

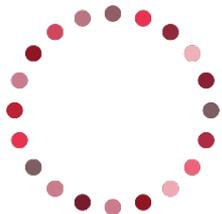


Introduction to Economic Evaluation

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Introduction

- Purpose of lecture
 - To frame the value of economic evaluation within movement to universal health coverage
 - To introduce the more common questions asked within economic evaluation
 - To introduce the core components of economic evaluation
 - To bring concepts ‘to life’ through application to a case study of priority setting around a new cancer drug

Lecture outline

- PART ONE
 - The role of economic evaluation in Universal Health Coverage (UHC)
- PART TWO
 - Definition of economic evaluation (EE)
 - Core components of economic evaluation
 - Interpretation of economic evaluation results

Lecture outline

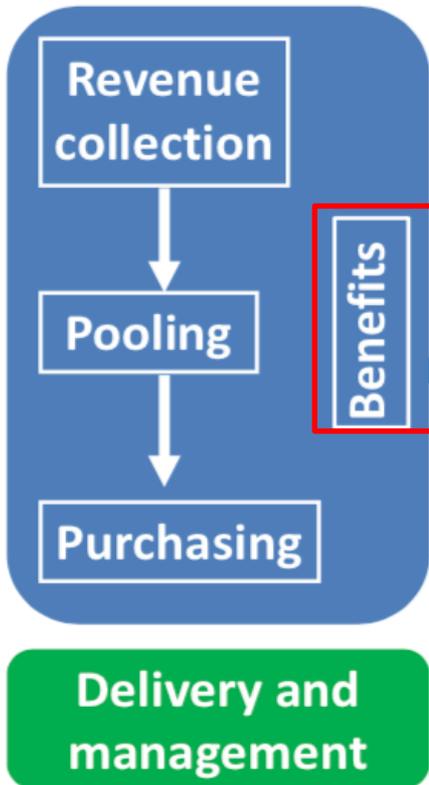
- PART ONE
 - The role of economic evaluation in Universal Health Coverage (UHC)
 - Kutzin framework “Pathways to UHC Goals”
 - UHC intermediate objectives
 - Equity
 - Efficiency
 - Transparency and accountability
 - Choosing benefits (i.e. medicines, vaccines, diagnostics and models of care) to achieve UHC objectives
 - “UHC Cube”
 - Illustrating trade-offs between benefits, quality and equity
 - Summary

Universal Health Coverage

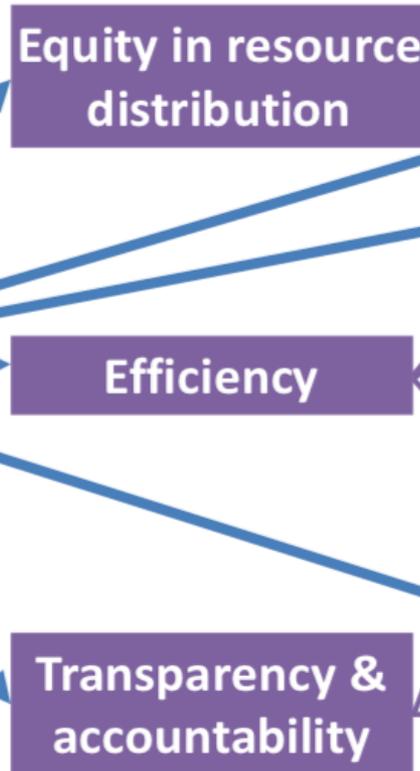
- ‘provide **all people** with **access** to **needed** health services of sufficient **quality** to be effective and to ensure that the use of these services does not expose the user to **financial hardship**’ (World Health Report 2010)
- UHC goals therefore are:
 - Access to quality services when in need
 - Financial risk protection (protection from catastrophic health care expenditure)

Pathways to UHC goals

Health financing arrangements



UHS intermediate objectives



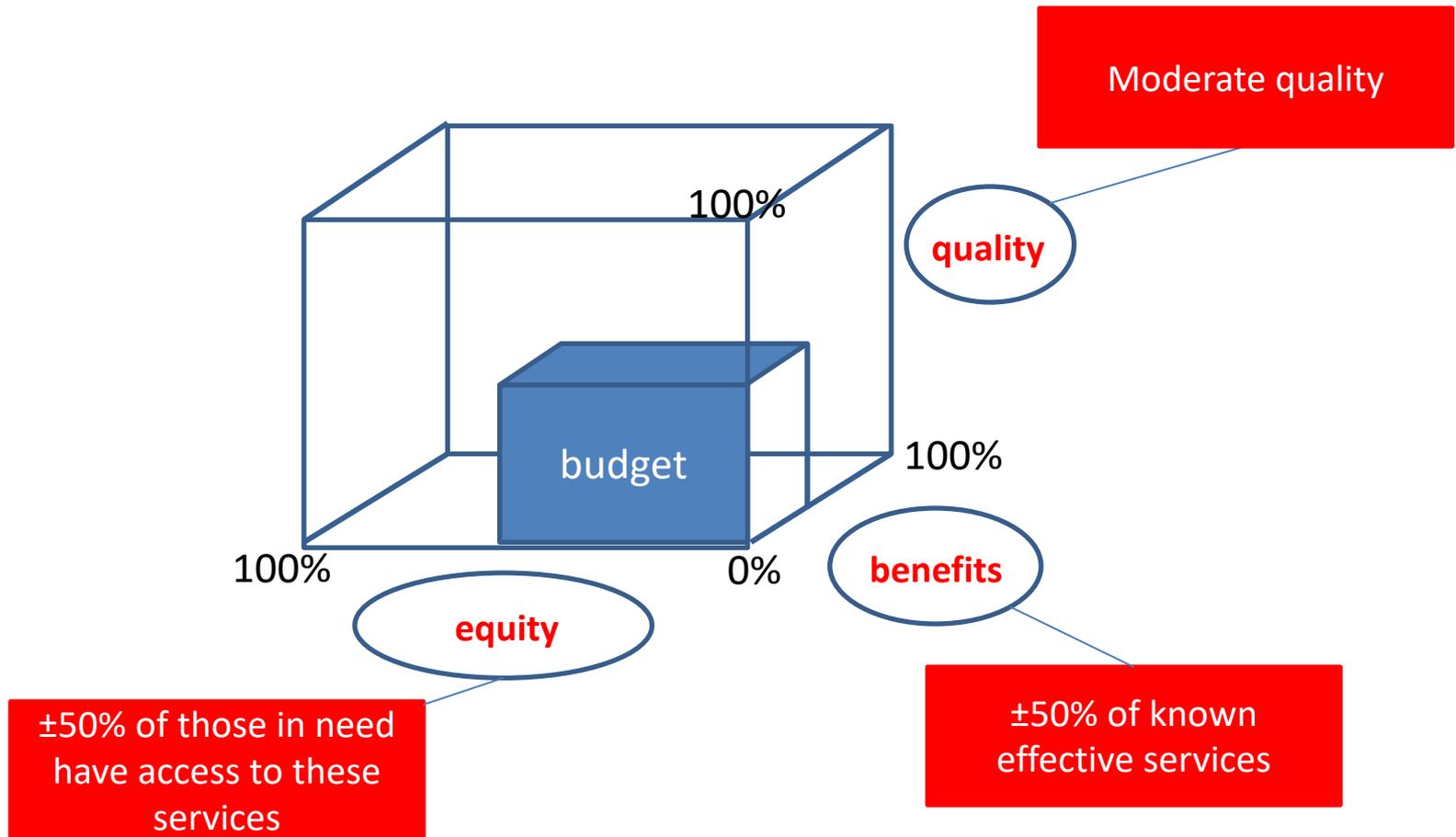
UHS goals



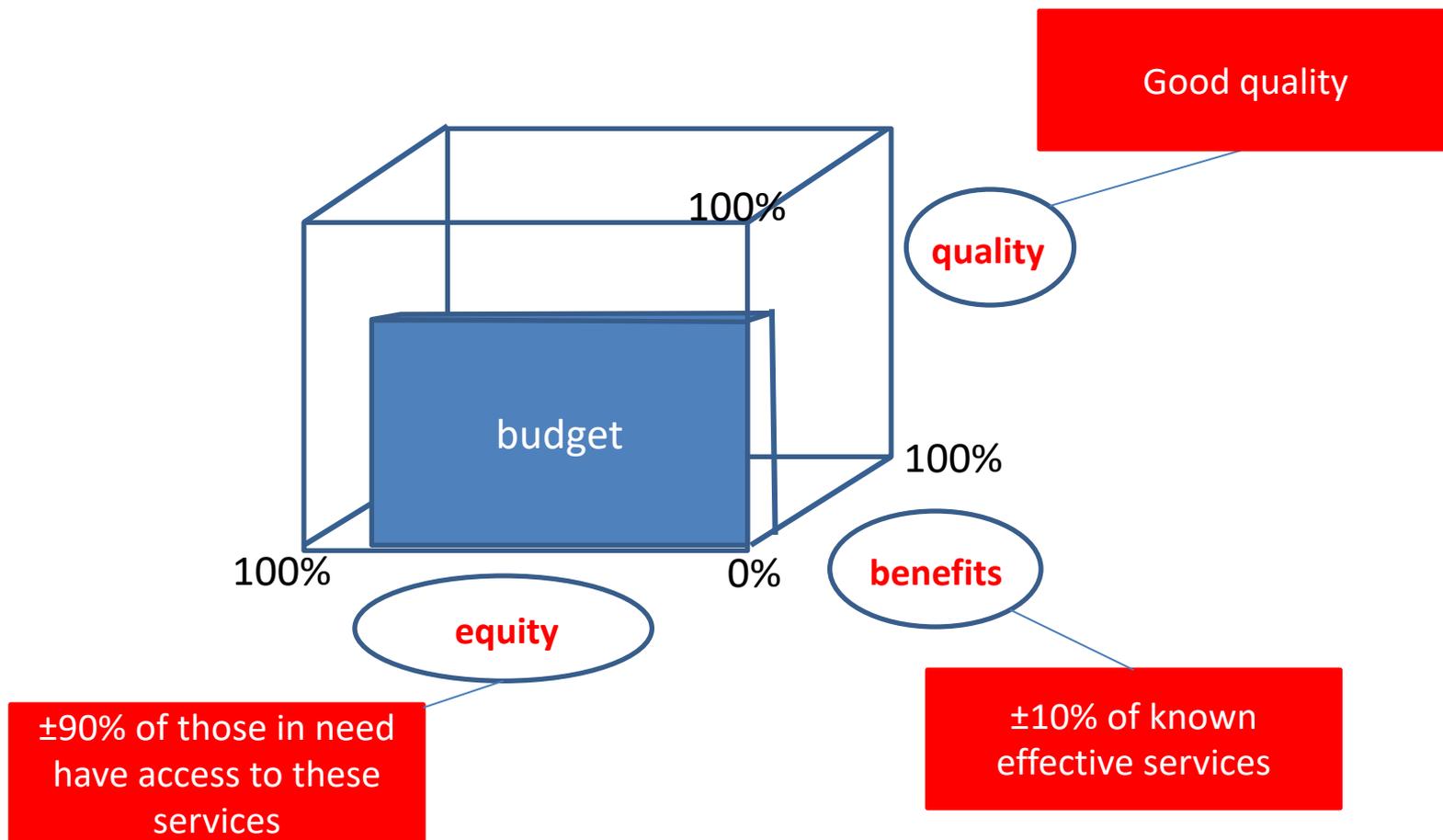
➔ Direct effect of financing

➔ Indirect effect of financing

Modified UHC cube: Benefits vs Equity vs Quality



Modified UHC cube: Benefits vs Equity vs Quality



Modified UHC cube: Benefits vs Equity vs Quality

- The shape of the UHC cube reveals our preferences regarding trade-offs between benefits, equity and quality
- For UHC, we will need to be purposeful about choosing benefits to achieve equity, with quality

Benefits Package

- Of course, it's much more complicated than that...
- An extremely technical listing of the services available within a health system
- Possibly defined through standard treatment guidelines, essential medicine and diagnostic lists
- Benefits rest on a health system *platform* of health facilities, laboratories, information systems, district managerial structures, etc
- How do we evaluate the cost-effectiveness of different platform components? [watch next lecture for more!]

Summary

- Choice of benefits should be based on the relative efficiency of these options and whether the budget impact is affordable for all in need (equity)
- Answering these questions can be achieved through the broad methodologies of
 - ECONOMIC EVALUATION
- [Prior questions include:
 - Is it safe and efficacious?
 - Does it improve health, is it effective?]

Summary

- The way in which process and evidence is organised to make these decisions, is the purview of:
 - HEALTH TECHNOLOGY ASSESSMENT
- If done well, this promotes
 - ACCOUNTABILITY AND TRANSPARENCY

Lecture outline

- PART TWO
 - What is economic evaluation?
 - What are the core components of economic evaluation?
 - How do we interpret economic evaluation results?
 - What is a cost-effectiveness threshold and where does it come from?
 - Summary

What is economic evaluation?

- Comparative analysis of alternative courses of action in terms of their costs and outcomes
- “Courses of action” or “alternatives” respond to a particular health care need, e.g.
 - Different medicines to treat a particular condition
 - Different diagnostics to diagnose a particular condition
 - Different vaccines to prevent a particular condition
 - Different models of care (e.g. facility-based ANC versus home-based ANC) for a particular condition

What is economic evaluation?

- At least two courses of action are included in each economic evaluation:
 - First option is normally ‘standard of care’ i.e. current practice; may include ‘do nothing’ if that is current practice
 - Alternative is normally something new that we are considering including within the health system

Disease/condition	Status quo	Alternative
HIV/AIDS	D4T in first-line treatment	TDF in first-line treatment
Human papillomavirus	Do nothing	HPV vaccine
HIV associated cryptococcal meningitis	Do nothing	Cryptococcal antigen screening

Components of economic evaluation

Costs

Health workers,
medicines,
investigations,
equipment, etc

Opportunity cost of
time seeking care,
out of pocket
payments, etc

*Medicine A versus Medicine B for x disease;
*Vaccine A versus 'do nothing' for y disease;
*Diagnostic A versus Diagnostic B for z disease
etc

Outcomes

Delayed disease
progression

QALYs or DALYs

Summary of components

- **Costs:**
 - Resources needed per patient, per alternative
 - Perspective can be provider, patient or societal (including both provider and patient)
 - Provider: resources incurred by the provider of the service; can include health system, and other sectors that contribute towards health (e.g. social development)
 - Patient: resources incurred by the patient and his/her carer(s) or family
- **Outcomes:**
 - Benefits (e.g. health gains) produced per patient, per alternative
 - Type of outcome might be unidimensional or multidimensional
 - Unidimensional: 'natural' measures like viral suppression; life years gained; deaths averted
 - Multidimensional: includes morbidity and mortality within one measure; QALYs or DALYs
 - Multidimensional outcomes (QALYs or DALYs) useful for broader comparison across disease or programme areas and for comparison to cost-effectiveness threshold

Summary of components

- Analysis ultimately summarizes findings as follows:
- Costs:
 - Cost per patient of option A
 - Cost per patient of option B
 - Difference in costs (option B – option A)
- Benefits:
 - Outcomes per patient of option A
 - Outcomes per patient of option B
 - Difference in outcomes (option B – option A)
- Incremental cost-effectiveness ratio
 - $(\text{Difference in costs}) / (\text{Difference in outcomes})$

Interpretation of EE results

- Cost analysis:
 - Provides a summary of the per patient additional costs associated with the change in alternatives
- Cost-effectiveness analysis:
 - Provides a summary of the per patient additional costs and additional unidimensional health outcomes associated with a change in alternatives

Interpretation of EE results

- Cost-utility analysis
 - Provides a summary of the per patient additional costs and additional multidimensional health outcomes associated with a change in alternatives
 - Through comparing ICER to **cost-effectiveness threshold (CET)** we can judge whether the change in alternatives is cost-effective or ‘value for money’
 - If ICER lower than CET: potentially cost-effective
 - If ICER higher than CET: unlikely to be cost-effective

Interpretation of EE results

- CET captures value of the least cost-effective intervention within given context
- **CET for multi-dimensional outcomes only (i.e. QALYs or DALYs)**
- **DALY-based thresholds:** Ochalek, Jessica, James Lomas, and Karl Claxton. 2018. “Estimating Health Opportunity Costs in Low-Income and Middle-Income Countries: A Novel Approach and Evidence from Cross-Country Data.” *BMJ Global Health* 3 (6): e000964. <https://doi.org/10.1136/bmjgh-2018-000964>.
- **QALY-based thresholds:** Woods, Beth, Paul Revill, Mark Sculpher, and Karl Claxton. 2016. “Country-Level Cost-Effectiveness Thresholds: Initial Estimates and the Need for Further Research.” *Value in Health* 19 (8): 929–35. <https://doi.org/10.1016/j.jval.2016.02.017>.

Example EE results

Cost analysis: What is the incremental cost of intensive care in the management of critical COVID-19 patients? ¹

Comparators	Cost per admission (ZAR)	Incr. cost per admission (ZAR)
No ICU - critical patients managed in the general ward	75,127.25	
ICU - critical patients managed in ICU	103,030.20	27,902.95

1: Cleary, S. M., T. Wilkinson, C. R. Tamandjou Tchuem, S. Docrat, and G. C. Solanki. 2021.

“Cost-Effectiveness of Intensive Care for Hospitalized Covid-19 Patients: Experience from South Africa.”

BMC Health Services Research 21 (82): 1–10. <https://doi.org/10.1101/2020.10.30.20222802>.

Example EE results

Cost-effectiveness analysis: What is the incr. cost and incr. effect of intensive care in the management of critical COVID-19 patients? ¹

Comparators	Cost per admission (ZAR)	Deaths	Incr. Cost per Death Averted
No ICU - critical patients managed in the general ward	75,127.25	0.27	
ICU - critical patients managed in ICU	103,030.20	0.20	390,797.60

1: Cleary, S. M., T. Wilkinson, C. R. Tamandjou Tchuem, S. Docrat, and G. C. Solanki. 2021. "Cost-Effectiveness of Intensive Care for Hospitalized Covid-19 Patients: Experience from South Africa." *BMC Health Services Research* 21 (82): 1–10. <https://doi.org/10.1101/2020.10.30.20222802>.

Example EE results

Cost-utility analysis: What is the cost-effectiveness of intensive care in the management of critical COVID-19 patients? ¹

Comparators	Cost per admission (ZAR)	DALYs	Incr. Cost per DALY Averted
No ICU - critical patients managed in the general ward	75,127.25	1.48	
ICU - critical patients managed in ICU	103,030.20	1.10	73,091.37

Cost effectiveness threshold = ZAR 38,465 per DALY averted²

ICER at ZAR 73,091 is **higher than CET**

Purchasing ICU for COVID-19 **unlikely to be cost-effective** in South Africa

1: Cleary, S. M., T. Wilkinson, C. R. Tamandjou Tchuem, S. Docrat, and G. C. Solanki. 2021.

“Cost-Effectiveness of Intensive Care for Hospitalized Covid-19 Patients: Experience from South Africa.”

BMC Health Services Research 21 (82): 1–10. <https://doi.org/10.1101/2020.10.30.20222802>.

2: Edoke, Ijeoma P, and Nicholas K Stacey. 2020.

“Estimating a Cost-Effectiveness Threshold for Health Care Decision-Making in South Africa.”

Health Policy and Planning, no. March: 546–55. <https://doi.org/10.1093/heapol/czz152>.



Thank you

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