

Cochlear Implant Quality of Life-35 Profile Instrument Scoring Manual

The Cochlear Implant Quality of Life-35 Profile (CIQOL-35 Profile) is a patient-reported outcome measure that was developed to assess the functional ability of adult cochlear users in 6 domains:¹⁻⁶

- Communication: receptive and expressive communication ability in different situations
- Emotional: impact of hearing ability on emotional well-being
- Entertainment: enjoyment and clarity of TV, radio, and music
- Environmental: ability to distinguish and localize environmental sound
- Listening effort: degree of effort and resulting fatigue associated with listening
- Social: ability to interact in groups and to attend and enjoy social functions

The CIQOL-10 Global measure is an additional patient-reported outcome measure that provides a general overall assessment of quality of life in CI users.^{4,6} The CIQOL-10 Global score can be derived from a subset of item-level responses from the CIQOL-35 Profile. .

Participants should be instructed to answer all of the items in the instrument so a comprehensive measurement can be obtained. The CIQOL instruments were developed and validated for adult (ages 18+) cochlear implant users.

Scoring the CIQOL-35 Profile

All items in the instrument utilize the same five answer choices. Individual items can be forward scored where 1=Never, 2=Rarely, 3= Sometimes, 4=Often, 5=Always or reversed scored where 5=Never, 4=Rarely, 3=Sometimes, 2=Often, 1=Always. The table below describes how each item in the CIQOL-35 Profile is assigned to a domain and whether the item should be forward or reversed scored.

Domain (item numbers)	Forward Items	Reversed Items
Communication (1-10)	1,2,3,4,5,7,8,9,10	6
Emotional (11-15)	11	12,13,14,15
Entertainment (16-20)	17,18,19,20	16
Environment (21-25)	21,22,23,24,25	
Listening Effort (26-30)	26,27,28	29,30
Social (31-35)	31,32	33,34,35
Global	1,5,9,11,17,25,26	14,30,33

To calculate the scores for each domain and the Global measure, sum the individual item scores to obtain the raw score. Then use the table below to convert the raw score to the interval-scale score (“outcome measure”) as derived from item-response theory.^{5,6} Each outcome measure score has a standard error (SE) term, which is a statistical measure of variance. The 95% confidence interval around the outcome measure can be calculated from the SE: $95\%CI = \pm(1.96 * SE)$. For example, a communication

raw score of 34 is converted to an outcome measure score of 52.84 with a standard error of 3.18 and 95% CI of ± 6.23 .

Score conversion tables:

Communication:

Raw Score	Outcome Measure	SE	Raw Score	Outcome Measure	SE	Raw Score	Outcome Measure	SE
10	0.0	12.08	24	38.21	3.04	38	59.48	3.37
11	8.61	7.01	25	39.64	3.03	39	61.28	3.43
12	14.22	5.28	26	41.07	3.02	40	63.15	3.51
13	17.91	4.53	27	42.49	3.03	41	65.10	3.58
14	20.78	4.09	28	43.92	3.03	42	67.15	3.68
15	23.19	3.80	29	45.35	3.05	43	69.32	3.78
16	25.31	3.59	30	46.81	3.06	44	71.63	3.93
17	27.23	3.44	31	48.28	3.08	45	74.14	4.12
18	29.01	3.33	32	49.77	3.11	46	76.95	4.40
19	30.69	3.24	33	51.29	3.14	47	80.26	4.85
20	32.28	3.17	34	52.84	3.18	48	84.47	5.63
21	33.82	3.12	35	54.43	3.22	49	90.78	7.37
22	35.31	3.08	36	56.06	3.26	50	100.00	12.32
23	36.77	3.05	37	57.74	3.31			

Emotional:

Raw Score	Outcome Measure	SE	Raw Score	Outcome Measure	SE	Raw Score	Outcome Measure	SE
5	0.0	14.44	12	40.88	5.24	19	66.48	5.20
6	11.12	8.82	13	44.55	5.23	20	70.13	5.24
7	19.08	6.88	14	48.21	5.23	21	73.90	5.39
8	24.62	6.07	15	51.88	5.23	22	78.02	5.72
9	29.20	5.66	16	55.56	5.23	23	82.90	6.43
10	33.30	5.43	17	59.22	5.22	24	89.83	8.28
11	37.16	5.31	18	62.86	5.20	25	100.00	14.07

Entertainment:

Raw Score	Outcome Measure	SE	Raw Score	Outcome Measure	SE	Raw Score	Outcome Measure	SE
5	.00	16.94	12	35.92	5.22	19	60.24	6.10
6	11.48	9.51	13	38.92	5.30	20	64.39	6.26
7	18.55	7.03	14	42.05	5.43	21	68.79	6.49
8	23.13	6.05	15	45.35	5.58	22	73.65	6.91
9	26.76	5.56	16	48.82	5.73	23	79.42	7.77
10	29.96	5.32	17	52.47	5.86	24	87.69	10.07
11	32.96	5.22	18	56.28	5.98	25	100.00	17.26

Environment:

Raw Score	Outcome Measure	SE	Raw Score	Outcome Measure	SE	Raw Score	Outcome Measure	SE
5	.00	13.41	12	34.60	4.92	19	61.22	5.65
6	9.59	7.84	13	38.02	4.97	20	65.74	5.71
7	16.06	6.06	14	41.53	5.04	21	70.36	5.80
8	20.58	5.38	15	45.14	5.11	22	75.26	6.09
9	24.38	5.07	16	48.85	5.20	23	81.01	6.81
10	27.87	4.93	17	52.73	5.34	24	89.06	8.63
11	31.23	4.89	18	56.85	5.51	25	100.00	13.92

Listening Effort:

Raw Score	Outcome Measure	SE	Raw Score	Outcome Measure	SE	Raw Score	Outcome Measure	SE
5	.00	12.60	12	35.05	4.66	19	59.57	5.19
6	9.30	7.54	13	38.30	4.63	20	63.73	5.33
7	15.88	5.95	14	41.53	4.64	21	68.21	5.58
8	20.62	5.33	15	44.82	4.71	22	73.28	6.06
9	24.63	5.02	16	48.24	4.82	23	79.59	6.97
10	28.29	4.84	17	51.83	4.94	24	88.66	8.73
11	31.73	4.73	18	55.61	5.07	25	100.00	13.29

Social:

Raw Score	Outcome Measure	SE	Raw Score	Outcome Measure	SE	Raw Score	Outcome Measure	SE
5	.00	13.64	12	38.61	5.07	19	64.15	5.22
6	10.28	8.25	13	42.20	5.05	20	68.05	5.33
7	17.62	6.49	14	45.79	5.06	21	72.17	5.53
8	22.85	5.79	15	49.40	5.07	22	76.72	5.88
9	27.24	5.43	16	53.03	5.09	23	82.10	6.58
10	31.21	5.23	17	56.68	5.11	24	89.60	8.32
11	34.97	5.12	18	60.38	5.15	25	100.00	13.68

Global:

Raw Score	Outcome Measure	SE	Raw Score	Outcome Measure	SE	Raw Score	Outcome Measure	SE
10	0.0	13.31	24	38.21	3.13	38	58.00	3.36
11	9.14	7.54	25	39.56	3.12	39	59.60	3.42
12	14.86	5.59	26	40.91	3.11	40	61.26	3.50
13	18.53	4.77	27	42.26	3.12	41	63.01	3.59
14	21.36	4.30	28	43.62	3.12	42	64.86	3.71
15	23.74	3.98	29	44.98	3.14	43	66.85	3.87
16	25.82	3.76	30	46.35	3.15	44	69.04	4.07
17	27.69	3.59	31	47.74	3.17	45	71.49	4.34
18	29.42	3.46	32	49.14	3.18	46	74.34	4.73
19	31.03	3.36	33	50.56	3.20	47	77.82	5.31
20	32.57	3.28	34	51.99	3.22	48	82.42	6.27
21	34.03	3.22	35	53.45	3.25	49	89.54	8.31
22	35.45	3.18	36	54.93	3.28	50	100.00	13.84
23	36.84	3.14	37	56.45	3.32			

References:

1. McRackan TR, Bauschard M, Hatch JL, Franko-Tobin E, Droghini HR, Nguyen SA, Dubno JR. Meta-analysis of quality-of-life improvement after cochlear implantation and associations with speech recognition abilities. *Laryngoscope*. 2018;128(4):982-90. PMID: 28731538; PMCID: PMC5776066.
2. McRackan TR, Bauschard M, Hatch JL, Franko-Tobin E, Droghini HR, Velozo CA, Nguyen SA, Dubno JR. Meta-analysis of Cochlear Implantation Outcomes Evaluated With General Health-related Patient-reported Outcome Measures. *Otol Neurotol*. 2018;39(1):29-36. PMID: 29227446; PMCID: PMC5728184.
3. McRackan TR, Velozo CA, Holcomb MA, Camposeo EL, Hatch JL, Meyer TA, Lambert PR, Melvin CL, Dubno JR. Use of Adult Patient Focus Groups to Develop the Initial Item Bank for a Cochlear Implant Quality-of-Life Instrument. *JAMA Otolaryngol Head Neck Surg*. 2017;143(10):975-82. PMID: 28772297; PMCID: PMC5710256.
4. McRackan TR, Hand BN, Velozo CA, Dubno JR, Cochlear Implant Quality of Life Development Consortium. Development of the Cochlear Implant Quality of Life Item Bank. *Ear Hear*. 2018 (epub ahead of print). PubMed PMID: 30531259.
5. McRackan TR, Hand BN, Velozo CA, Dubno JR. Association of Demographic and Hearing-Related Factors With Cochlear Implant-Related Quality of Life. *JAMA-Otolaryngology-Head and Neck Surgery*. 2019 (epub ahead of print).
6. McRackan TR, Hand BN, Cochlear Implant Quality of Life Development Consortium Velozo CA, Dubno JR. Cochlear Implant-Quality of Life (CIQOL): Development of a profile instrument (CIQOL-35 Profile) and a global measure (CIQOL-10 Global). *J Speech Lang Hear Res*. 2019 (in press).