

**Adjustments for Mode and Language for the SF-36® or VR-12
in the SEER-MHOS Data Resource:
A User's Guide**

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Goal of User's Guide

The goal of this user's guide is to present an approach to adjusting observed VR-12 and SF-36v.1® (MOS) scores obtained with the administration modes of self-report by phone ("self-report/phone"), proxy response by mail ("proxy/mail") and proxy response by phone ("proxy/phone") and the languages of Spanish and Chinese so that they are commensurate with scores that would have been obtained if the same respondents had used self-report by mail ("self-report/mail") in English. Responding to these surveys by self-report/phone, proxy/mail, or proxy/phone or in the Spanish or Chinese language typically results in an observed health status that is different from the health status that would be expected if the survey respondent had used self-report/mail in English. We refer to the difference in scores related to mode or language as the reporting bias.

We developed models to estimate average reporting biases for each of the "alternative" modes (self-report/phone, proxy/mail, proxy/phone) and languages (Spanish, Chinese). The estimated values of reporting bias for a given mode and language can then be subtracted from the observed score obtained in an alternative mode or language so that the score is more commensurate with the score that would have been obtained in English using self-report/mail. Details of the rationale and specific derivation of the methods for this approach are contained in the technical report made available by the National Cancer Institute.¹

Implementation of Adjustments for Mode and Language

This operational user's guide gives the estimated reporting bias values for this approach in the tables below. While the mode and language reporting bias values were calculated in our models for individual VR-12 and corresponding SF-36v.1 items, the values also can be used to calculate mode and language adjustments for scale scores and the two summary scores, PCS and MCS. Calculation for the scale scores is relatively straightforward. For four of the VR-12 scales that consist of single items, the scale adjustment is the same as the item adjustment. For the VR-12 scales comprised of two items, the adjustment for each of the corresponding items can be averaged. While SF-36v.1 scales are comprised of additional items to those of the VR-12, the scale adjustments based on the one or two-item VR-12 scales may be reasonable adjustments for the corresponding SF-36v.1 scales based on the full set of SF-36v.1 items. For adjustment of VR-12 PCS and MCS scores, our approach is to use the formula from which each summary score is calculated from the individual items or scales and to substitute the mode adjustment value in place of the item or scale value in the formulas. The reporting biases for PCS, MCS and the 8 scales in the tables below are based on these approaches. The reporting bias adjustments for PCS and MCS based on the items and scales in the VR-12, as indicated in the tables below, are estimates to use as reporting bias adjustments for the SF-36v.1 (MOS) PCS and MCS scores when those summary scores are scored in the usual manner. It should be noted that the reporting bias adjustments were derived from MHOS cohorts 1-12 and do not necessarily apply to settings outside the MHOS.

The estimated reporting bias values in Tables 1 and 2 below for different modes of administration should be subtracted from the observed individual-level item scores, PCS/MCS, and the 8 scales obtained by self-report/phone, proxy/mail and proxy/phone from the MHOS surveys, to make them more commensurate with scores that would have been obtained by self-report/mail as the reference.

The estimated reporting bias values in Tables 3 and 4 below for language in the columns under Spanish and Chinese should be subtracted from the observed individual-level item scores, PCS/MCS, and the 8 scales obtained in these other languages from the MHOS surveys, to make them more commensurate with scores that would be obtained from the English language version as the reference.

The appendix to this guide contains SAS programs that provide SF-36 and VR-12 scores for MHOS cohorts 1-12 that have been adjusted for reporting bias for mode and language. The calculated scores include PCS, MCS, 8 scales, and 12 items common to the SF-36 and VR-12. Prior to adjustment for reporting bias, each of the scores was calculated in a manner that would provide the best comparability between scores based on the SF-36 and that of the VR-12. For PCS and MCS, this involved scoring using Modified Regression Estimates (MRE). The SEER-MHOS datasets currently contain MRE-based scores for all cohorts, but they have been calculated in different ways for SF-36-era and VR-12-era surveys. For SF-36 surveys, the MRE-based scores (PCS12 and MCS12) were based on the 12 questions common to the SF-36 and VR-12 using an MRE algorithm based on mail surveys. To account for telephone surveys (whether self-report or proxy), an offset was subtracted from the calculated scores (1.9 for PCS and 4.5 for MCS). For VR-12 surveys, there were separate MRE algorithms for the mail and telephone surveys (but neither accounted for proxy). Therefore, in order to apply the new reporting bias corrections, it was first necessary to obtain MRE scores for both SF-36 and VR-12 era surveys that were based on mail administration. For the SF-36 era, this required adding back the telephone offsets to the calculated values currently in the SEER-MHOS datasets. For the VR-12 era, this required calculating the mail version MRE for all respondents. For scales and items, rescaling of items was performed in a manner that provided the best match across a range of possible MHOS subsamples using a metric we have referred to as “extensibility”, as described in a prior technical report submitted to NCI in 2016.² The steps in the SAS program can be summarized as follows:

1. Calculate PCS MCS scores in mail survey mode for all survey respondents in dataset Noseer_ch1to12 and name them PCS_m and MCS_m.

For SF-36 cohort 1-8 baseline and cohort 1-6 follow-up: use embedded missing imputed norm 90 SF-36 to VR-12 equivalent scores PCS12 and MCS12 and remove existing telephone offsets.

IF survey is a mailed survey then $PCS_m = PCS12$

IF survey is a mailed survey then $MCS_m = MCS12$

IF survey is a telephone survey then $PCS_m = PCS12 + 1.9$

IF survey is mail telephone then MCS_m = MCS12 + 4.5

For VR-12 cohort 9-12 and 7-8 follow-up:

Re-impute VR-12 scores with mail survey coefficients and name the scores PCS_m and MCS_m.

The SAS program scale.sas and coefficients files - two SAS datasets

pcs90_vr12_mar14_native_mail and mcs90_vr12_mar14_native_mail are used to impute VR-12 scores.

2. Using MHOS SF-36 and VR-12 items that were rescored to best match SF-36 scales, calculate the 8 scales for both the SF-36 and VR-12 era surveys;
3. Obtain values for the 12 SF-36 items that have been rescored to best match corresponding VR-12 items that were previously rescored to match SF-36 scales;
4. Calculate adjusted PCS MCS, 8 scales and VR-12/SF-12[®] items by phone, proxy, phone/proxy, and Chinese, Spanish languages with new offsets values and save the results – adjusted PCS/MCS scores, 8 scales and SF-12 items along with original variables LinkID Cohort Srvttype Svlang Srvdsp and Whocmp in new dataset AdjustedScores_PPL.

Table 1. Estimated reporting bias* for survey modes relative to self-report/mail for VR-12 Items and corresponding SF-36v.1 items

Item	Variable	Self-report/ Phone	Proxy/mail	Proxy/phone
Moderate Activities	pf2	3.0	-2.0	-1.2
Climbing several flights of stairs	pf4	2.6	-2.0	-0.2
PH Limiting Amount Accomplished	rp2	10.7	0.5	10.4
PH Limiting the Kind of Activities	rp3	9.9	1.4	10.9
Pain Interfering with Work	bp2	3.2	-1.5	2.0
General Health	gh1	-0.8	-0.4	-0.2
A lot of energy	vt2	3.2	-3.0	1.1
Time PH or EP Interfered with Social Activities	sf2	1.1	-1.6	1.6
Emotional Problems Limiting Accomplished	re2	11.0	4.1	15.2
Emotional Problems Limiting Carefulness	re3	15.7	0	17.8
Calm and Peaceful	mh3	2.3	-3.4	2.0
Downhearted and Blue	mh4	0.8	-0.3	0.8

*Bias values should be subtracted from the corresponding item scores, thus a positive bias value represents a decrease in the item score and a negative value represents an increase.

Table 2. Estimated reporting bias* for survey modes relative to self-report/mail for PCS and MCS and 8 scales

	Self-report/Phone	Proxy/Mail	Proxy/Phone
Summaries			
PCS	2.8	-1.2	0.6
MCS	5.4	-0.6	7.2
Scales			
PF	2.8	-2.0	-0.7
RP	10.3	1.0	10.7
RE	13.4	2.1	16.5
MH	1.6	-1.9	1.4
BP	3.2	-1.5	2.0
GH	-0.8	-0.4	-0.2
VT	3.2	-3.0	1.1
SF	1.1	-1.6	1.6

*Bias values should be subtracted from the corresponding summary and scale scores, thus a positive bias value represents a decrease in the score and a negative value represents an increase.

Table 3. Estimated Reporting Bias by Survey Language Relative to English for Individual VR-12 Items and Corresponding SF-36v.1 Items

		Spanish	Chinese
	Item	Variable	
	Moderate Activities	PF2	2.7
	Climbing several flights of stairs	PF4	2.0
	PH Limiting Amount Accomplished	RP2	-1.4
	PH Limiting the Kind of Activities	RP3	-0.2
	Pain Interfering with Work	BP2	1.1
	General Health	GH1	0.7
	A lot of energy	VT2	9.1
	Time PH or EP Interfered with Social Activities	SF2	-2.2
	Emotional Problems Limiting Accomplished	RE2	-5.0
	Emotional Problems Limiting Carefulness	RE3	5.6
	Calm and Peaceful	MH3	5.3
	Downhearted and Blue	MH4	-8.4

*Bias values should be subtracted from the corresponding item scores, thus a positive bias value represents a decrease in the item score and a negative value represents an increase.

Table 4. Estimated Reporting Bias by Survey Language Relative to English for PCS, MCS and 8 scales

		Spanish	Chinese
Summaries			
Physical Health Summary Scale	PCS	1.8	-5.0
Mental Health Summary Scale	MCS	0.4	-10.7
Scales			
Physical Functioning	PF	2.3	-1.1
Role Physical	RP	-0.8	-13.9
Role Emotional	RE	0.3	-17.6
Mental Health	MH	-1.6	-7.1
Bodily Pain	BP	1.1	-4.3
General Health	GH	0.7	-12.1
Vitality	VT	9.1	-6.3
Social Functioning	SF	-2.2	-2.8

*Bias values should be subtracted from the corresponding summary and scale scores, thus a positive bias value represents a decrease in the score and a negative value represents an increase.

REFERENCES

1. Rogers W, Rothendler J, Selim A, Qian S, Kazis LE. Adjustments for Mode and Language for the SF-36 or VR-12 in the SEER-MHOS Data Resource. A technical Report submitted to the National Cancer Institute Outcomes Research Branch/ Healthcare Delivery Research Program, Division of Cancer Control and Population Sciences, National Cancer Institute, May 31, 2017.
2. Rogers W, Rothendler J, Selim A, Qian S, Kazis LE. Item to Item Bridges Between the SF-36 and VR-12 Health Surveys in the SEER-MHOS Data Resource. A technical Report submitted to the National Cancer Institute Outcomes Research Branch/ Healthcare Delivery Research Program, Division of Cancer Control and Population Sciences, National Cancer Institute, December, 2016.