Two large yellow circles are positioned in the upper right area of the slide. One is a solid yellow circle, and the other is a yellow outline circle that overlaps with a large purple circle on the left side of the slide.

Cost-effectiveness of Enhanced Depression Care for Patients With Acute Coronary Syndrome

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Conflict of Interest Disclosures: None

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Overview

- Rationale for cost-effectiveness (CE) analysis of Coronary Psychosocial Evaluation Studies (COPES)
- Approach to estimating cost and quality of life (QoL) outcomes
- Approach to CE analysis
- Results

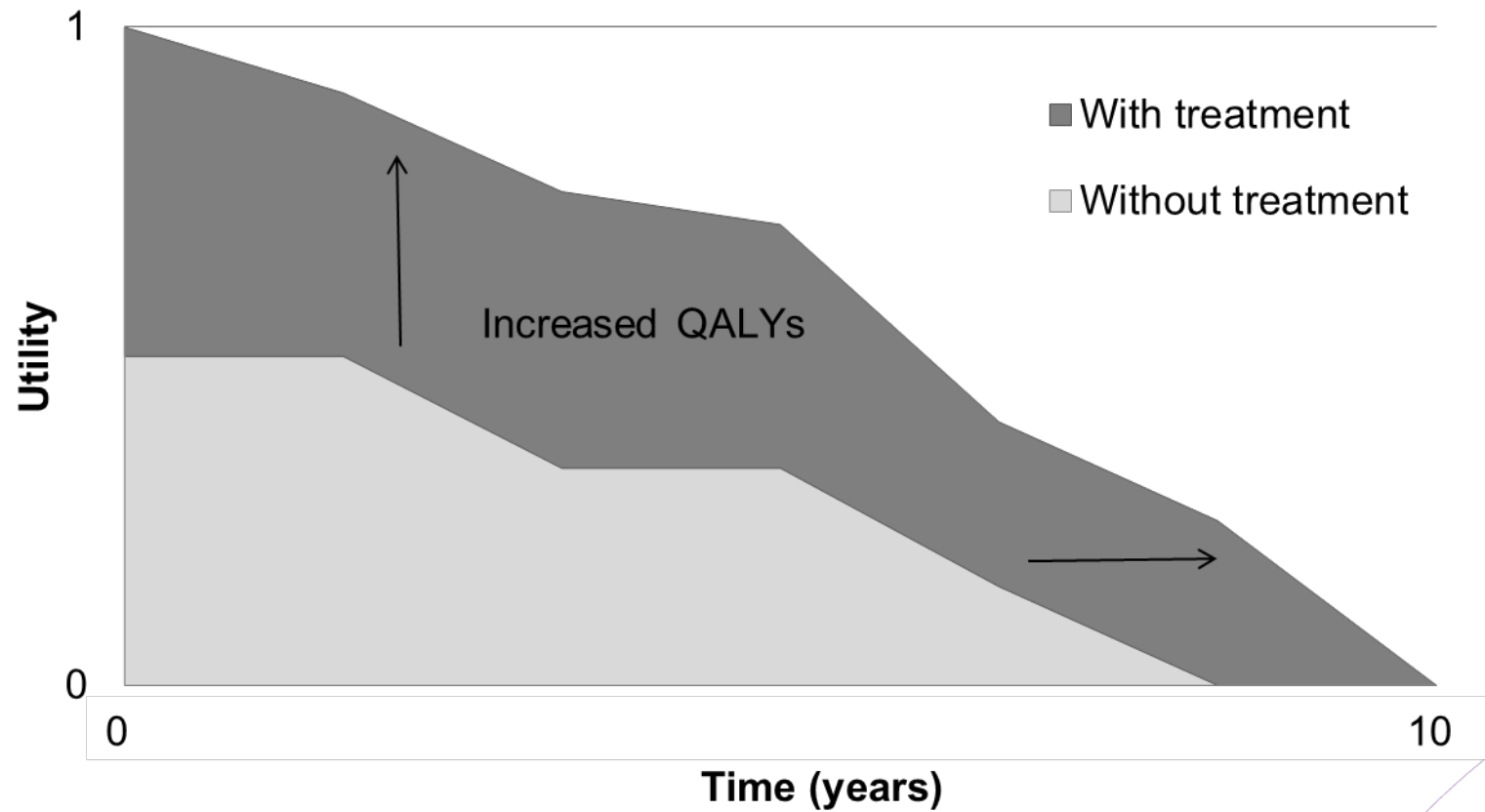
Role for CE analysis in COPES

- Burden of illness of coronary heart disease (CHD)
 - 440,000 deaths each year
- Depression magnifies CHD risk
- Competing interventions in patients with CHD
 - smoking cessation programs
 - medication adherence interventions
- Cost and cost-effectiveness influence decision-making

Estimating cost-effectiveness

- Cost-effectiveness (CE) analysis compares relative value of decisions
- Economic costs = resource utilization or opportunity costs
- Quality-adjusted life-years (QALYs) or other units for effectiveness
 - integrates quality and quantity of life
 - Utility $\in [0$ (death), 1 (perfect health)]
- utility x duration = quality-adjusted life-years

QALYs

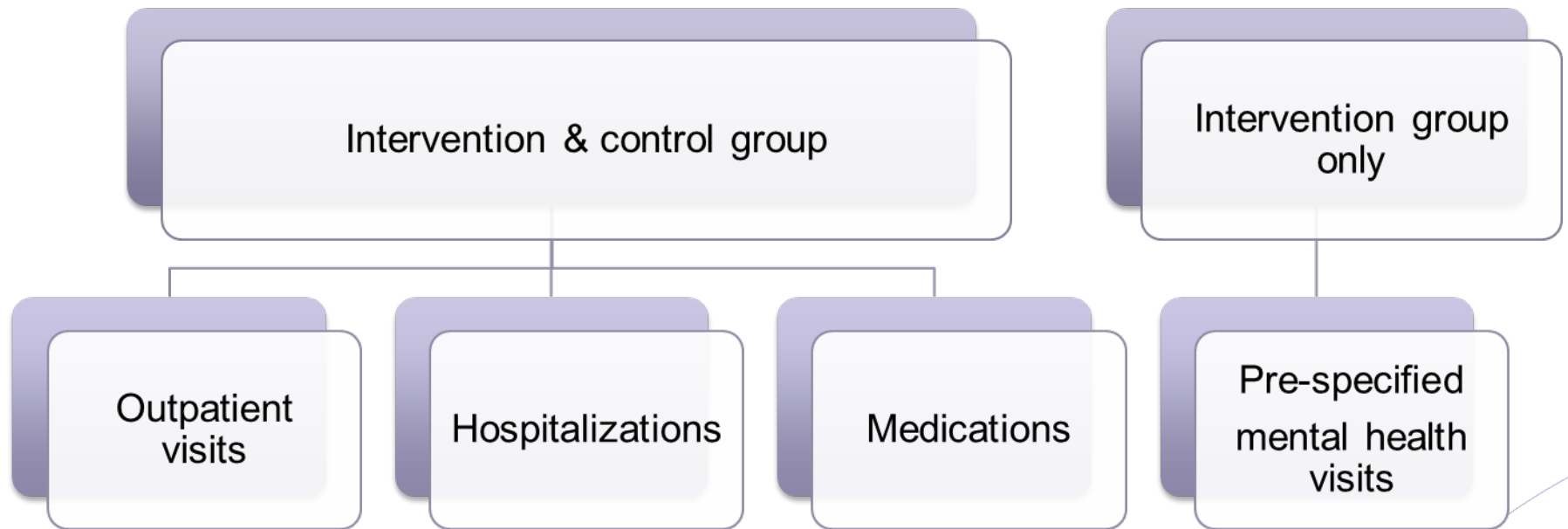


Cost-effectiveness ratio

$$\text{CE ratio} = \frac{\text{Cost}_{\text{new policy}} - \text{Cost}_{\text{current policy}}}{\text{Effect}_{\text{new policy}} - \text{Effect}_{\text{current policy}}}$$

Life years, QALYs

COPEs: Sources of healthcare utilization



Estimating costs

- Ambulatory care (mental health, primary care, cardiology)
 - CPT codes and Medicare reimbursement
- Hospitalizations
 - DRGs and Medicare reimbursement
 - Acute myocardial infarction, angina, heart failure
- Medications
 - Antidepressants only (fluoxetine, paroxetine, etc.)
 - Average wholesale price

Data limitations

- Participants surveyed every two months
 - No closed healthcare system
- Incomplete data on outpatient care
 - Data are categorical, not continuous
- Incomplete data on non-ACS hospitalizations

Other important economic costs not considered

- Out of pocket expenses (e.g., copays)
- Time costs for travel, waiting, etc.
- Employment/productivity

Quality of life

- Participants completed the Short Form-12 (SF-12, version 2) health survey
- Completed other surveys to assess quality of life (QOL) but only SF-12 preference-based
- SF-12 responses available at baseline and at 6 month follow-up

Page 1

SF-12v2™ Health Survey Scoring Demonstration

This survey asks for your views about your health. This information will help keep track of how you feel and how well you are able to do your usual activities.

Answer every question by selecting the answer as indicated. If you are unsure about how to answer a question, please give the best answer you can.

1. In general, would you say your health is:

Excellent Very good Good Fair Poor

☐ ☐ ☐ ☐ ☐

2. The following questions are about activities you might do during a typical day. Does your health now limit you in these activities? If so, how much?

	Yes, limited a lot	Yes, limited a little	No, not limited at all
a <u>Moderate activities</u> , such as moving a table, pushing a vacuum cleaner, bowling, or playing golf	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b Climbing <u>several</u> flights of stairs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

3. During the past 4 weeks, how much of the time have you had any of the following problems with your work or other regular daily activities as a result of your physical health?

	All of the time	Most of the time	Some of the time	A little of the time	None of the time
a <u>Accomplished less</u> than you would like	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b Were limited in the <u>kind</u> of work or other activities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

4. During the past 4 weeks, how much of the time have you had any of the following problems with your work or other regular daily activities as a result of any emotional problems (such as feeling depressed or anxious)?

	All of the time	Most of the time	Some of the time	A little of the time	None of the time
a <u>Accomplished less</u> than you would like	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b Did work or activities <u>less carefully than usual</u>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Page 2

5. During the past 4 weeks, how much did pain interfere with your normal work (including both work outside the home and housework)?

Not at all A little bit Moderately Quite a bit Extremely

☐ ☐ ☐ ☐ ☐

6. These questions are about how you feel and how things have been with you during the past 4 weeks. For each question, please give the one answer that comes closest to the way you have been feeling.

How much of the time during the past 4 weeks...

	All of the time	Most of the time	Some of the time	A little of the time	None of the time
a Have you felt calm and peaceful?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b Did you have a lot of energy?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c Have you felt downhearted and depressed?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

7. During the past 4 weeks, how much of the time has your physical health or emotional problems interfered with your social activities (like visiting friends, relatives, etc.)?

All of the time Most of the time Some of the time A little of the time None of the time

☐ ☐ ☐ ☐ ☐

Thank you for completing these questions!

Score the survey

Reset the survey form

Estimating health utilities

- SF-12 responses converted to utilities using published regression equation
 - standard gamble-based preferences of 611 members of the general UK population

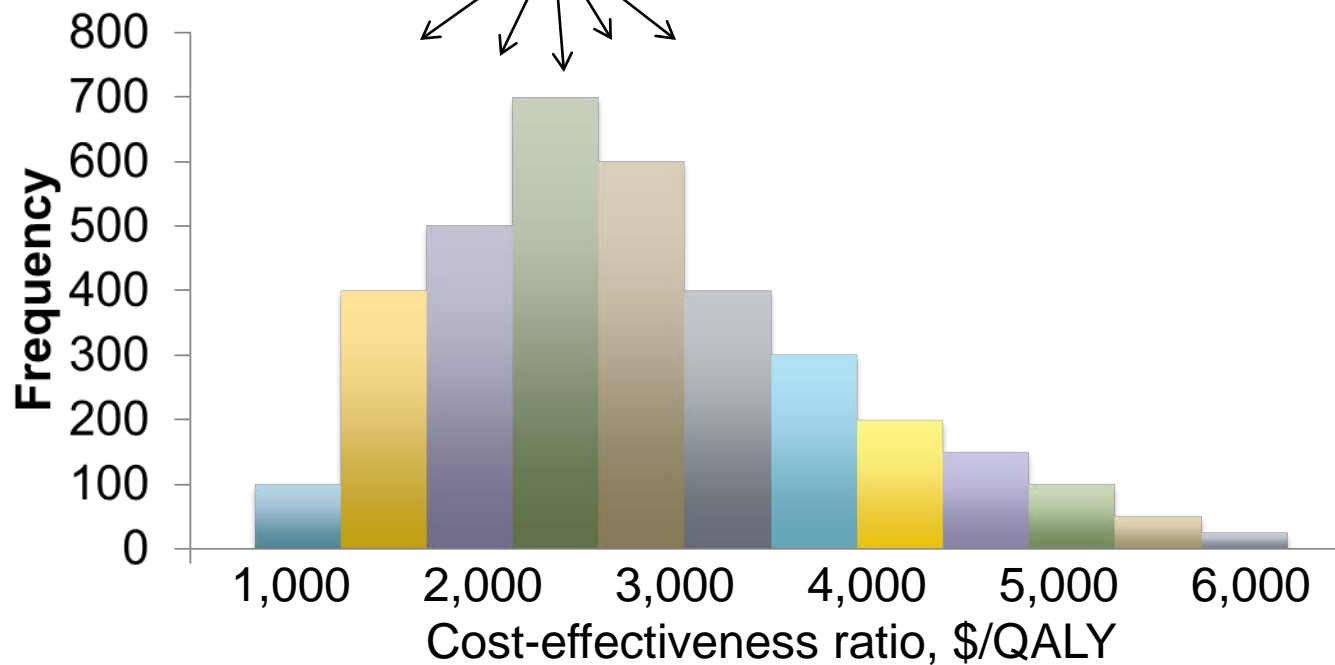
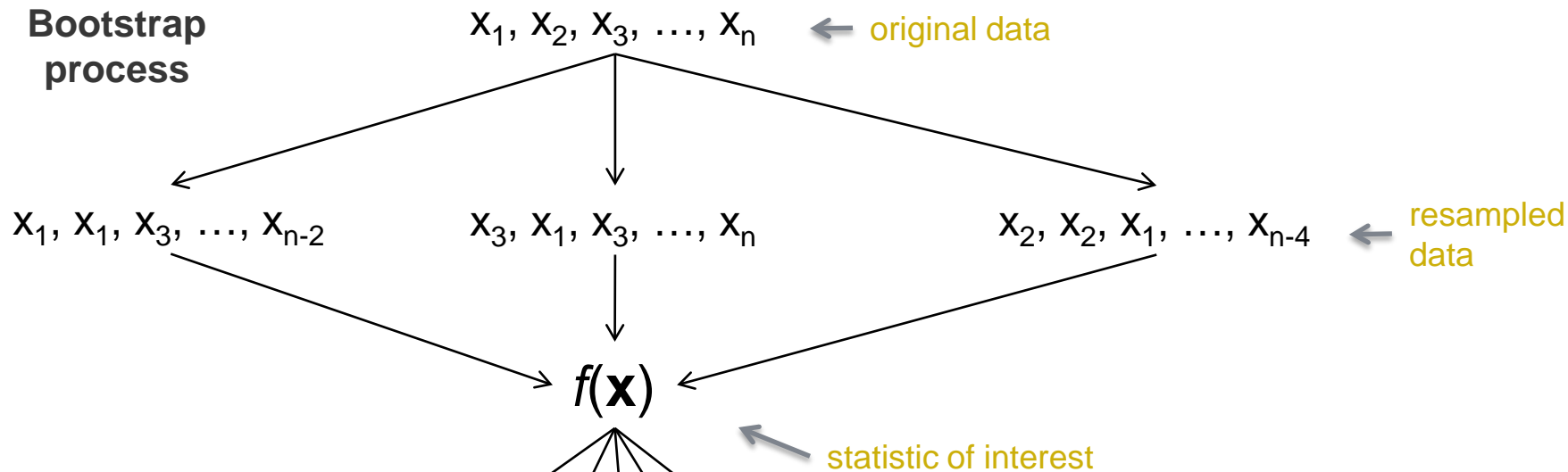
$$Utility = 1 - \beta_1 \cdot sf12_resp_1 - \beta_2 \cdot sf12_resp_2 - \dots - \lambda * worst_resp$$

- Linear regression to adjust utility at follow-up using baseline utility and patient characteristics

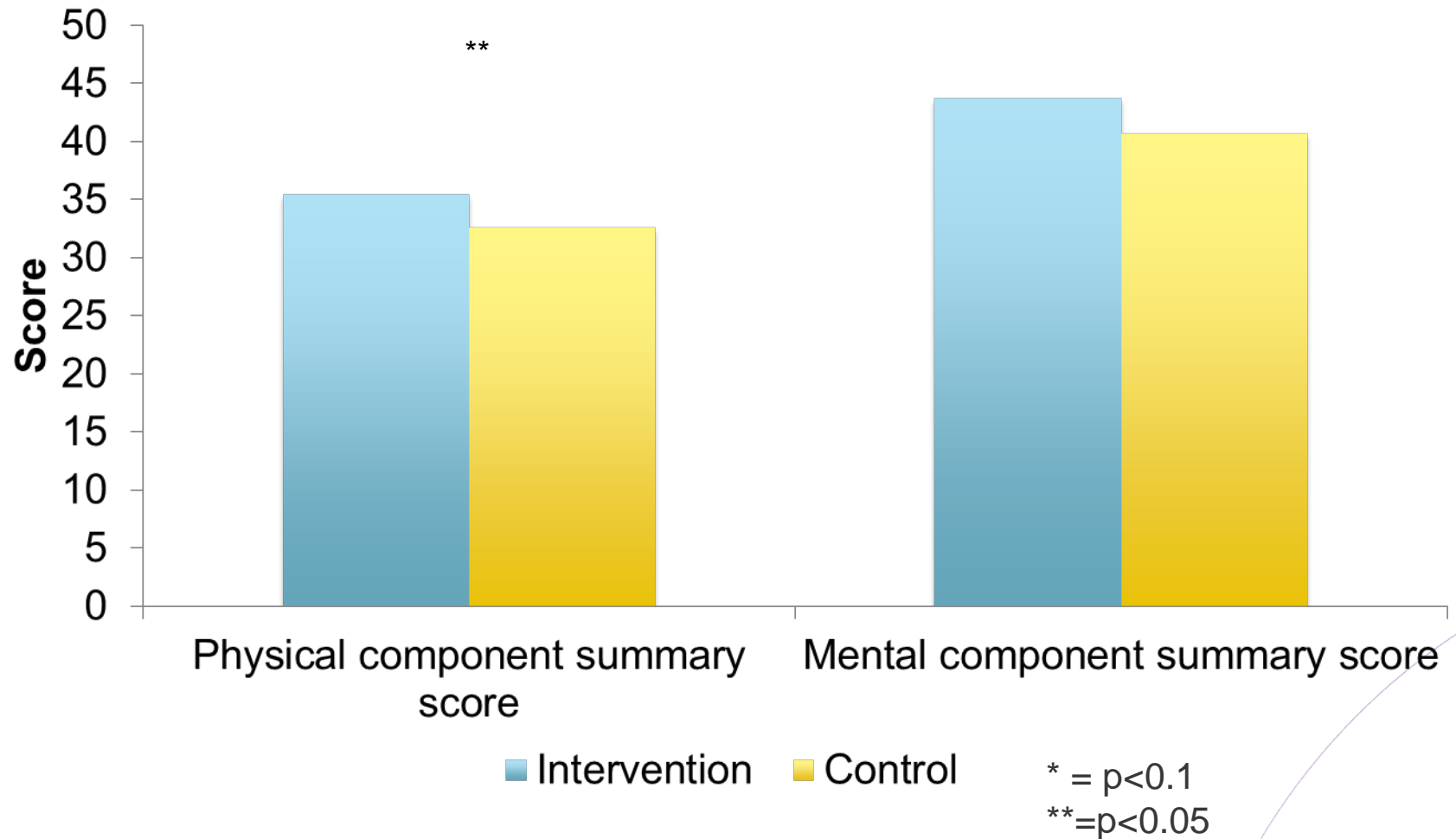
Cost-effectiveness analysis

- Mean value is $\Delta C/\Delta E$
 - difference-in-differences of means, within-group and between baseline and follow-up
- Bootstrapping to estimate confidence intervals
 - resamples from original data with replacement
 - simulates population distribution of the CE ratio
 - typically performed at least 1,000 times
- Layered onto multiple imputation
- Intercooled Stata 11.2

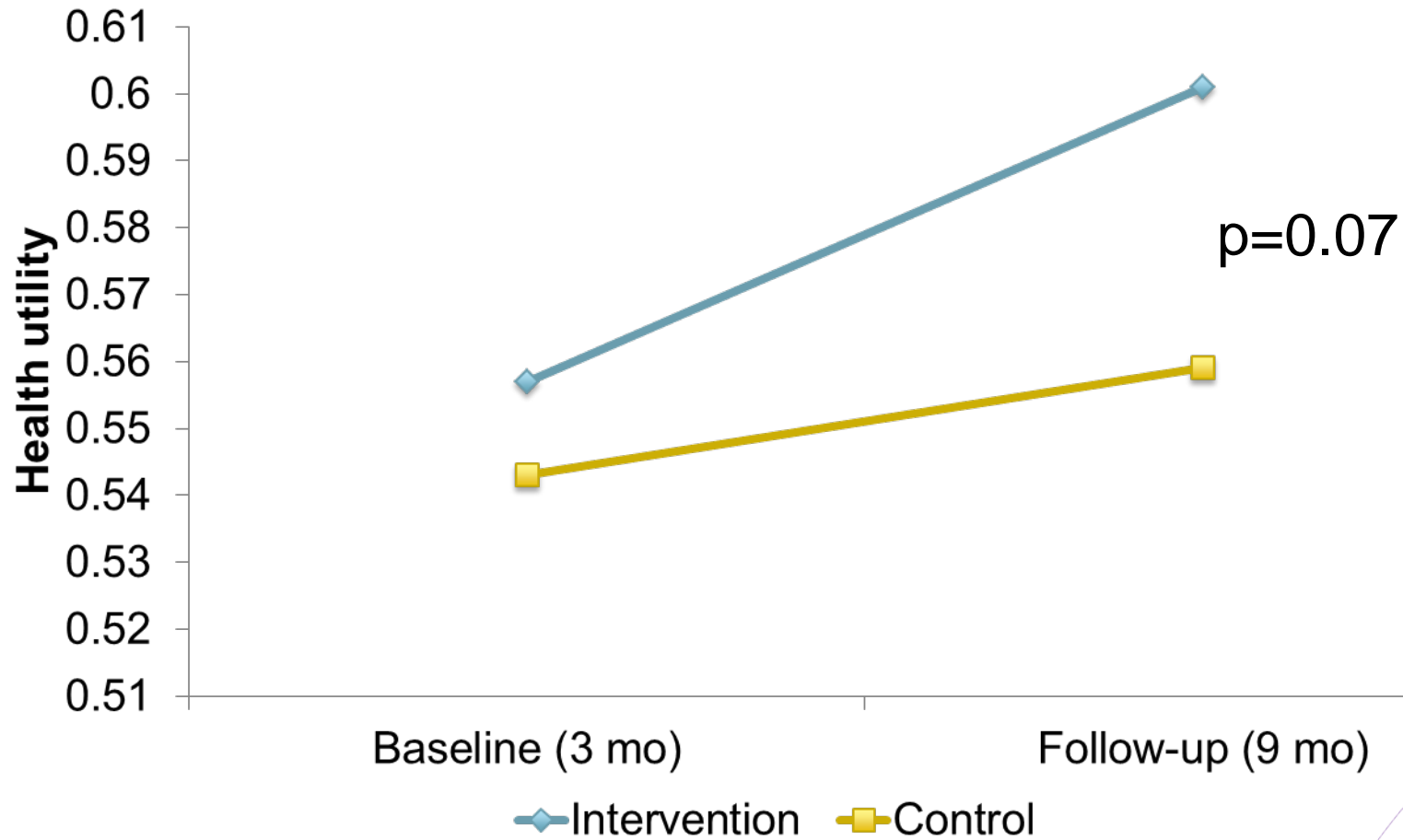
Bootstrap process



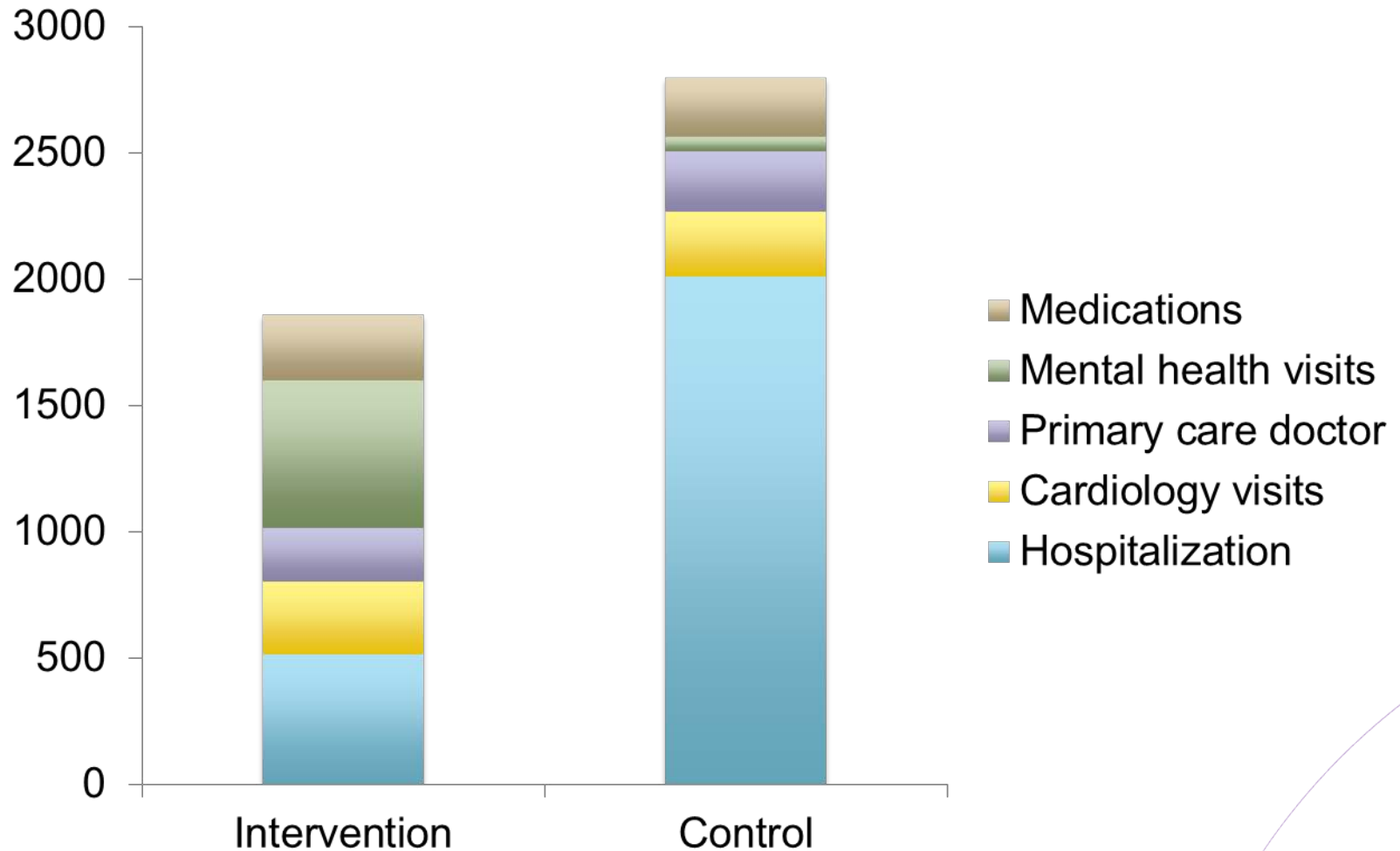
SF-12 component scores – 6 mo



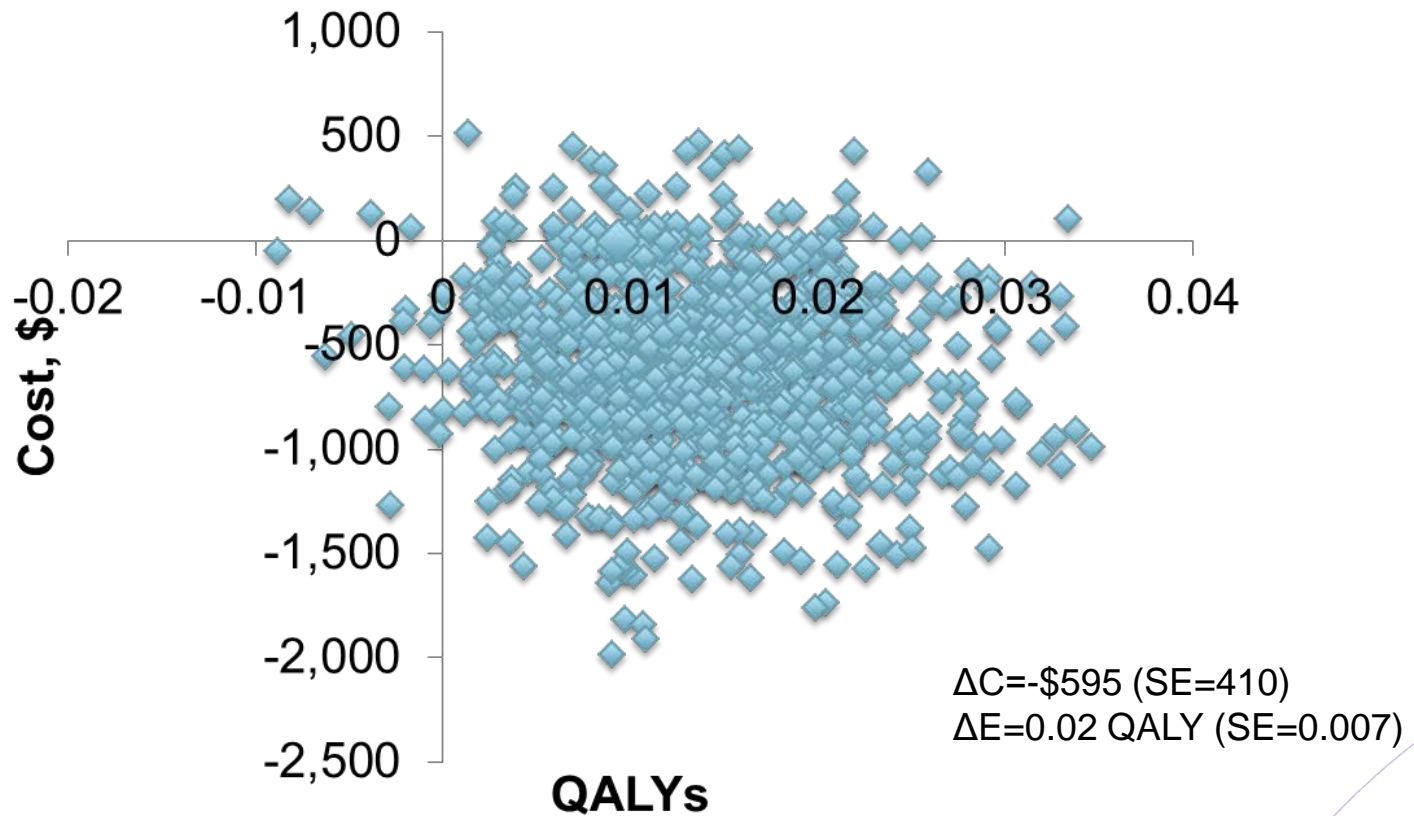
Health utility



Healthcare costs (at 6 mo)



Cost-effectiveness scatter plot



Ladapo JA, Shaffer JA, Fan Y, Ye S, Davidson KW. (in press). Cost-effectiveness of Enhanced Depression Care After Acute Coronary Syndrome: Results From the Coronary Psychosocial Evaluation Studies Randomized Controlled Trial. *Archives of Internal Medicine*.

Thank you!