

De-Implementing Cost-Effectiveness Analysis in Implementation Research

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No conflicts of interest



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Economic Methods

- Methods talk are tough...
- Especially over Zoom or Teams
- So, let's talk about something else for a bit





Restaurants and Health

- There are some important insights that we can gain by looking at restaurants.
- Restaurants are different than health care organizations
 - Extremely competitive
 - Tight margins
 - Quality is observable
 - The market works



Covid was tough on restaurants

- The market is a dispassionate boss.



Value

- To survive, a restaurant needs customers
- Customers only go to places they value.
- There is no formula for value.
 - Value can be convenience
 - It can be quality
 - It can be ambiance or location
 - It can be speed of service
- The consumer is the judge and if it is a poor value, they don't go back.
- If enough people value the restaurant, it can survive.



Restaurants and Implementation Science

- The market provides continuous feedback that can guide the restaurant leadership
- Restaurants don't need implementation science
- Ramsay's Kitchen nightmares was the exception





Value in Health Care

- I like talking about restaurants because in this context value is easy to understand.
- Understanding value in health care is harder because fundamentally the market doesn't work.

Competition in Health Care

- A healthy market requires competition
- More competition may help lower prices, but it doesn't solve all the problems.
- Quality gaps are still there.



"There will be a bit of a wait while we figure out a market solution to your problem."

Market Failure

- Uncertainty and information asymmetries drive market failure in health care
- That hasn't changed in 70+ years

THE AMERICAN ECONOMIC REVIEW

LIII

DECEMBER 1963

NUMBER 1

UNCERTAINTY AND THE WELFARE ECONOMICS OF MEDICAL CARE

By KENNETH J. ARROW*

I. Introduction: Scope and Method

This paper is an exploratory and tentative study of the specific content of medical care as the object of normative economics. I intend here, on the basis of comparison of obvious characteristics of the medical-care industry with the norms of welfare economics, to show that special economic problems of medical care can be explained in terms of the existence of uncertainty in the incidence of disease and in the efficacy of treatment.

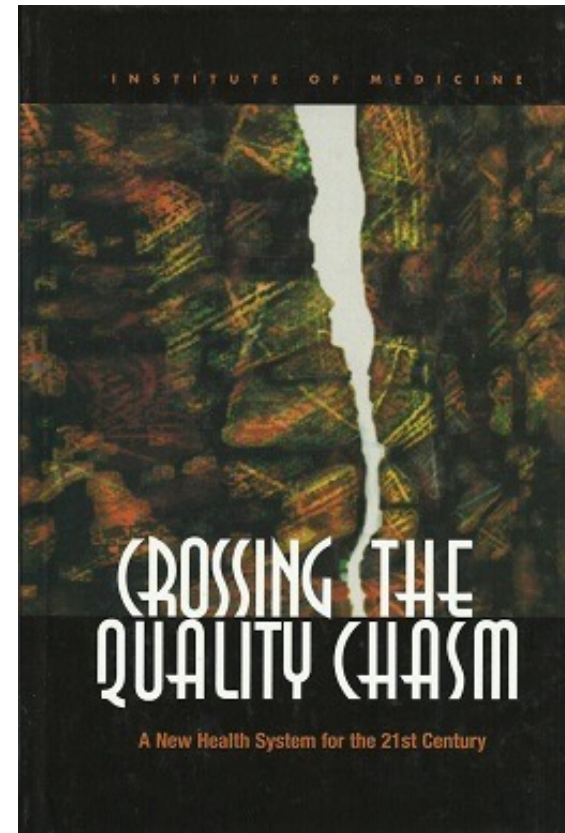
The Information Revolution

- The late 1990s saw the dot.com boom and bust
- Health information flooded the internet.
 - It was a mile wide and inch deep.
 - Providing more information did not magically solve the market failure.



IOM Quality Chasm

- The IOM published the landmark report on the quality chasm in 2001.
- Health care leaders have more information and data than ever before, but that hasn't fixed health care.



Implementation and Costs

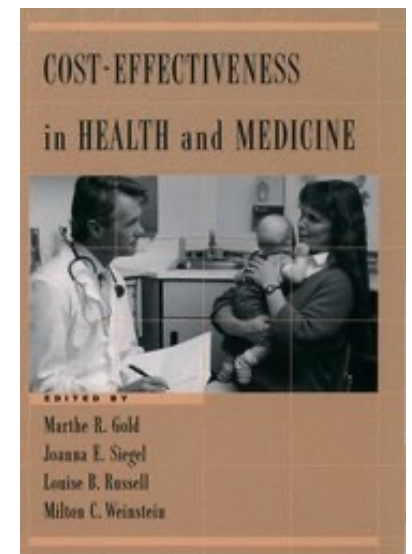
- Leaders have to make decisions within a budget.
- They face decisions with tradeoffs.

Should they invest in staff, equipment, space?



How I Learned About Implementation Science

- Joined the Palo Alto VA in 1999
- Supported several large, multi-site trials
- The dominant question was whether the treatment was cost-effective-- should society pay for that treatment?
- We followed the “Gold” Book
 - Societal perspective
 - Lifetime cost





Trials Changed

- Over time, we saw fewer traditional effectiveness trials and more implementation trials
- These trials wanted shorter term economic evaluations with a focused payer perspectives— mostly because that is what the decision makers wanted.
- The idea of a budget impact analysis repeatedly came up.

Budget Impact Analysis (BIA)

- International Society of Pharmacoeconomics and Outcomes Research (ISPOR) had published recommendations for BIAs with medications

VALUE IN HEALTH 17 (2014) 5–14



Available online at www.sciencedirect.com

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journal homepage: www.elsevier.com/locate/jval



ISPOR TASK FORCE REPORT

Budget Impact Analysis—Principles of Good Practice: Report of the ISPOR 2012 Budget Impact Analysis Good Practice II Task Force

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Budget Impact and Implementation

- ISPOR BIA methods did not translate to implementation science.
- I started working to create BIA methods for implementation science.
- In Dec 2019, a group of us met at the D&I conference, with funding from NCI and VA to support our work.
- What have we learned in the past 5 years?

Four Common Questions

1. Implementation costs: What does it cost to implement X?
2. Implementation effects: What are the effects or benefits of implementing X?
3. Budget Impact: What is the budget impact of investing in X?
4. Efficiency and Sustainability: Is X efficient and sustainable?



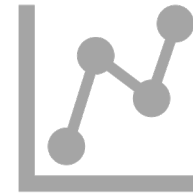
Question 1:

What does it cost to implement X?




Goal

Estimate costs of the observed intervention
Estimate the costs of replicating in another site



Methods

Micro-costing / Direct measurement / TDABC
Observational analysis with administrative records



Micro-costing

- Identifying which costs to measure
- Activity measurement
 - Labor ← particularly important in labor-based strategies
 - Capital ← particularly important in tech-based strategies
- Accuracy is the goal.
- Precision: affects ability to have subgroup analysis
- Measurement over time and linking activities to implementation
 - stages of implementation completion (Saldana)
 - design, initiation, and maintenance (Sohn)



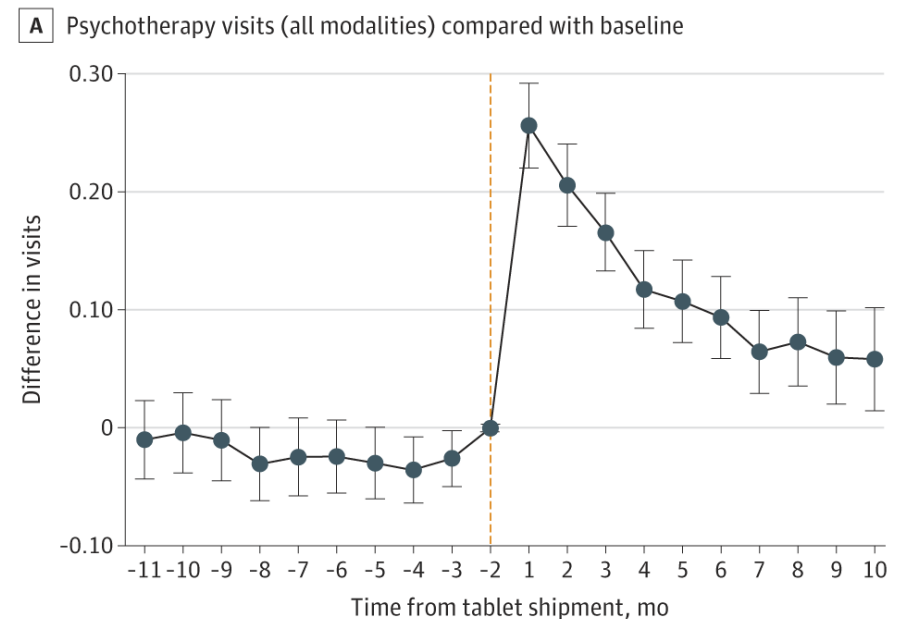
Question 2:

What are the Effects of Implementation?

- RCTs / hybrid trials
 - Intent to treat
 - On treatment, adjusting for compliance / selection (instrumental variable)
- Causal inference methods
 - Difference-in-differences (DID)
 - Event study
 - Regression discontinuity/kink designs
 - Instrumental variables
- Qualitative / Mixed methods
- Weaker observational methods
 - Cross-sectional
 - Pre-post

Results: Implementation Targets

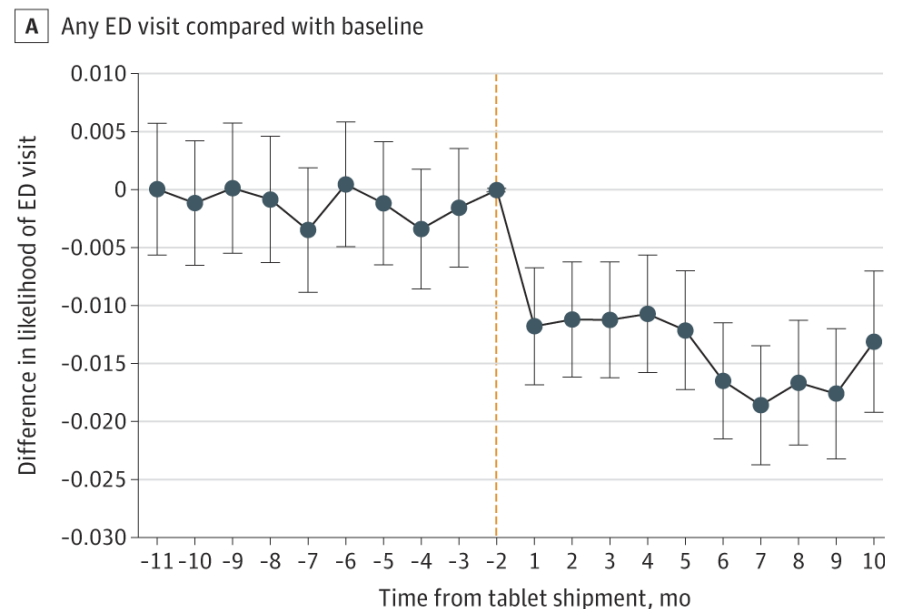
- Difference in differences: compare cases and controls before and after an intervention.
- Tablets were associated with an increase 3.5 visits/year in video visits – a 33% increase.



Gujral, K., Van Campen, J., Jacobs, J., Kimerling, R., Blonigen, D., & Zulman, D. M. (2022). Mental health service use, suicide behavior, and emergency department visits among rural US veterans who received video-enabled tablets during the COVID-19 pandemic. *JAMA Network Open*.

Results: Downstream effects

- Tablets were associated with a 20% reduction in the likelihood of an emergency department (ED) visit.
- Use these methods with costs.
 - MCA data are perfect for this.

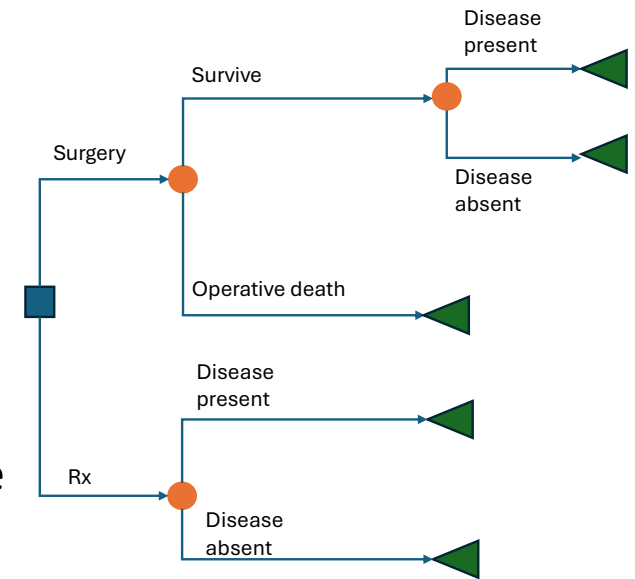


Question 3:

Budget Impact -- Did Implementation Save Me Money?

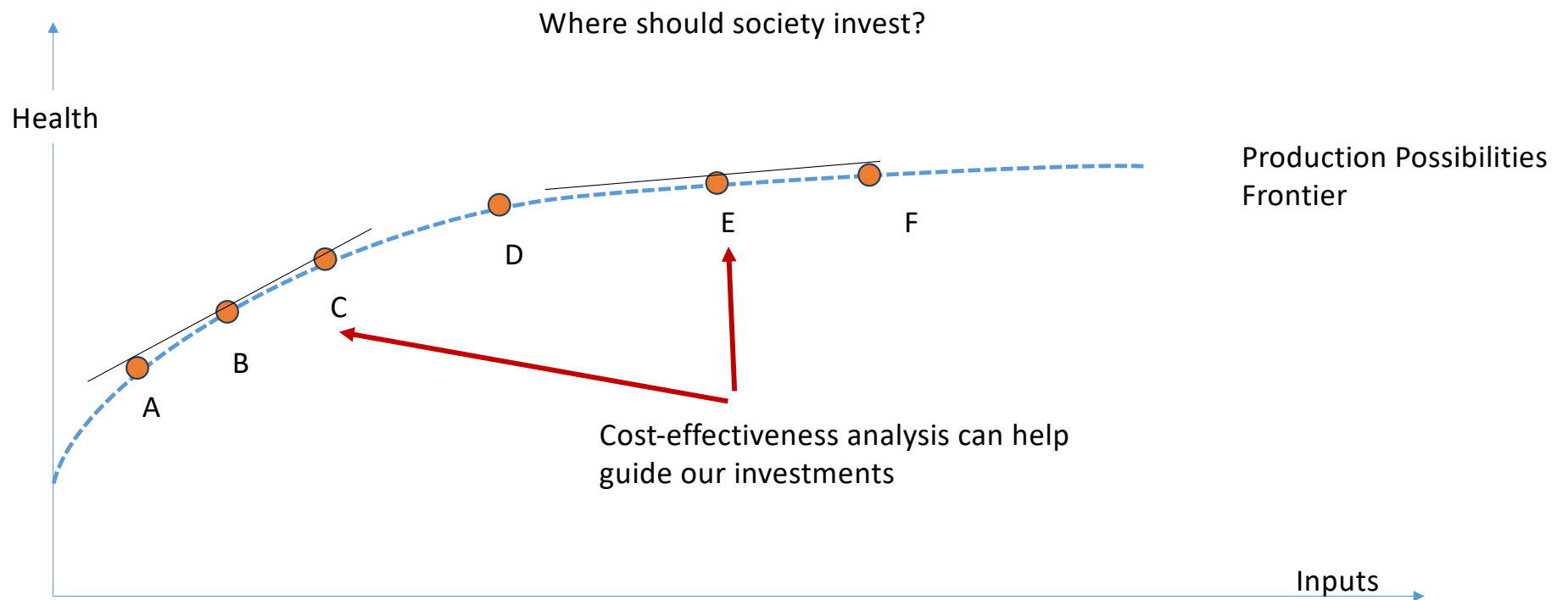
- Two methodological approaches
 - Create a decision model
 - Go back to question 2 and focus on utilization and costs.
- Can be hard to answer with a decision model.
 - Narrow perspective
 - Short term-time horizon
 - Modeling challenges: most organizations don't have the data necessary to build this model

Simple decision model



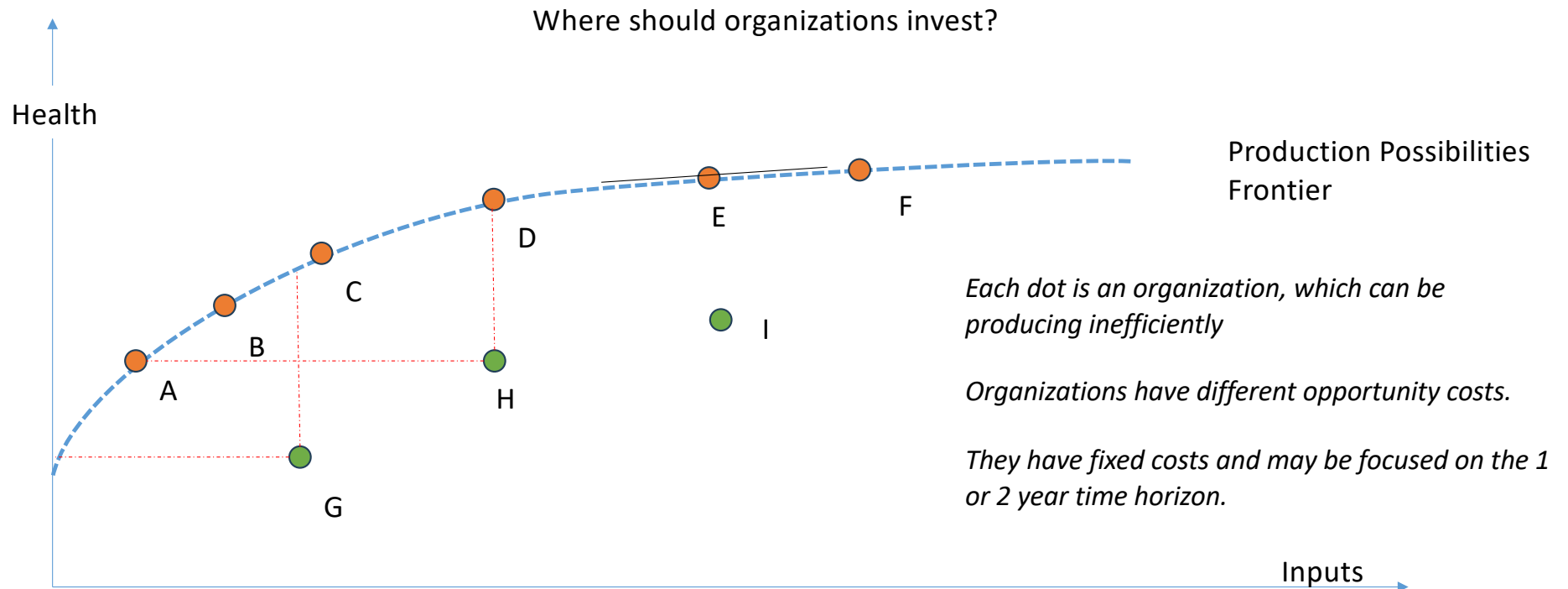
Question 4:

Is implementation efficient and sustainable?



Chandra A, Jena AB, Skinner JS. The pragmatist's guide to comparative effectiveness research. J Econ Perspect 2011;25(2):27-46

Implementation



Example

- NCI was interested in promoting smoking cessation at 16 different cancer centers.
- Two implementation outcomes:
 - Reach – the number of smokers offered smoking cessation
 - Effectiveness – the number of smokers who quit
- Sites were allowed to choose different strategies
- How do you judge which sites are doing better?
 - Answer: You can estimate the production possibilities frontier

Pluta K, Hohl SD, D'Angelo H, et al. Data envelopment analysis to evaluate the efficiency of tobacco treatment programs in the NCI Moonshot Cancer Center Cessation Initiative. *Implement Sci Commun* 2023;4(1):50.



Efficiency Analysis

- Need many intervention sites (the more the better)
- Can measure costs and outcomes over time (monthly)
- You can then feed that information back to the sites (simulating a market).

Where should
you focus your
time?





Recommendation 1

- Start with Question 2: Is implementation effective?
- Examine utilization and/or cost outcomes. This can give you insights on budget impact.
- Administrative data connected with difference-in-differences methods are increasingly popular and really powerful.

Recommendation 2

- If effective, focus on efficiency.
- To measure efficiency, you will need to measure cost of implementation (Q1) as well as implementation outputs
- Don't try to estimate an incremental cost-effectiveness ratio





Recommendation 3

- Be cautious of question 1.
 - Estimating costs of implementation alone may not be informative.
 - Usually, you want to know what you getting for that investment. A cost analysis can't answer that.
 - Cost summaries hide who is involved. Understanding who is involved and the time commitments are sometimes more helpful than costs.

Recommendation 4

- Modeling budget impact is really hard
 - Hard to find the right data
 - Often you need a lot of assumptions
 - Often need to also measure cost-effectiveness to place budget impact in context
 - Hard to publish



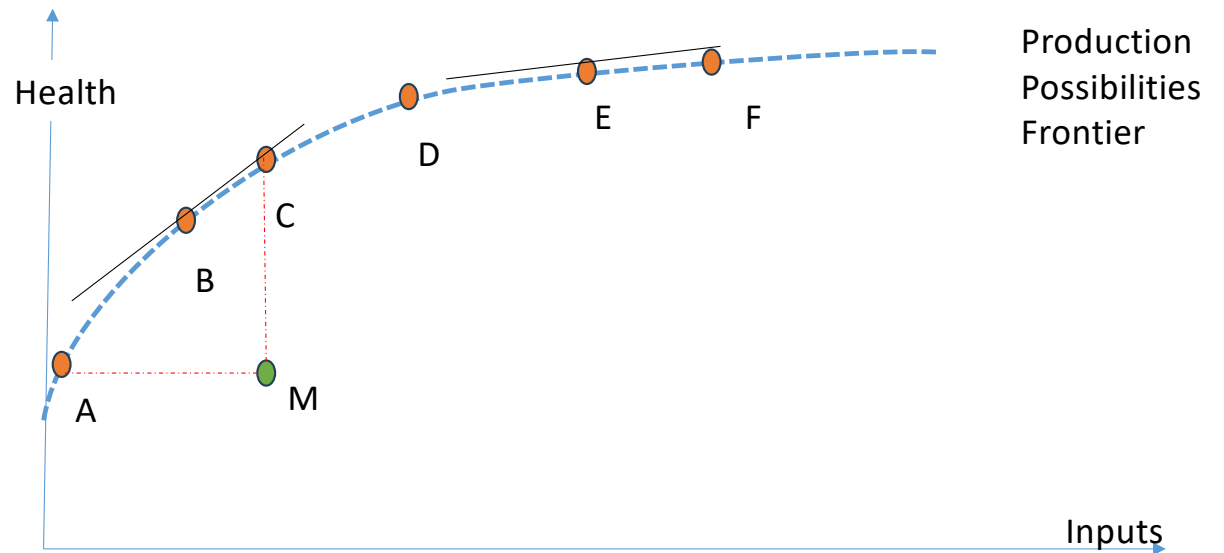


Recommendation 5

- Avoid estimating the marginal cost per implementation outcome.
- An added cost of \$10 per person reached is not informative.

Budget Impact vs CEA

- They address different questions, over different time horizons, from a different perspective
- Which is needed?





Summary:

De-Implementing Cost-Effectiveness?

- CEA is but one of many economic tools.
- CEA is less informative to local decision makers.
- Other economic tools are more often appropriate for implementation research.
- CEA is useful in some contexts, but not every context.

Recommended Papers

- Cidav Z, Mandell D, Pyne J, Beidas R, Curran G, Marcus S. A pragmatic method for costing implementation strategies using time-driven activity-based costing. *Implementation Science* 2020;15(1):1–15.
 - Daniels SI, Cave S, Wagner TH, Perez TA, Becker WC, Midboe AM. (2024) Evaluation of Implementation, Intervention, and Downstream Costs of a Quasi-Experimental Study on a Multidisciplinary Pain Clinic for Veterans. *Health Services Research*.
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- <https://www.biomedcentral.com/collections/EconomicEvaluation>



Summary

- The path forward involves understanding effectiveness and efficiency.
 - Cost-effectiveness is well known, but is less helpful with implementation
- The field is still relatively young, so we have lots to learn.



Questions?