

S13 MATERIALS - Determining the Economic Impacts of Advancing Whole Health

Exercises and Answer Sheets for Experiential Workshop

Exercise 1: Group Evaluation of Published Abstracts

For each example abstract:

- What was being compared?
 - Would this be considered a whole person health intervention?
 - Is the comparator appropriate for economic evaluation?
- What is the measure of health impacts used in the study?
 - Would that be a measure of whole person health?
 - What type of an economic evaluation is this?
- What is the perspective of analysis?
 - What source was used to obtain costs?
 - What type of decision maker is this study targeting?
- Within which quadrant do the results reside?

Cost-effectiveness of Yoga for Chronic Low Back Pain in Veterans

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Background: Yoga interventions can improve function and reduce pain in persons with chronic low back pain (cLBP).

Objective: Using data from a recent trial of yoga for military veterans with cLBP, we analyzed the incremental cost-effectiveness of yoga compared with usual care.

Methods: Participants (n=150) were randomized to either 2x weekly, 60-minute yoga sessions for 12 weeks, or to delayed treatment (DT). Outcomes were measured at 12 weeks, and 6 months. Quality-adjusted life years (QALYs) were measured using the EQ-5D scale. A 30% improvement on the Roland-Morris Disability Questionnaire (primary outcome) served as an additional effectiveness measure. Intervention costs including personnel, materials, and transportation were tracked during the study. Health care costs were obtained from patient medical records. Health care organization and societal perspectives were examined with a 12-month horizon.

Results: Incremental QALYs gained by the yoga group over 12 months were 0.043. Intervention costs to deliver yoga were \$307/participant. Negligible differences in health care costs were found between groups. From the health care organization perspective, the incremental cost-effectiveness ratio to provide yoga was \$4488/QALY. From the societal perspective, yoga was “dominant” providing both health benefit and cost savings. Probabilistic sensitivity analysis indicates an 89% chance of yoga being cost-effective at a willingness-to-pay of \$50,000. A scenario comparing the costs of yoga and physical therapy suggest that yoga may produce similar results at a much lower cost.

Discussion/Conclusions: Yoga is a cost-effective treatment for reducing pain and disability among military veterans with cLBP.

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RANDOMIZED TRIAL

Cost-effectiveness of Mindfulness-based Stress Reduction *Versus* Cognitive Behavioral Therapy or Usual Care Among Adults With Chronic Low Back Pain

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Abstract

Study Design.

Economic evaluation alongside a randomized trial of cognitive-behavioral therapy (CBT) and mindfulness-based stress reduction (MBSR) versus usual care alone (UC) for chronic low back pain (CLBP).

Objective.

To determine 1-year cost-effectiveness of CBT and MBSR compared to UC.

Summary of Background Data.

CLBP is expensive in terms of healthcare costs and lost productivity. Mind-body interventions have been found effective for back pain, but their cost-effectiveness is unexplored.

Methods.

A total of 342 adults in an integrated healthcare system with CLBP were randomized to receive MBSR (n=116), CBT (n=113), or UC (n=113). CBT and MBSR were offered in 8-weekly 2-hour group sessions. Cost-effectiveness from the societal perspective was calculated as the incremental sum of healthcare costs and productivity losses over change in quality-adjusted life-years (QALYs). The payer perspective only included healthcare costs. This economic evaluation was limited to the 301 health plan members enrolled ≥ 180 days in the years pre-and post-randomization.

Results.

Compared with UC, the mean incremental cost per participant to society of CBT was \$125 (95% confidence interval, CI: -4103, 4307) and of MBSR was -\$724 (CI: -4386, 2778)—that is, a net saving of \$724. Incremental costs per participant to the health plan were \$495 for CBT over UC and -\$982 for MBSR, and incremental back-related costs per participant were \$984 for CBT over UC and -\$127 for MBSR. These costs (and cost savings) were associated with statistically significant gains in QALYs over UC: 0.041 (0.015, 0.067) for CBT and 0.034 (0.008, 0.060) for MBSR.

Conclusion.

In this setting CBT and MBSR have high probabilities of being cost-effective, and MBSR may be cost saving, as compared with UC for adults with CLBP. These findings suggest that MBSR, and to a lesser extent CBT, may provide cost-effective treatment for CLBP for payers and society.

Healthcare utilization and cost data collected from the health plan's electronic databases which include utilization and costs incurred in health plan's facilities as well as those reimbursed at non-plan facilities.

GENERAL GYNECOLOGY

Acupuncture in patients with dysmenorrhea: a randomized study on clinical effectiveness and cost-effectiveness in usual care

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OBJECTIVE: To investigate the clinical effectiveness and cost-effectiveness of acupuncture in patients with dysmenorrhea.

STUDY DESIGN: In a randomized controlled trial plus non-randomized cohort, patients with dysmenorrhea were randomized to acupuncture (15 sessions over three months) or to a control group (no acupuncture). Patients who declined randomization received acupuncture treatment. All subjects were allowed to receive usual medical care.

RESULTS: Of 649 women (mean age 36.1 ± 7.1 years), 201 were randomized. After three months, the average pain intensity (NRS 0-10) was lower in the acupuncture compared to the control group: 3.1 (95%

CI 2.7; 3.6) vs. 5.4 (4.9; 5.9), difference -2.3 (-2.9 ; -1.6); $P < .001$. The acupuncture group had better quality of life and higher costs. (overall ICER €3,011 per QALY).

CONCLUSION: Additional acupuncture in patients with dysmenorrhea was associated with improvements in pain and quality of life as compared to treatment with usual care alone and was cost-effective within usual thresholds.

Key words: acupuncture, complementary medicine, cost-effectiveness, dysmenorrhea, randomized controlled trial

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The cost perspective was societal. Data analysis included 1) the overall costs during the 3 months after randomization (including costs not related to dysmenorrhea) and 2) only diagnosis-specific costs using ICD-10 codes to identify costs due to dysmenorrhea and related conditions. Direct health-related costs for physician visits, hospital stays, medication, acupuncture treatment, and the number of sick leave days were provided by the participating health insurance companies... Cost per acupuncture session was €35.

The mean difference between the 2 treatment groups during the 3 months intervention phase (overall: €259.26, 95% CI €-14.37, 532.89; diagnosis-specific: €437.67, 95% CI €357.16, 518.18) was essentially due to the costs of acupuncture (€365.59 [SD: 98.56]) in the acupuncture group.

Example 4



RESEARCH
EDUCATION
TREATMENT
ADVOCACY



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A Cost-Analysis of an Interdisciplinary Pediatric Chronic Pain Clinic



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Abstract: Chronic pain is characterized by high rates of functional impairment, health care utilization, and associated costs. Research supports the use of comprehensive, interdisciplinary treatment approaches. However, many hospitals hesitate to offer this full range of services, especially to Medi-Cal/Medicaid patients whose services are reimbursed at low rates. This cost analysis examines the effect on hospital and insurance costs of patients' enrollment in an interdisciplinary pediatric pain clinic, which includes medication management, psychotherapy, biofeedback, acupuncture, and massage. Retrospective hospital billing data (inpatient/emergency department/outpatient visits, and associated costs/reimbursement) from 191 consecutively enrolled Medi-Cal/Medicaid pediatric patients with chronic pain were used to compare 1-year costs before initiating pain clinic services with costs 1 year after. Pain clinic patients had significantly fewer emergency department visits, fewer inpatient stays, and lower associated billing, compared with the year before without interdisciplinary pain management services. Cost savings to the hospital of \$36,228 per patient per year and to insurance of \$11,482 per patient per year were found even after pain clinic service billing was included. Analyses of pre-pain clinic costs indicate that these cost reductions were likely because of clinic participation. Findings provide economic support for the use of interdisciplinary care to treat pediatric chronic pain on an outpatient basis from a hospital and insurance perspective.

Perspective: This article presents a cost analysis of an interdisciplinary pediatric pain outpatient clinic. Findings support the incorporation of a comprehensive treatment approach that can reduce costs from a hospital and insurance perspective over the course of just 1 year.

Exercise 1: Checklist to evaluate published economic evaluations (ANSWERS)

	Example 1 Yoga	Example 2 MBSR/CBT	Example 3 Acupuncture	Example 4 Pain Clinic
Perspective(s) of the analysis	Health care organization, Societal	Society, Payer	Societal	Hospital, Payer
Comparator – what are the therapies compared to?	Delayed treatment (usual care)	Usual care alone	Usual medical care	Usual care before pain clinic
What are health impacts included in the analysis?	QALYs, 30% improvement in RMDQ	QALYs	Pain intensity, QALYs	None measured
What are the sources of the cost data?	Intervention costs from study records, actual health care utilization records	Health plan data	Data from health insurance companies	Hospital billing and insurance reimbursement data
What type of analysis was done? <ul style="list-style-type: none"> • Cost comparison (no measure of health impact) • Cost- benefit analysis (CBA) • Cost-effectiveness (CEA) • Cost-utility analysis (CUA) 	CUA, CEA	CUA	CUA	Cost comparison
What other types of analysis could be done with the data available?	Cost comparison	Cost comparison	CEA, Cost comparison	None
Who is/are the decision maker(s) to which these results would be of interest? Connect the perspective of the analysis to the decision maker(s).	Health care organization, Government	Government, Health insurance company	Government	Hospital, Health insurance company

Exercise 2 (Option 1) – Calculate Your Health-Related Quality of Life (HRQoL) or Utility Score Using the EQ-5D-5L

Determine your 5-digit health state using the EQ-5D-5L instrument. Then calculate your HRQoL by adding up the coefficients for your health state listed below.

Table 2. Parameter estimates for main-effects models.

Dimension/level	Model 1: cTTO (Tobit with heteroscedasticity, censored at -1, RE) (preferred model)		
	Estimate	SE	P value
MO2	-0.096	0.015	<.0001
MO3	-0.122	0.016	<.0001
MO4	-0.237	0.018	<.0001
MO5	-0.322	0.016	<.0001
SC2	-0.089	0.014	<.0001
SC3	-0.107	0.017	<.0001
SC4	-0.220	0.018	<.0001
SC5	-0.261	0.016	<.0001
UA2	-0.068	0.015	<.0001
UA3	-0.101	0.016	<.0001
UA4	-0.255	0.013	<.0001
UA5	-0.255	0.013	<.0001
PD2	-0.060	0.013	<.0001
PD3	-0.098	0.017	<.0001
PD4	-0.318	0.015	<.0001
PD5	-0.414	0.017	<.0001
AD2	-0.057	0.014	<.0001
AD3	-0.123	0.018	<.0001
AD4	-0.299	0.016	<.0001
AD5	-0.321	0.015	<.0001

Note: A health state of 1 for any dimension has a coefficient of 0.

MO = Mobility

Your 1-5 value: _____

Model 1 coefficient: _____

SC = Self-Care

Your 1-5 value: _____

Model 1 coefficient: _____

UA = Usual Activities

Your 1-5 value: _____

Model 1 coefficient: _____

PD = Pain/Discomfort

Your 1-5 value: _____

Model 1 coefficient: _____

AD = Anxiety/Depression

Your 1-5 value: _____

Model 1 coefficient: _____

HRQoL = 1 + (_____ + _____ + _____ + _____ + _____) = _____

Source: Pickard AS, Law EH, Jiang R, et al. United States valuation of EQ-5D-5L health states using an international protocol. *Value Health*. 2019;22(8):931-941.

Exercise 2 (Option 2) – Calculate Your Health-Related Quality of Life (HRQoL) or Utility Score Using the SF-6D

Dimensions	Dimension Score (Circle Answer)	Weights (Move # to next column)	SF-6D
Physical functioning	IF (sf2=3) then SFPhys = 1 ; IF (sf2=2) then SFPhys = 2 ; IF (sf2=1) then SFPhys = 3 ;	If (SFPhys=1) then pf1 = 0 ; IF (SFPhys=2) then pf1 = 0 ; IF (SFPhys=3) then pf1 = -.045 ;	
Role limitations	IF (sf5=5) and (sf6=5) then SFRole = 1 ; IF (sf5=1 or sf5=2 or sf5=3 or sf5=4) and (sf6=5) then SFRole = 2 ; IF (sf6=1 or sf6=2 or sf6=3 or sf6=4) and (sf5=5) then SFRole = 3 ; IF (sf5=1 or sf5=2 or sf5=3 or sf5=4) and (sf6=1 or sf6=2 or sf6=3 or sf6=4) then SFRole = 4 ;	If (SFRole=1) then rl1 = 0 ; IF (SFRole=2) then rl1 = -.063 ; IF (SFRole=3) then rl1 = -.063 ; IF (SFRole=4) then rl1 = -.063 ;	
Social functioning	IF (sf12=5) then SFSocial = 1 ; IF (sf12=4) then SFSocial = 2 ; IF (sf12=3) then SFSocial = 3 ; IF (sf12=2) then SFSocial = 4 ; IF (sf12=1) then SFSocial = 5 ;	IF (SFSocial=1) then sc1 = 0 ; IF (SFSocial=2) then sc1 = -.063 ; IF (SFSocial=3) then sc1 = -.066 ; IF (SFSocial=4) then sc1 = -.081 ; IF (SFSocial=5) then sc1 = -.093 ;	
Bodily pain	IF (sf8=1) then SFPain = 1 ; IF (sf8=2) then SFPain = 2 ; IF (sf8=3) then SFPain = 3 ; IF (sf8=4) then SFPain = 4 ; IF (sf8=5) then SFPain = 5 ;	If (SFPain=1) then pn1 = 0 ; IF (SFPain=2) then pn1 = 0 ; IF (SFPain=3) then pn1 = -.042 ; IF (SFPain=4) then pn1 = -.077 ; IF (SFPain=5) then pn1 = -.137 ;	
Mental health	IF (sf11=5) then SFMental=1 ; IF (sf11=4) then SFMental=2 ; IF (sf11=3) then SFMental=3 ; IF (sf11=2) then SFMental=4 ; IF (sf11=1) then SFMental=5 ;	If (SFMental=1) then mh1 = 0 ; IF (SFMental=2) then mh1 = -.059 ; IF (SFMental=3) then mh1 = -.059 ; IF (SFMental=4) then mh1 = -.113 ; IF (SFMental=5) then mh1 = -.134 ;	
Vitality	If (sf10=1) then SFVital = 1 ; If (sf10=2) then SFVital = 2 ; If (sf10=3) then SFVital = 3 ; If (sf10=4) then SFVital = 4 ; If (sf10=5) then SFVital = 5 ;	IF (SFVital=1) then v1 = 0 ; IF (SFVital=2) then v1 = -.078 ; IF (SFVital=3) then v1 = -.078 ; IF (SFVital=4) then v1 = -.078 ; IF (SFVital=5) then v1 = -.106 ;	
Most	if SFPhys=3 or SFRole=3 or SFRole=4 or SFSocial=4 or SFSocial=5 or SFPain=4 or SFPain=5 or SFMental=4 or SFMental=5 or SFVital=4 or SFVital=5 then most=1;	if most=0 then mst1 = 0 ; if most=1 then mst1 = -.077 ;	
SF-6D (HRQoL) score	-	-	1+above

Source: Brazier JE, Roberts J. The estimation of a preference-based measure of health from the SF-12. *Med Care* 2004;42:851-859.

Exercise 2 – Calculating Quality-Adjusted Life-Years (QALYs) Using Area Under the Curve (AUC) - Worksheet

QALYs are an area; not a distance.

Vertical distance is health-related quality of life (HRQoL) or utility.

Horizontal distance is the time (in years) over which the HRQoL was experienced.

Some assumption must be made as to what happens between two measurements of HRQoL. Usually a linear change is assumed.

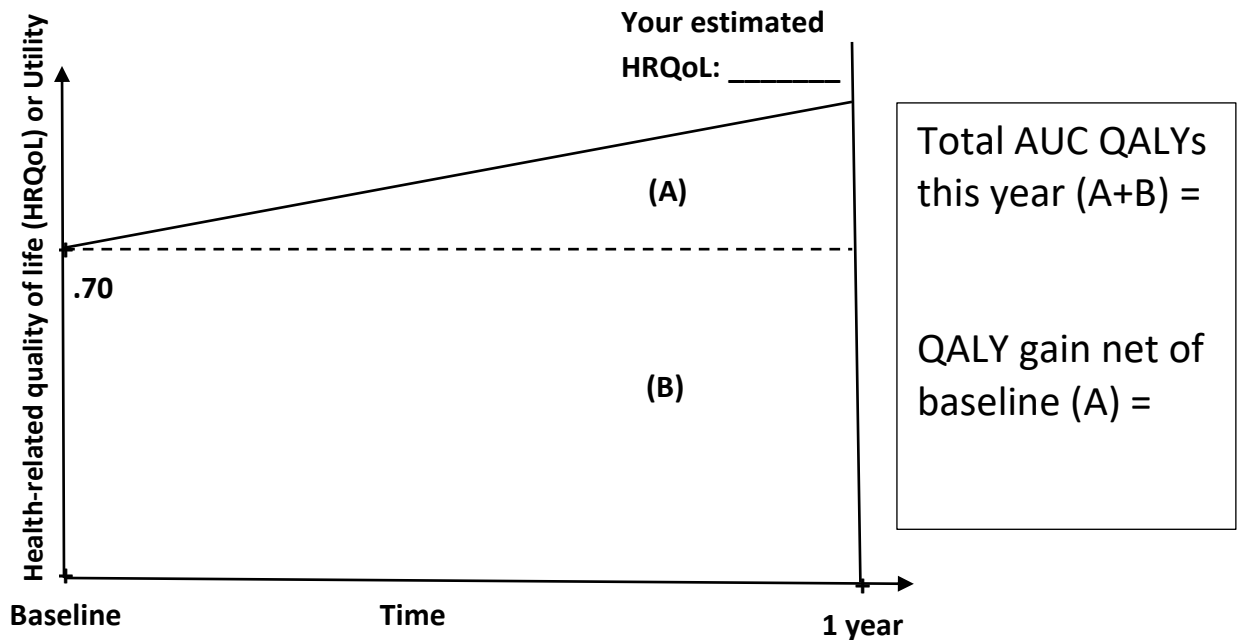


Figure 1: EQ-5D-5L (UK English sample version)

Under each heading, please tick the **ONE** box that best describes your health **TODAY**

MOBILITY

- I have no problems in walking about
- I have slight problems in walking about
- I have moderate problems in walking about
- I have severe problems in walking about
- I am unable to walk about

SELF-CARE

- I have no problems washing or dressing myself
- I have slight problems washing or dressing myself
- I have moderate problems washing or dressing myself
- I have severe problems washing or dressing myself
- I am unable to wash or dress myself

USUAL ACTIVITIES (*e.g. work, study, housework, family or leisure activities*)

- I have no problems doing my usual activities
- I have slight problems doing my usual activities
- I have moderate problems doing my usual activities
- I have severe problems doing my usual activities
- I am unable to do my usual activities

PAIN / DISCOMFORT

- I have no pain or discomfort
- I have slight pain or discomfort
- I have moderate pain or discomfort
- I have severe pain or discomfort
- I have extreme pain or discomfort

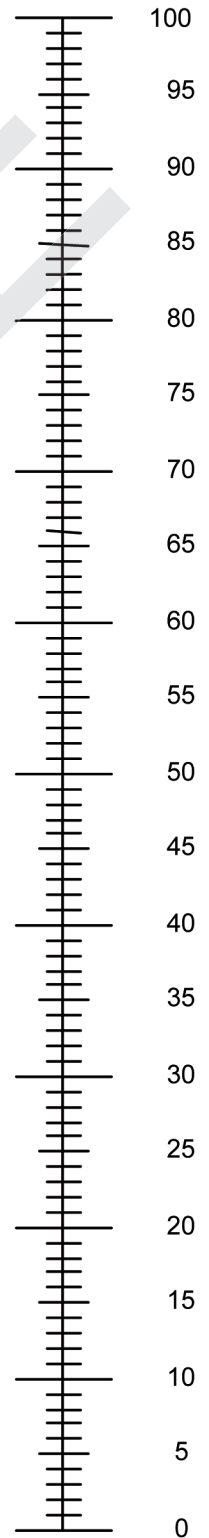
ANXIETY / DEPRESSION

- I am not anxious or depressed
- I am slightly anxious or depressed
- I am moderately anxious or depressed
- I am severely anxious or depressed
- I am extremely anxious or depressed

- We would like to know how good or bad your health is **TODAY**.
- This scale is numbered from **0** to **100**.
- **100** means the best health you can imagine.
0 means the worst health you can imagine.
- Mark an **X** on the scale to indicate how your health is **TODAY**.
- Now, please write the number you marked on the scale in the box below.

YOUR HEALTH TODAY =

The best health
you can imagine



The worst health
you can imagine

1.3. What is a health state?

Each of the 5 dimensions comprising the EQ-5D descriptive system is divided into 5 levels of perceived problems:

Level 1: indicating no problem

Level 2: indicating slight problems

Level 3: indicating moderate problems

Level 4: indicating severe problems

Level 5: indicating extreme problems

A unique health state is defined by combining 1 level from each of the 5 dimensions.



A total of 3125 possible health states is defined in this way. Each state is referred to in terms of a 5 digit code. For example, state 11111 indicates no problems on any of the 5 dimensions, while state 12345 indicates no problems with mobility, slight problems with washing or dressing, moderate problems with doing usual activities, severe pain or discomfort and extreme anxiety or depression.

SF-12v2™ Health Survey

(SF-12 v2 Standard, US Version 2.0)

Identification Number
Event

To be completed by the PATIENT

Directions: This survey asks for your views about your health. This information will help you keep track of how you feel and how well you are able to do your usual activities. If you need to change an answer, completely erase the incorrect mark and fill in the correct circle. If you are unsure about how to answer a question, please give the best answer you can.

Today's Date (MM/DD/YY)

		/			/		
--	--	---	--	--	---	--	--

Shade circles like this: 
 Not like this:  

Mark only one answer for each question. Please do not mark outside the circles or make stray marks on the questionnaire.

	Excellent	Very Good	Good	Fair	Poor
01. In general, would you say your health is:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>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?</i>	Yes, limited a lot	Yes, limited a little	No, not limited at all		
02. Moderate activities, such as moving a table, pushing a vacuum cleaner, bowling, or playing golf	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		
03. Climbing several flights of stairs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		
<i>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?</i>	All of the time	Most of the time	Some of the time	A little of the time	None of the time
04. Accomplished less than you would like	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
05. Were limited in the kind of work or other activities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>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)?</i>	All of the time	Most of the time	Some of the time	A little of the time	None of the time
06. Accomplished less than you would like	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
07. Did work or activities less carefully than usual	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
08. 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
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>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...</i>	All of the time	Most of the time	Some of the time	A little of the time	None of the time
09. Have you felt calm and peaceful	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. Did you have a lot of energy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
11. Have you felt downhearted and depressed	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12. 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.)?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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Exercise 3:

Inputs for an Economic Evaluation of Two Pain Treatments

You have been asked to perform an economic evaluation for a new pain treatment: Pain₂. Pain₁ is the current standard of practice – e.g., a pain medication. Pain₂ is the new complementary and integrative health (CIH) alternative being considered. Below are the results of a randomized effectiveness trial comparing Pain₁ to Pain₂ over one year of treatment. **Note: either treatment involves both treatment costs and treatment-related physician visit costs.**

Cost or benefit component	Pain ₁ (usual care)	Pain ₂ (new tx)
Reimbursed monthly cost for each treatment	\$100	\$200
Patient co-pay per month for each treatment	\$20	\$25
Annual average cost per patient for supplemental OTC pain medication	\$100	\$40
Average annual reimbursed pain treatment-related physician visit costs per patient	\$500	\$350
Average total annual patient co-pays for pain treatment-related physician visits	\$50	\$35
Pain-related productivity losses to employers per patient over the year	\$300	\$150
Avg. patient quality of life (utility) at year end (both started at .60; assume a linear trend)	.65	.75
Percent of patients pain-free at year's end	35%	50%

OTC = over the counter—i.e., medication available in a retail store without a prescription.

Please calculate the one-year results for the economic evaluation assignment you choose.

Remember:

- ICER = Incremental Cost Effectiveness Ratio = $(\text{Cost}_2 - \text{Cost}_1) / (\text{Benefits}_2 - \text{Benefits}_1)$
- QALY = Quality-Adjusted Life-Years = area between baseline patient quality of life (utility) and a line drawn to the new quality of life level.

Group 1: Cost-effectiveness analysis from the third-party payer perspective

You are a health plan (insurer, aka third-party payer) and presently your company reimburses for the standard pain treatment (Pain₁). You want to know whether you should also reimburse for [insert your favorite CIH treatment for pain] (Pain₂). You have done some calculations and know that it is worth about \$9,000 to your company to move one member from being in pain to being pain free. Should you offer coverage for Pain₂?

Group 2: Cost-utility analysis from the societal perspective

You are a state legislator and want to know if you should push a bill through the legislature that would require all insurers in your state to provide coverage for [insert your favorite CIH

treatment for pain] (Pain₂). As a legislator you care about the costs and benefits of this decision to all your constituents and about the health-related quality of life in your state. It is standard in your state to cover treatments that cost up to \$50,000 per QALY. Should you push to get Pain₂ covered?

Group 3: Cost-effectiveness analysis from the employer perspective

You are an employer who self-insures for healthcare coverage and you are trying to decide whether to cover [insert your favorite CIH treatment for pain] (Pain₂) for your employees. You have done some calculations and know that you reduce your future healthcare costs by about \$8,000 for each employee who goes from being in pain to being pain free, and this is in addition to the improvement in productivity.

Group 4: Cost-utility analysis from the health care sector perspective

You are a policy maker at the Veterans Health Administration (VHA) and presently your health care organization offers the standard pain treatment (Pain₁). You want to know whether you should also offer [insert your favorite CIH treatment for pain] (Pain₂). You have done some calculations and have gotten some input from your board that you should cover treatments up to \$50,000 per quality-adjusted life-year when also including the veterans' out of pocket costs.

Results Exercise 3 - Worksheets

Group 1: Cost-effectiveness analysis from the third-party payer (insurer) perspective

	Pain ₁	Pain ₂	Difference (2-1)
Costs			
Health benefits			

ICER =

Group 2: Cost-utility analysis from the societal (e.g., government) perspective

	Pain ₁	Pain ₂	Difference (2-1)
Costs			
Health benefits			

ICER =

Group 3: Cost-effectiveness analysis from the employer perspective

	Pain ₁	Pain ₂	Difference (2-1)
Costs			
Health benefits			

ICER =

Group 4: Cost-utility analysis from the health care sector perspective

	Pain ₁	Pain ₂	Difference (2-1)
Costs			
Health benefits			

ICER =

Results Exercise 3 - Results

Group 1: Cost-effectiveness analysis from the third-party payer (insurer) perspective

	Pain ₁	Pain ₂	Difference (2-1)
Costs			
Reimbursed treatment costs	12*\$100=\$1200	12*\$200=\$2400	\$1200
Reimbursed pain-related physician visit costs	\$500	\$350	-\$150
Total costs	\$1700	\$2750	\$1050
Health benefits			
Percent of patients pain-free by year's end	35%	50%	15% (or 0.15)

ICER = $\$1050 / .15$ = cost of \$7000 per additional pain-free member. Compare this to the value to your company of \$9000 per pain free member.

FYI: You can also calculate these:

Net Present Value (NPV) = $0.15 * \$9000 - \$1050 = \$300$

Return on Investment (ROI) = $(\$150 + 0.15 * \$9000 - \$1200) / \$1200 = 25\%$

Group 2: Cost-utility analysis from the societal (e.g., government) perspective

	Pain ₁	Pain ₂	Difference (2-1)
Costs			
Reimbursed treatment costs	12*\$100=\$1200	12*\$200=\$2400	\$1200
Patient co-pay for treatment	12*\$20=\$240	12*\$25=\$300	\$60
Patient OTC pain medication cost	\$100	\$40	-\$60
Reimbursed pain-related physician visit costs	\$500	\$350	-\$150
Patient co-pays for pain-related physician visits	\$50	\$35	-\$15
Productivity losses to employers	\$300	\$150	-\$150
Total costs	\$2390	\$3275	\$885
Health benefits			
Quality-adjusted life-years (QALYs)	$(.65 + .60)/2 = .625$	$(.75 + .60)/2 = .675$.05

ICER = \$885/.05 = \$17,700 per QALY Compare this to state coverage goal of up to \$50,000 per QALY.

Group 3: Cost-effectiveness analysis from the employer perspective

	Pain ₁	Pain ₂	Difference (2-1)
Costs			
Reimbursed treatment costs	12*\$100=\$1200	12*\$200=\$2400	\$1200
Reimbursed pain-related physician visit costs	\$500	\$350	-\$150
Productivity losses to employers	\$300	\$150	-\$150
Total costs	\$2000	\$2900	\$900
Health benefits			
Percent of patients pain-free by year's end	35%	50%	15% (or .15)

ICER = \$900/.15 or cost of \$6000 per additional pain-free employee Compare this to the benefit of \$8000 in reduced future healthcare costs.

FYI: You can also calculate these:

Net Present Value (NPV) = 0.15 * \$8000 - \$900 = \$300

Return on Investment (ROI) = (\$150 + \$150 + 0.15 * \$8000 - \$1200) / \$1200 = 25%

Group 4: Cost-utility analysis from the health care sector perspective

	Pain ₁	Pain ₂	Difference (2-1)
Costs			
Reimbursed treatment costs	12*\$100=\$1200	12*\$200=\$2400	\$1200
Patient co-pay for treatment	12*\$20=\$240	12*\$25=\$300	\$60
Patient OTC pain medication cost**	\$100	\$40	-\$60
Reimbursed pain-related physician visit costs	\$500	\$350	-\$150
Patient co-pays for pain-related physician visits	\$50	\$35	-\$15
Total costs	\$2090	\$3125	\$1035
Health benefits			
Quality-adjusted life-years (QALYs)	$(.65 + .60)/2 = .625$	$(.75 + .60)/2 = .675$.05

ICER = \$1035/.05 = \$20,070 per QALY Compare this to your board's coverage goal of up to \$50,000 per QALY.

**Sanders et al, 2016 is unclear about whether OTC medications are part of the "formal health care sector." This analysis assumes that they are, but if you don't agree the result is: \$1095/.05 or \$21900 per QALY.