Conflicts of Interest

- Funding: Alberta Health Services

A Discrete Choice Experiment to Understand the Value of Equity

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Objective

- To measure trade-offs between health and equity
- To provide a framework to incorporate equity in funding decisions

Background

- Alberta Health Services is a fully integrated health system
  - Delivers health services to >4.4 million
- Desire to incorporate equity in a systematic and transparent way

Methods – Attributes and Levels

Health Attributes	Definitions	Levels
Baseline Life-Expectancy	The number of Yrs the patient is expected to live without receiving the treatment.	1 Yr, 2 Yrs, 3 Yrs, 5 Yrs, 10 Yrs, 15 Yrs, 20 Yrs, 30 Yrs, 45 Yrs
Gain Life-Expectancy	The additional number of Yrs a patient is expected to gain after receiving treatment.	0 Yrs, 3 Months (0.25 Yrs), 6 Months (0.5 Yrs), 1 Yr, 3 Yrs, 5 Yrs
Baseline Quality-of-Life	Represents the patient's health-related well-being without receiving the treatment and is measured on a scale where 0 represents death and 100 represents perfect health.	20, 30, 40, 50, 60, 70, 80
Gain Quality-of-Life	Gain from treatment: The additional quality of life a patient who receives treatment would be expected to gain.	0, 1, 2, 5, 10, 15, 20

Methods – Attributes and Levels

Treatment Attribute	Definitions	Levels
Potential Conflict with Patients' Beliefs	Whether the care experience is aligned with all patients' strongly held beliefs. Patients might have strong beliefs about what is right or wrong for them. For example, blood transfusions or animal by-products in medical treatments. If a prioritized treatment conflicts with any patient's strongly held beliefs, that individual would have the option to choose the next best treatment.	Yes: Due to known conflicts in some patients' strongly held beliefs, not everyone will want to receive the treatment. These patients would receive the next best treatment. No: There are no known conflicts with patient beliefs. Treatment can be given to everyone.

Methods – Attributes and Levels

Disease Attributes	Definitions	Levels
Rare Disease	Conditions where there are a small number of affected patients, there are limited treatment options, a small community of support, and high out-of-pocket costs to the patient.	Yes: Disease is considered rare No: Disease is not considered rare

Methods – Attributes and Levels

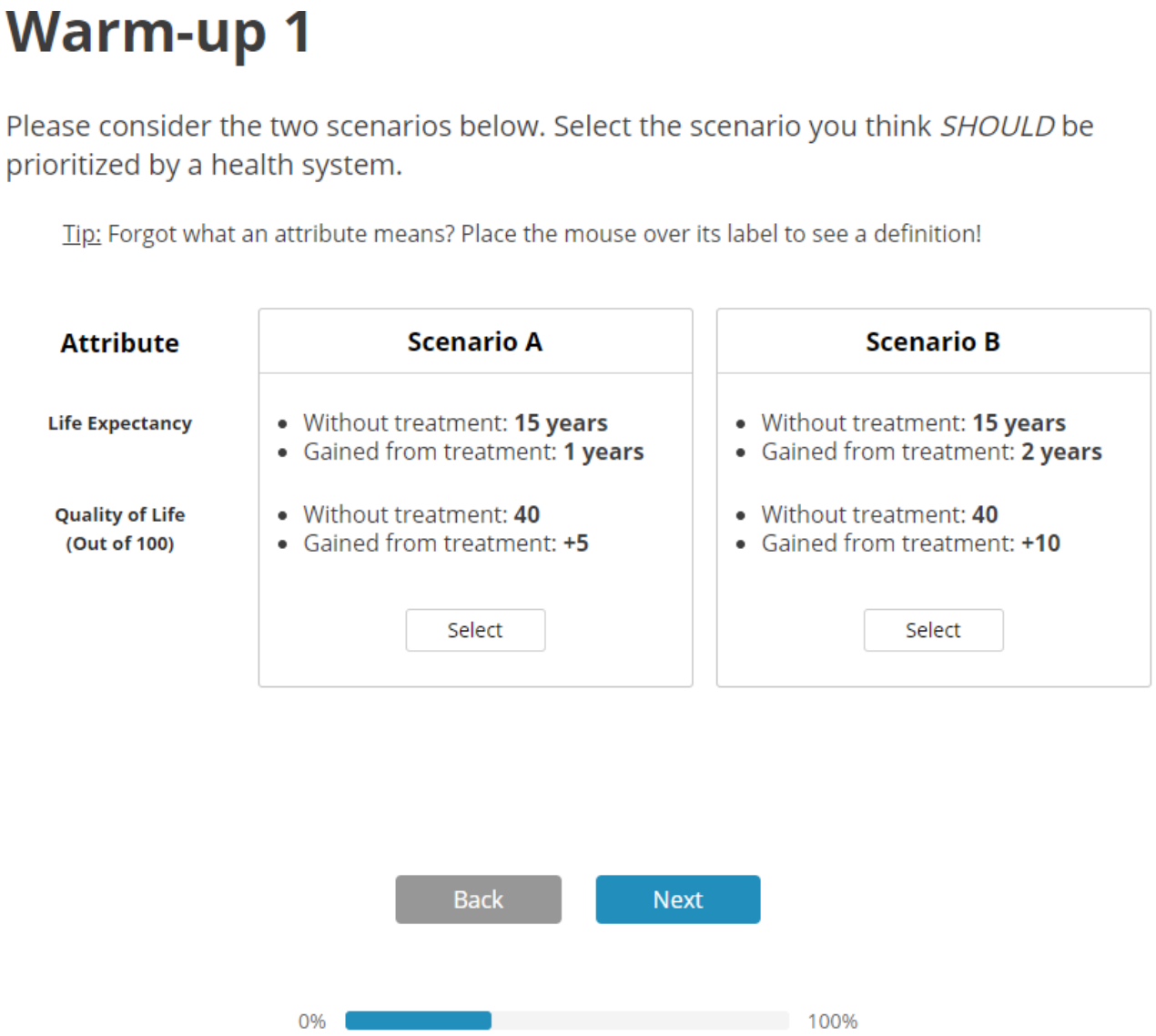
Population Characteristics	Definitions	Levels
Time with Disease	The average amount of time the patients have lived with the disease or condition being treated.	1 Month, 1 Year, 5 Years, 10 Years, 15 Years, 30 Years.
Unfair Treatment by Society	Individuals whose condition is at least partially caused by unfairness in society, and over which they have had little control. This will include conditions linked to limited access to education, health care or safe housing.	Yes: Patient's condition is at least partially caused by unfairness in society. No: Patient's condition is not caused by unfairness in society.

Methods – Recruitment

- We contacted 1,445 adults in Alberta by email (May - July 2021)
- Attempted to recruit a representative sample of the general population
  - The panel was sampled in deliberate portions and incentives were utilized with groups which were known to be harder to target

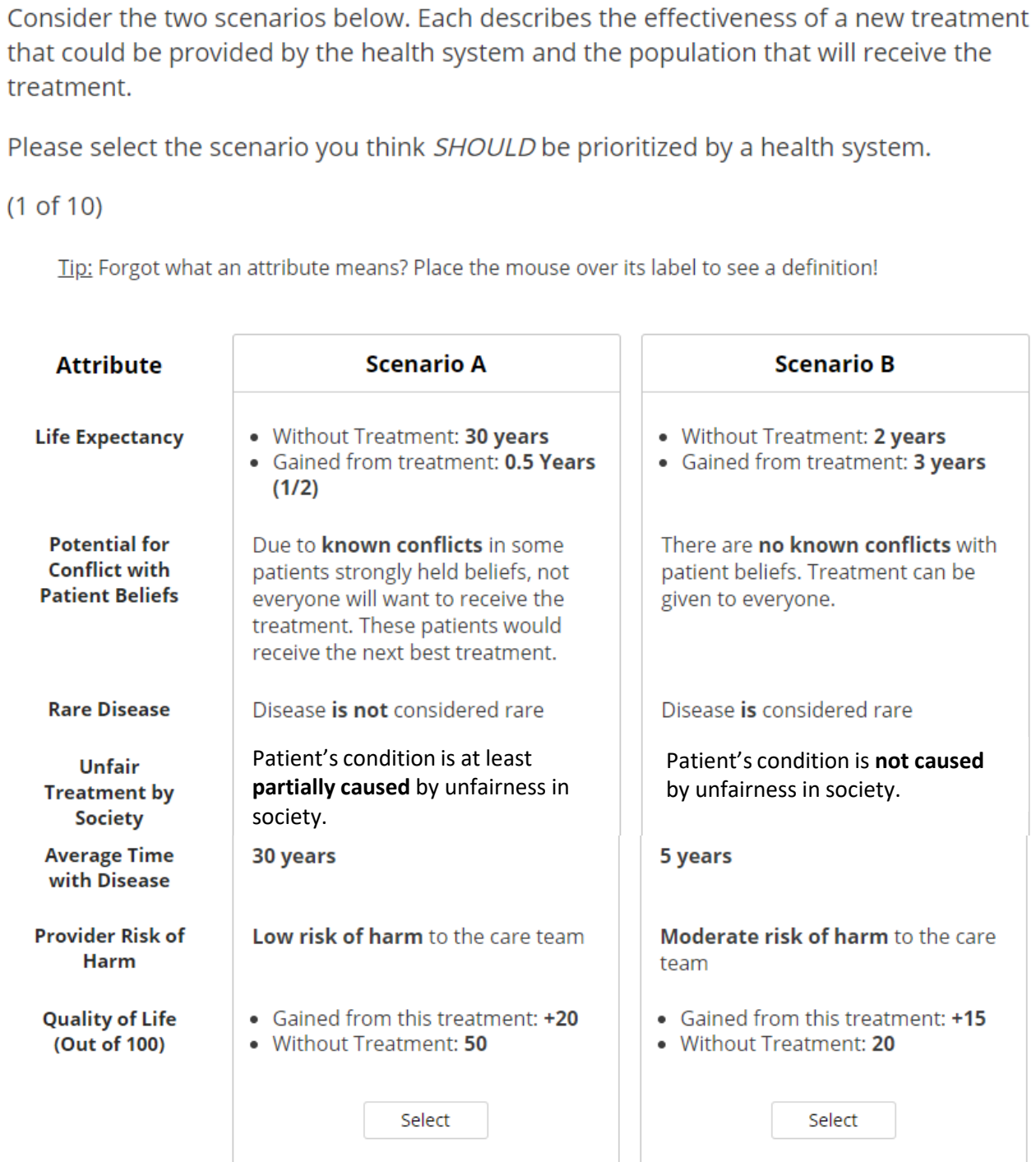
Methods – Survey

- Each respondent was asked 3 warm-up questions



Methods – Survey

- Each respondent was asked 10 discrete choice questions
  - specific levels shown to each respondent were determined by a balanced overlap fractional factorial experimental design



Consider the two scenarios below. Each describes the effectiveness of a new treatment that could be provided by the health system and the population that will receive the treatment.

Please select the scenario you think *SHOULD* be prioritized by a health system.

(1 of 10)

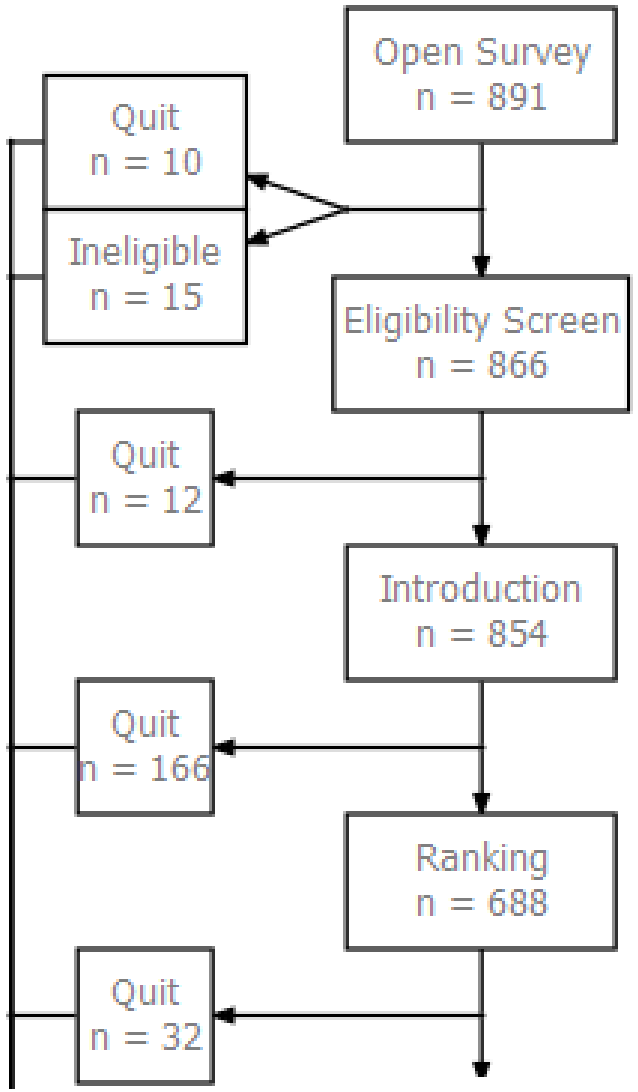
Tip: Forgot what an attribute means? Place the mouse over its label to see a definition!

Attribute	Scenario A	Scenario B
Life Expectancy	• Without Treatment: **30 years** • Gained from treatment: **0.5 Years (1/2)**	• Without Treatment: **2 years** • Gained from treatment: **3 years**
Potential for Conflict with Patient Beliefs	Due to **known conflicts** in some patients strongly held beliefs, not everyone will want to receive the treatment. These patients would receive the next best treatment.	There are **no known conflicts** with patient beliefs. Treatment can be given to everyone.
Rare Disease	Disease **is not** considered rare	Disease **is** considered rare
Unfair Treatment by Society	Patient's condition is at least **partially caused** by unfairness in society.	Patient's condition is **not caused** by unfairness in society.
Average Time with Disease	**30 years**	**5 years**
Provider Risk of Harm	**Low risk of harm** to the care team	**Moderate risk of harm** to the care team
Quality of Life (Out of 100)	• Gained from this treatment: **+20** • Without Treatment: **50**	• Gained from this treatment: **+15** • Without Treatment: **20**
	Select	Select

Methods - Analysis

- Straight lining and attribute dominance to test validity
- Main analysis used multinomial logit model
- Latent class analysis to test for groups

Participant Flow Diagram



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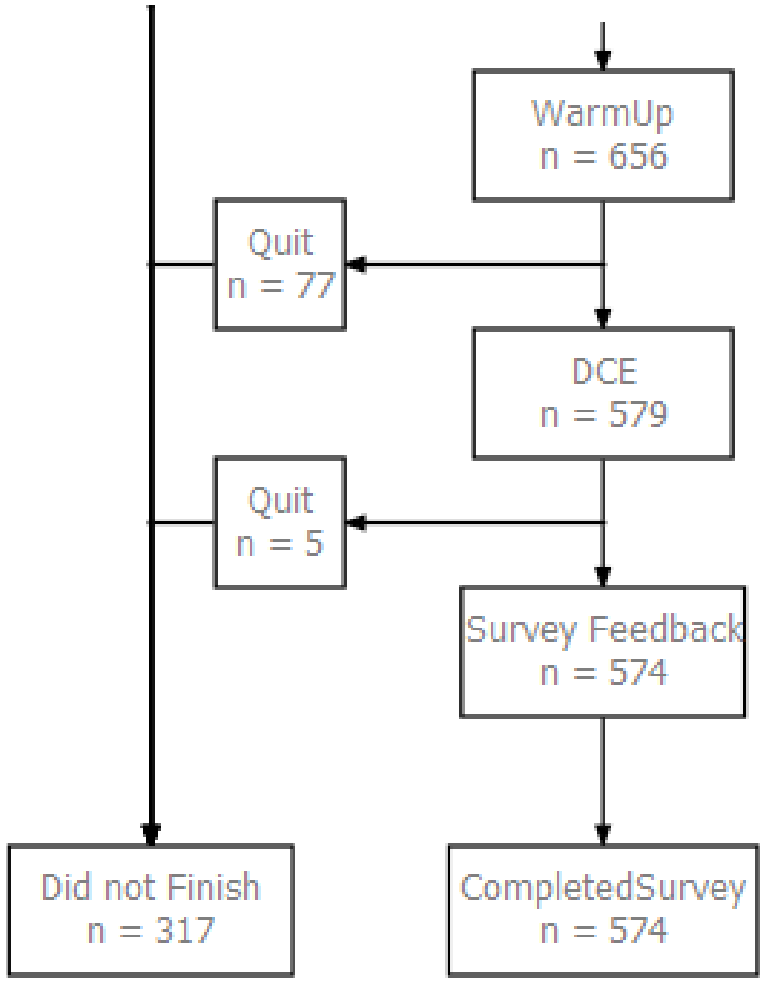

64%

Characteristic	2016 Census		Survey	
Age	Count(n)		Count(n)	
25-34	644115	23%	83	15%
35-44	586710	21%	120	22%
45-54	553340	20%	106	20%
55-64	501770	18%	104	19%
65<	500215	18%	128	24%
Sex				
Female	2027755	50%	282	51%
Male	2039410	50%	270	49%
Income				
Less than $10,000	37255	2%	8	2%
$10,000-$19,999	53140	3%	12	3%
$20,000-$29,999	99180	6%	24	6%
$30,000-$39,999	105925	7%	29	7%
$40,000-$49,999	116890	8%	23	6%
$50,000-519,999	119200	8%	33	8%
$60,000-$79,999	228925	15%	60	14%
$80,000-$99,999	201835	13%	45	11%
$100,000 or more	565340	37%	183	44%

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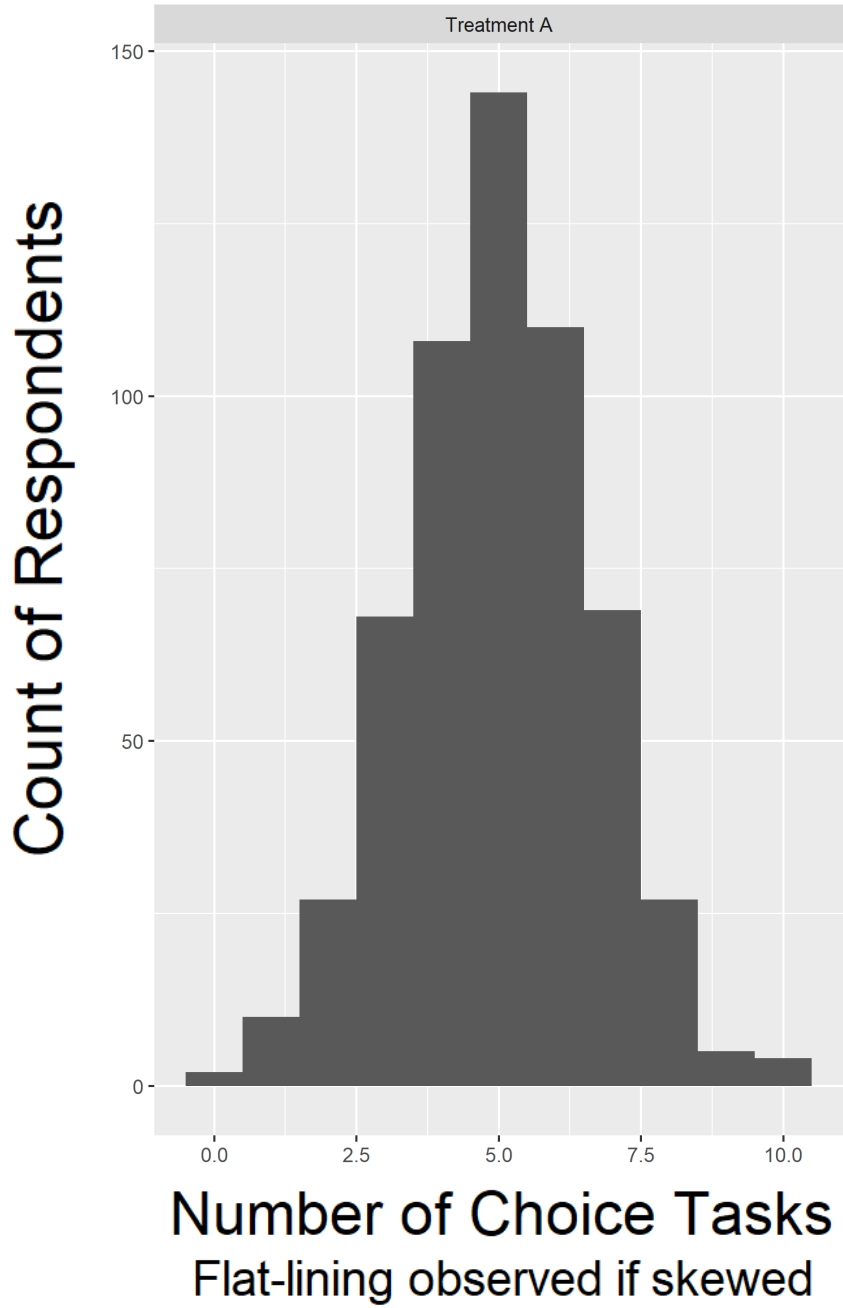
Characteristic	2016 Census		Survey	
Marital Status				
Never Married	905700	28%	20	16%
Married or Living common law	1969295	60%	82	67%
Separated	76150	2%	3	2%
Divorced	195850	6%	10	8%
Widowed	141020	4%	7	6%
Minority Status				
Aboriginal identity	258640	7%	12	3%
Total visible minority population	933165	23%	46	10%
Not a visible minority	3044980	77%	417	90%

Validity Assessment: Flat-Lining



Flat-lining observed if skewed

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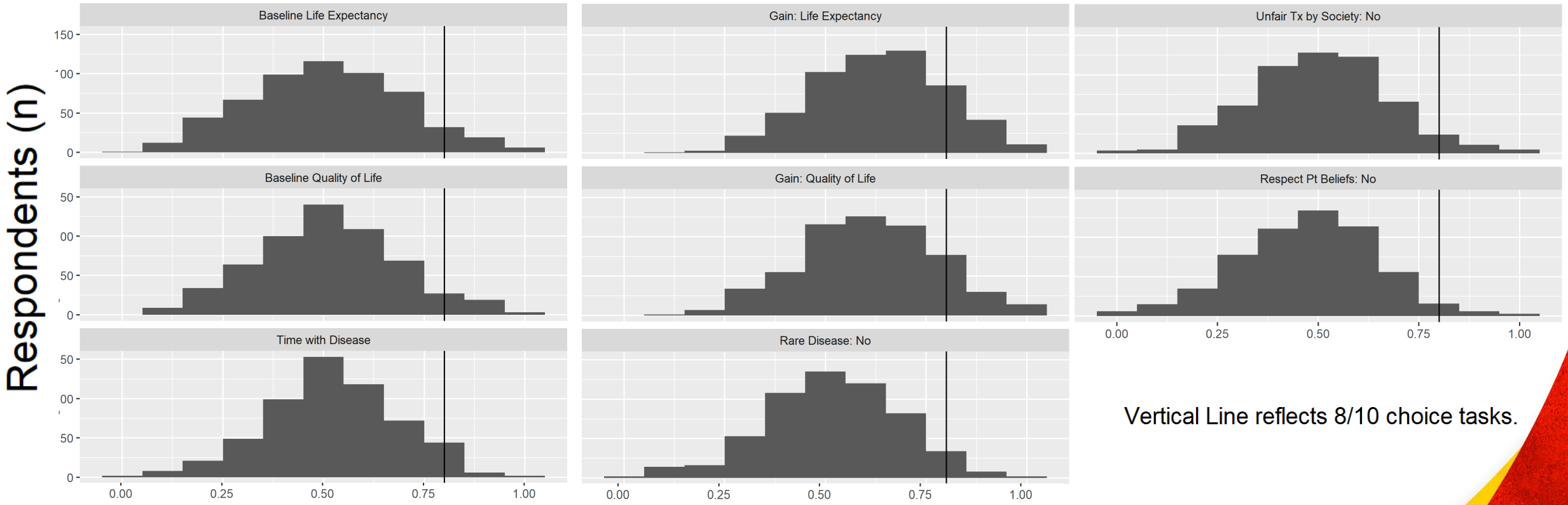
Validity Assessment: Dominance



Vertical Line reflects 8/10 choice tasks.

Proportion of Tasks where Higher Attribute Level Chosen

Group	Total
	β (95%CI)
Baseline Life Expectancy	**-0.2(-1.1,0.7)**
Baseline Quality of Life	**-0.5(-1.1,0.1)**
Gain in Life Expectancy	67.8(61.0,74.6)
Gain in Quality of Life	15.3(13.5,17.0)
Time with Disease	**0.9(-0.3,2.0)**
Rare Disease	**-2.4(-11.7,6.9)**
Patients have been treated unfairly	14.2(4.9,23.5)
Respect for patient beliefs	28.5(19.2,37.7)

Bolded values are not statistically different from zero i.e. there is not a strong preference

	More Visible Minority, choose 1 attribute	Less Disabled, Fail Warm Up, Less than 10 seconds	More Older
Group	**1**	**2**	**3**
Segment Size	20%	44%	36%
	β (95%CI)	β (95%CI)	β (95%CI)
Baseline Life Expectancy	-1.8(-3.2,-0.4)	-3.0(-3.5,-2.4)	5.2(4.3,6.1)
Baseline Quality of Life	-3.9(-4.9,-2.9)	-1.5(-1.9,-1.1)	3.3(2.7,3.9)
Gain in Life Expectancy	16.4(6.1,26.8)	51.9(46.9,56.9)	29.5(22.7,36.3)
Gain in Quality of Life	4.98(2.2,7.6)	11.9(10.7,13.2)	6.7(5.0,8.4)
Time with Disease	**1.3(-0.6,3.1)**	0.8(0.03,1.5)	**-0.4(-1.6,0.7)**
Rare Disease	22.3(7.4,37.1)	-10.7(-16.7,-4.7)	**-1.9(-11.2,7.5)**
Patients have been treated unfairly	53.3(38.3,68.3)	14.5(8.5,20.5)	-21.6(-31.0,-12.2)
Respect for patient beliefs	60.4(45.4,75.4)	**3.5(-2.5,9.4)**	16.7(7.4,25.9)

Attributes	
Baseline Life Expectancy	The number of years the patient is expected to live without receiving the treatment.
Baseline Quality of Life	Represents the patient's health-related well-being without receiving the treatment and is measured on a scale where 0 represents death and 100 represents perfect health.
Gain in Life Expectancy	The additional number of years a patient is expected to gain after reciving treatment.
Gain in Quality of Life	The additional quality of life a patient who receives treatment would be expected to gain.
Time with Disease	The average amount of time the patients have lived with the disease or condition being treated.
Rare Disease	Conditions where there are a small number of affected patients, there are limited treatment options, a small community of support, and high out-of-pocket costs to the patient.
Unfair Treatment	Individuals whose condition is at least partially caused by unfairness in society, and over which they have had little control. This will include conditions linked to limited access to education, health care or safe housing.
Respects Patients Beliefs	There are no known conflicts with patient beliefs. Treatment can be given to everyone.

Populatons	
Groups are based on how they responded to the survey. These groups have different make-ups but don't tell us how a particular populations would have answered.	
All	This is the full survey population which is older and more affluent with less visible minorities than the Alberta population
Group 1	20.3% of the survey population. Higher proportion of visible minorities and more likely to respond based on a single attribute
Group 2	43,9% % of the survey population. Less likely to be disabled and less likely to fail the survey tests.
Group 3	35.8% of the survey population. More likely to be older.
User Chosen	This allows the user to adjust the coefficients as desired. For instance, inputting zeros for coefficients that were not statistically significant.

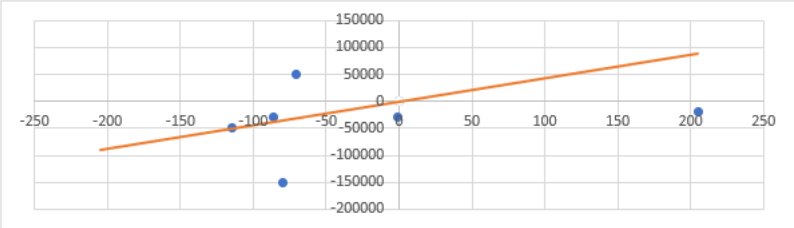
Input Values

Discrete Choice Experiment Results (coefficients)

Calculations (do not change)

Equity and Efficiency Calculator

Treatment	Baseline Life Expectancy	Baseline Quality of Life (0-100)	Gain in Life Expectancy	Gain in Quality of Life (0-100)	Time with Disease	Rare Disease	Unfair Treatment	Respects Patients Beliefs	Total Utility	Incremental Utility	Cost	Incremental Cost	ICER Compared to System Average (Cost/Utility)
All	-0.20	-0.52	67.79	15.26	0.86	-2.43	14.18	28.45					
User Chosen	-0.20	-0.52	67.79	15.26	0.00	0.00	14.18	28.45					
System Average	40	80	1	4.0	10	0%	10%	90%	115	0	$50,000	0	-
1	1	65	0.5	0	5	Yes	Yes	Yes	44	-70	$100,000	50000	More costly and less effective
2	60	60	0	20	15	No	Yes	Yes	320	205	$30,000	-20000	Less costly and more effective
3	40	80	0.5	5	10	No	Yes	Yes	114	-1	$20,000	-30000	$50,167
4	40	80	0.5	5	10	No	No	No	29	-86	$20,000	-30000	$349
5	50	85	1	4	1	No	No	No	35	-80	($100,000)	-150000	$1,885



Input Table

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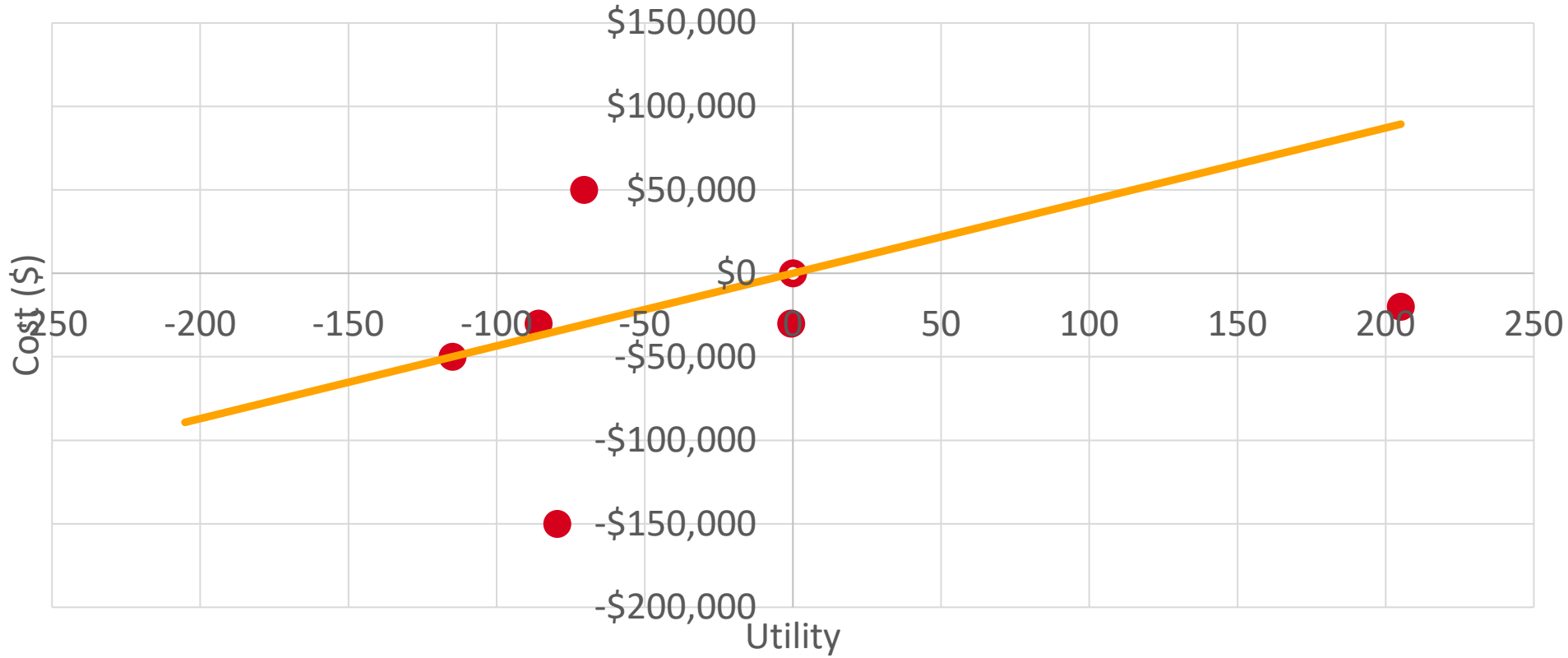
Equity and Efficiency Calculator

Treatment	Baseline Life Expectancy	Baseline Quality of Life (0-100)	Gain in Life Expectancy	Gain in Quality of Life (0-100)	Time with Disease	Rare Disease	Unfair Treatment	Respects Patients Beliefs
All	-0.20	-0.52	67.79	15.26	0.86	-2.43	14.18	28.45
User Chosen	-0.20	-0.52	67.79	15.26	0.00	0.00	14.18	28.45
System Average	40	80	1	4.0	10	0%	10%	90%
1	1	65	0.5	0	5	Yes	Yes	Yes
2	60	60	0	20	15	No	Yes	Yes
3	40	80	0.5	5	10	No	Yes	Yes
4	40	80	0.5	5	10	No	No	No
5	50	85	1	4	1	No	No	No

Results Table

Total Utility	Incremental Utility	Cost	Incremental Cost	ICER Compared to System Average (Cost/Utility)
115	0	$50,000	0	-
44	-70	$100,000	50000	More costly and less effective
320	205	$30,000	-20000	Less costly and more effective
114	-1	$20,000	-30000	$50,167
29	-86	$20,000	-30000	$349
35	-80	($100,000)	-150000	$1,885

Incremental Cost-Effectiveness Plane



This research demonstrates the willingness of respondents to trade-off health for treatments that respect all patients' beliefs and populations that have been treated unfairly by society.