

Scoring Instructions for the Expanded Prostate cancer Index Composite (EPIC)*

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The **Expanded Prostate cancer Index Composite (EPIC)** was developed by researchers at University of Michigan and UCLA to measure health related quality of life among men with prostate cancer.¹ It represents an adaptation of the UCLA Prostate Cancer Index,² modified to enhance sensitivity to therapy effects by increasing the number of prostate-targeted items to 50 (compared to 20 in the original UCLA-PCI). EPIC has been validated in men with localized prostate cancer who underwent surgery, external beam radiation, or brachytherapy with or without the use of hormonal adjuvants. EPIC is sensitive to specific HRQOL effects of these therapies and to HRQOL effects of cancer progression.³

EPIC assesses the disease-specific aspects of prostate cancer and its therapies and comprises four summary domains (Urinary, Bowel, Sexual and Hormonal). Factor analysis supports dividing the Urinary Domain Summary Score into two distinct *Incontinence* and *Irritative/Obstructive* subscales. In addition, each Domain Summary Score has measurable *Function Subscale* and *Bother Subscale* components. Response options for each EPIC item form a Likert scale, and multi-item scale scores are transformed linearly to a 0-100 scale (see following page: EPIC scoring), with higher scores representing better HRQOL. A summary of EPIC Summary Score and Subscale characteristics are tabulated (from Ref. 1):

HRQOL Domain	Number of items	Mean Score (sd)	Test-retest reliability	Internal consistency reliability
<u>HRQOL Domain Summary Scores</u>				
Urinary	12	80.2 (17.5)	0.88	0.88
Bowel	14	86.6 (15.7)	0.84	0.92
Sexual	13	33.1 (23.6)	0.91	0.93
Hormonal	11	86.6 (13.8)	0.80	0.82
<u>Domain-Specific HRQOL Subscales</u>				
Urinary Subscales				
[Function	5	86.5 (16.7)	0.83	0.69
[Bother	7	75.8 (20.4)	0.87	0.85
[Incontinence*	4	83.2 (22.9)	0.87	0.89
[Irritative/Obstructive*	7	79.7 (18.5)	0.85	0.81
Bowel Subscales				
Function	7	87.9 (13.6)	0.78	0.75
Bother	7	85.3 (18.8)	0.85	0.90
Sexual Subscales				
Function	9	29.5 (24.0)	0.90	0.92
Bother	4	41.1 (30.1)	0.78	0.84
Hormonal Subscales				
Function	5	84.0 (15.3)	0.79	0.51
Bother	6	88.7 (13.6)	0.73	0.73

* A single global urinary bother item, which does not distinguish bother related to incontinence from that related to urinary obstruction, is not included in the Urinary Incontinence or Urinary Irritative/Obstructive subscales; therefore, 11 urinary items comprise these 2 subscales whereas the Urinary Summary Domain includes 12 items.

EPIC can be used alone or combined with other instruments, including the AUA-SI, FACT-P, and Medical Outcomes Study SF-12 or SF-36. Inter-scale correlation between EPIC and these instruments has indicated that efficient (yet comprehensive) HRQOL assessment can be achieved by co-administering EPIC with SF-12.⁴ Concurrent use of the AUA-SI can also provide useful complementary clinical information.⁵ The following scoring instructions therefore assume that EPIC will be co-administered with SF-12 and the AUA-SI, with these 3 instruments combined according to the following format:

SF-12 General Health Function Survey (first 12 items):	Items 11-22
EPIC (subsequent 50 items excluding 7 AUA-SI items):	Items 23-34, 42-79
AUA Symptom Index (7 items embedded in EPIC Urinary Section):	Items 35-41

Scoring the EPIC

There are 2 steps involved in scoring EPIC:

Step 1. The response for each item is standardized to a 0 to 100 scale according to the table below.

Item Number	Item Response Value	Standardized Value
23,24,25,42,43,48,56,57,58,60,61, 62,63,64,69,70,71,72	1	0
	2	25
	3	50
	4	75
	5	100
26,59	1	0
	2	33
	3	67
	4	100
27	0	100
	1	67
	2	33
28,29,30,31,32,33,49,50,51,52,53, 54,65,66,67,74,75,76,77,78,79	3	0
	0	100
	1	75
	2	50
	3	25
34,44,45,46,55,68	4	0
	1	100
	2	75
	3	50
	4	25
47	5	0
	1	100
	2	50
	3	0
73	0	100
	1	0
	2	50
	3	100
	4	50
	5	0

Step 2. Using the item groupings listed below for each HRQOL Domain Summary Score or Subscale score, average the standardized values (see Step 1, above) for all items within a group to create the summary or subscale score. (If $\geq 20\%$ of the items that comprise a domain summary score or subscale score are missing a response, the corresponding domain summary or subscale score can not be calculated).

To calculate the following HRQOL domain Summary Score or Subscale Score:	Determine the average of the Standardized Values (see Step 1, above) for the following items:	Number of non-missing items needed to compute score (otherwise, set score to missing)
<u>HRQOL Domain Summary Scores</u>		
Urinary Summary	23-34	10
Bowel Summary	42-55	12
Sexual Summary	56-68	11
Hormonal Summary	69-79	9
<u>Domain-specific HRQOL Subscales</u>		
Urinary Subscales:		
Function	23-27	4
Bother	28-34	6
Incontinence	23,26-28	4
Irritative/Obstructive	24,25,29-33	6
Bowel Subscales:		
Function	42-48	6
Bother	49-55	6
Sexual Subscales:		
Function	56-64	8
Bother	65-68	4
Hormonal Subscales:		
Function	69-73	4
Bother	74-79	5

Please note:

- Item numbers are indicated along the right border of the questionnaire (question numbers on left of questionnaire pages are not used for scoring because some questions contain multiple items).
- The **AUA Symptom Index** (AUA-SI) is included to provide a clinical context for EPIC urinary measures.⁵ However, the seven AUA-SI items are not included in the calculation of any EPIC domain scores. For ease of reference, scoring instructions for the AUA-SI are provided in the Appendix below.
- The **Medical Outcomes Study SF-12** is a validated measure of General Health Function developed by RAND.⁴ It is intended to be used here to derive 2 summary scores (physical and mental component summaries) relevant to general HRQOL status, which provide a context for EPIC score results. The SF-12 items themselves are not included in the calculation of any EPIC domain scores. For ease of reference, scoring instructions for the SF-12 are provided in the Appendix below.
- Optional satisfaction and socio-demographic/medical history items (Items 80-117) from the original UCLA-PCI can be administered with EPIC. These items are not included in any EPIC domain score calculations.

REFERENCES

- (1) Wei JT, Dunn R, Litwin M, Sandler H, Sanda MG. Development and Validation of the Expanded Prostate Cancer Index Composite (EPIC) for Comprehensive Assessment of Health-Related Quality of Life in Men with Prostate Cancer. *Urology* 2000; In press.
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- (3) Sanda MG, Dunn RL, Sandler HM, McLaughlin PW, Montie JE, and Wei JT. Comparison of HRQOL after brachytherapy, radical prostatectomy, or external beam radiation for localized prostate cancer. *ASCO Proceedings* 2000; 19:327a.
- (4) Ware JE, Keller SD, Kosinski M. SF-12: How to Score the SF-12 Physical and Mental Health Summary Scales. Second ed. Boston: The Health Institute, New England Medical Center, 1995.
- (5) Barry MJ, Fowler FJ, Jr., O'Leary MP, Bruskewitz RC, Holtgrewe HL, Mebust WK et al. The American Urological Association symptom index for benign prostatic hyperplasia. The Measurement Committee of the American Urological Association. *Journal of Urology* 1992; 148(5):1549-57; discussion 1564.

APPENDIX: Scoring the AUA-SI and SF-12

Scoring the AUA Symptom Index:

The sum of the raw values for items 35-41 provides the total AUA symptom score.⁵

Scoring the Medical Outcomes Study SF-12:

There are 3 steps involved in calculating the SF-12 Physical Component Summary (PCS) and Mental Component Summary (MCS) scores.

- Step 1.** Check for missing or out-of-range values for items 11-22 (SF-12 portion of combined survey). If any missing or out-of-range values are found for those items, the PCS and MCS scores can not be calculated.
- Step 2.** Convert each item response into both physical and mental standardized values according to the table on the following page.
- Step 3.** Sum the physical standardized values from step 2 across all 12 items and add 56.57706 to create the SF-12 PCS score. Sum the mental standardized values in similar fashion and add 60.75781 to create the SF-12 MCS score.

Converting SF-12 Item Responses to Physical and Mental Standardized Values:

Item Number	Item Response Value	Physical Standardized Value	Mental Standardized Value
11 (General Health)	1	0	0
	2	-1.31872	-0.06064
	3	-3.02396	0.03482
	4	-5.56461	-0.16891
	5	-8.37399	-1.71175
12 (Moderate Activities)	1	-7.23216	3.93115
	2	-3.45555	1.86840
	3	0	0
13 (Climbing Several Flights of Stairs)	1	-6.24397	2.68282
	2	-2.73557	1.43103
	3	0	0
14 (Accomplish less than you would like)	1	-4.61617	1.44060
	2	0	0
15 (Limited in the kind of activities)	1	-5.51747	1.66968
	2	0	0
16 (Accomplish less than you would like)	1	3.04365	-6.82672
	2	0	0
17 (Didn't do activities as carefully as usual)	1	2.32091	-5.69921
	2	0	0
18 (Pain interferes with normal work)	1	0	0
	2	-3.80130	0.90384
	3	-6.50522	1.49384
	4	-8.38063	1.76691
	5	-11.25544	1.48619
19 (Felt calm and peaceful)	1	0	0
	2	0.66514	-1.94949
	3	1.36689	-4.09842
	4	2.37241	-6.31121
	5	2.90426	-7.92717
	6	3.46638	-10.19085
20 (Have a lot of energy)	1	0	0
	2	-0.42251	-0.92057
	3	-1.14387	-1.65178
	4	-1.61850	-3.29805
	5	-2.02168	-4.88962
	6	-2.44706	-6.02409
21 (Felt downhearted and blue)	1	4.61446	-16.15395
	2	3.41593	-10.77911
	3	2.34247	-8.09914
	4	1.28044	-4.59055
	5	0.41188	-1.95934
	6	0	0
22 (Health interferes w/social activities)	1	-0.33682	-6.29724
	2	-0.94342	-8.26066
	3	-0.18043	-5.63286
	4	0.11038	-3.13896
	5	0	0