

Improving the Value of Care for Aging Adults

Presented by
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February 23, 2023



DURHAM CENTER OF INNOVATION
TO ACCELERATE DISCOVERY AND
PRACTICE TRANSFORMATION



@Brystana
@DurhamADAPT

Agenda

- Types of Cost Analyses
- Business Case Analysis: STRIDE
- Cost-Effectiveness Analysis: STEP-KOA, PAL-HF
- VA Outpatient Palliative Care Implementation
- Discussion and Questions

Funding Disclosures

- The contents do not represent the views of the US Department of Veterans Affairs or the US Government. The funders did not have a role in the design of the study, data collection, analysis, interpretation or writing the manuscript.
- STRIDE: This work was funded by the United States (US) Department of Veterans Affairs Quality Enhancement Research Initiative (QUE-16-170) , the Center of Innovation to Accelerate Discovery and Practice Transformation (CIN-13-410) at the Durham VA Health Care System.
- STEP-KOA: Research reported in this manuscript was funded through an Investigator Initiated Award (IIR 14–091) from the Health Services Research and Development Service of the Department of Veterans Affairs.
- PAL-HF: This work was funded by National Institutes of Nursing Research (ClinicalTrials.gov Identifier: NCT01589601)

Acknowledgements and Authors

STRIDE

- We greatly value the contributions of Elizabeth Mahanna, program manager, and dedicate this work to her memory.
- Brystana Kaufman PhD
- S. Nicole Hastings MD
- Cassie Meyer BS
- Karen M. Stechuchak, MS
- Ashley Choate, MPH
- Katina Robinson, MPH
- Kasey Decosimo, MPH
- Caitlin Sullivan, MS
- Virginia Wang, PhD
- Kelli D. Allen PhD
- Courtney H. Van Houtven PhD
- **Durham VA Health Care System**



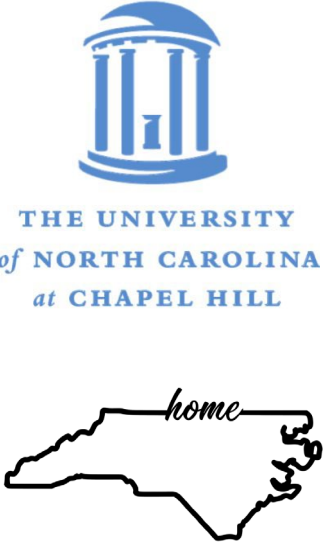


STEP-KOA

- Brystana Kaufman
- Sandra Woolson
- Dennis Bongiorno
- Kevin Caves
- Teresa Floegel
- Katherine Hall
- Bryan Heiderscheid
- Helen Hoenig
- Kim Huffman
- Miriam Morey
- Shalini Ramasunder
- Herbert Severson
- Courtney Van Houtven
- Cynthia Coffman
- Kelli D. Allen
- **Durham VA Health Care System**

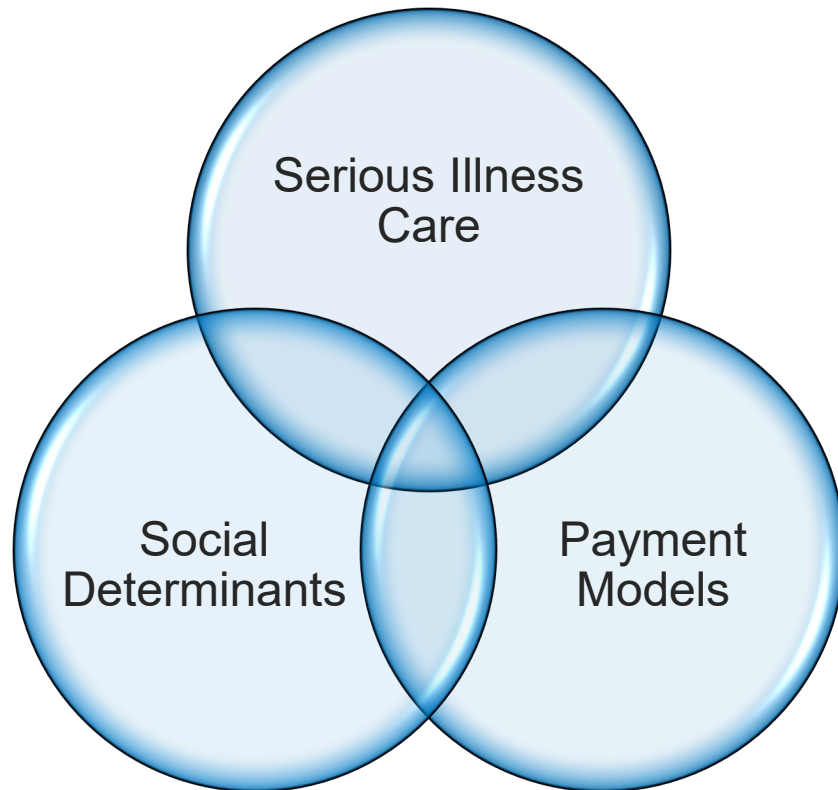
PAL-HF

- Acknowledgements: John Sperber, MD, Philip Jones for KCCQ-Utilities Mapping
- Brystana Kaufman, PhD, MSPH
- Gillian Sanders-Schmidler, PhD
- Bradi B. Granger, PhD, MSN, RN
- Jie-Lena Sun, MS
- Daniel Mark, MD
- Haider Warraich, MD
- Donald H. Taylor, Jr, PhD
- James A. Tulskey, MD
- Joseph G. Rogers, MD
- Robert J. Mentz, MD
- **Duke University**

Academic and Professional History

2000-2003	2004-2012	2013-2015	2016-2018	2018-Present
				

Research Interests



- Economic evaluation and cost-effectiveness
- Quasi-experimental observational designs
- Using real world data

When hospitals run out of beds, here's how they ration care



By Jacqueline Howard

Updated 1:59 PM

Clinicians

COVID-19 Surge Forces Health Care Rationing in of Wes

Healthcare
resources
are limited

Money

Time

Space

ign about the delta variant, Idaho public health leaders expanded health care rationing

CORONAVIRUS CRISIS

A COVID Surge Is Overwhelming U.S. Hospitals, Raising Fears Of Rationed Care

September 5, 2021 · 7:00 AM ET

WILL STONE

Health System Decision-making

Comparative Effectiveness

Compares health outcomes for multiple interventions to maximize patient or population outcomes.

Economic Analysis*

Quantifies the cost along or relative to health for 1+ interventions to assess the value and/or risk to key stakeholders.

*Includes a number of specific study designs including Cost Utility, Cost Benefit, and business case analysis

Health System Decision-making

What is a “good” decision?

Business

What strategy maximizes revenue?

Is the financial risk worth it?

What is the worst case scenario/existential threat?

Health

How can we optimize resource use?

What are the trade-offs in long term and short term benefits?

How does uncertainty impact outcomes?

Types of Cost Analyses



Business Case
Analysis (BCA)

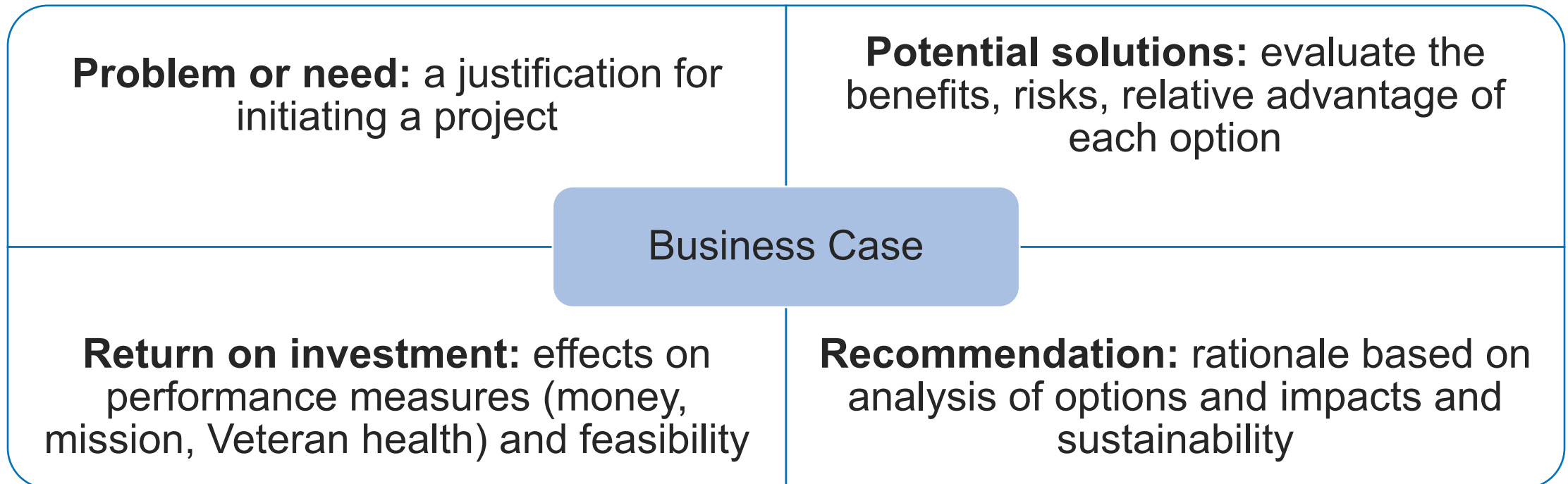


Budget Impact
Analysis (BIA)



Cost-Effectiveness
Analysis (CEA)

Business Case Analysis



Budget Impact Analysis



- Estimated costs of the intervention
 - E.g. an 8-week nurse-led telehealth program to support seriously ill patients and caregivers following discharge to home costs \$400 per participant on average
- Estimated revenues generated by the intervention
 - CMS reimbursement using Transitional Care Management and Chronic conditions codes ranges from \$300 to \$500 depending on the billing criteria met by each visit
- Scenario analyses and other financial impacts direct or indirect
 - What if a social worker or advanced practice nurse conducted the intervention? Will existing staff conduct the intervention or should hiring and training costs be incorporated?

Costing Methods

General formula: Unit x Price

Micro costing: direct enumeration and costing out of every input consumed in the treatment of a particular patient.

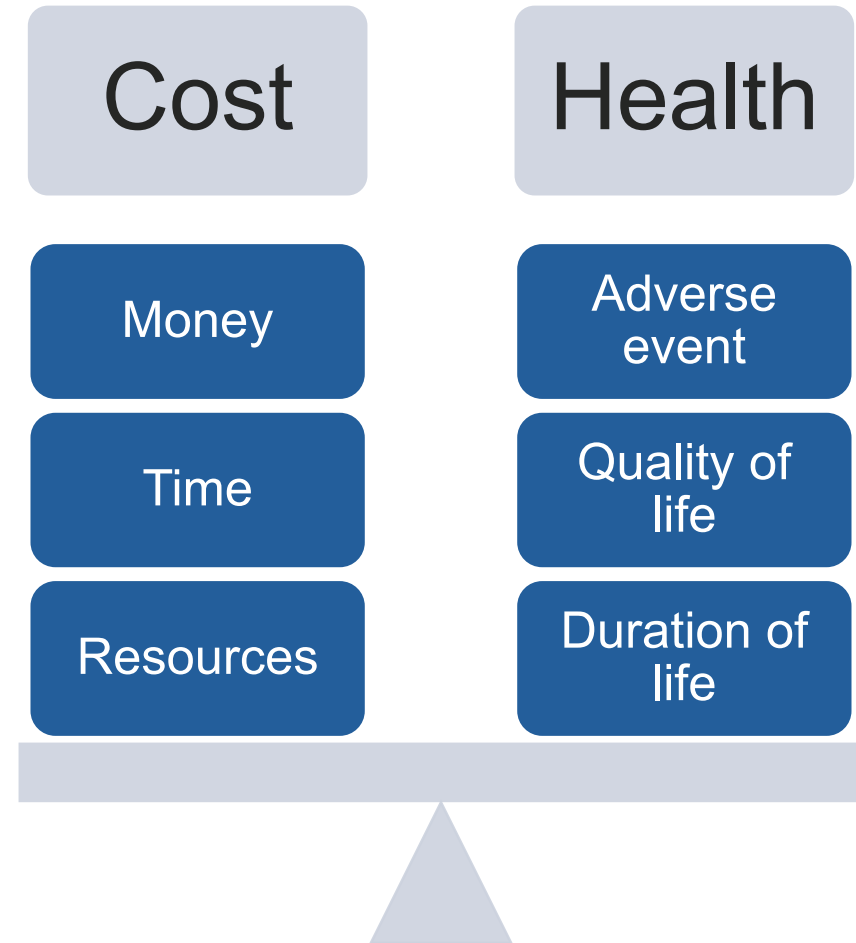
- Salary expense per hour
- Office space per square foot
- Overhead or fixed costs per unit
- Supplies and invoices

Gross Costing: average costs of events are assigned using regional or national data

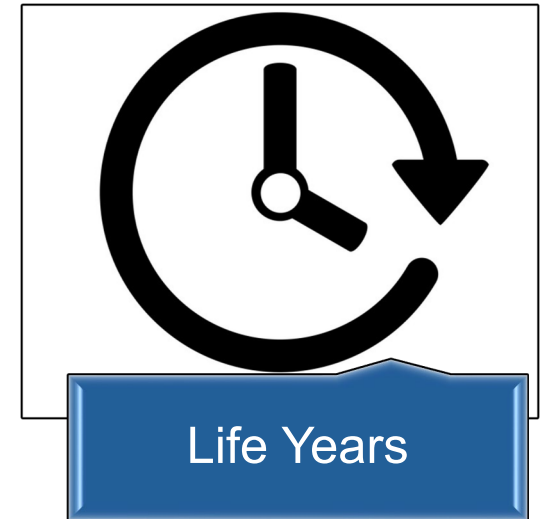
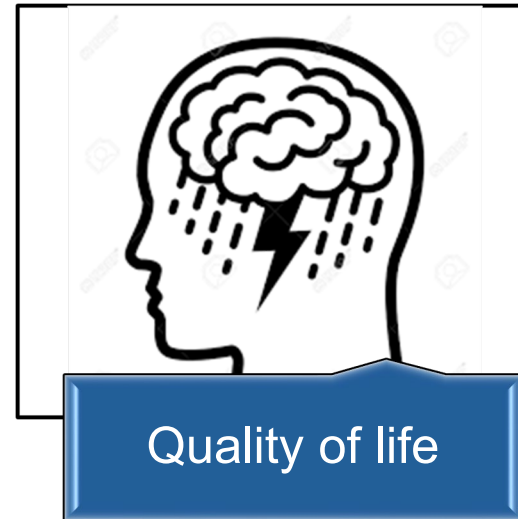
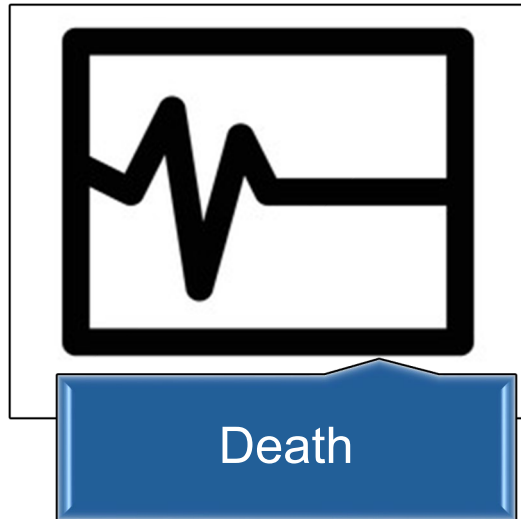
- Medicare data
- Industry averages
- Estimated costs

Cost-Effectiveness Analysis (CEA)

- Formal assessment of trade-offs
 - Short term vs long term
 - Quality of life vs life extension
 - Benefits vs harms
- Compares alternative treatment options
- Considers all outcomes for all stakeholders
- Outputs a single measure incorporating all outcomes



Health: Many aspects that matter



Units of Health

- Life Year: start of follow up until death
 - Older adults have fewer expected life years
- Quality Adjusted Life Year (QALY): utility weighted life years
 - Example: 2 years at 50% health = 1 QALY = 1 year at 100% health



Utility Weights

- Utility weights: measure health related quality of life
 - Single measure of health related quality of life representing mortality, disability, and quality
 - defined for different disease states using standard gamble, time trade-off, and rating scales
- Utility Weights: properties
 - Continuous values ranging from 0 (death) to 1 (perfect health)
 - Positive outcomes/events (remission) increase utility weight (utility gain)
 - Negative outcomes/events (adverse event) decrease utility weight (disutilities)

Incremental Cost-Effectiveness Ratio

For any 2 interventions, the Incremental Cost Effectiveness Ratio (ICER) is calculated as the difference in cost between two possible interventions, divided by the difference in effects or health unit.

$$ICER = \frac{(C_1 - C_0)}{(E_1 - E_0)}$$

Interpretation: average incremental cost associated with 1 additional unit of the measure of effect.



Business Case Example: Function QUERI: STRIDE Improving Post-Hospitalization Outcomes

ASsisted EaRly Mobilization for hospitalized older VEterans





Supports VHA's HRO Principles

- Processes focused on front-line staff
- Anticipates the risks of immobility
- Gets to the root cause of hospital-acquired disability

Moves Toward Age-Friendly Health Systems

- Targets an aging population
- Accomplishes the Mobility 'M' of 4M's

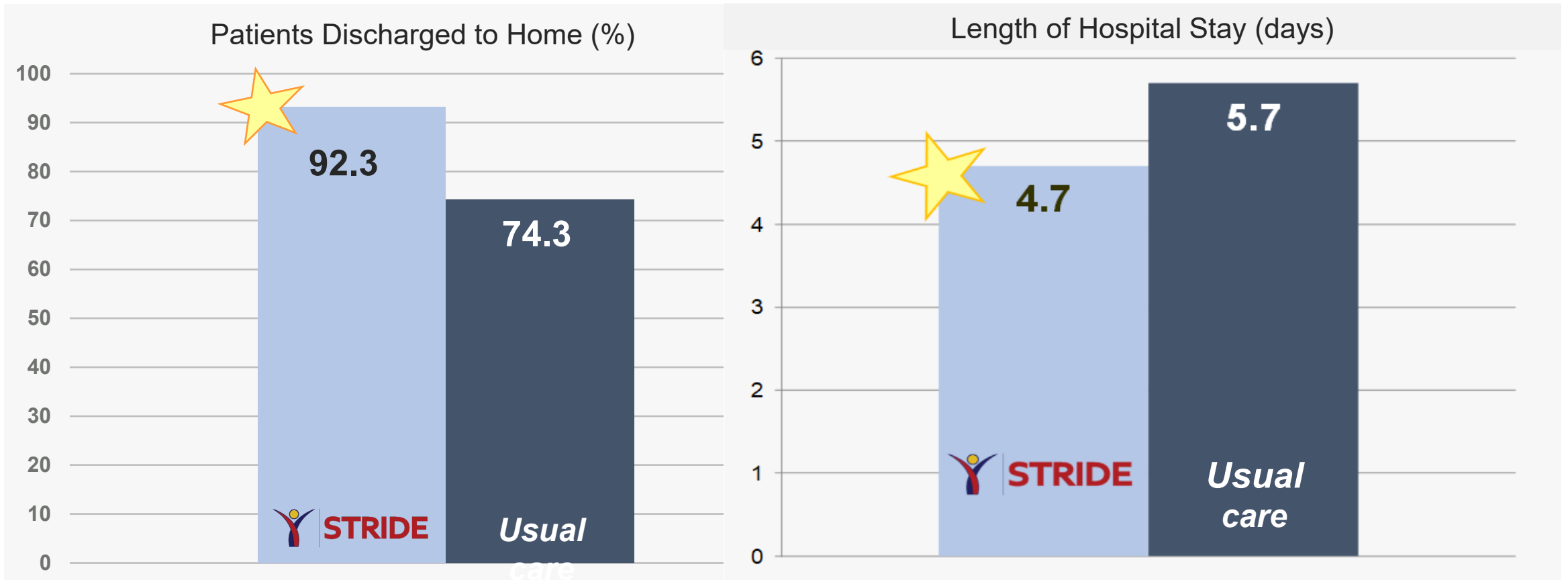


Objective: To optimize the physical function of older Veterans by increasing the amount of time spent walking during their hospitalization

Core Program Components

- 1 Proactive**
 - No baseline functional deficits required
- 2 Early enrollment**
 - Ideally **within 24 hours** of admission
- 3 Supervised walking**
 - Up to **20 minutes per day** until discharge
- 4 Dedicated STRIDE staff**
 - To perform pre/post evaluations and daily walks
 - Can come from various service lines

STRIDE Results: Benefit to Veterans



Why use Budget Impact Analysis?

STRIDE has been shown to be effective in improving veteran outcomes. We could have conducted a cost-effectiveness analysis by assigning utility weights to those outcomes. We instead chose a BIA because:

- There are not valid/reliable utility measures for these outcomes in this population.
- The decision to implement STRIDE is made by either by 1) VISN leadership or 2) National mandate. Nationally, 59 hospitals planned to implement STRIDE as of the end of FY2022.
- So, the intervention is already accepted by the decision-makers, and a cost-effectiveness evaluation isn't valuable. This budget estimation was more useful to the decision makers who need to know how to plan for implementation in their budget.



Budget Impact Analysis to Support the Business Case

- Objective: Use resource use and enrollment data from 8 study sites to estimate to assess needed resources for the first year to implement STRIDE nationally.
 - STRIDE may generate cost-savings from reduced hospital days
 - STRIDE generates implementation and delivery expenses
 - Simulate resources needed under different scenarios

Key Decision: Implementation Facilitation Strategies

REP:

- activities to support implementation of STRIDE with space for stakeholder input and flexibility to modify STRIDE to site specific resources and patient needs.

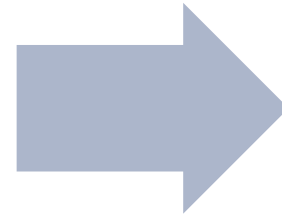
CONNECT:

- A team-based communication training to address challenges with assembling interdisciplinary teams. Delivered to leadership and clinical personnel on inpatient units during a 2-day site visit, included follow-up activities after visit.

- Implementation costs estimated for two implementation strategies; All 8 sites received REP. Half (n=4) were randomized to receive REP + CONNECT.

Implementation Strategy

- REP
- CONNECT



Outcomes

- Enrollment
- Cost

Analysis and Assumptions

Evaluation of resource use across 8 study sites

- **Costs were assessed using VA perspective in adopting this program for clinical care.**
- **Delivery costs were estimated by tracking time at each site and applying standardized VA labor costs**

Assumptions for National Projections

- **75K STRIDE eligible* hospitalizations nationally each year estimated using Average Daily Census (ADC=5,235) for Fiscal Year 2022 Quarter 1.**
- **60 hospitals with > 25 beds who have not yet implemented STRIDE.**

*Eligible hospitalizations were based on data from the 8 study sites reported numbers of eligible hospitalizations relative to Average Daily Census, then applied that rate to the national ADC

Key findings:

- STRIDE is a low-cost intervention to deliver (\$26 per enrolled)
- Program enrollment has the biggest impact on resources needed to deliver STRIDE, and implementation strategy may impact reach
- **In the first year, implementation costs are likely to exceed the program delivery costs using either REP or Connect strategies.**

8 study sites: Delivery Cost

- Total delivery costs per site was around \$2000 for both groups.
- Cost drivers: number enrolled and number of walks per enrolled
- Hospitals averaged 1-5 walks per enrolled participant, and the mean was similar in both implementation strategy groups, about 2.5 walks
- Annualized enrollment ranged from 8 to 150 participants per site
 - higher enrollment rates in the REP+CONNECT group (**12% vs 4%**)
 - Difference may be due to chance



8 study sites: Implementation cost

REP: >\$5000

REP+ Connect: ~\$10,000

	REP ONLY Group	REP + CONNECT Group
Site	Mean	Mean
# months in post-period	10.5	10.5
Hospital Average Daily Census ^a	88.1	66.6
Hospital 5-Star Performance Rating ^b	3.8	3.3
REP Only Costs (2022 USD)		
Site Staff Activities, # hours	59	61
Cost of implementation team (site)	\$4086	\$3139
Cost of implementation team (Durham)	\$1536	\$1662
Cost of REP only	\$5622	\$4801
CONNECT Costs (2022 USD)		
Site Staff Activities, # hours		74
Cost of implementation team (site)		\$2240
Cost of implementation team (Durham)		\$2409
Cost of CONNECT	n/a	\$4649
Total Implementation Cost	\$5622	\$9450

^a Internal Medicine FY22Q1

^b Hospital 5-Star Rating (1-5) indicates a VA hospital's quality of care relative to other VA hospitals and is based on data such as deaths, nursing turnover, patient satisfaction.

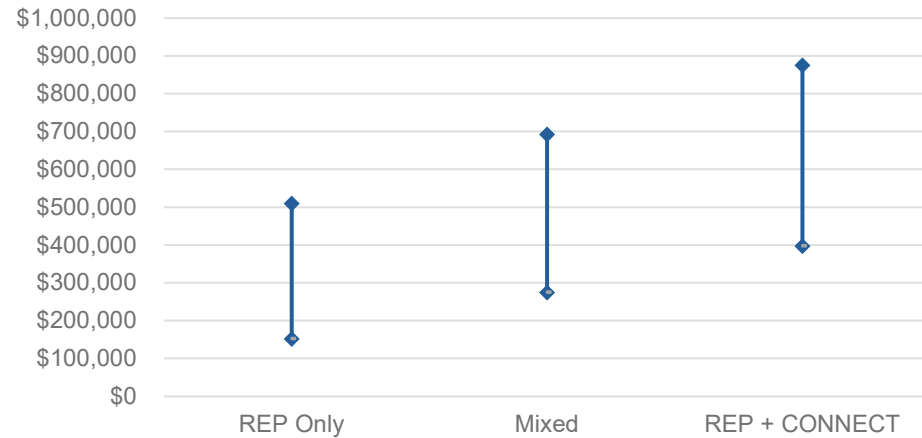
National Cost and Enrollment Scenarios

Expansion to 60 new sites

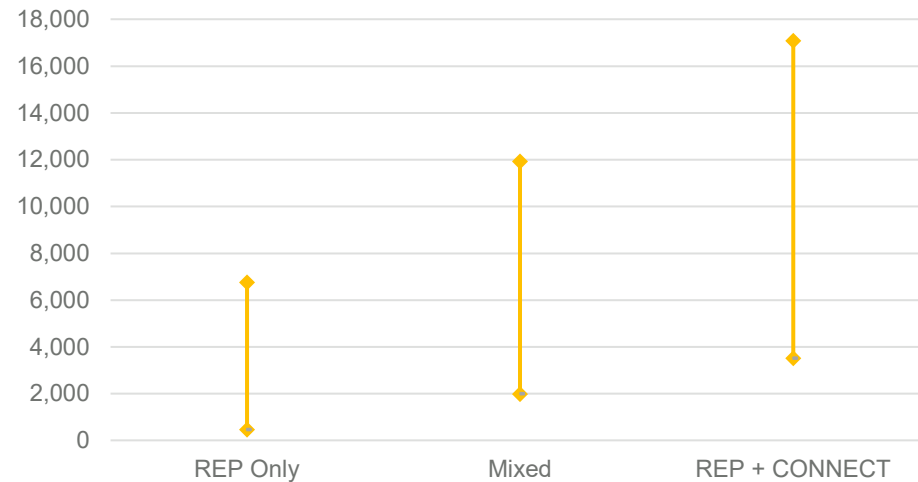
Implementation cost per enrolled

- \$66 REP+Connect (\$51-113)
- \$118 REP-only (\$75-328)

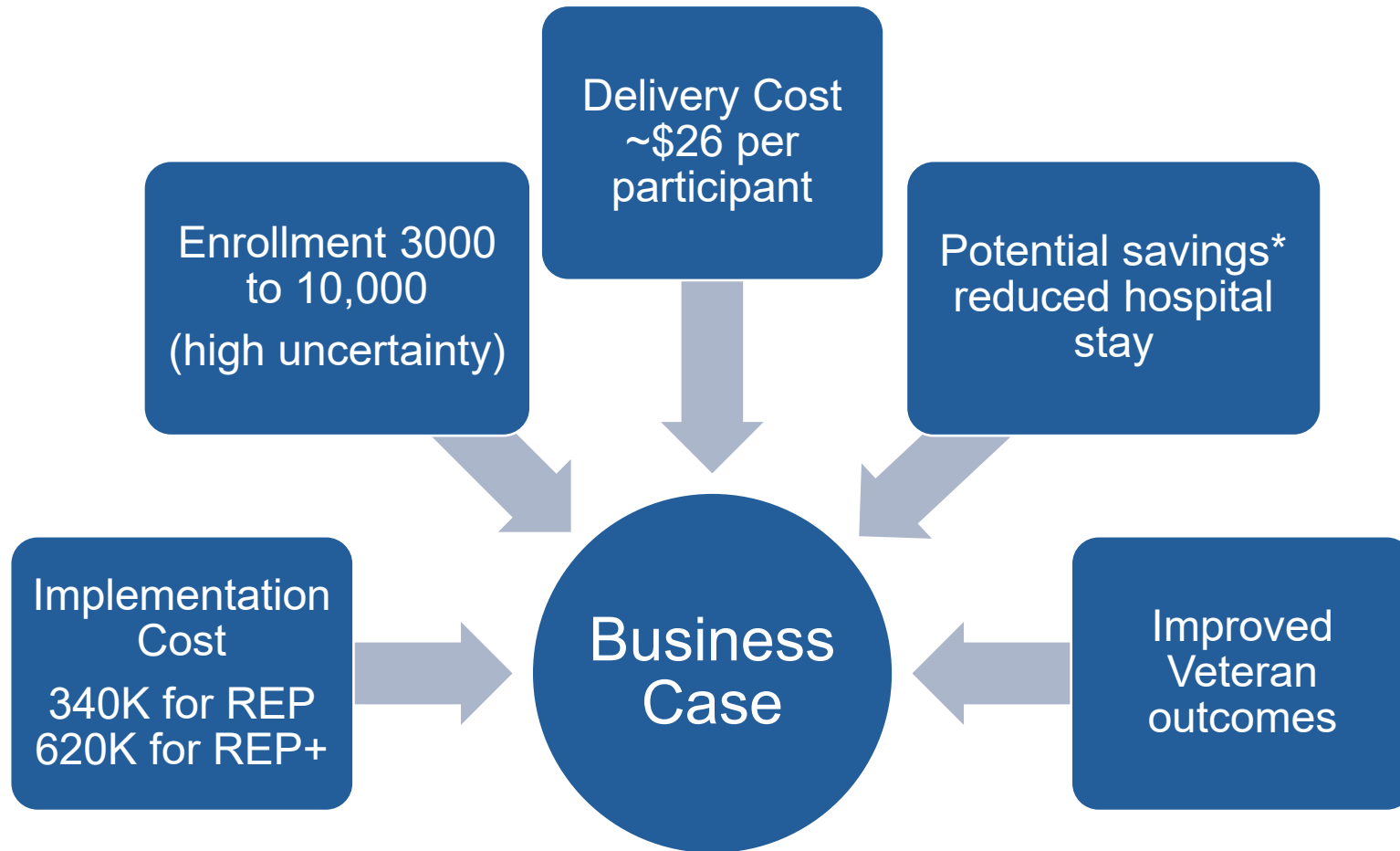
First Year Cost by National Implementation Facilitation Strategy



First Year Enrollment at 60 New Sites



National First Year Projections





Cost and Quality of Life Outcomes of the STepped Exercise Program for Patients With Knee OsteoArthritis Trial

Stepped Exercise Program for Knee OsteoArthritis

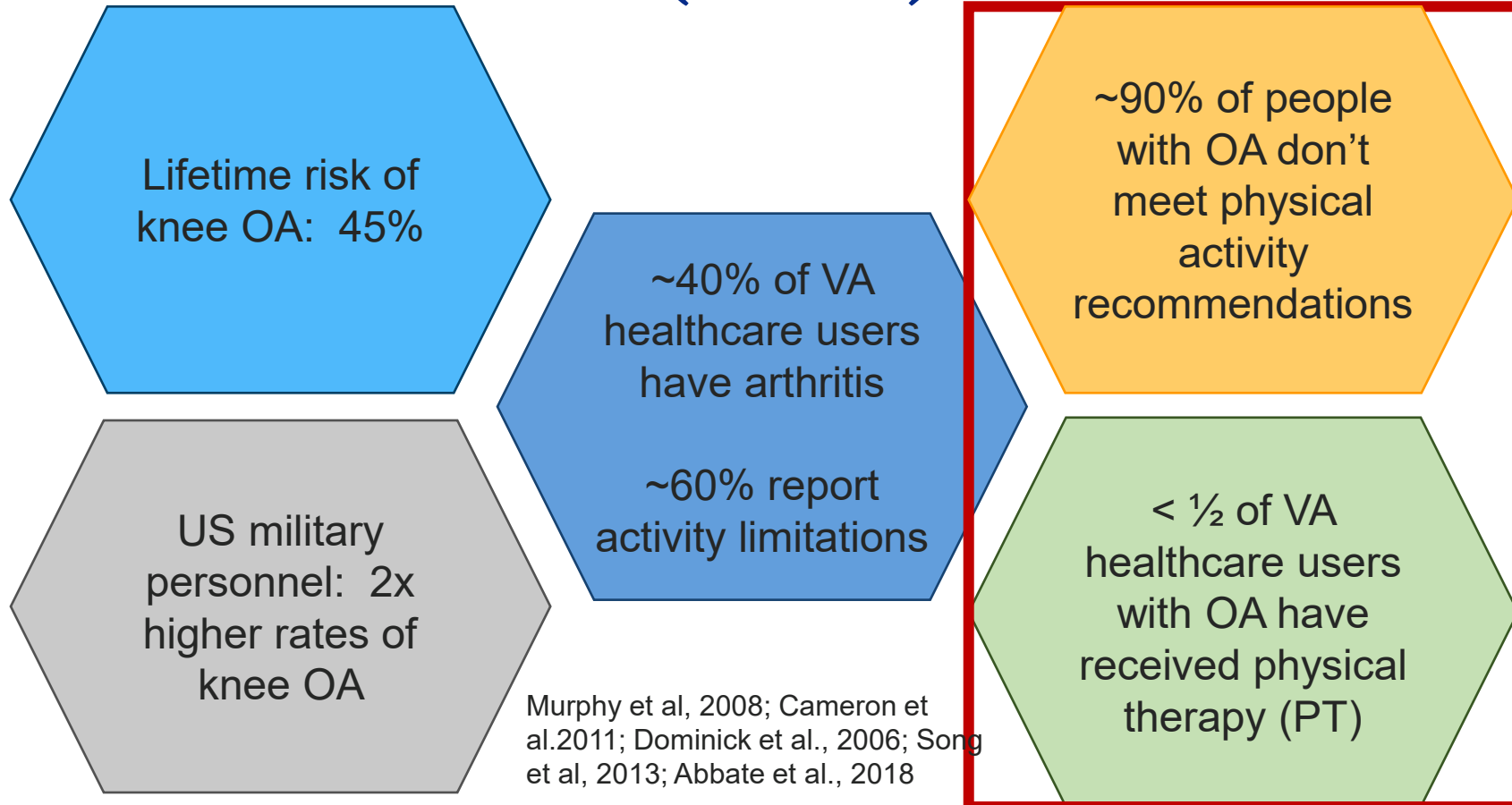
Value in Health 2021 PMID: 35365305

DOI: [10.1016/j.jval.2021.09.018](https://doi.org/10.1016/j.jval.2021.09.018)



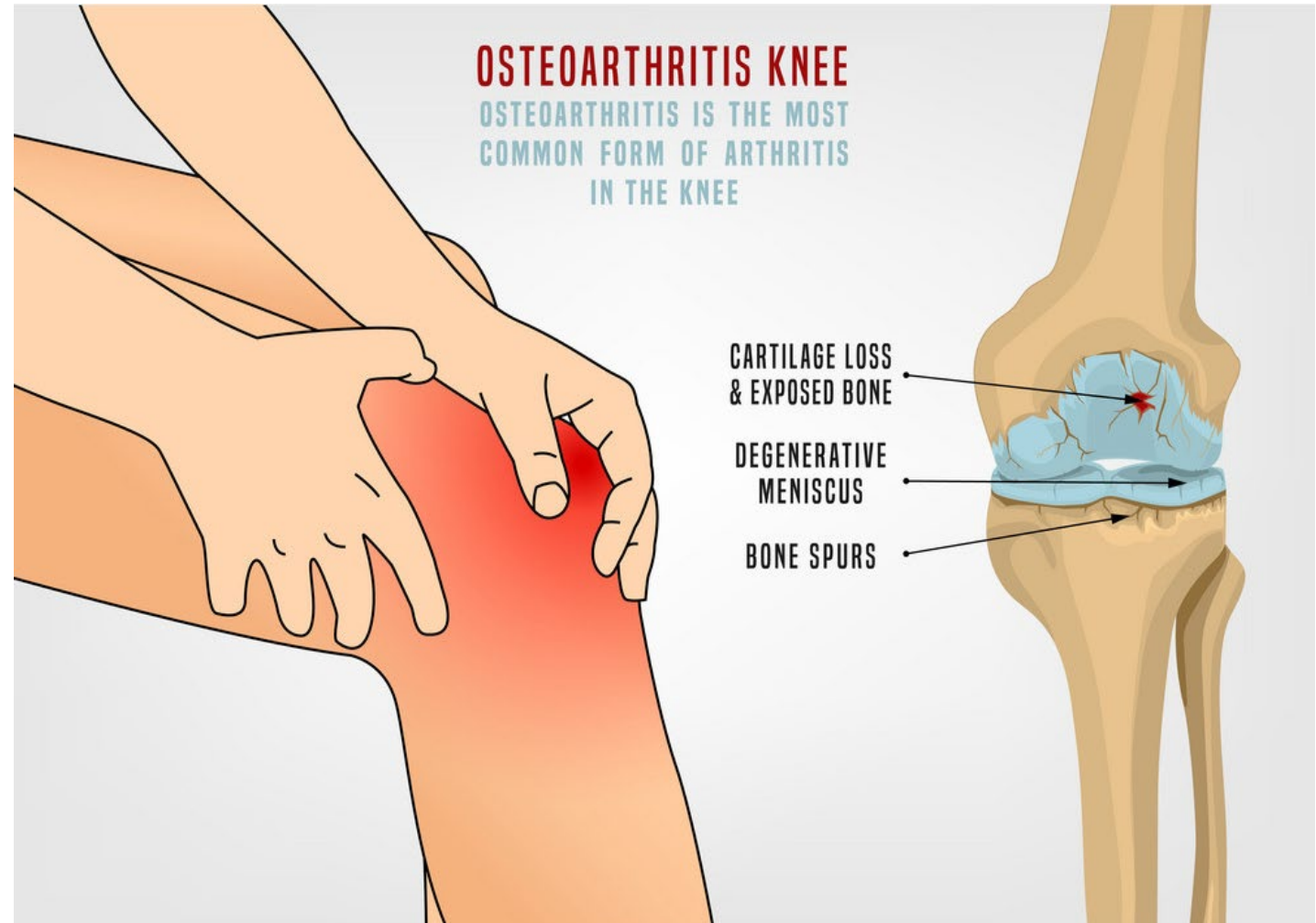
Function QUERI
Optimizing Function and Independence
Quality Enhancement Research Initiative

Knee Osteoarthritis (KOA) Limits Activity



STEP-KOA Trial

- **Participants:** 345 Veterans with symptomatic knee OA (pain ≥ 3), Durham and Greenville, NC
- **Randomized:** STEP-KOA (n=230) or Arthritis Education (115)
- **Outcomes:** Baseline, 3-, 6-, 9 months (primary)
- **Population:** about 60yo living with KOA for 15+ years



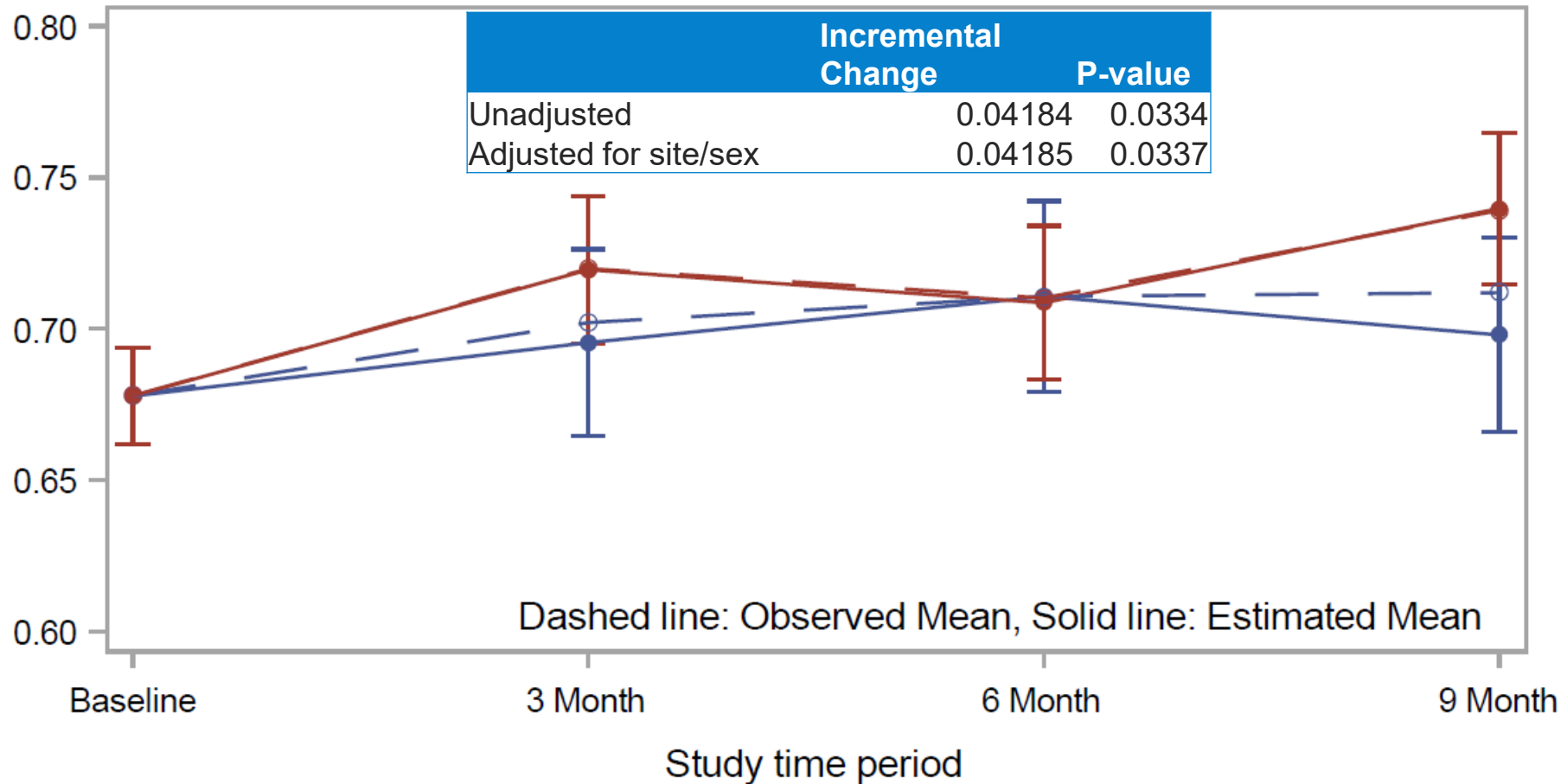
STEP-KOA Stepped Program



- Tailored, patient-centered approach
- Conserves more costly services

STEP-KOA Study, 02JAN20

Modeling us with common baseline, dummy coded time, and no strat vars

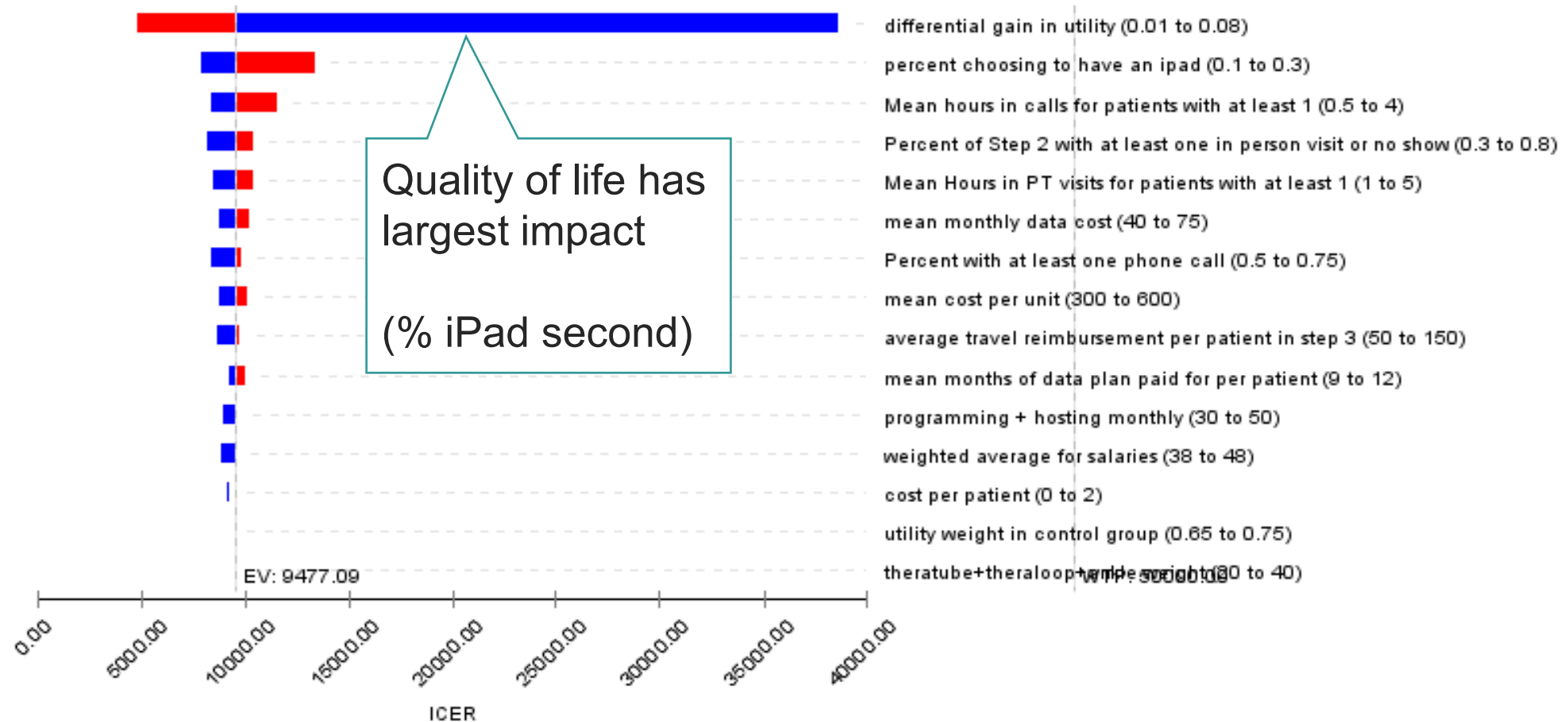


randarm ● Control Education ● Intervention Step-KOA

Results: Base Case 9 month outcomes

	Cohort Outcomes (n=230)	Per Patient
Labor Costs	21,930	
Other Costs	42,449	
Program Total cost	64,379	280
Website Creation Costs	37,974	
Trial Total cost	102,353	445
Quality adjusted life years (QALY) gained	6.9	.03
Incremental Cost	\$9,138	
Effectiveness Ratio (ICER)		

Results: One-way sensitivity analyses



Conclusions

- STEP-KOA improves quality of life and reduces KOA pain
- 99% probability of cost-effectiveness at \$50,000 willingness-to-pay per QALY
- Resources needed to implement the program will decline as ownership of mobile health devices increases.

The Cost-Effectiveness of Palliative Care: Insights from the PAL-HF Trial

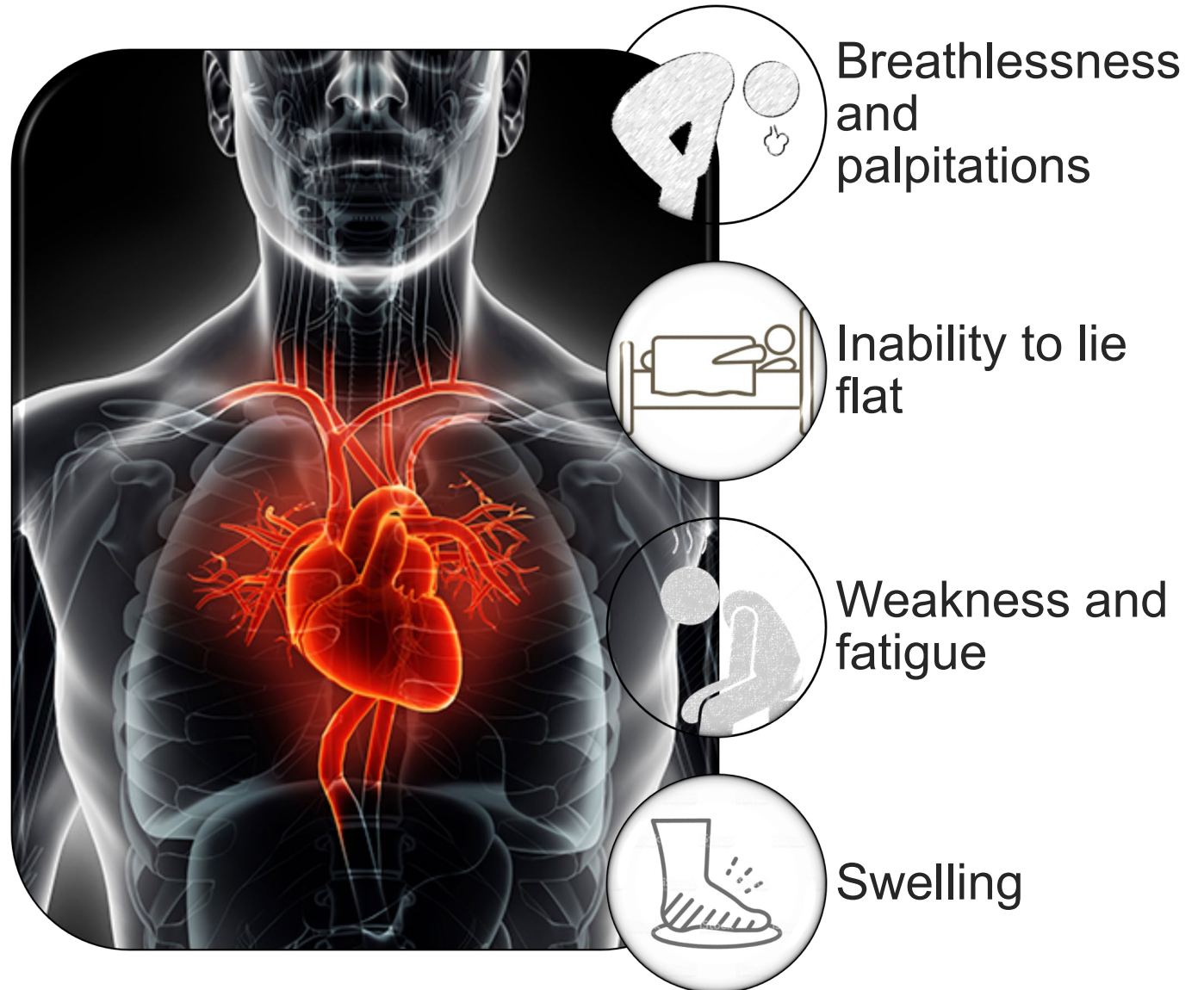
Palliative Care In Heart Failure Trial

Journal of Cardiac Failure PMID: 33731305

DOI: [10.1016/j.cardfail.2021.02.019](https://doi.org/10.1016/j.cardfail.2021.02.019)

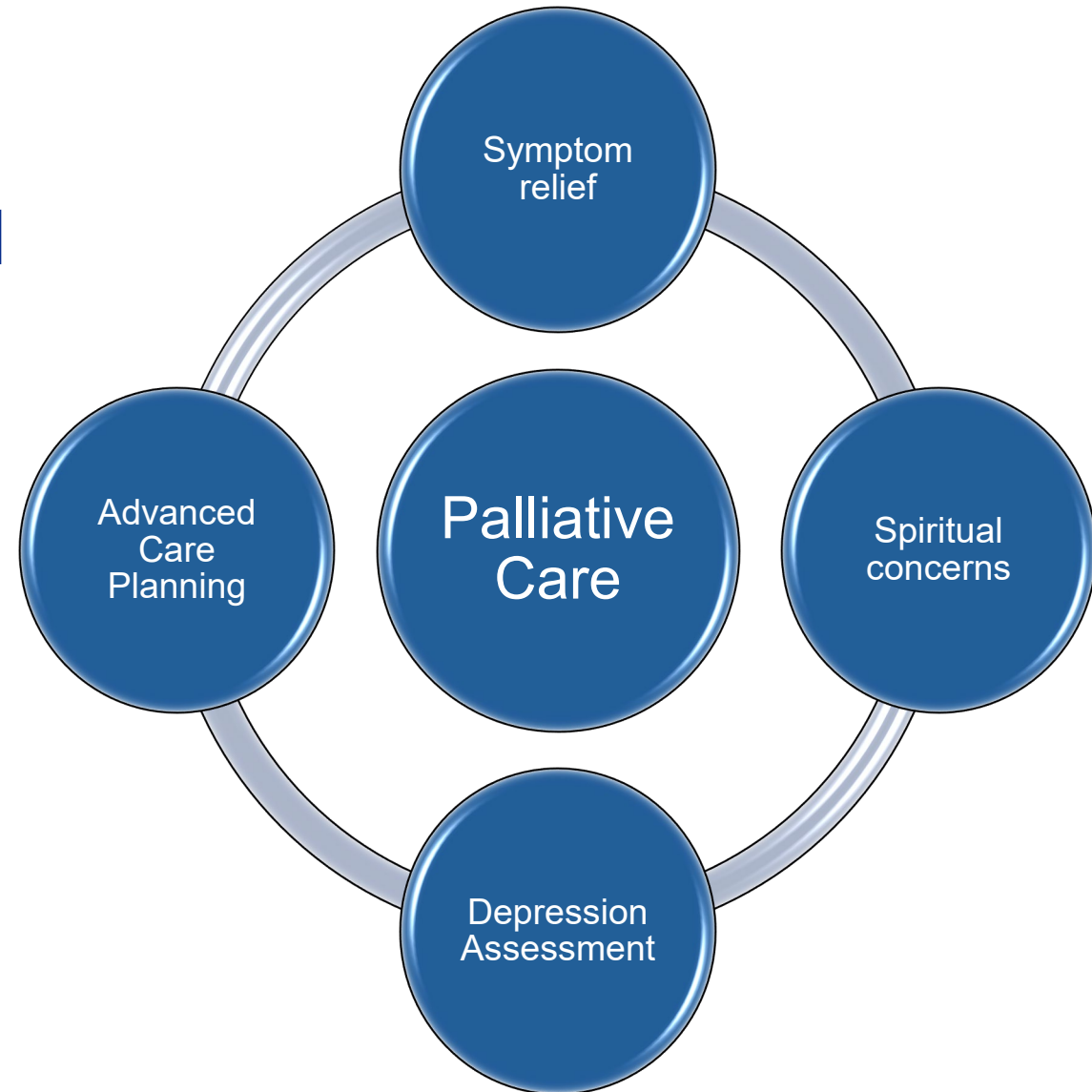
Palliative Care in Advanced Heart Failure

- Improved Quality of Life
- Reduced Depression
- Reduced Hospitalization



Payment for team-based Palliative Care

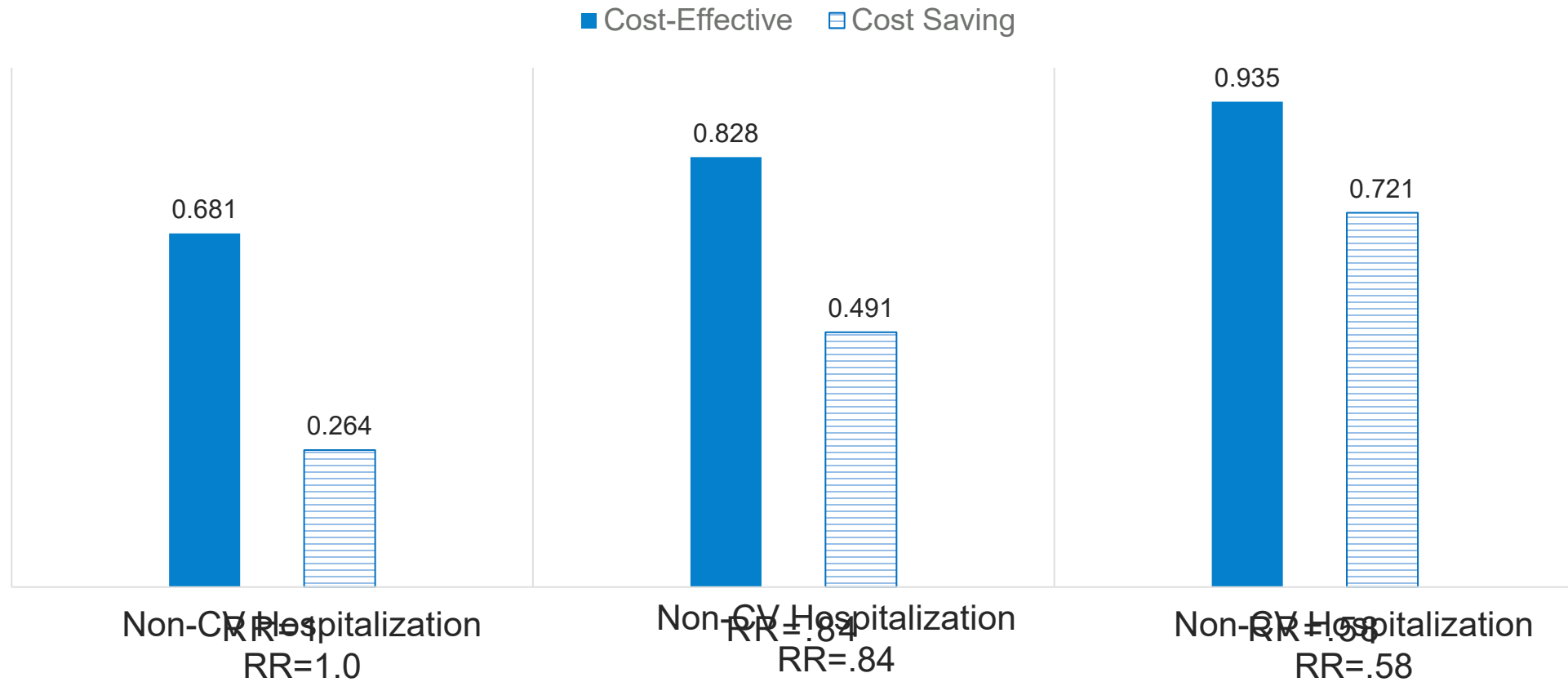
- High-touch, holistic, team-based care
- Medicare Part B Limited reimbursement
- Palliative Care is provided at a loss to the Provider



What should Medicare pay for outpatient palliative care in advanced heart failure?

- Standard 50,000 Willingness-to-pay per QALY
- CMMI expectation of cost-savings for scaling Palliative Care Programs

Probabilities of Cost-Effectiveness and Cost savings

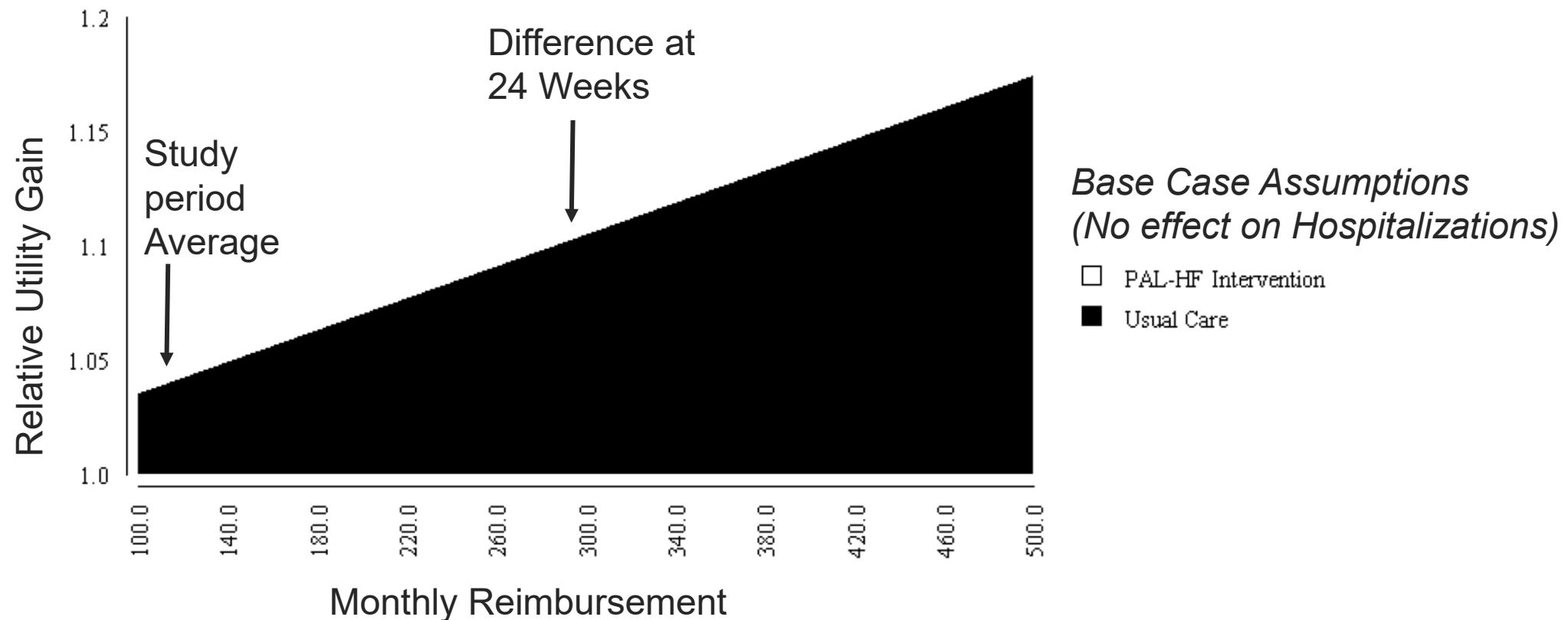


Monte Carlo Probabilistic Sensitivity Analysis over 1000 simulations

Why use CEA?

Utility values can inform CMS reimbursement

(Net Benefit, WTP=50000.0)



Conclusions

- Outpatient Palliative Care In Heart Failure is Cost Effective
- Potential cost-savings
- Decision-making is sensitive to quality of life effects
- Identification of patients likely to benefit is key

Who is the decision-maker?

Provider

- Budget Impact or Business Case analysis
- Short Term (1 year)
- Costs incurred by the organization
- Optimize Return on Investment+mission
- The Board/CFO

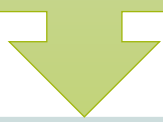
Health system/Payer

- Cost-Effectiveness
- Short-Term or Longer-term (5-10 years)
- Cost incurred by health care system
- Optimizing value in the market
- Tax payers; stock holders

Consumer/Society

- Cost-Effectiveness
- Long-term, life-time outcomes (10+ years)
- All costs incurred by all parties
- Optimize Population Health;
- Society (access and equity)

Budget Impact Analysis



STRIDE

VA Administrators

1 year

What will it cost?

Cost-Effectiveness
Analysis



STEP-KOA

VA Administrators

<1 year

Is it Cost-Effective?

Cost-Effectiveness
Analysis



PAL-HF

Medicare and Payers

Life time (3 years)

What should we pay?

Limitations of CEA

Simulation

Forecasting based on history. Probabilistic Sensitivity Analysis can take into account known uncertainty (distributions of estimates) but not unknown uncertainty (publication bias; future events)

Black box

Requires a large number of assumptions, implicit (structural relationships, choice set) and explicit (inputs)

Ecological Fallacy

Evaluates population averages rather than individual preferences and decision making

Valuing Health

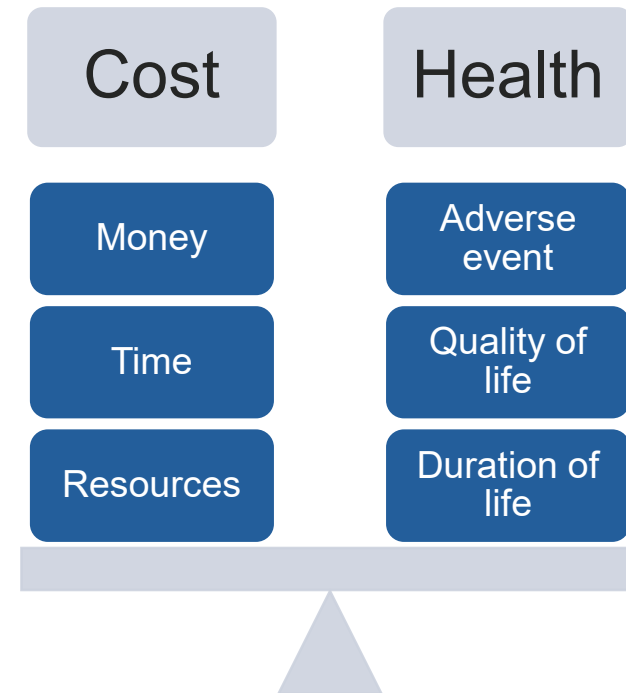
Limitations of QALY measures (validity of utilities, linear relationships)

Equity

Societal resources use and gains is the goal, but rarely achieved in practice; structural racism built into wages; Access and equity considerations.

Benefits of CEA Models

- Measures the cost per unit of health, considering all resource use and health impacts (side effects, complications, mortality, function)
- Useful in determining the value of various treatment options
- Facilitates comparison across interventions that impact different health outcomes



Discussion

- How do you use cost-analyses to expand the impact of your work?
- What challenges have you had with conducting cost-analyses?

