ACCORDS Sustainability, Value, and Cost: Developing Enduring Health Care Interventions Seminar Series

- About the Adult and Child Consortium for Health Outcomes Research and Delivery Science (ACCORDS) at CU Anschutz Medical Campus:
  - Health services, outcomes, and implementation research
  - Methodological cores and programs focused on service including consultation, training, and grant development

- Today: **Using the Tools of Financial Management to Make a Business Case for Value-Based Interventions**
  - *Presented by:* Richard Lindrooth, PhD; Colorado School of Public Health

ACCORDS Sustainability, Value, and Cost: Developing Enduring Health Care Interventions Seminar Series

Upcoming Seminars:

3/15/2021 12:00-1:00 PM MT	**The Value Proposition is Not Just for the Business World Anymore: Lessons for Program Sustainability** *Presented by:* Demetria McNeal, PhD, MBA; CU AMC

- Previously recorded seminars can be found on our ACCORDS Education website

The Colorado Pragmatic Research in Health Conference

- Registration is live!
  - Registration fee waived for students, staff or faculty from the University of Colorado Anschutz Medical Campus, Children's Hospital of Colorado, and affiliate institutions of the Colorado Clinical and Translational Sciences Institute (CCTSI).
  - $149 early bird registration for others before April 2, 2021.
- Dual track conference:
  - Dissemination and implementation science
  - Biostatistics and data science
- Keynote and plenary speakers:
  - Dr. Monica Perez Jolles, University of Southern California
  - Dr. Fan Li, Yale University
  - Dr. David Vock, University of Minnesota,
  - Dr. Andrea Troxel, New York University
  - And more!

See COPRHCon.com for more information!

Call for abstracts in three theme areas is open!

Do you work in health services research, dissemination & implementation science, population health, public health research, patient-centered outcomes research, or pragmatic clinical trials?

Are you a methodologist, investigator, and/or a stakeholder representative in research?

Please join us at “COPRH Con” to share your methods and approaches to planning and engaging communities in research designed for real world impact.

Poster abstract submissions should address one of three theme areas: **Pragmatic Trial Examples, Dissemination and Implementation Science Methods, or Data Science and Biostatistics Methods for Pragmatic Research.**

Abstract deadline March 29, 2021.

See COPRHCon.com for more information and poster guidelines!

Complete the seminar evaluation!

- At the conclusion of this seminar, please be sure to complete our evaluation
  - **https://ucdenverdata.formstack.com/forms/seminar_eval**

- If you are interested in viewing this webinar at a later date or sharing out with colleagues, it will be available on the ACCORDS Education archived sessions
  - **https://medschool.cuanschutz.edu/accords/educational-offerings/archive/seminar-series-(2020---2021)**

Colorado School of Public Health

Using the Tools of Financial Management to Make a Business Case for Value-Based Interventions

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Summary

- **Budget impact analysis**
  - Perspective of budget holder
  - Companion to cost effectiveness analysis
  - Projects costs over the budget holder's relevant population
  - No discounting, it is presented annually
- ***Pro forma* financial analysis**
  - Related to budget impact analysis
    - Incremental costs used
    - Perspective of financial decision-maker
    - Estimate costs over the entire population in the organization
  - Return on investment (ROI) calculation
    - Need revenue offset
    - Near-term investment (fixed costs) yields long-term improvement of cash flow
    - Discounting helpful for decision-making
  - Decision-making
    - Consider nonfinancial objectives/mission

Budget Impact Analysis

- **Designed to measure the impact of health-care interventions on national, regional, or local health plan budgets.**
  - Perspective of the specific health-care decision-maker.

- **Complement to cost-effectiveness (CE) analysis**
  - Extends incremental costs from CE to the population
  - Required in addition to CE analysis by the National Institute for Health and Clinical Excellence in England and Wales and the Pharmaceutical Benefits Advisory Committee in Australia, that companies submit estimates of both the cost-effectiveness*

*Mauskopf, Josephine A., et al. 2007 "Principles of good practice for budget impact analysis: report of the ISPOR Task Force on good research practices—budget impact analysis." *Value in Health* 10(5): 336-347.

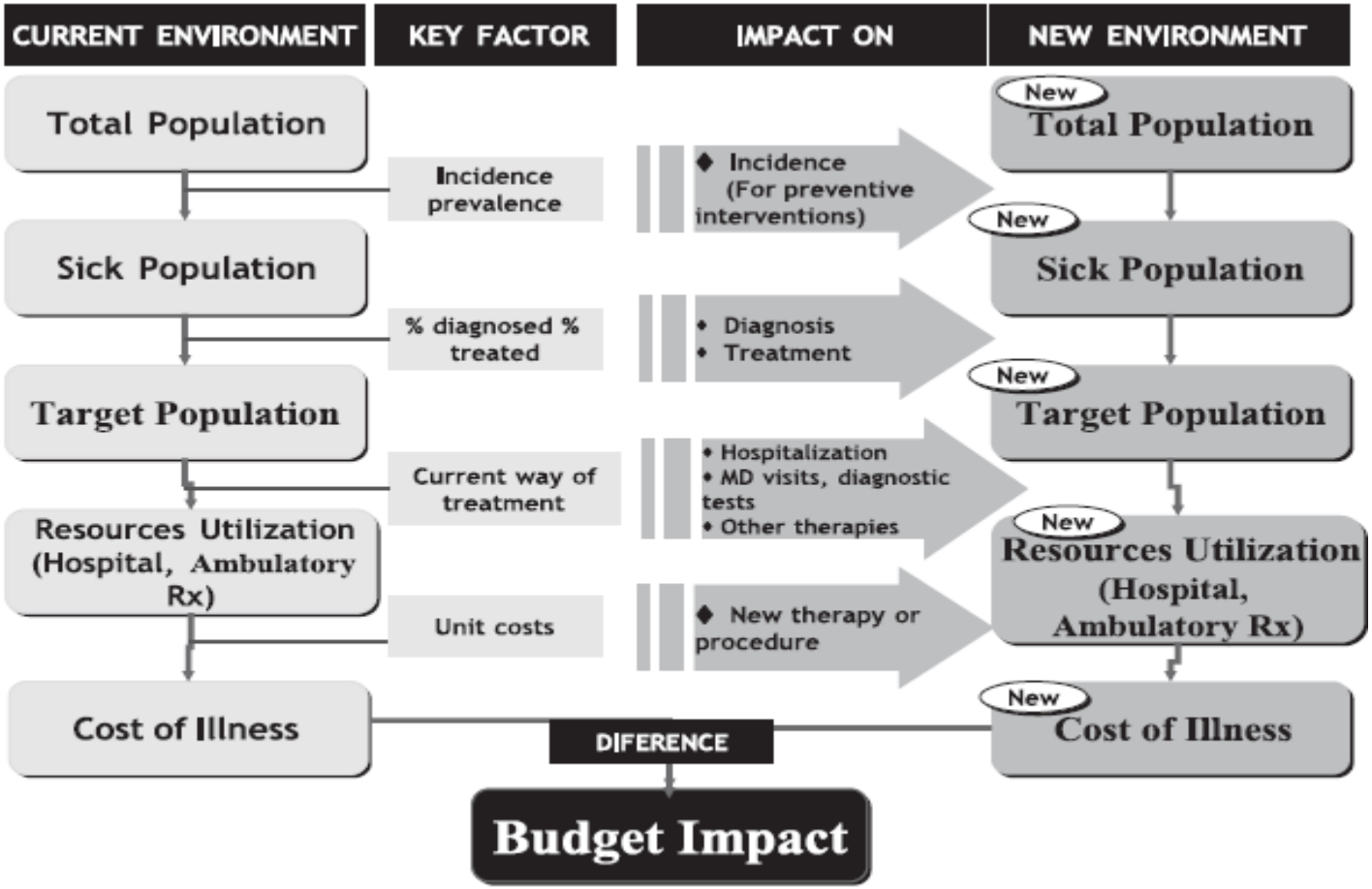
Budget Impact Analysis

Similarities and differences between budget impact analyses and cost-effectiveness analyses

	Budget Impact Analysis	Cost Effectiveness Analysis
Perspective	Payer	Societal
Time Horizon	Short-term	Long-term/Lifetime
Size of Population	Includes	Ignores
Model Inputs	Payer-specific	Population-average
Model Output	Cost	Cost and Health Outcomes
Uses Discounting	No	Yes
Includes Overhead Costs	No	Yes

*Source: US Department of Veterans Affairs, Health Economics Resource Center https://www.herc.research.va.gov/include/page.asp?id=budget-impact-analysis, accessed February 19, 2021.

Figure 1. Budget Impact Scheme (Mauskopf *et. al*, 2007)



* Estimate the incremental cost of the new intervention at the population level

Budget Impact Analysis—Design

- **Chronic versus acute conditions**
  - Unit of analysis an episode or patient?
- **Type of intervention**
  - Preventive, curative, palliative, one-time, ongoing, vs periodic
- **Expected uptake of the intervention**
  - Influences the number of persons treated
  - Compliance/adherence
  - Sensitivity analysis
- **Computational Approach**
  - Deterministic calculation or incorporate time-dependency?
    - Markov chains, agent-based modeling, etc…

Budget Impact Analysis—Perspective

- **Decision-maker responsible for the budget**
  - Who pays for the intervention?
    - Insurer, Health system, patient?
  - CEA is generally from the societal perspective
    - Includes societal costs and benefits
    - Budget impact analysis includes costs to the budget entity
- **Health system or department perspective?**
  - Depends on who is deciding
  - If department perspective, then spillovers to the health system ignored
    - Primary care decisions may affect specialists or hospital
    - Health system perspective includes all departments

Budget Impact Analysis—Other elements

- **Scenarios**
  - Define base-case/reference scenario (status quo)
    - Does the intervention replace current practice?
    - Does it add to current treatment?
    - Are you choosing among several new scenarios?
- **Population– Key element of budget impact**
  - Estimate the number of patients who are candidates for the intervention
  - Consider uptake by clinicians, adherence by patients
    - Does uptake change over time?
- **Subgroups**
  - Consider impact of limiting to subgroups
    - Age, sex, disease severity, etc
    - First-line treatment?
- **Time horizon**
  - Relevant period for budget holder—present disaggregated over time

Budget Impact Analysis—Costs

- **Defined according to perspective /budget-holder**

- **Costs relevant to the health condition during the time horizon**
  - Expenditures expected to accrue (not opportunity costs)
  - Relevant transaction prices, net of discounts, etc..
  - Short-run includes variable costs/cash-flows
  - Long-run analyses include fixed costs

- **Reimbursement for intervention**
  - If unknown then include in sensitivity analysis

Pro forma financial analysis

- **Examines the impact of an intervention of the financial health of an organization**

- **Best suited to investments**
  - Incur fixed costs to implement→ Improve cash flows
  - Do the returns justify the initial cost?
  - Will it improve or detract from financial performance?

- **Example: Magnet Hospital Designation**
  - Costly to achieve Magnet status
  - Do the (financial) benefits of Magnet status outweigh the costs?

Pro forma financial analysis

- **Estimate the project's cash flows:**
  - Initial investment (Fixed cost)
    - Expenses incurred to purchase and/or implement
    - e.g. Training, investment into IT systems, equipment
  - Variable cost (cash flows)
    - Once it is up and running, what is the incremental cost? Benefit?
    - Only incremental costs, difference via status quo
      - Overhead? If it doesn't change don't include it
    - Does not include suck costs, only costs necessary to implement
  - Terminal flow (truncate time horizon or sell)
    - Mostly relevant for tangible assets that can be sold or long-term investments
- **Calculate return on investment (ROI)**
  - ROI=discount rate that sets future benefits=investment cost

Pro forma financial analysis

- **ROI is an estimate of the financial rate of return**
  - If ROI<Average return on capital → lower financial performance
    - Not necessarily a bad thing, must be considered in context of what can be measured and mission
  - If ROI>Average return on capital → Improve financial performance

- **Benchmark return on capital should be risk-adjusted**
  - High risk projects have higher benchmark to reflect risk-return tradeoff

Pro forma financial analysis

- **Perspective is extremely important**
  - An expansion/investment may look great from departmental perspective
  - But cannibalism makes it worse from a health system perspective

- **Incremental revenue is as important as costs**
  - If no change in revenue and higher costs business case become qualitative
  - Quality improvement activities may not have an immediate revenue benefit
    - Additional effort in treatment or screening may not be reimbursed
    - However, QI may lead to higher revenue once the word gets out (or is directly rewarded through P4P)
    - But difficult to quantify reputation for high quality

Towards a business case

- **Financial analysis only one component of a business case**
- **Non-financial and difficult to measure financial elements need to be considered**
- **Strategic considerations**
  - Will the project be a way to distinguish you from the competition?
  - Will the intervention be broadly recognized, even reimbursed through P4P?

Towards a business case—Example*

- **Is there a business case for becoming a Magnet Hospital?**

- **Investment**:
  - The process that lasts 4.25 years on average to attain Magnet status.
  - Invest to meet staffing/process criteria and make structural changes in the working environment
  - Investments of $100,000–600,000 per year, depending on the size of the hospital.

- **Does Magnet recognition provide financial benefits over time?**
  - There are well known costs but are there revenue benefits?
  - "Magnet" sends a quality signal to patients
  - Private insurers pay more for Magnet status

*Jayawardhana, J., Welton, J.M. and Lindrooth, R.C., 2014. Is there a business case for magnet hospitals? Estimates of the cost and revenue implications of becoming a magnet. Medical care, pp.400-406.

Towards a business case—Example

- **Cost and revenue implications of Magnet status**

- **Estimated a difference-in-difference specification**
  - Designed to measure incremental costs and revenues
  - Treatment: Hospital attained Magnet status
  - Control: Did not attain Magnet status
- **But attaining Magnet status is not random**
  - Control for selection bias/confounding
    - Hospital fixed effects (Dummy variable for each hospital controls for time-invariant confounders)
    - Instrumental variables
    - Propensity Score strata and matching (referee's request)

Towards a business case—Example

- **Primary results:**
  - $193.43 increase in cost per discharge
  - $320.48 increase in net inpatient revenue per discharge.
  - Net patient income increase by about $127.05 per discharge

- **Estimate of the change in net income was not significant**
  - Concluded that hospitals would benefit over time
  - But didn't include the ROI estimates
- **Assuming 9000 discharges (approximate mean):**
  - Net patient income would increase $1.1 Million per year

- **Initial cost is about $500k * 4.5 years=$2.25 million**

Towards a business case—Example

- **Assumptions**
  - Time horizon: 10 years, 4.5 years prep with 5.5 follow-up
  - No value after ten years
- **Initial investment $2.25 million**
  - Spread over 4.5 years
- **Subsequent cash flows: $1,143,450**
  - Start after 4.5 years and gradually increase over time

	Timeline										
Year:	0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Investment:	**-$1,000,000**	**-$250,000**	**-$250,000**	**-$250,000**	**-$250,000**	**-$250,000**					
Cash flows:						**$200,000**	**$600,000**	**$800,000**	**$1,143,450**	**$1,143,450**	**$1,143,450**
Net cash flows:	**-$1,000,000**	**-$250,000**	**-$250,000**	**-$250,000**	**-$250,000**	**-$50,000**	**$600,000**	**$750,000**	**$900,000**	**$1,000,000**	**$1,143,450**

Towards a business case—Example

- **Results:**

	Timeline										
Year:	0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Investment:	**-$1,000,000**	**-$250,000**	**-$250,000**	**-$250,000**	**-$250,000**	**-$250,000**					
Cash flows:						**$200,000**	**$600,000**	**$800,000**	**$1,143,450**	**$1,143,450**	**$1,143,450**
Net cash flows:	**-$1,000,000**	**-$250,000**	**-$250,000**	**-$250,000**	**-$250,000**	**-$50,000**	**$600,000**	**$750,000**	**$900,000**	**$1,000,000**	**$1,143,450**
ROI	**12%**	**←Calculated using Excel's IRR Function**									

The ROI is the discount rate that sets the stream of cash flows =0

If 12%>Benchmark cost of capital → Improve financial performance

Towards a business case—Key points

- **Always do sensitivity analysis of difficult to justify assumptions**
  - Always some inputs that are difficult to measure and vary them
  - Report a range of estimates
- **Financial impact is only that, mission is important**
  - Key to sustainability
  - Important to understand impact, can you afford to improve unreimbursed quality?
- **Many interventions are not sustainable is payers don't change reimbursement**
  - Analysis from the payer perspective informative about sustainability

Summary

- **Perspective is of critical importance**
  - What party incurs costs, who incurs benefits
- **Focus on incremental cost and revenues**
  - Difference between the intervention at status quo
- **Budget Impact Analysis**
  - Not conducive to ROI calculations but useful for budgeting
    - Focus on cash flows after implementation
- ***Pro forma* financial analysis**
  - Balances initial investment with financial benefit to calculate ROI
  - Key component of a business case
  - Meaningless if there is not an incremental improvement in cash flows