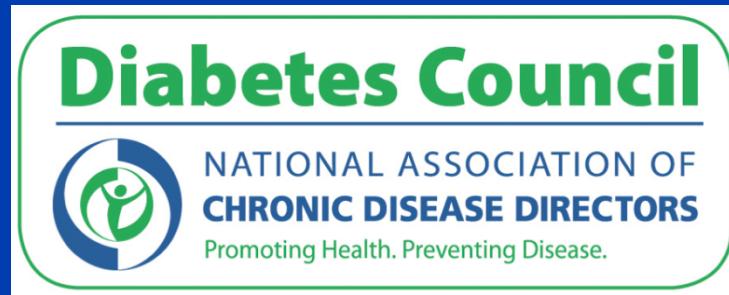


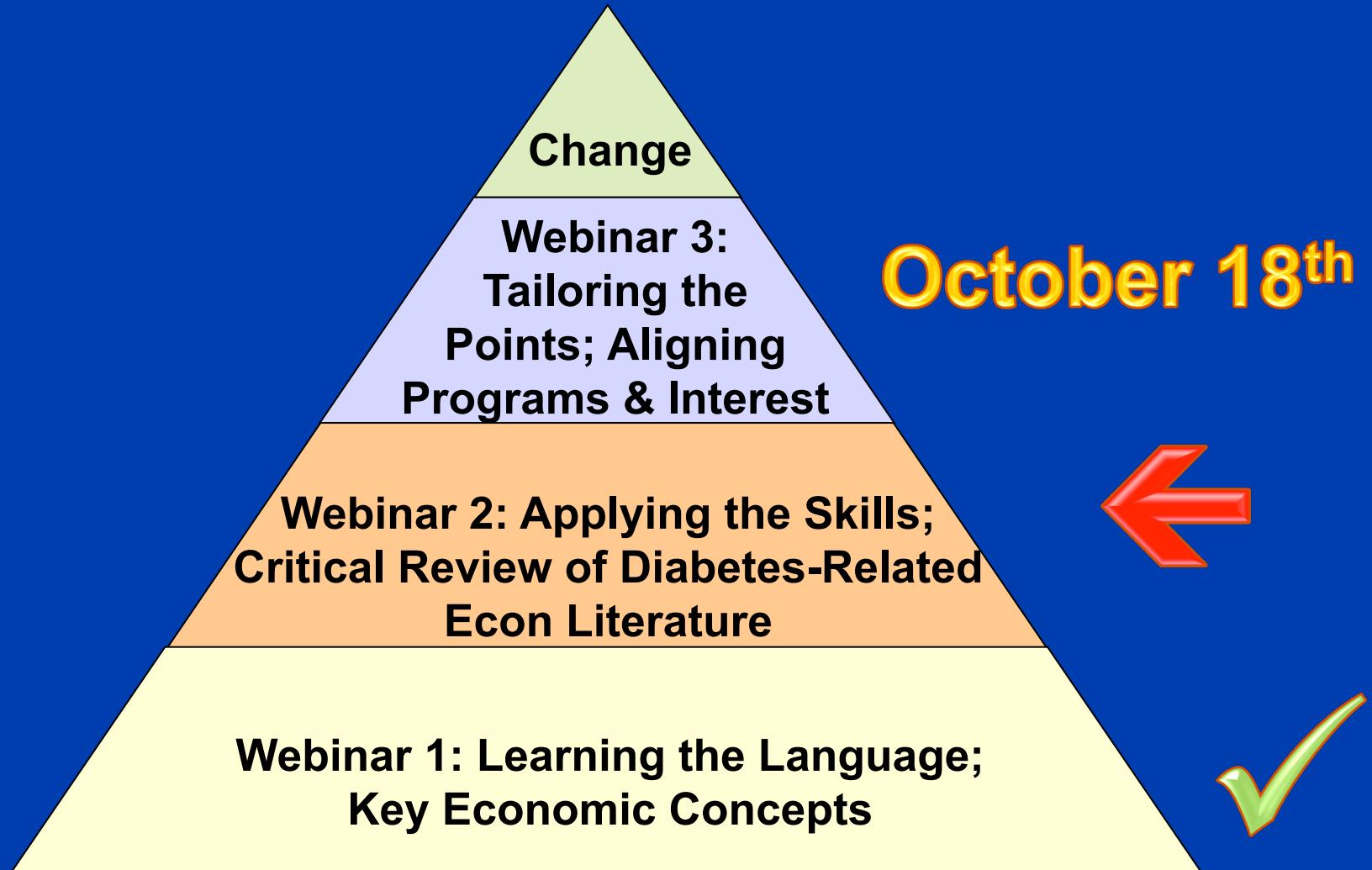
Economic Evaluation: Making the case for diabetes self- management education

NACDD Webinar Series
Session 2: Applying Economic Evaluation
October 4, 2012

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DSME Webinar Series Blueprint

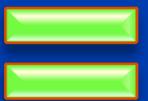


Applying Economic Evaluation: Overview

- Part 1: Review concepts from Session 1
- Part 2: Answering participant questions
- Part 3: Critical review of literature (homework report out: audience participation 😊)
- Part 4: State example of using an economic evaluation for policy advocacy

The Job Interview

- A mathematician, an accountant and an economist apply for the same job...
- What do two plus two equal?



Learning Objectives

- Recognizing different types of economic evaluations (cost-inclusive, cost-benefit [a.k.a. return-on-investment], cost-effectiveness and cost-utility analysis) in the literature
- Critically reviewing the DSME economic evaluation literature by applying key terms in economic analysis
- Selecting key findings from economic evaluation studies to match our audience(s)

Part 1: Review of key concepts

- What is economic evaluation?
- Cost, benefits
- Perspective, time horizon, sensitivity
- Main types of economic evaluation
 - Cost inclusive, cost minimization
 - Cost benefit, cost effectiveness, cost utility

What is Economic Evaluation (EE)?

Definition:

- EE compares the outcomes (benefits) and costs of alternative interventions to inform decisions about the allocation of scarce resources using an established set of economic tools
- It is one decision-making tool
- It compares a new alternative vs. the base case (current approach; business as usual)

Should intervention be adopted?

		Worse Outcomes	No Change	Improved Outcomes
Increased Costs	Definitely reject new alternative (base case preferred)			Decision: Are the benefits worth the costs?
No Change		Indifferent		
Cost Savings	Decision: Is the health loss worth the savings?			Definitely accept new alternative (base case rejected)

Review: Key Concepts

- Cost (direct, indirect, opportunity*)
- Benefits (money, life years, etc.)
- Perspectives (individual, group, society)
- Time horizon (discounting)
- Uncertainty (sensitivity)

Key Concept: Cost Types

- Intervention program (or direct) costs
 - Fixed costs & variable costs
- Indirect program costs on client and others
- Averted health care costs
 - A negative cost (i.e. a benefit shifted to the cost side of the equation)

➔ Note: not all costs apply to all perspectives!

Key Concept: Benefits (Health Outcomes)

In monetary units (currency)

- Monetary value of years of life saved (gained)

In physical units – global health outcomes

- Years of life saved (YOLS)
- Health Related Quality of Life (HRQL) Units
- Quality Adjusted Life Years Saved (QALYS)

In physical units - intermediate outcomes

- % lowered blood pressure, cholesterol
- Lifestyle changes: exercise, nutrition, smoking cessation

➔ Note: not all audiences interested in all benefits!

What are Expected Outcomes?

Decision Tree for Tx Uptake & Adherence

- % of population targeted for intervention
 - Adjust for % who participate
 - Adjust for % effectively treated
 - % adherence to intervention, relapse
 - Adjust for % with improved health status from intervention
 - Expected benefit from successful intervention
 - Number of years of life gained * successful cases
- Note: not all will participate nor succeed!

Key Concept: Perspective of Analysis

- Narrow: Includes benefits and costs to the individual
 - Intermediate: Includes benefits and costs to
 - Public Health Agency
 - Medical Care Provider
 - Payer: Health Plan or Government
 - Consumer Group
 - Broad (Societal): Includes the benefits and costs to the entire population
- ➔ Note: not all audiences interested in all benefits!

Key Concept: Time Horizon

- Over what period will you observe and include outcomes and costs of intervention?
- Benefits and costs from the intervention
 - Short term (1 year or less)
 - Longer term (more than 1 year)
 - Lifetime benefits or costs
- The longer the time horizon the greater the uncertainty about outcome and cost
- The preference is for something now

→ Note: time horizon determined by audience!

Key Concept: Uncertainty

Apply Sensitivity Analysis

- Identifies critical variables
- Variables in sensitivity analysis
 - Risk of disease or injury
 - Discount rate (0-5%)
 - Direct costs of program
 - Value of estimated benefits
 - Patient compliance, adherence
 - Successful quitters = 5% or 50% of participants

Review: Main Types of Economic Evaluation

- Cost-inclusive evaluation (CIE) 

- Cost-benefit analysis (CBA) 

- Cost-minimization 

- Cost-effectiveness analysis (CEA) 

- Cost-utility analysis (CUA)



Reviewing EE Types

Type of Analysis	Outcome (Benefit)	Measurement of Benefits
Cost Minimization (CMA) 	Identical, but costs are different <i>Can we do it for less?</i>	None (or kept constant)
Cost Effectiveness (CEA) 	Single common benefit (or outcome) <i>Are the (natural) outcomes worth the cost?</i>	Natural units e.g. life years gained, A1C levels, blood pressure, improved nutrition/physical activity
Cost Utility (CUA) 	1 or more benefits (outcomes) standardized into a single value <i>Are standardized outcomes worth the cost?</i>	QALYS, DALYS, Quality of life measures (discounted)
Cost Benefit (CBA) 	Single, or multiple benefits (outcomes) standardized into a single monetary value (in present dollars) <i>Do we save more than we spend?</i>	Present value of \$\$; Monetary value of a YOLS or QALY

Part 2: Questions from Session 1

- Questions from Session 1 public chat
- New questions?

Questions from Session 1

1. How do you know which time period to use for determining ROI (other than that determined by the funding period)?
2. How do you figure in that folks would be more likely to maintain one of the tx vs the other?
3. What method would you recommend to measure the cost savings of DSME preventing hospitalization due to ketoacidosis in a high risk population? (e.g., people who were hospitalized for ketoacidosis within the last year)

Questions from Session 1, cont.

4. When there are multiple variables that could impact an outcome, and you aren't addressing all of them in your intervention, can you really do cost benefit if you can't prove that your variable was the effective one?
5. How do you apply this in translation research or community interventions where there are many confounders/uncontrolled variables?
6. What is an indifference curve?

Part 3: Critical review of literature

- Homework report out:
audience participation
- Volunteers for each article



Articles for Review

- 1) What was the intervention/program?
- 2) In what setting? With what population?
- 3) What type of economic analysis?
- 4) From whose perspective?
- 5) What were the cost & types of costs?
- 6) What were the benefits?
- 7) How do findings support case for DSME?
- 8) What is the key take-away message? For what audience?
- 9) What additional information did you hope to see?

Part 4: State example of using an economic evaluation for policy advocacy

More Economic Evaluation Slides; Drinking from the Fire Hose



Photo source: Massachusetts Institute of Technology, Alumni Newsletter;
<http://alum.mit.edu/news/QuickTake/Archive/200908/>



Cost-Inclusive Evaluation

- Definition: Any evaluation that looks at both effectiveness (intended outcomes) and costs
- Outcomes: Monetary & non-monetary units
- Answers: Did it work and at what cost?
- Decision: Accept if effectiveness is better or cost is lower than alternative



Cost-Benefit Analysis

- Definition: CBA compares the costs and benefits of the same (or different) program using monetary outcomes
 - Outcomes: Monetary units
 - Answers: Are the net benefits greater than net costs?
 - Decision: Accept if the effects are worth more than the cost; select the intervention that has a cost/benefit ratio < 1
- Most common form of EE in business:
- AKA return-on-investment (ROI) analysis

Cost-Minimization (Saving) Analysis

- Definition: CMA compares the costs of different programs that produce the same health related outcomes (cell H)
- Outcomes: Monetary units*
- Answers: While keeping outcomes constant, are the costs lower?
- Decision: Select the effective intervention with the lower cost (cost saving strategy)



Cost-Minimization Analysis: Example

A. Participants walk 4 days per week

- Lowers Cardiovascular Disease (CVD) risk by 10%
- Costs \$3000 per participant per year

B. Participants reduce fat from 40% to 30% of calories

- Lowers CVD risk by 10%
- Costs \$2500 per participant per year

Outcome: Compare data on outcome only

- Both equally effective in lowering CVD risk

Analysis: Compare data on costs only

- Reduced fat intake intervention costs less

Decision: Choose the fat reduction intervention

- Cost saving strategy

Note: these examples are fictitious



Cost-Effectiveness Analysis

- Definition: CEA compares the costs and benefits of different programs using the same outcome measure
- Outcomes: Non-monetary, natural units
- Answers: Are the net effects worth the net costs?
- Decision: Accept if effects are worth the cost; select the intervention that has a lowest cost/benefit ratio
 - ➔ Most common form of EE in health:
 - Cells C, F, and I (better outcomes vs. lower/constant/higher costs)



Cost Utility Analysis Outcomes

- When is CUA used?
 - When quality of life is important
 - When the program affects both morbidity and mortality of participants
 - When the programs being compared have a wide range of outcomes but all have an effect on healthy years of life
 - Diabetes self-management education versus violence prevention
 - Reducing secondhand smoke exposure versus increasing prenatal care



Adjust YOLS for Quality of Life (QALYS)

- QALYS take into account morbidity occurring in additional years of life
- Time spent in a particular health state multiplied by a **preference weight** for that state
- Q of L adjustment to YOLS ranges from 0 – 1
 - 0 = dead
 - 1 = perfect health
- If Q of L adjustment is .80 (80 percent)
 - 5 years (in poor health) = .8(5)
 - 5 years (in poor health) = 4 years in good health



Converting QALYs to Dollars

- Monetary Valuation (Human Capital Approach)
- Value of a year of life saved based on average annual (hourly) earnings
 - Average worker earns \$50,000 per year, working 40 hours per week
 - Value of a year of life saved = \$ 50,000

➔ Note: if pushed to state outcomes in \$\$, use the \$50k figure per QALY; apply discounting if benefits accrue in the future



Converting to Common Temporal Monetary Units

- Future Benefits (and Costs) measured in monetary units must be discounted to reflect
PRESENT VALUES
 - Money received tomorrow is worth less than money received today
 - $10.00/(1.10)^1 = \$9.09 = \text{value today @ } 10\%$
 - Future Value of year of life in 20 yrs = \$ 50,000
 - Present Value of a year of life \$ 27,683
 - $\$50,000/(1.03)^{20}$