Cost-Benefit and Cost-Utility Analyses in a Randomized Clinical Trial for Psychological versus Medical Treatments for Depression

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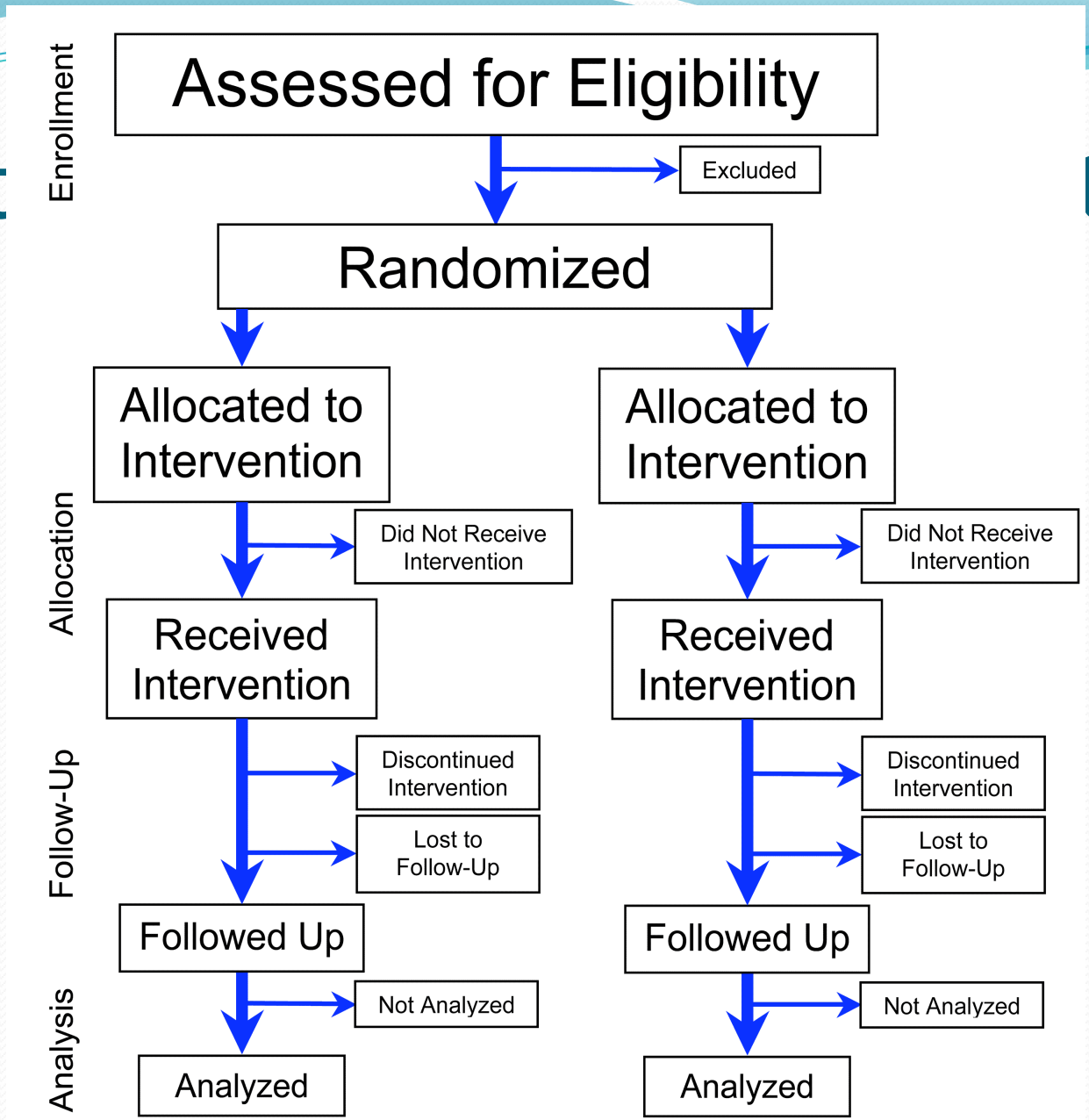
Objectives

- Define randomized clinical trial (RCT)
- Provide benefits and limitations of using a cost-inclusive evaluation as part of an RCTs
- Explain design methods used when adding cost-inclusive evaluation to already established RCTs
  - Provide real-world example: Cost benefit and cost utility analysis of CBT vs. LT for SAD

What trial?



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Benefits of Randomized Clinical Trials

- Random Selection
- Random Assignment
-  Biases
-  Confounding Variables

Limitations of Randomized Clinical Trials

- Ideal Situation = Real World?
- Utilization of outside data sources or remote data
- Relationship with parent study staff
- Staff Support
- Available Funding

RCT Overview

- Data from RCT at UVM (Grant # R01Mh078982)
  - PI: Kelly Rohan, PhD
  - 5 year trial
  - N = 177 (CBT-SAD, *N* = 88; LT, *N* = 89)

Treatment	Yr1 (Pilot)	Yr2	Yr3	Yr4	Yr5
CBT-SAD	12	14	15	25	22
LT	12	10	18	25	24
Total	24	24	33	50	46

Treatments

Light Therapy for SAD

- 30 minutes each morning
  - then, individually tailored

CBT-SAD

- Group Format Rohan (2009)
  - 2x wk sessions (12 total)

Study Aim

- Differences in CBT vs LT for SAD over 2 winters:
  - Costs
  - Benefits
  - Effectiveness

Measures

- BDI-II
- SIGH-SAD
- Patient Daily Diaries
- Cost Questionnaire

Beck, Steer, and Brown (1996); Williams et al. (1992)

Treatment Cost Estimation
Patient Costs

- Patient Cost
  - Treatment engagement
  - Productivity
  - Transportation

Treatment Cost Estimation
Patient perspective

- Intended Treatment
  - Treatment as prescribed
- As Treated
  - Individual differences in treatment engagement
- Opportunity Cost
  - $0/minute for patient time in front of light box
- Follow-up Treatment
- Cumulative Costs

Treatment Cost Estimation Provider Costs

- Health services
  - converted into CPT codes x Medicaid rate
- Cost of space
  - Average rental price per sq ft
- Overhead costs
  - median hourly income of an office manager

Treatment Benefit Estimation

- Hospital services and associated costs
  - Median cost for hospital visit paid by Medicaid
- Emergency room service use
  - # of visits x median emergency room charge
- Doctor's office visits
  - Patient self-report and converted to CPT codes x visit paid by Medicaid
- Monetary benefits of CBT-SAD and LT
  - total cost of health $_{servicesbeforetx}$ – total costs of health $_{servicesaftertx}$

Cost Utility Estimation

- BDI-II scores converted into QALYs

(Freed et al., 2007)

Health Utility to QALY Time-weighting Schedule

Timeframe	# of months	Data used
Early January to mid-February	1.5	Pretreatment (Pre)
Mid-February to mid-May	3	Posttreatment (Post)
Mid-May to end of September	4.5	Spontaneous remission (Sprsum)
October through December	3	1-year (next winter) follow-up (Yr1)
January to December	12	2-year (second winter) follow-up (Yr2)

$$\frac{(\text{Pre} \times 1.5) + (\text{Post} \times 3) + (0.9\ \text{Sprsum} \times 4.5) + (\text{Yr1} \times 3) + (\text{Yr2} \times 12)}{24\ \text{months}} = \text{QALY}$$

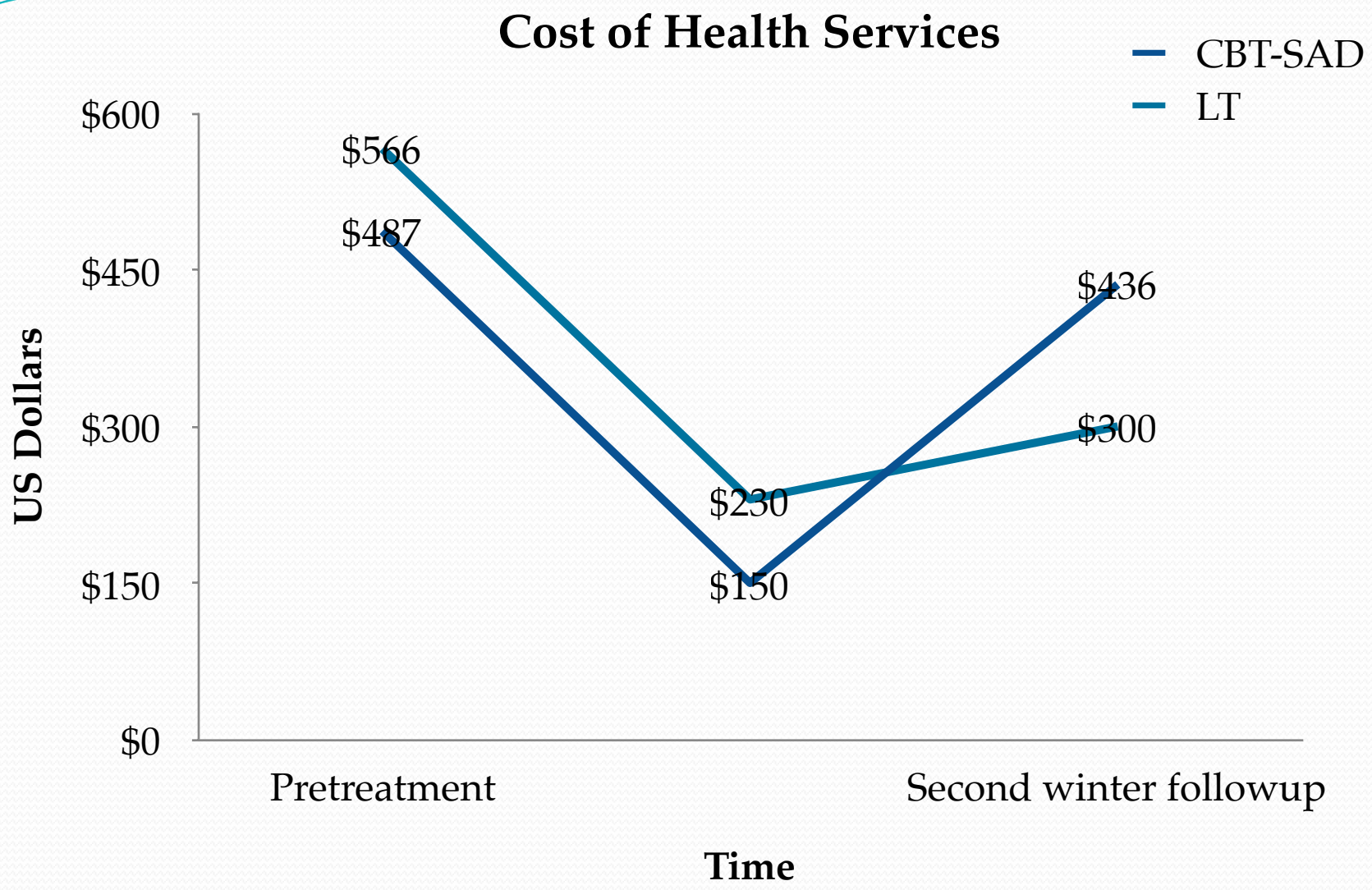
RESULTS

Treatment Costs Per Patient
Provider perspective

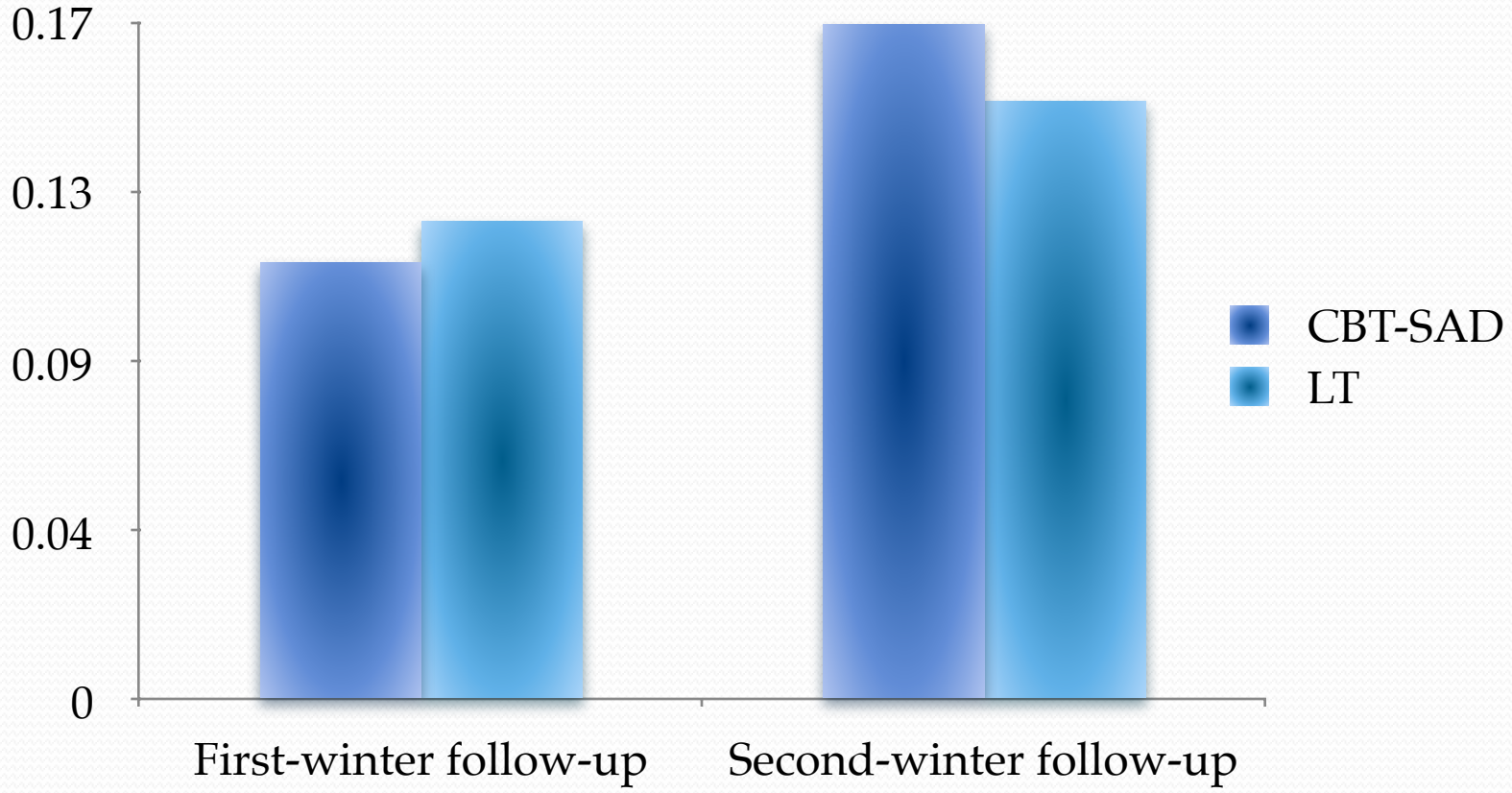
Resource type	Resource amount		Cost per unit	Total cost (resource amount x cost per unit)	
	CBT	LT		CBT	LT
Psychiatrist time	0	1.5	$68.06	$0.00	$102.09
Therapist time	4.5	0	$34.34	$154.53	$0.00
Supervisor time	1.5	0.5	$34.34	$51.51	$17.17
Manuals/homework	60	18	$0.10	$6.00	$1.80
Space (sq. ft)	180	0	$0.05	$8.22	$0.00
Office management	0.5	0	$18.19	$9.10	$0.00
Total Cost				**$229.35**	**$121.06**

CBT-SAD Cost Less Cumulatively from the Patient Perspective

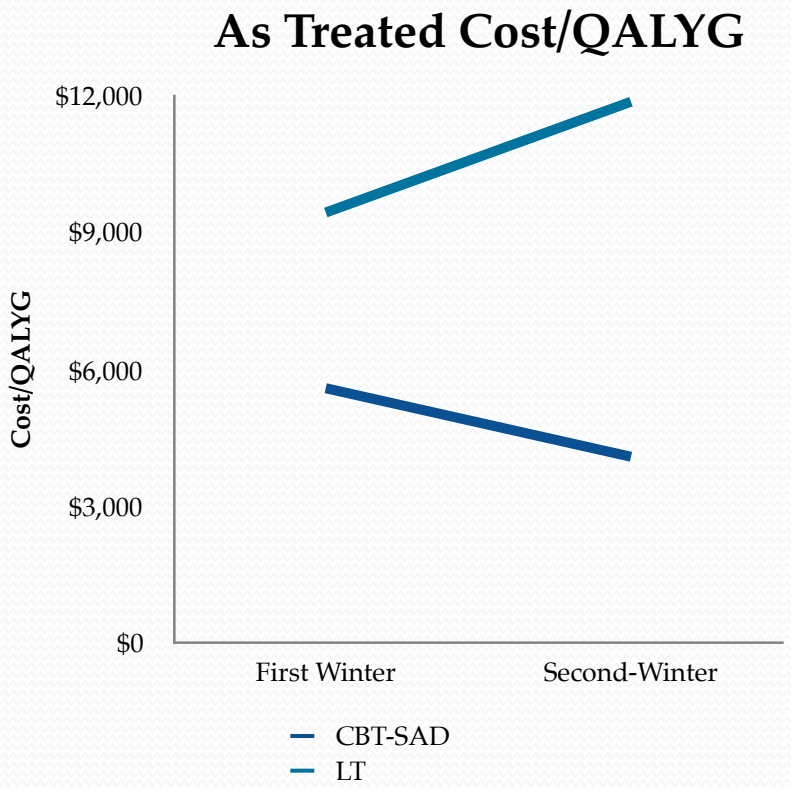
- Intended Treatment
  - **CBT-SAD < LT**
- As Treated
  - **CBT-SAD < LT**
- Opportunity Cost
  - **CBT-SAD > LT**

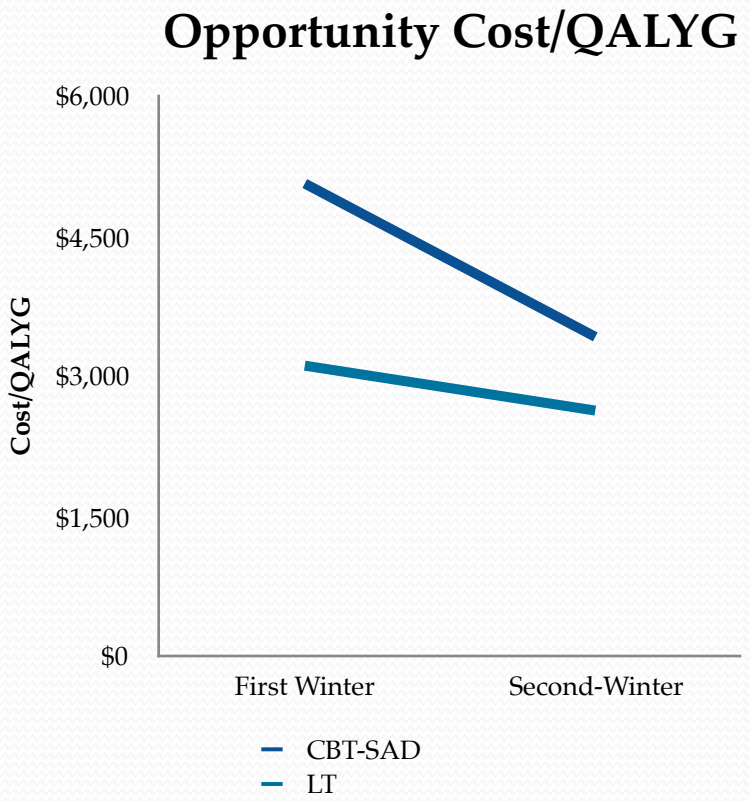

Cost of Health Services
CBT-SAD
LT
$600
$450
$300
$150
$0
US Dollars
$566
$487
$230
$150
$436
$300
Pretreatment
Second winter followup
Time

Median Quality of Life Years Gained



Cost/QALYG


As Treated Cost/QALYG
$12,000
$9,000
$6,000
$3,000
$0
Cost/QALYG
First Winter
Second-Winter
CBT-SAD
LT


Opportunity Cost/QALYG
$6,000
$4,500
$3,000
$1,500
$0
Cost/QALYG
First Winter
Second-Winter
CBT-SAD
LT

Limitations

- Estimated costs based on specific region in US
- Treatment cost according to current market data
- Service use outcomes based on self-report and service cost based on CPT codes converted to Medicaid rates
- Index treatment and follow-up treatment were different lengths of time
- Limited data on activities engaged in while undergoing light therapy
- QALYs over a 1 and 2 year period not lifetime

Future Research/Lessons Learned

- Gain access to patient medical records
- Have equal lengths of time re: index treatment and follow-up
- Gather data over an even longer period of time for accurate QALYs and long-term effects of CBT-SAD

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Questions & Comments