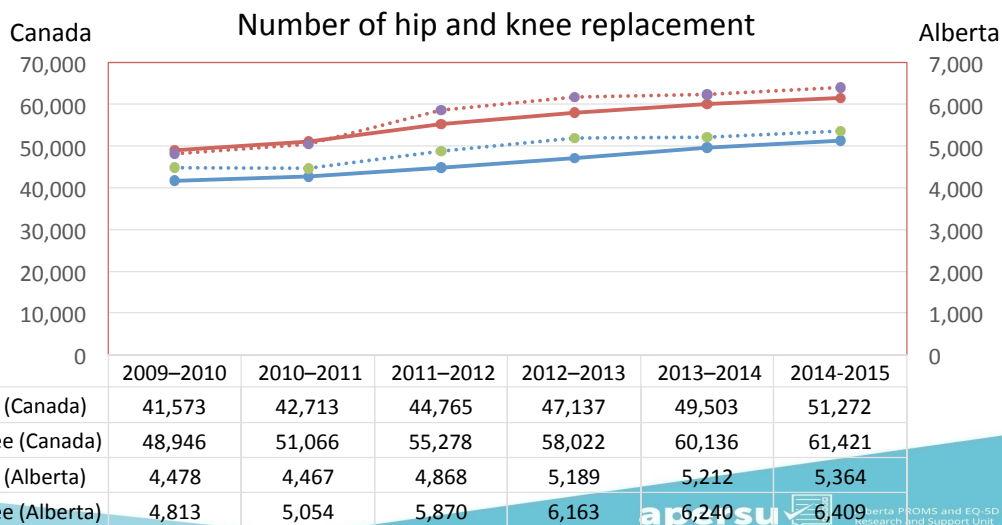




EQ-5D-3L vs. EQ-5D-5L: A cross-sectional comparison of measurement properties among hip & knee replacement patients – Preliminary findings

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Background



Canadian Institute for Health Information. <https://www.cihi.ca/en>

Alberta hip and knee replacement project overview

- Alberta Bone and Joint Health Institute (ABJHI)
- Launched in 2010, ongoing
- Measure the performance of hip and knee surgeries
 - Waiting time
 - Surgery length
 - Post-surgery length of hospital stay
 - Surgery complications
 - Readmissions
 - Patient satisfaction
 - Patient-reported outcome measures (PROMs)
 - EQ-5D (3L → 5L)
 - WOMAC
 - Pre-surgery, 3 months and 12 months after surgery

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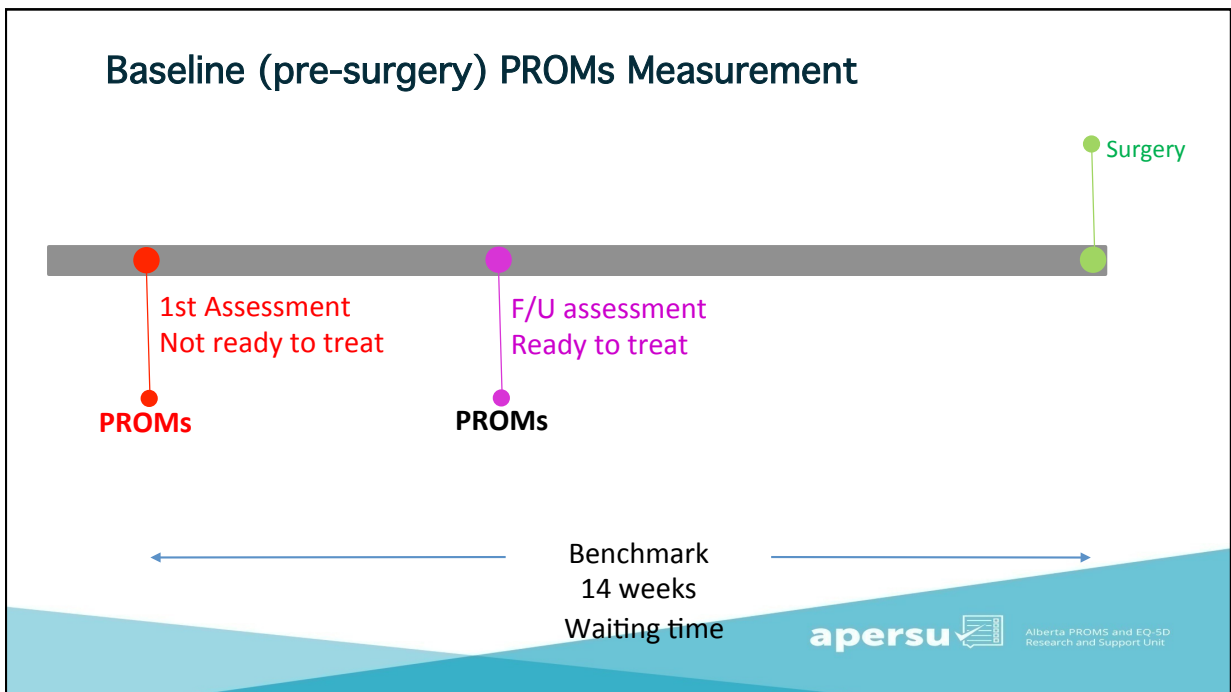
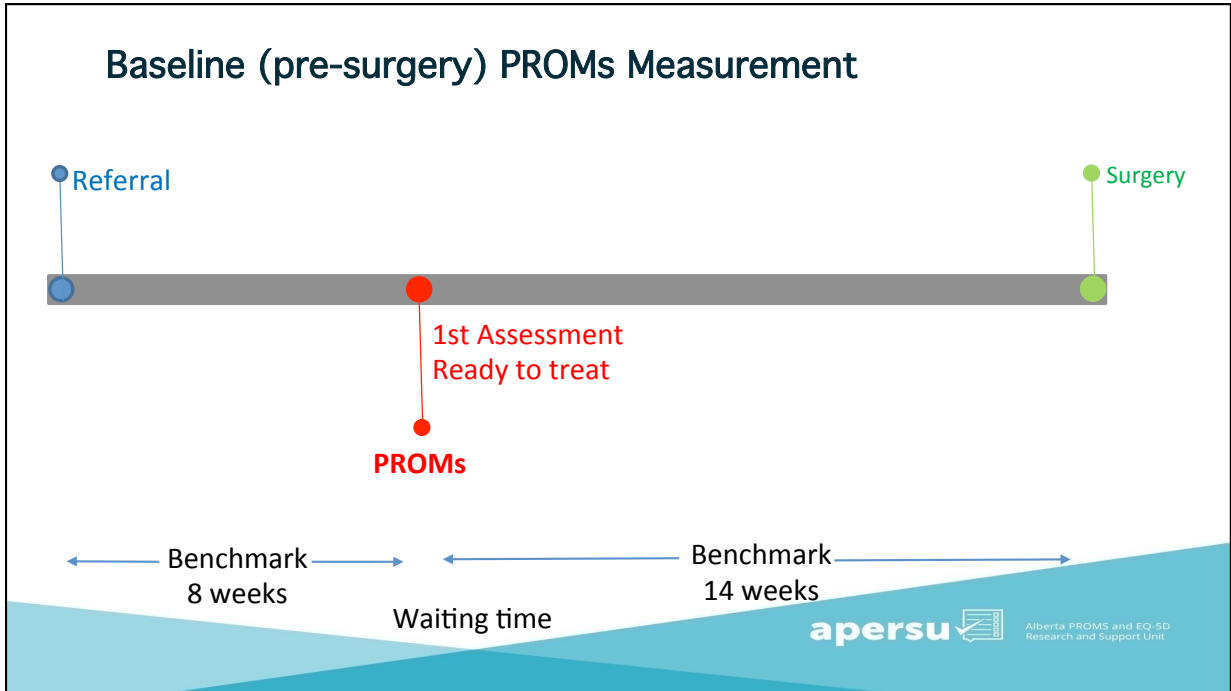
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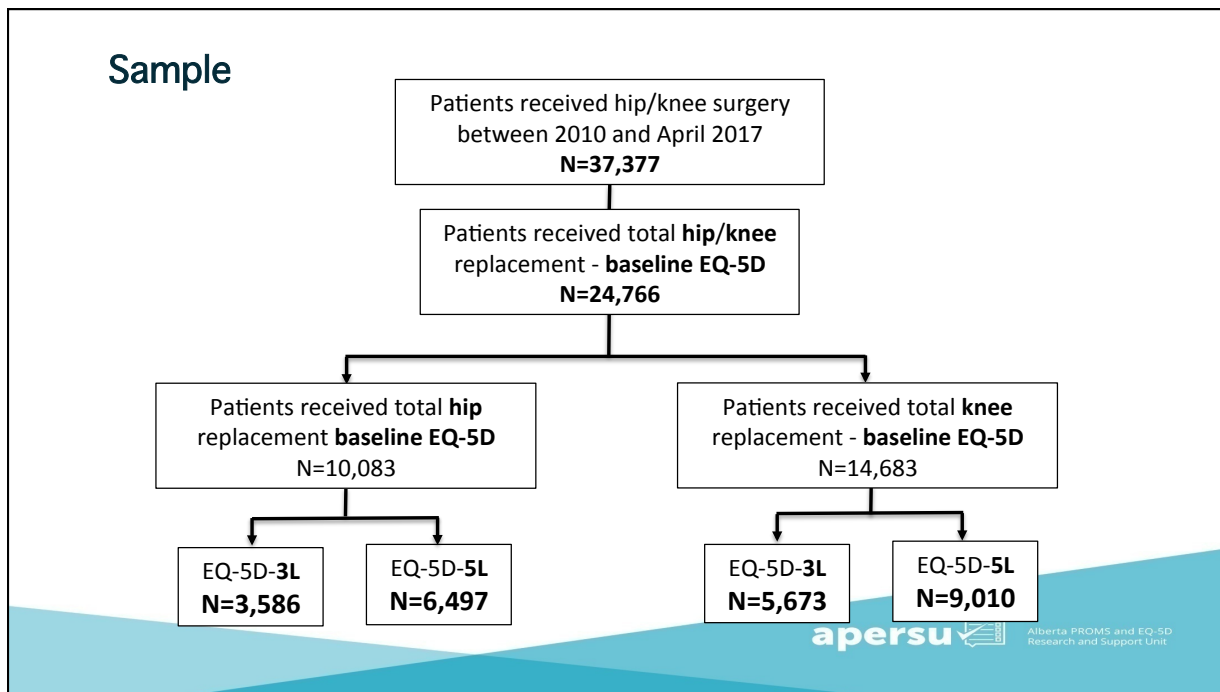
Objective

- To compare the measurement properties of EQ-5D-3L and EQ-5D-5L among patients undergoing hip/knee replacement in Alberta

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Sample and Propensity score matching

- No patients finished both two versions of EQ-5D at a same time
- In order to compare the measurement properties of the two versions using balanced samples:
 - Propensity score matching
 - 1:1 matching EQ-5D-3L and EQ-5D-5L
 - Variables used to calculate propensity scores:
 - Age, gender, and baseline WOMAC at domain level

Results _ Propensity score matching

Baseline Patient Characteristics

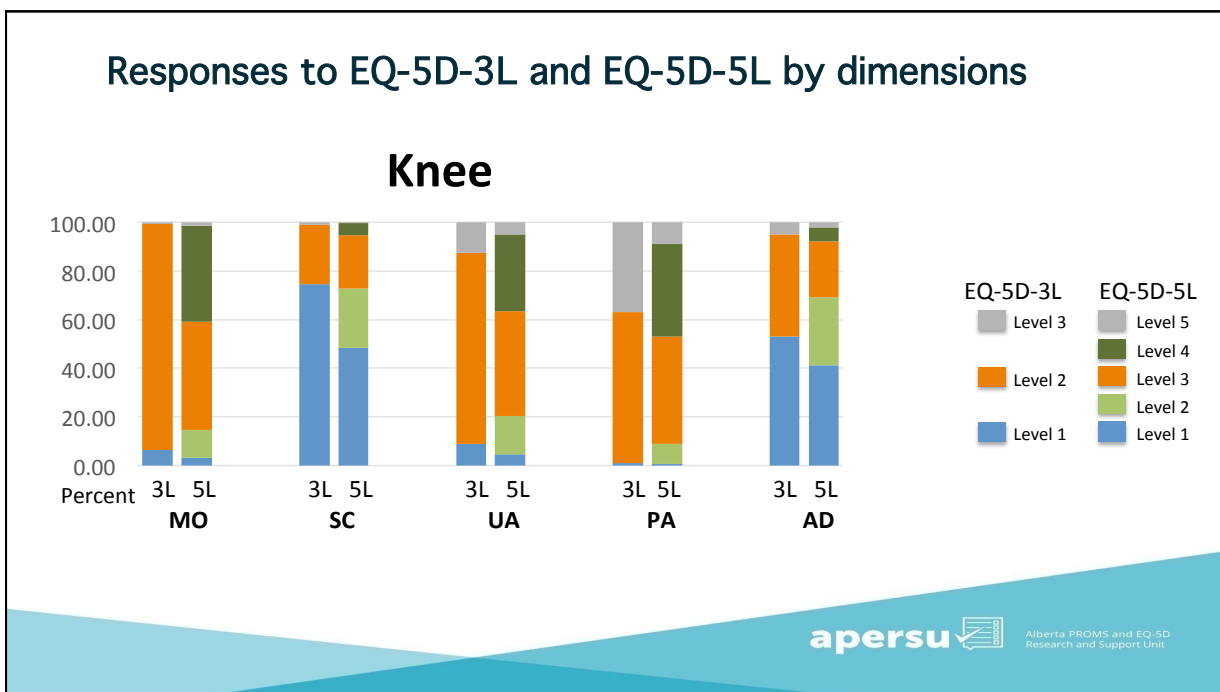
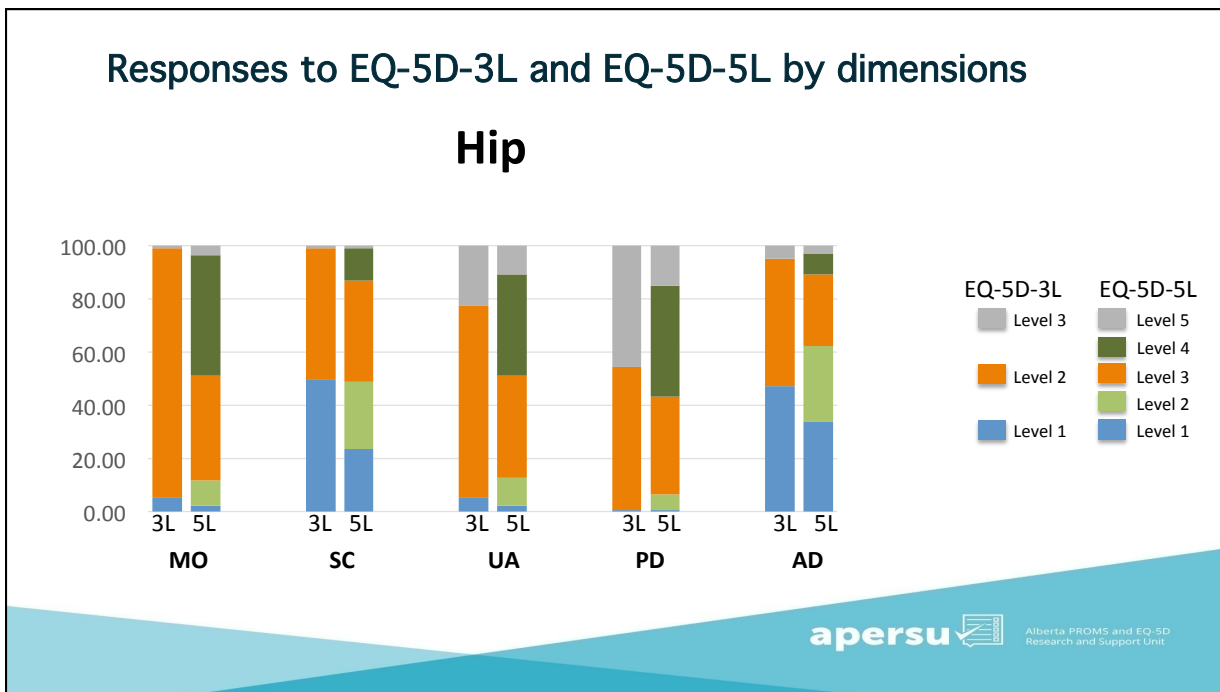
Variable	Hip				Knee			
	Before matching		After matching		Before matching		After matching	
	EQ-5D-3L (n=3,586)	EQ-5D-5L (n=6,497)	EQ-5D-3L (n=3,446)	EQ-5D-5L (n=3,446)	EQ-5D-3L (n=5,673)	EQ-5D-5L (n=9,010)	EQ-5D-3L (n=5,428)	EQ-5D-5L (n=5,428)
Age	66.36 (11.18)	65.92 (11.32)	66.35 (11.20)	66.52 (11.12)	67.03 (9.37)	67.01 (9.16)	66.99 (9.34)	67.03 (9.20)
Female sex	54.90%	54.58%	54.67%	54.59%	59.65%	60.15%	59.56%	58.70%
WOMAC_Pain	40.35 (17.77)	38.67 (18.13)	40.31 (17.74)	40.35 (17.83)	44.08 (17.46)	42.86 (17.47)	44.10 (17.46)	44.14 (17.29)
WOMAC_Stiffness	38.95 (19.83)	36.98 (20.18)	38.93 (19.82)	38.88 (19.71)	41.49 (19.86)	40.19 (20.20)	41.44 (19.85)	41.56 (20.25)
WOMAC_Physical difficult	37.97 (17.21)	36.20 (17.29)	37.81 (17.10)	37.69 (17.12)	43.55 (16.79)	42.25 (16.91)	43.40 (16.78)	43.37 (16.73)
Mental illness record	36.28%	34.35%	36.51%	33.60%	38.66%	35.43%	38.76%	34.52%
BMI > 30	46.07%	43.91%	45.74%	43.99%	64.19%	62.82%	64.19%	62.90%

Responses to EQ-5D index score and health states

Hip	Matched Samples	
	EQ-5D-3L (n=3,446)	EQ-5D-5L (n=3,446)
Index score, mean (SD)	0.526 (0.211)	0.424 (0.245)
Index score, Median (range)	0.508 (-0.040, 1)	0.403 (-0.148, 0.949)
N (%) of 11111	10 (0.27)	6 (0.16)
N (%) of very mild health state (severity level of 6)	57 (1.56)	11 (0.30)
N (%) of worst health state (33333/55555)	2 (0.05)	5 (0.14)

Knee	Matched Samples	
	EQ-5D-3L (n=5,428)	EQ-5D-5L (n=5,428)
Index score, mean (SD)	0.590 (0.202)	0.508 (0.231)
Index score, Median (range)	0.689 (-0.038, 1)	0.530 (-0.102, 0.949)
N (%) of 11111	19 (0.35)	13 (0.24)
N (%) of very mild health state (severity level of 6)	108 (1.99)	35 (0.64)
N (%) of worst health state (33333/55555)	1 (0.02)	2 (0.04)

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Convergent construct validity

Spearman correlation coefficients (r)

EQ-5D-3L

Hip	WOMAC Pain	WOMAC Stiffness	WOMAC Function	WOMAC Overall	Knee	WOMAC Pain	WOMAC Stiffness	WOMAC Function	WOMAC Overall
MO	-0.235	-0.165	-0.256	-0.258	MO	-0.208	-0.171	-0.232	-0.235
SC	-0.311	-0.252	-0.426	-0.41	SC	-0.248	-0.205	-0.364	-0.347
UA	-0.363	-0.269	-0.417	-0.416	UA	-0.281	-0.228	-0.328	-0.329
PD	-0.63	-0.45	-0.637	-0.661	PD	-0.586	-0.43	-0.564	-0.598
AD	-0.292	-0.206	-0.316	-0.319	AD	-0.257	-0.204	-0.291	-0.295
Index	0.6377	0.465	0.6949	0.7059	Index	0.582	0.4392	0.6187	0.6382

EQ-5D-5L

Hip	WOMAC Pain	WOMAC Stiffness	WOMAC Function	WOMAC Overall	Knee	WOMAC Pain	WOMAC Stiffness	WOMAC Function	WOMAC Overall
MO	-0.568	-0.385	-0.624	-0.628	MO	-0.519	-0.359	-0.566	-0.575
SC	-0.445	-0.378	-0.584	-0.569	SC	-0.343	-0.274	-0.493	-0.471
UA	-0.536	-0.406	-0.587	-0.594	UA	-0.492	-0.38	-0.546	-0.556
PD	-0.688	-0.501	-0.697	-0.72	PD	-0.624	-0.459	-0.629	-0.655
AD	-0.376	-0.314	-0.412	-0.421	AD	-0.286	-0.236	-0.331	-0.335
Index	0.6955	0.5228	0.762	0.773	Index	0.6376	0.4705	0.7012	0.7143

Strength of correlation

Absent $|r| < 0.2$
 Weak $0.2 \leq |r| < 0.35$
 Moderate $0.35 \leq |r| < 0.5$
 Strong $|r| \geq 0.5$

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Informativity

Shannon index and Shannon evenness index (Matched sample)

		Hip (3,446 pairs)			Knee (5,428 pairs)		
		EQ-5D-3L	EQ-5D-5L	Ratio (5L/3L)	EQ-5D-3L	EQ-5D-5L	Ratio (5L/3L)
EQ_MO	Shannon index	0.37	1.66	4.49	0.41	1.66	4.05
	Shannon evenness index	0.23	0.72	3.13	0.26	0.71	2.73
EQ_SC	Shannon index	1.06	1.95	1.84	0.86	1.72	2.00
	Shannon evenness index	0.67	0.84	1.25	0.55	0.74	1.35
EQ_UA	Shannon index	1.05	1.86	1.77	0.96	1.89	1.97
	Shannon evenness index	0.66	0.80	1.21	0.60	0.81	1.35
EQ_PD	Shannon index	1.05	1.75	1.67	1.02	1.71	1.68
	Shannon evenness index	0.66	0.75	1.14	0.65	0.74	1.14
EQ_AD	Shannon index	1.24	1.99	1.60	1.23	1.88	1.53
	Shannon evenness index	0.78	0.86	1.10	0.77	0.81	1.05

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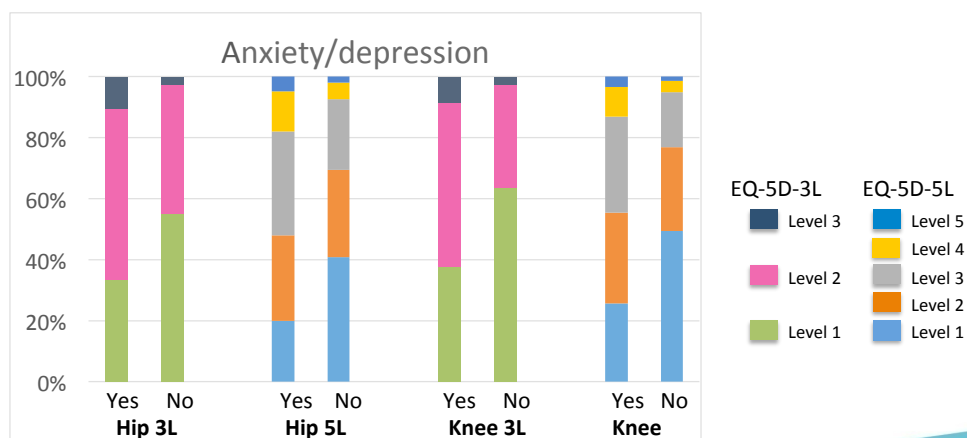
Known Group Validity

- **Age, sex, number of pre-surgery risk factors, obesity, WOMAC domains**
- **Mental health condition** (pre-surgery)
 - Had mental health condition record VS. No mental health condition record
 - Hypothesis: Patients with mental health condition will have lower index score and report more problems on the AD dimension than their counterparts

Mental health condition – index score

Mental health condition	Hip		Knee	
	EQ-5D-3L	EQ-5D-5L	EQ-5D-3L	EQ-5D-5L
Yes	0.483 (0.213)	0.375 (0.248)	0.549 (0.207)	0.466 (0.236)
No	0.550 (0.206)	0.449 (0.239)	0.616 (0.195)	0.530 (0.226)
P-value (rank sum test)	<0.0001	<0.0001	<0.0001	<0.0001

Mental health condition – A/D dimension



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Key Findings

- EQ-5D-3L and -5L have similar ceiling and flooring effects in this patient population.
- Mean and median EQ-5D-5L index scores were lower than those of 3L.
- Responses to EQ-5D-5L dimensions were more evenly distributed than those of the 3L.
- EQ-5D-5L had better convergent construct validity than the 3L.
- The highest improvement in relative discriminatory power, when moving from 3L to 5L, was noticed in the mobility dimension.
- Known-groups validity tests confirmed prior hypotheses.

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