
Advanced Certificate in Economic Evaluation in Public Health Interventions

Foundations of Economic Evaluation

Absorption Costing – Related terms: full costing, overhead allocation. A costing method that assigns all manufacturing costs, both variable and fixed, to the cost of a product. Example: calculating the unit cost of a vaccine batch by including production labor, materials, and facility overhead. Practical application: used in budgeting to assess total resource use. Challenge: may overstate costs for decision-making when fixed costs are sunk.

Adverse Event – Related terms: side effect, safety monitoring. An undesirable experience associated with the use of a health intervention. Example: fever following immunisation. Practical application: incorporated into cost-effectiveness models as a decrement in quality-adjusted life years (QALYs). Challenge: under-reporting can bias evaluation results.

Allocation Rule – Related terms: cost allocation, decision rule. A principle that determines how costs or benefits are distributed among alternatives. Example: using the “least-cost” rule to select a screening program. Practical application: guides resource distribution in budget impact analysis. Challenge: may ignore equity considerations.

Annualisation – Related terms: discounting, equivalent annual cost. The process of spreading a one-off capital cost over its useful life to produce an annual cost figure. Example: converting the purchase price of an ultrasound machine into yearly cost. Practical application: facilitates comparison of capital-intensive and recurrent interventions. Challenge: choice of discount rate and lifespan assumptions affect results.

Benefit-Cost Ratio (BCR) – Related terms: cost-benefit analysis, net benefit. A metric that divides total monetary benefits by total costs; a BCR greater than 1 indicates that benefits outweigh costs. Example: a BCR of 1.8 for a smoking-cessation program. Practical application: quick screening tool for policymakers. Challenge: monetising health benefits can be controversial.

Budget Impact Analysis (BIA) – Related terms: financial forecasting, payer perspective. An assessment of the financial consequences of adopting a new health intervention within a specific budget context. Example: estimating the yearly cost to a national health service of adding a new HPV vaccine. Practical application: informs funding decisions and sustainability planning. Challenge: requires accurate uptake and adherence data.

Cost-Benefit Analysis (CBA) – Related terms: economic evaluation, willingness-to-pay. An analysis that expresses both costs and outcomes in monetary terms to determine net economic value. Example: valuing avoided disease cases using the human capital approach. Practical application: supports cross-sectoral comparisons (e.g., health vs. transport). Challenge: ethical concerns about placing a price on life.

Cost-Effectiveness Analysis (CEA) – Related terms: incremental cost-effectiveness ratio, health outcomes. An evaluation that compares the relative costs and health effects of two or more interventions, typically expressed as cost per unit of health gain (e.g., cost per QALY). Example: comparing a new antiretroviral regimen to standard care. Practical application: central method for health technology assessment (HTA). Challenge: choice of outcome measure influences conclusions.

Cost-Effectiveness Threshold (CET) – Related terms: willingness-to-pay, opportunity cost. The maximum amount a decision-maker is prepared to pay for a unit of health gain. Example: a threshold of \$50 000 per QALY used by some agencies. Practical application: determines whether an intervention is “cost-effective.” Challenge: thresholds may not reflect true resource constraints or societal values.

Cost-Effectiveness Plane – Related terms: ICER, quadrants. A graphical representation plotting incremental costs on the vertical axis and incremental effects on the horizontal axis, dividing outcomes into four quadrants (more effective-more costly, etc.). Example: positioning a new vaccine in the northeast quadrant indicates higher cost and greater benefit. Practical application: visual tool for stakeholder communication. Challenge: does not capture uncertainty without confidence ellipses.

Cost-Effectiveness Ratio (CER) – Related terms: average cost-effectiveness, unit cost. The ratio of total costs to total health outcomes for a single intervention, without comparison to an alternative. Example: \$200 per additional life-year saved. Practical application: baseline for budgeting. Challenge: lacks context of alternatives, limiting decision relevance.

Cost-Utility Analysis (CUA) – Related terms: QALY, DALY. A form of CEA that uses utility-based outcomes (e.g., QALYs) to capture both length and quality of life. Example: evaluating a new asthma inhaler by estimating QALY gains. Practical application: preferred method for HTA bodies that require generic health measures. Challenge: deriving robust utility weights can be resource-intensive.

Cost-Utility Ratio (CUR) – Related terms: average cost per QALY, cost per DALY. The total cost of an intervention divided by the total utility-based health gain. Example: \$30 000 per QALY for a cardiac surgery. Practical application: aids budgeting when a single intervention is considered in isolation. Challenge: does not reflect incremental trade-offs with other options.

Decision Analytic Model – Related terms: Markov model, decision tree. A structured representation of the pathways, probabilities, costs, and outcomes associated with health interventions. Example: a Markov model simulating disease progression for chronic hepatitis B. Practical application: enables extrapolation beyond trial horizons. Challenge: model complexity may reduce transparency.

Discount Rate – Related terms: present value, time preference. The rate used to convert future costs and outcomes into present-day values, reflecting time preference and opportunity cost of capital. Example: a 3 % annual discount rate applied to both costs and QALYs. Practical application: standardises comparisons across interventions with different timing. Challenge: choice of rate can markedly influence cost-effectiveness results, especially for long-term programs.

Discounting – Related terms: present value, temporal adjustment. The mathematical process of applying a discount rate to future costs and benefits to reflect their present value. Example: discounting a 10-year-later benefit of a vaccination program. Practical application: aligns analyses with economic theory. Challenge: ethical debate on discounting health benefits versus costs.

Dynamic Transmission Model – Related terms: infectious disease modelling, herd immunity. A model that captures how an infectious disease spreads through a population over time, accounting for changes in susceptibility and contact patterns. Example: modelling the impact of a measles vaccination campaign on outbreak probability. Practical application: estimates indirect effects (herd immunity) for vaccination economic evaluations. Challenge: requires detailed epidemiological data and sophisticated calibration.

Effectiveness – Related terms: efficacy, real-world performance. The extent to which an intervention produces the intended health outcome under routine practice conditions. Example: a 70 % reduction in TB incidence after implementation of a new diagnostic test. Practical application: feeds into cost-effectiveness calculations. Challenge: effectiveness may differ from efficacy observed in controlled trials.

Economic Evaluation – Related terms: cost analysis, health technology assessment. A systematic comparative analysis of alternative interventions in terms of both costs and outcomes. Example: a full CEA comparing two malaria control strategies. Practical application: informs resource allocation decisions. Challenge: data availability and methodological choices can affect credibility.

Equity-Weighted Analysis – Related terms: distributional cost-effectiveness, social value judgments. An approach that adjusts health gains to reflect societal preferences for reducing inequalities. Example: applying higher weight to QALYs gained by disadvantaged groups. Practical application: supports policies aimed at reducing health disparities. Challenge: selecting appropriate equity weights is inherently normative.

Health-Adjusted Life Year (HALY) – Related terms: QALY, DALY. A generic measure of disease burden that combines mortality and morbidity into a single metric. Example: one HALY could be a year lived in perfect health. Practical application: enables comparison across diverse health programs. Challenge: different HALY variants (QALY vs. DALY) may lead to inconsistent results.

Incremental Cost-Effectiveness Ratio (ICER) – Related terms: incremental analysis, cost per QALY. The ratio of the difference in costs to the difference in health outcomes between two interventions. Example: an ICER of \$10 000 per QALY for a new hypertension drug versus standard therapy. Practical application: primary decision metric for HTA agencies. Challenge: interpretation becomes difficult when the comparator is dominated or when there is high uncertainty.

Incremental Net Benefit (INB) – Related terms: net monetary benefit, willingness-to-pay. A reformulation of the ICER that expresses the net monetary value of an intervention given a specific willingness-to-pay threshold. Example: $INB = (\lambda \times \Delta QALY) - \Delta Cost$, where λ is the threshold. Practical application: simplifies statistical inference and probabilistic sensitivity analysis. Challenge: requires pre-specifying a threshold,

which may be contentious.

Intention-to-Treat (ITT) Analysis – Related terms: per-protocol analysis, efficacy. An analytical approach that includes all participants as originally allocated, regardless of adherence, preserving randomisation. Example: reporting the cost per patient for a vaccine trial using ITT. Practical application: reflects real-world effectiveness. Challenge: may dilute observed benefits if non-adherence is high.

Life-Year Gained (LYG) – Related terms: survival benefit, mortality reduction. The number of additional years of life that an intervention is expected to provide. Example: a cancer screening program yields 0.05 LYG per screened individual. Practical application: used in CEAs when quality of life data are unavailable. Challenge: does not capture morbidity, potentially over-estimating value.

Markov Model – Related terms: state transition, cycle length. A type of decision-analytic model that represents health states and the probabilities of moving between them over discrete time cycles. Example: a three-state Markov model for HIV (healthy, AIDS, death). Practical application: suitable for chronic diseases with recurring events. Challenge: requires assumptions about transition probabilities that may be uncertain.

Net Monetary Benefit (NMB) – Related terms: INB, cost-effectiveness threshold. A transformation of the ICER that expresses the value of an intervention in monetary terms: $NMB = (\lambda \times \Delta\text{Effect}) - \Delta\text{Cost}$. Example: an NMB of \$5 000 indicates the intervention is worthwhile at the chosen λ . Practical application: facilitates probabilistic analysis and decision rules. Challenge: depends on the selected λ , which may vary across jurisdictions.

Net Present Value (NPV) – Related terms: discounted cash flow, financial appraisal. The sum of discounted costs and benefits, where a positive NPV indicates that benefits outweigh costs. Example: an NPV of \$2 million for a national immunisation programme. Practical application: used in budget impact and investment decisions. Challenge: translating health outcomes into monetary terms can be contentious.

Quality-Adjusted Life Year (QALY) – Related terms: utility, health state valuation. A measure that combines length of life with quality of life, where each year of perfect health equals 1 QALY and death equals 0. Example: a treatment that adds 0.5 QALY per patient. Practical application: standard outcome metric for CEA in many HTA bodies. Challenge: deriving reliable utility weights requires robust preference elicitation methods.

Quality-Adjusted Life Year (QALY) Threshold – Related terms: cost-effectiveness threshold, willingness-to-pay. The monetary value per QALY that a health system is prepared to spend. Example: \$30 000 per QALY used by a national health authority. Practical application: determines whether an ICER is acceptable. Challenge: thresholds may be arbitrary and not reflect true opportunity costs.

Reference Case – Related terms: standardised methodology, HTA guidelines. A set of methodological specifications (perspective, discount rate, outcome measure, etc.) that an agency recommends for consistency across evaluations. Example: the NICE reference case requires a 3.5 % discount rate for costs.

Practical application: ensures comparability of submitted economic evaluations. Challenge: strict adherence may limit innovative methods.

Resource Allocation – Related terms: budgeting, priority setting. The process of distributing limited health resources among competing uses. Example: allocating funds between a vaccination programme and a mental-health service. Practical application: guided by cost-effectiveness evidence and equity considerations. Challenge: political, ethical, and societal factors often complicate purely economic decisions.

Sensitivity Analysis – Related terms: deterministic, probabilistic. A set of techniques that explore how results change when key inputs vary. Example: one-way sensitivity analysis on vaccine efficacy. Practical application: identifies parameters that drive uncertainty. Challenge: extensive analyses can be computationally demanding.

Scenario Analysis – Related terms: what-if testing, alternative assumptions. A form of sensitivity analysis that evaluates the impact of different plausible future conditions (e.g., price changes, coverage rates). Example: a “high-uptake” scenario for a new oral contraceptive. Practical application: assists policymakers in planning for contingencies. Challenge: selection of realistic scenarios may be subjective.

Societal Perspective – Related terms: wide-angle view, all costs. An analytical viewpoint that includes all costs and benefits, regardless of who incurs them, such as patient time, productivity losses, and informal care. Example: including caregiver time in the cost of a dementia intervention. Practical application: provides comprehensive assessment of economic impact. Challenge: data collection is often more demanding than a payer perspective.

Standardised Mortality Ratio (SMR) – Related terms: observed/expected deaths, epidemiology. A ratio comparing observed mortality in a study population to expected mortality based on a reference population. Example: an SMR of 1.2 indicates 20% higher mortality than expected. Practical application: informs disease burden inputs for CEAs. Challenge: requires accurate demographic reference rates.

Threshold Analysis – Related terms: break-even point, sensitivity. An analysis that determines the value of a parameter at which an intervention becomes cost-effective. Example: finding the minimum efficacy needed for a vaccine to meet the CET. Practical application: guides product development and pricing negotiations. Challenge: relies on assumptions about other model inputs remaining constant.

Time Horizon – Related terms: analysis period, long-term outcomes. The length of time over which costs and outcomes are evaluated. Example: a 20-year horizon for a childhood vaccination programme. Practical application: ensures capture of all relevant effects. Challenge: longer horizons increase uncertainty and require more extrapolation.

Utility – Related terms: preference weight, health state value. A numeric representation (0–1) of the desirability of a particular health state, where 0 denotes death and 1 denotes perfect health. Example: a utility of 0.65 for moderate osteoarthritis. Practical application: used to calculate QALYs. Challenge: utilities

can vary across populations and elicitation methods.

Value of Information (VOI) – Related terms: expected value of perfect information, decision uncertainty. A technique that quantifies the benefit of acquiring additional information to reduce decision uncertainty. Example: estimating the VOI for a new diagnostic test to decide whether further research is worthwhile. Practical application: prioritises future research investments. Challenge: computationally intensive and requires probabilistic modelling.

Willingness-to-Pay (WTP) – Related terms: threshold, monetary valuation. The maximum amount an individual or society is prepared to spend to gain a health benefit, often expressed per QALY. Example: a WTP of \$50 000 per QALY derived from population surveys. Practical application: informs the choice of cost-effectiveness thresholds. Challenge: eliciting accurate WTP values can be methodologically complex.

Weighted Composite Indicator – Related terms: multicriteria analysis, aggregation. An index that combines several performance dimensions (e.g., cost, effectiveness, equity) using assigned weights. Example: a composite score ranking vaccination programmes across countries. Practical application: assists policymakers when multiple criteria matter. Challenge: weight assignment may be subjective and contentious.

Zero-Cost Intervention – Related terms: free programme, donated resources. An intervention that incurs no direct financial cost to the health system because it is provided at no charge (e.g., donated vaccines). Example: a mass campaign using a vaccine supplied by a manufacturer for free. Practical application: can dramatically improve cost-effectiveness ratios. Challenge: hidden costs (e.g., logistics, storage) must still be accounted for.