Cost-Effectiveness Analysis

Cost-effectiveness analysis, commonly referred to as CEA, can be used to compare the costs and outcomes between two or more healthcare treatments.

Cost-effectiveness analysis can be used as a tool to help understand the added costs and added consequences of a new healthcare treatment, and thus these analyses can be conducted to inform conversations around resource allocation and value.

Components of CEA

To conduct a cost-effectiveness analysis, you need information related to costs and information related to health outcomes for each of the healthcare treatments that are being evaluated. Information related to costs can include things such as the cost of the treatment, the cost to treat any adverse event, or the medical costs associated with treating the condition. Information related to health outcomes can include things such as the probability of survival, the occurrence of adverse events, or estimates of quality of life. A cost-effectiveness analysis can compare the costs and health outcomes of using a new treatment to the costs and health outcomes of using an existing treatment.

The findings from a cost-effectiveness analysis are commonly reported as an incremental cost-effectiveness ratio, which is simply the difference in costs between the two options divided by the difference in outcomes between the two options. An incremental cost-effectiveness ratio is interpreted as the cost required to get one additional unit of a health outcome. For example, the cost needed to get one additional year of life.

Let's consider an example. Consider a scenario where there is a new treatment that is intended to lower blood pressure. A cost-effectiveness analysis could be conducted to compare the costs and health outcomes associated with the new blood pressure treatment to the costs and health outcomes associated with the existing treatment. The outcomes evaluated might include things like the number of years someone is alive or the number of heart attacks someone experiences. The cost-effectiveness analysis would report an incremental cost-effectiveness ratio that would be calculated by taking the difference in cost between the new treatment and the existing treatment and dividing that by the difference in health outcomes between the new treatment and the existing treatment. If the outcome evaluated was related to survival, the incremental cost-effectiveness ratio might be $50,000 per life year gained. This would mean that for $50,000, one additional year of life could be gained with the new treatment as compared to the existing treatment.

Uses of CEA

Cost-effectiveness analysis can be used as a tool to support decisions.

For pharmaceuticals particularly, several countries (e.g., United Kingdom, Canada, Netherlands) use cost-effectiveness analysis **to inform decisions around if a treatment will be covered or not**. Relatedly, cost-effectiveness analysis can be used to **support reimbursement decisions for healthcare treatments**. Manufacturers and payers can conduct or review findings from a cost-effectiveness analysis when **making decisions about pricing**. A non-profit organization in the United States, the Institute for Clinical and Economic Review, conducts cost-effectiveness analyses to **inform the value of a healthcare treatment** and to calculate their assessment of a "fair" price.

Going back to the example of a new treatment that is intended to lower blood pressure, the Institute for Clinical and Economic Review could conduct a cost-effectiveness analysis for the new treatment to suggest a price for the treatment. Separately, the manufacturer could conduct their own cost-effectiveness analysis. Insurance companies could review the findings from both cost-effectiveness analyses when determining how they might cover and reimburse the new treatment.

Critiques of Cost-Effectiveness Analysis

Cost-effectiveness analysis is frequently critiqued, most recently for its narrow scope. Conventionally, a cost-effectiveness analysis is focused on healthcare costs, patient survival, and patient quality of life. However, numerous groups and leading academics have called for a broader inclusion of elements (e.g., caregiver impact, equity, etc.) and have developed methods to do so.

Going back to the example of a new treatment that is intended to lower blood pressure, a conventional cost-effectiveness analysis would consider the healthcare costs (e.g., drug costs, hospitalizations, etc.) and the patient health benefits (e.g., survival, quality of life, etc.) for the new and existing treatment. It is not typical for the cost-effectiveness analysis to consider societal costs (e.g., lost productivity due to premature mortality, transportation costs) or benefits beyond the health benefits for the patient (e.g., caregiver quality of life) even if the new treatment had a meaningful impact on those elements.

A second critique is related to the inaccurate forecasting of treatment costs that is typical in cost-effectiveness analysis. It is common practice for cost-effectiveness analysis to assume that a drug's price stays the same forever although evidence suggests that for most drugs, generic competition will eventually enter the market and dramatically reduce the drug's price. Without accounting for genericization, a cost-effectiveness analysis can misrepresent the treatment costs for the new treatment and the existing treatment.

Using our example of a new treatment that is intended to lower blood pressure, let's say it comes to the market in 2024 at a price of $50,000 per year. However, in 2037 multiple generic versions enter the market resulting in price competition that drives down the price to a small margin over its cost of goods sold, or around $100 a year. A conventional cost-effectiveness analysis would assume the drug would be priced at $50,000 per year forever and wouldn't incorporate the effect that genericization will have on its price.

Recommended Reading

1. **A Primer on Health Economic Evaluations** by Whittington et al., 2016 in *The Journal of Thoracic Oncology.*
2. **Second Panel on Cost-Effectiveness in Health and Medicine** by Sanders et al., 2016 in *The Journal of the American Medical Association.*
3. **Consolidated Health Economic Evaluation Reporting Standards 2022 (CHEERS 2022) Statement** by Husereau et al., 2022 in *Value in Health.*
4. **The History and Future of the "ISPOR Value Flower"** by Neumann et al., 2022 in *Value in Health.*
5. **The Case for Including Dynamic Drug Pricing in Cost-Effectiveness Analyses** by Whittington et al., 2023 in *Health Affairs Forefront.*
6. **Valuing the Societal Impact of Medicines and Other Health Technologies** by Shafrin et al., 2024 in *Forum for Health Economics & Policy.*

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