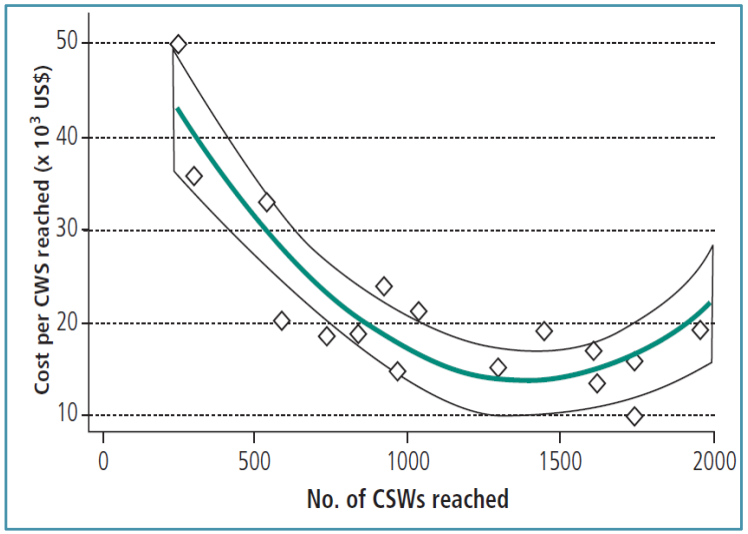
Reference [2]



3. Strategic planning models also utilize cost data, including the Spectrum **Goals/RNM** modules and the **AEM** model for HIV, and the **Optima TB** model for TB. These models often have default cost data, but the default values are editable. So, users often ask, should I change the data? And how?

4a and 4b. Scale efficiency

Unit costs of the same program vary by scale, most likely in a nonlinear fashion, making it important to use different unit costs for different service delivery levels.



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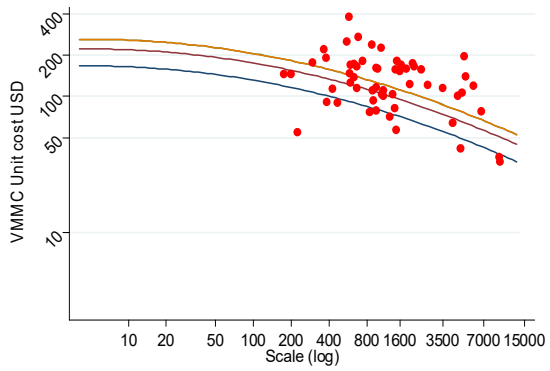
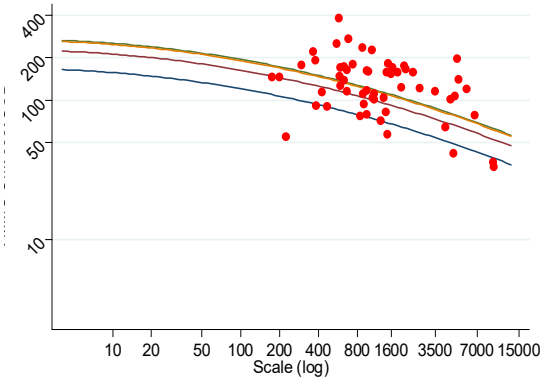
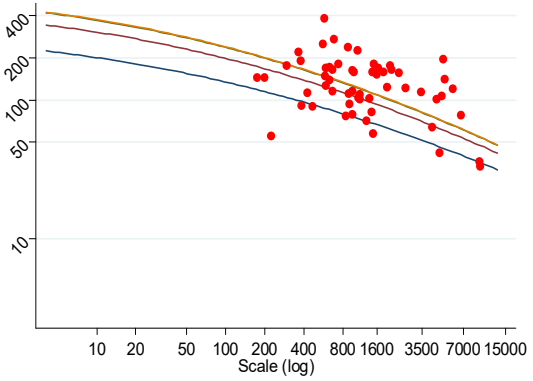
Fixed effects model



Random effects model



GLM



Reference [4]

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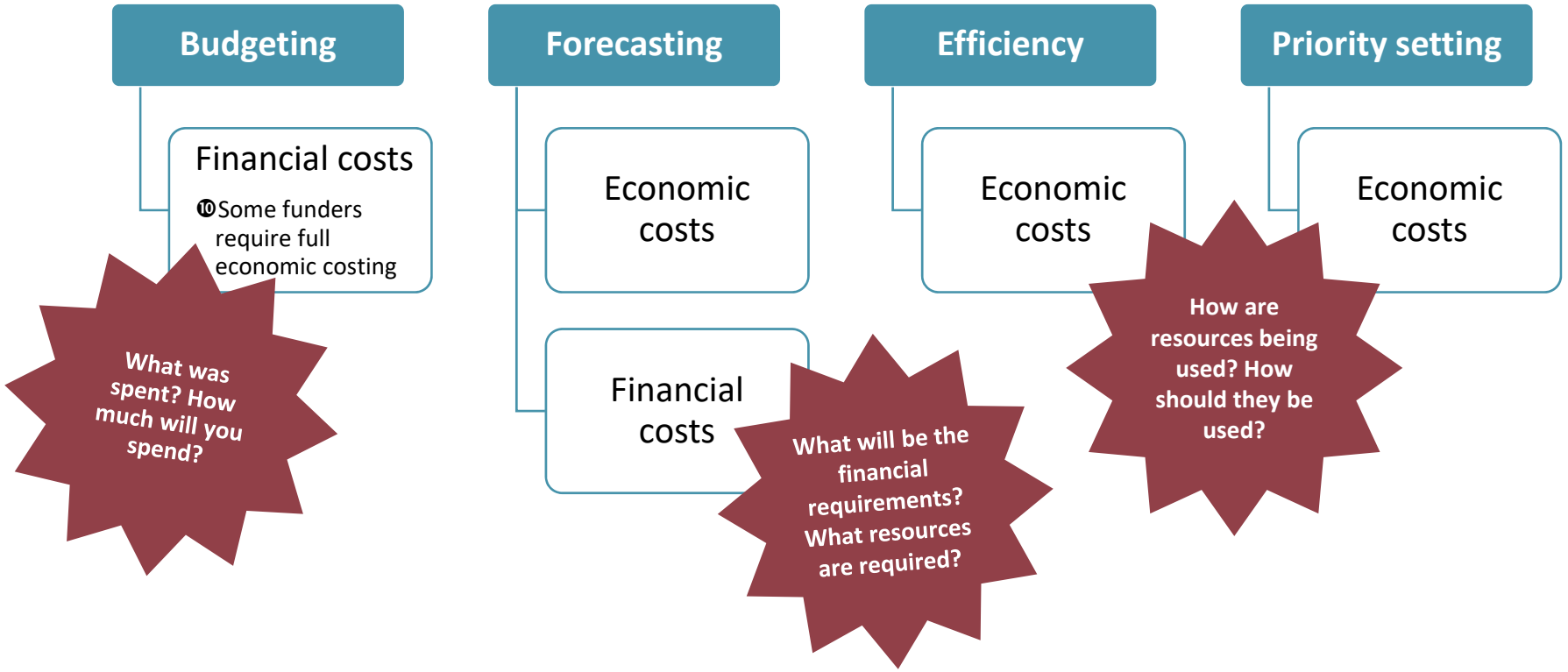
The purpose of the analysis dictates the type of cost data



Mathematical models help address these purposes using cost data (either unit or marginal or incremental) together with epidemiologic and program data.

What makes a good quality cost estimate?

What makes a good quality cost estimate?

Statistical properties

- Precision
- Accuracy

Other properties

- Transparent
- Reliable
- Consistent

1. Generalisable

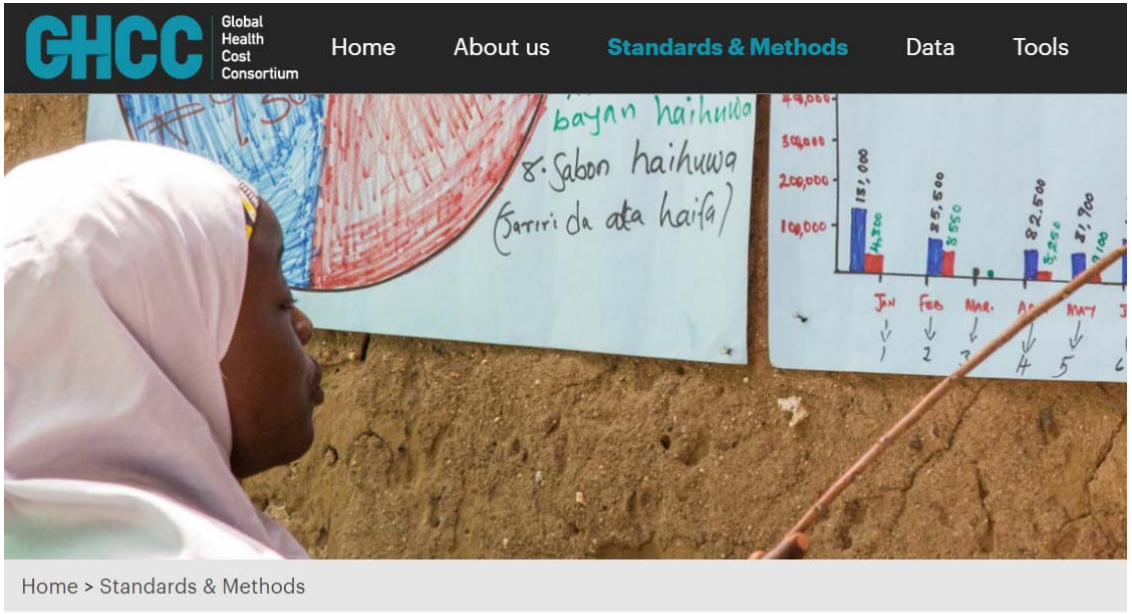
2. Transferable

3. Consistent

https://youtu.be/_LL0uiOgh1E

The GHCC Reference Case: ghcosting.org

- Set of guiding principles to improve cost estimates
- Describes best methodological practice' to support a cost estimation process that is fit for purpose and efficient given the funding and data available.
- Sets minimum reporting standards to improve the transparency of cost estimation



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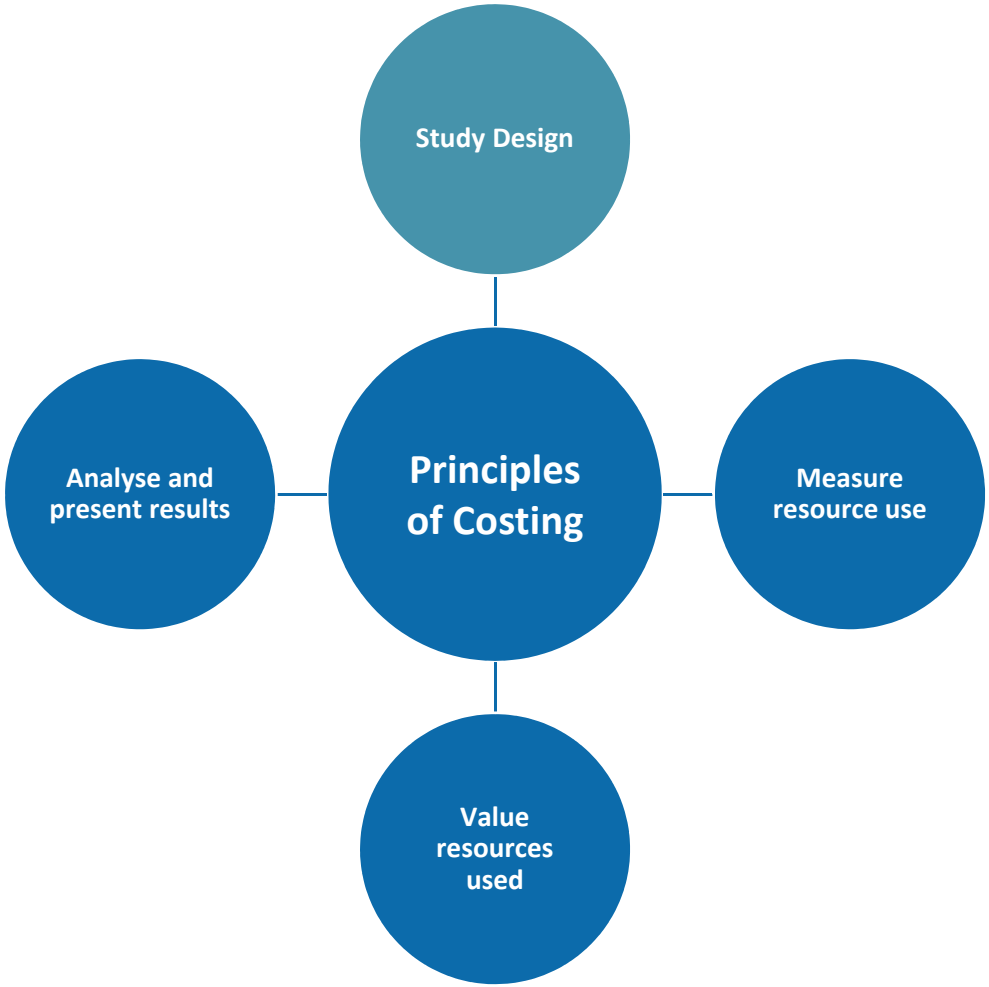

Study Design
Analyse and present results
Principles of Costing
Measure resource use
Value resources used

Study design (Principles 1–5)

Specify the **purpose** to define:

Perspective (whose costs?)	Types of cost?	Cost measure	Unit of service	Time horizon and period
▪ Health system ▪ Provider ▪ Society ▪ Patient/client ▪ Household	▪ Financial/ Economic ▪ Real world/ guideline	▪ Full ▪ Incremental ▪ Marginal	▪ Standardised units for different disease and intervention areas ▪ Episodes of care/ Unit of service use	▪ What is the time horizon you will be projecting to? ▪ What time periods need to be captured to be representative?

Two examples…

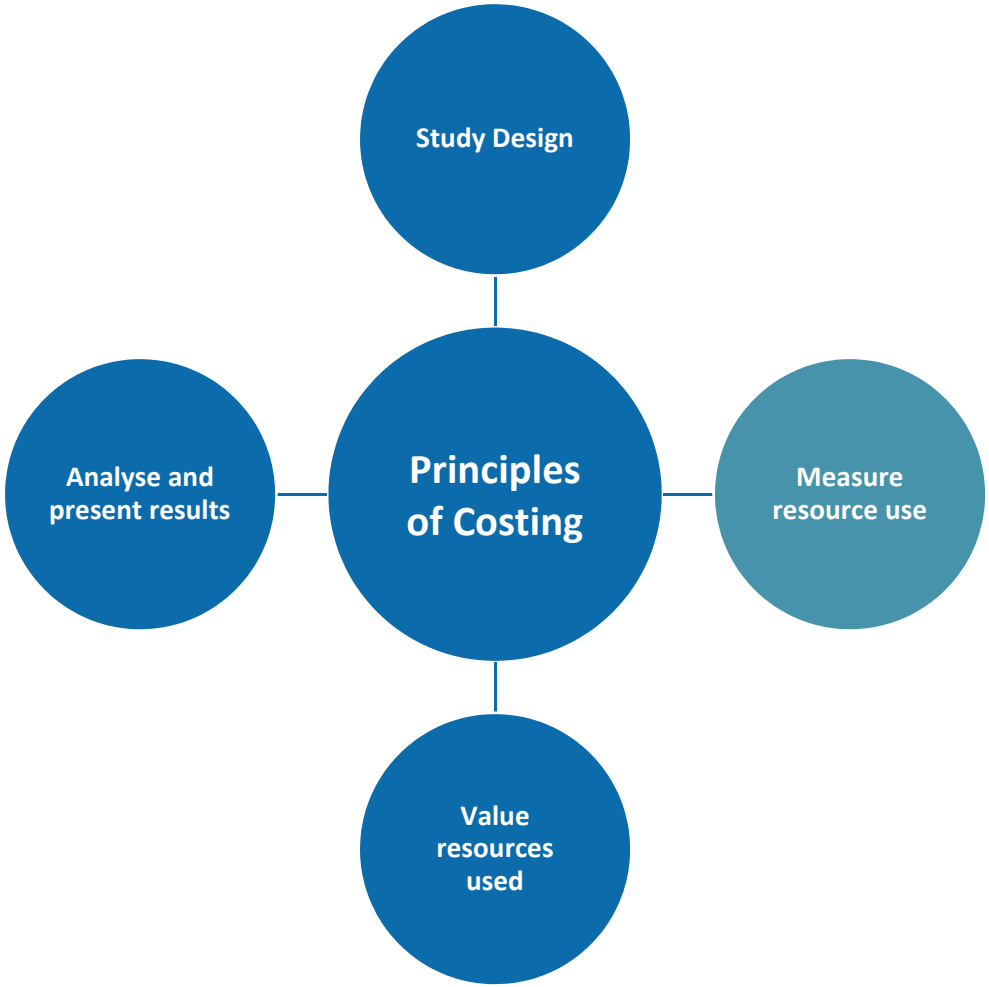
Cost-effectiveness of TB active case finding

- Most Ministries of Health would demand that the economic evaluation takes a societal perspective.
- Economic costing would be required to ensure that we capture the true opportunity cost
- Real world costing would be preferable to avoid any systematic bias.
- An incremental cost would be used and economic evaluation guidance would indicate whether future savings should be incorporated.
- The time frame needs to be sufficient to cover the cost of the intervention (direct and indirect).

Budget for ART in district Q over the next two years

- A provider perspective would be used as we are informing the budget; and
- Financial costs only — actual expenditures — would need to be included.
- Real world costs would be the most accurate way to budget but guidelines maybe sufficient and
- The full costs of the service needed.
- The time frame will be 2 years

More examples available at the Reference Case: www.ghcc.org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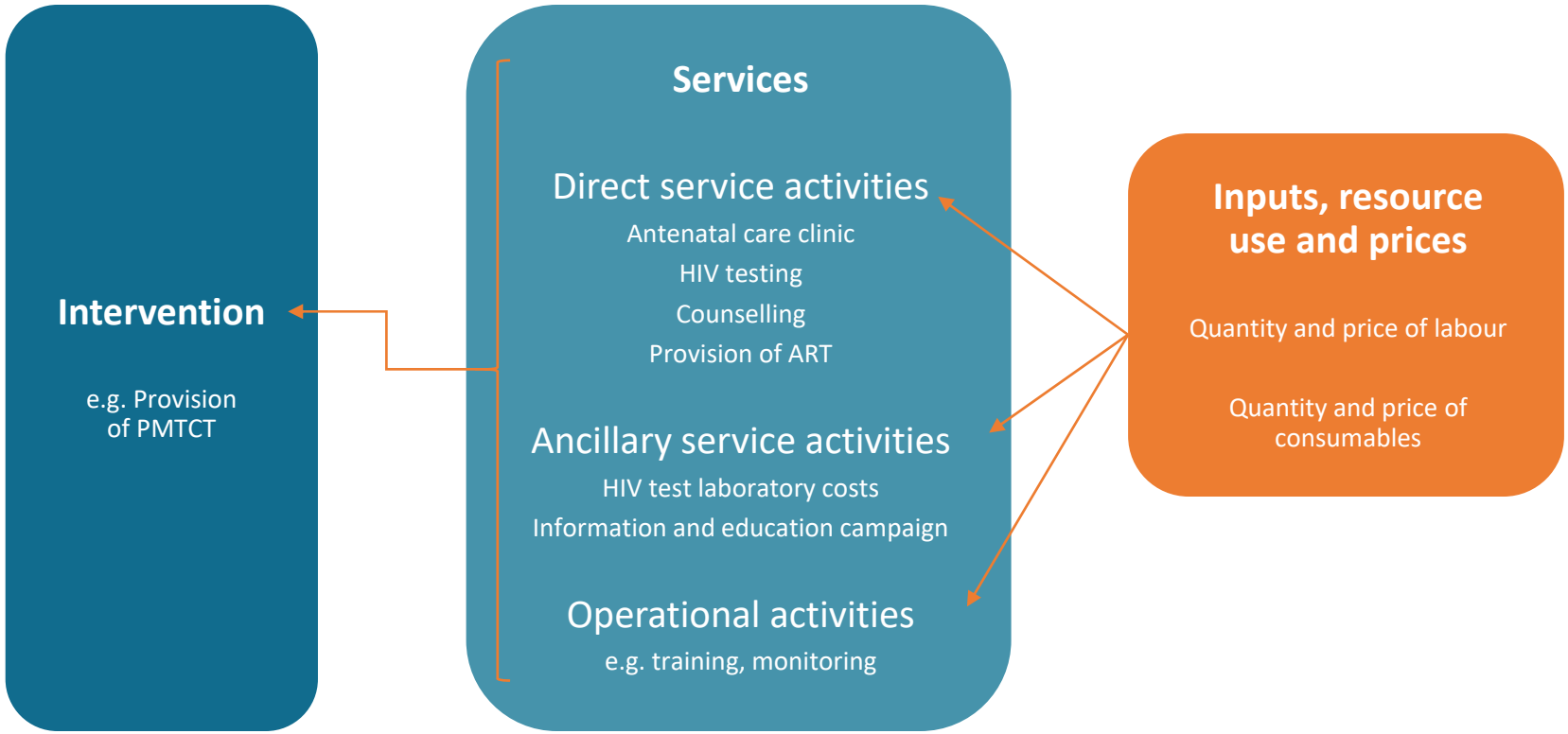
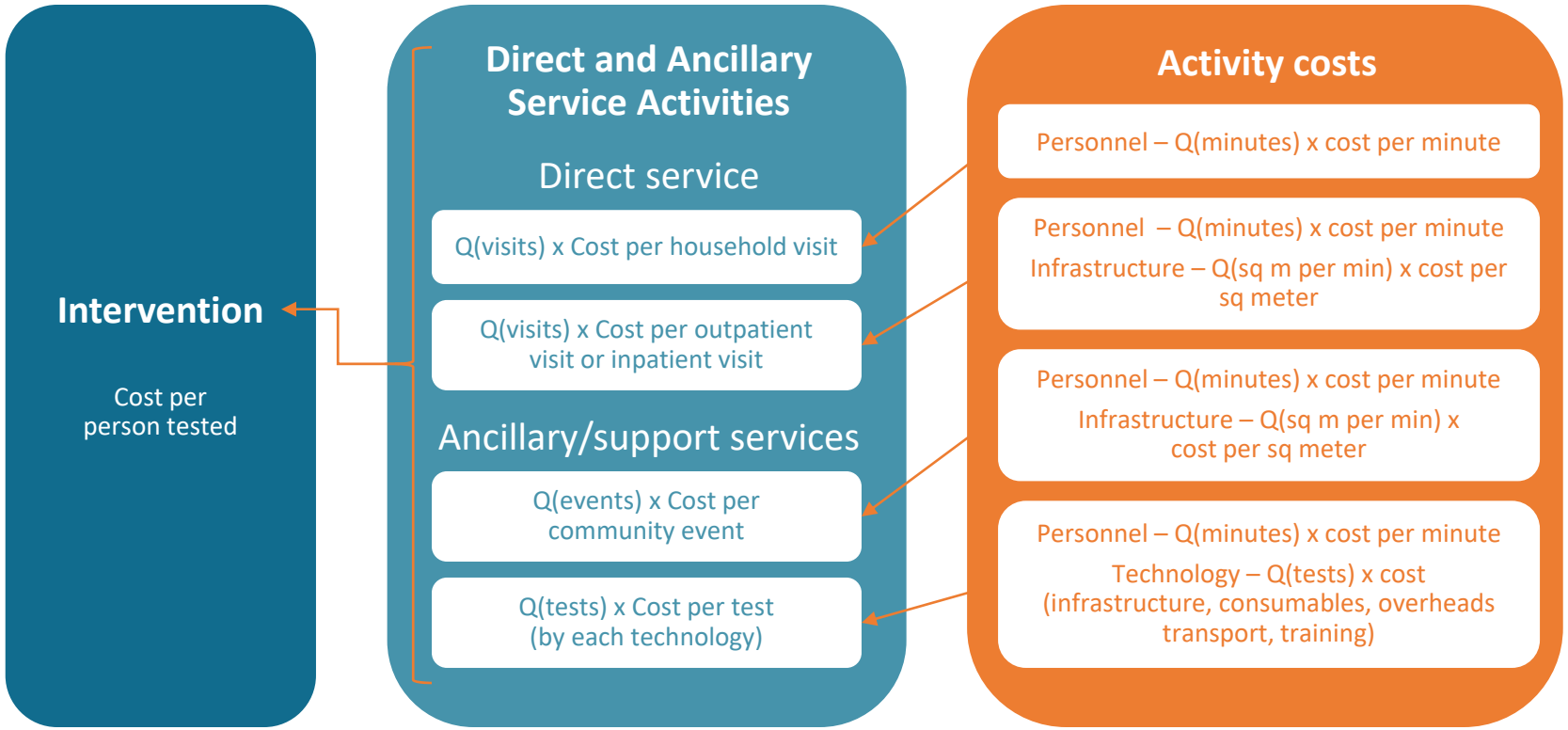
Measuring resource use: scope of the costing

- Describe the intervention/programme fully
- Identify the activities for the specific intervention/programme during the specified time for the specific in that context.
- Identify the inputs that are required for each activity
- Identify the outputs for each activity

The GHCC reference case framework



TB active case finding (simplified)

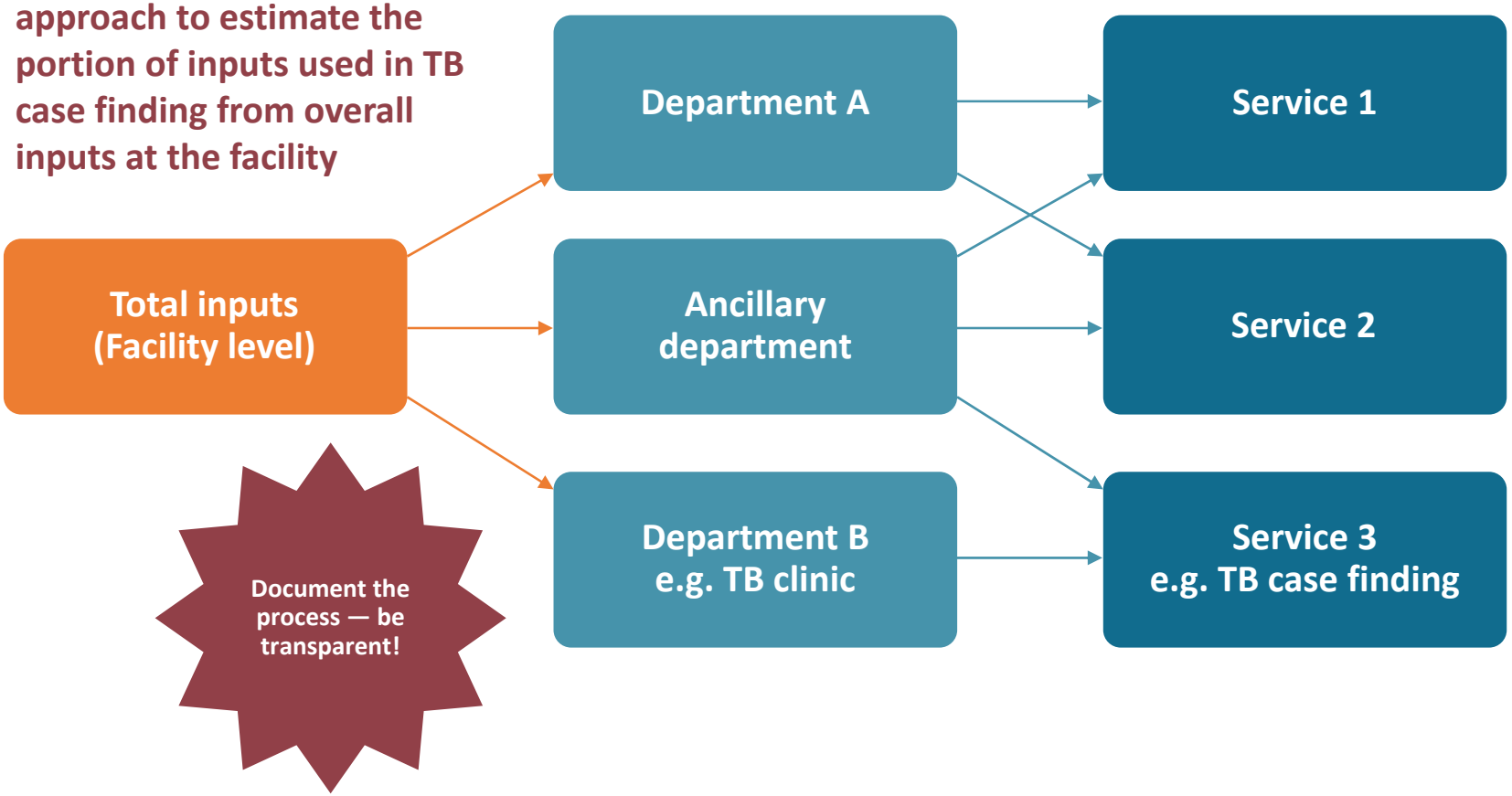


Measuring resource use: assessing sampling

- Sampling can be at individual or facility level
- Sampling frame will be determined by precision demanded
- Explicit consideration of each element inline with good practice
- Transparency!
- Look for sampling from:
  - Multiple sites
  - Real world (rather than clinical trials)

Methods of measurement: gross or microcosting?

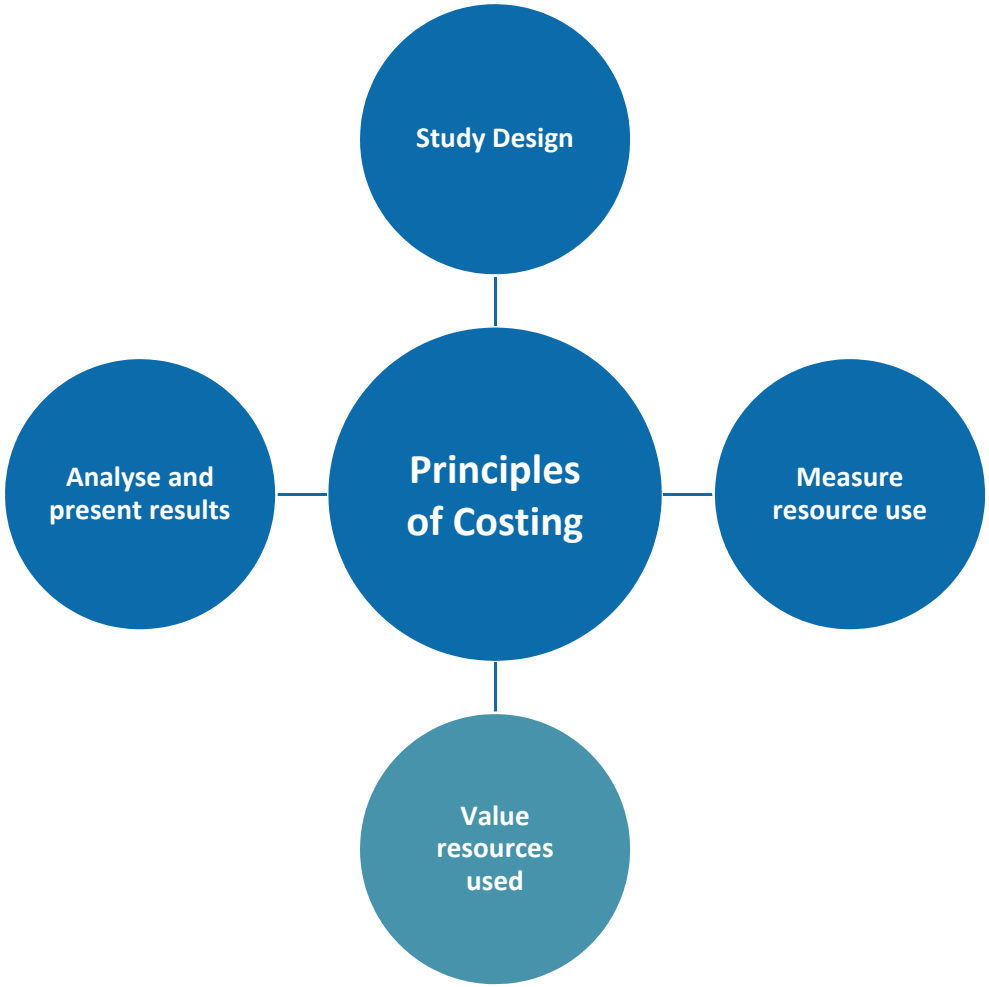
Example: The gross costing approach to estimate the portion of inputs used in TB case finding from overall inputs at the facility



Measuring outputs

- Outputs need to be measured at the different levels of analysis
- Intervention (e.g case diagnosed); Service (e.g. outpatient visits, tests carried out, monitoring visits completed)
- To ensure comparability, **standardized output units** are needed
- Standardized units TB diagnosis and treatment are available at the GHCC reference case, and those for HIV are forthcoming.
- Sources include facility or patient surveys, routine data and even focus groups

Remember to report the source of data, report the approach used to sample/fill missing data and justify the approach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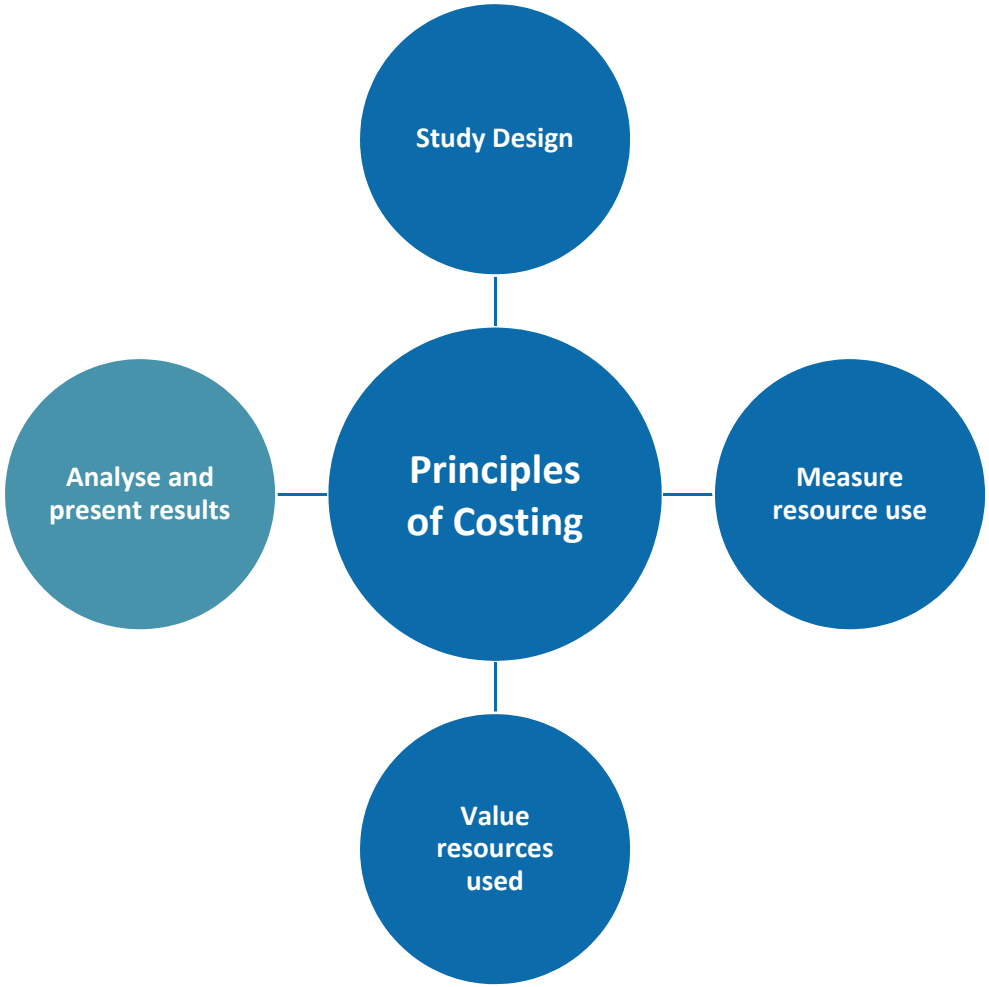
Pricing and Valuation: Sources of Price data/shadow prices

- Financial costs use expenditures for prices
- Economic costs use market prices or shadow prices (where there is no recorded expenditure)
- All costs are converted to constant prices using appropriate inflation index (usually a GDP deflator)
- Capital costs should be discounted (financial costing) and amortized [annualized] for economic costing.
- Valuations in local currency and US dollars.

Any analysis should document the adjustments and sources of any data used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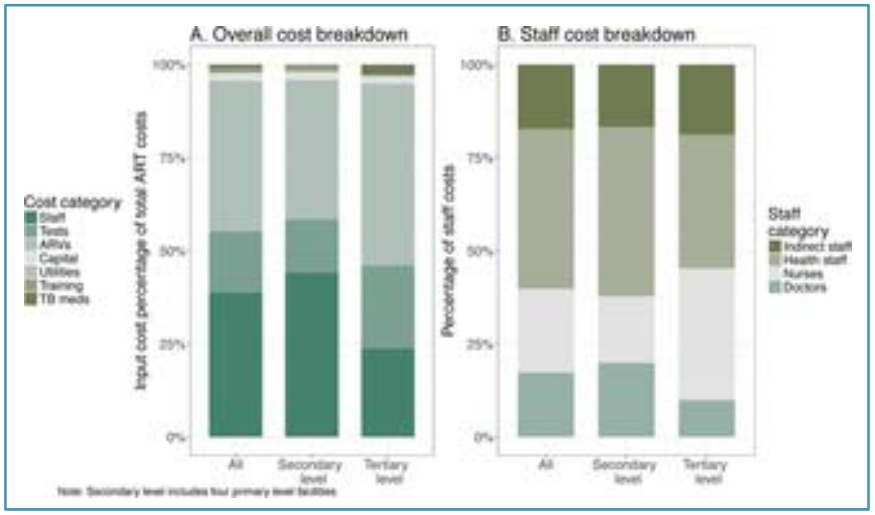
Analysing and presenting results

Exploring heterogeneity

Has heterogeneity been explored? If only one cost figure is presented, it may mask differences in cost between:

- Technologies (drugs, tests, surgical vs. device, radio vs. social media, etc.)
- Service delivery platforms
- Target populations
- Geographic areas
- Seasons



Reference [4]

Table 4 Unit costs of detailed NGOs by Typology (Economic costs 3%)

Typology	Population estimation			Cost per population reached			Cost per contact		
Year	05-06	06-07	07-08	05-06	06-07	07-08	05-06	06-07	07-08
Brothel-based	104	107	121	103	97	75	10	21	17
Street-based	100	123	124	93	102	96	7	15	18
Bar girls	98	86	97	92	86	75	25	18	10
HR-MSM	123	145	145	80	94	90	26	15	15
Hijras	-	101	107	-	123	116	-	43	30
HR-MSM site in Karnataka	26	63	78	45	42	42	12	10	9
FSW site in Karnataka	35	58	72	48	33	37	28	8	8

Reference [5]

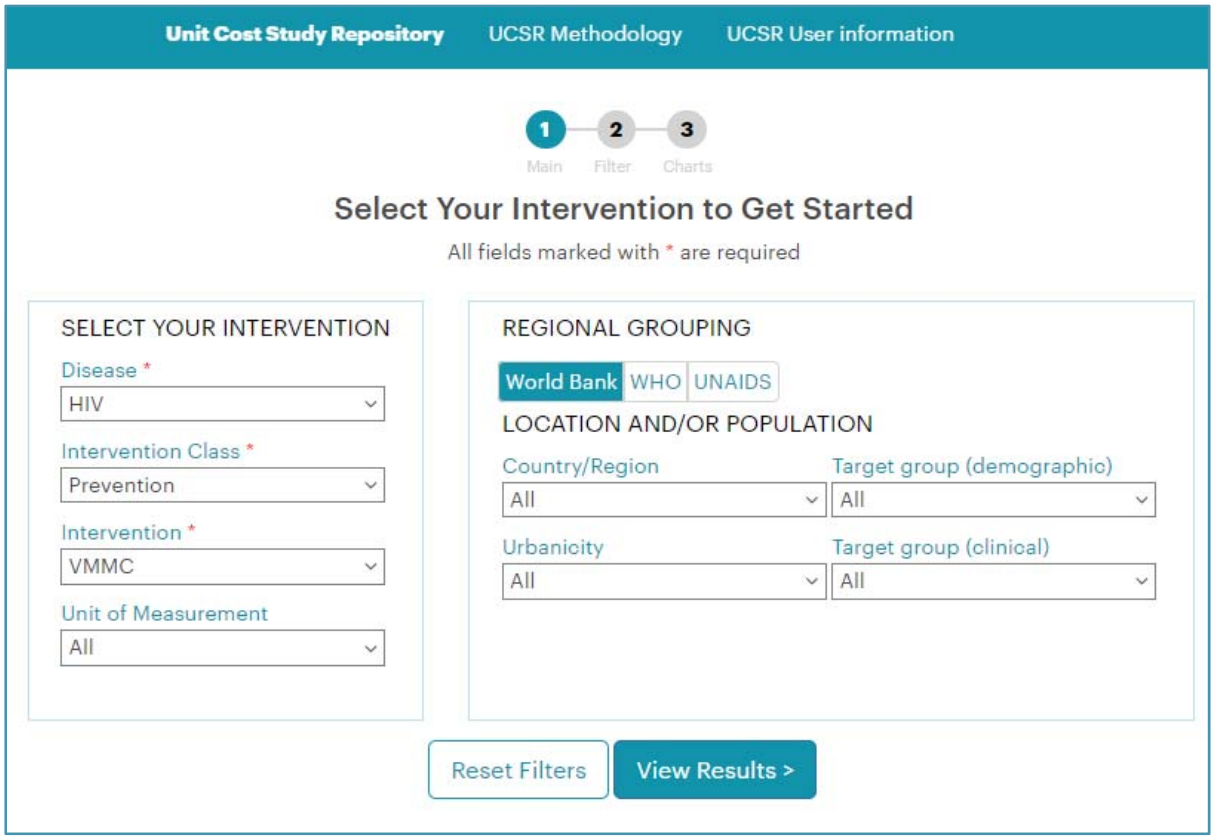
Characterizing uncertainty

- Sampling that may reflect higher- or lower-cost sites or populations disproportionately, and have more or less precision.
- Completeness — what elements of costs are missing (inputs, service use, providers).
- Possible under- or over-reporting of elements such as service and time use due to the data collection methods or program features
- Distortions or incompleteness in the prices of inputs.

While it may not always be feasible to quantify bias, the characteristics and direction of any bias should be reported in the study limitations.

Cost data reporting needs transparency around each principle described in the Reference Case, so that the data may be interpreted correctly.

The Unit Cost Study Repository: a resource to complement the Reference Case



UCSR Overview

- **Need for ACCESS to centralized cost data source, with information to assess the QUALITY of cost estimates, without overwhelming the user with data.**
- **Need for ability to sort data by key characteristics: region, country, type of intervention, platform, etc.**
- **Includes 2,577 unit costs from 340 studies up until mid-year 2016 for HIV and TB.**

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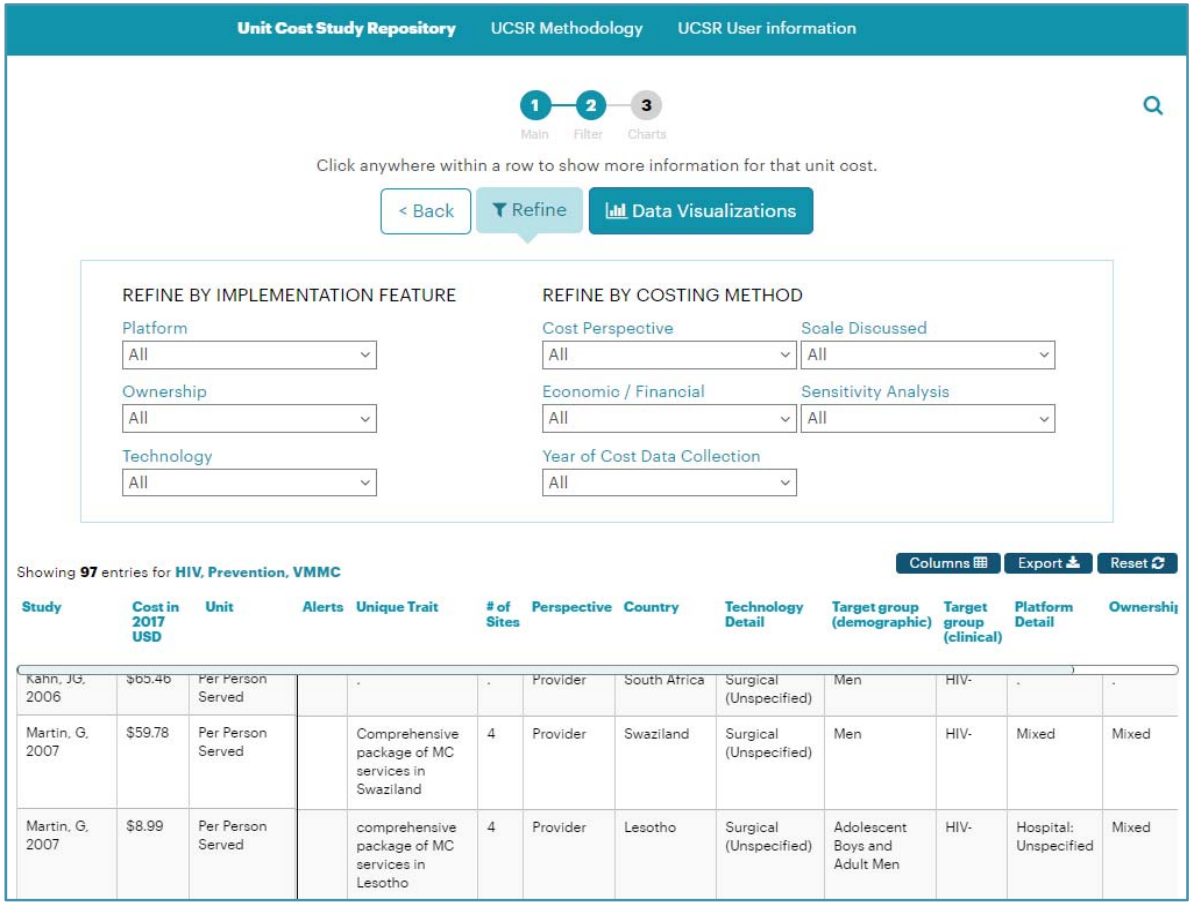

UCSR Utilization

- **Choose your intervention in Step #1 and view results. Step #2 allows you to further refine your search.**
- **More detailed information is available by clicking on any row.**
- **The display and filters align with the Reference Case Principles.**
- **Visualize your results through charts in Step #3.**

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Thank you!

You may find the Reference case and the UCSR at ghcosting.org

The UCSR pages include a Methodology description, a User Guide, and a link to a Feedback Survey in the main headings at the top of the page.

You may also send questions to **contactGHCC@gmail.com**

**** Please note, more resources and links are available in the actual presentation that you can download online from the event website.***

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References in this module

1. Vassall A, Siapka M, Foster N, Cunnama L, et al. (2017). **Cost-effectiveness of Xpert MTB/RIF for tuberculosis diagnosis in South Africa: a real-world cost analysis and economic evaluation.** *The Lancet Global Health* 5 (7): e710 - e719

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5. Bautista-Arredondo S, Amanze O, Fuentes G, Silverman Retana O, et al. (2018). **Explaining the heterogeneity in average costs per HIV/AIDS patient in Nigeria: The role of supply-side and service delivery characteristics**. *PLoS ONE* 13(5): e0194305. https://doi.org/10.1371/journal.pone.0194305

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