

### Description of the Sampling Procedure

The RAND-36 HSI normative information presented in this Manual is based on a national standardization sample of 800 respondents representative of the U.S. population of adults aged 18–89 years. A stratified sampling plan ensured that the standardization samples included representative proportions of adults according to each selected demographic variable. An analysis of the data gathered by the U.S. Bureau of the Census (1993) provided the basis for stratification by race/ethnicity and education level within age group. Due to the well-established findings that many health status constructs vary by age, two standardization samples were developed, the age-based sample, which was stratified *within* age group, and the age-stratified sample, which was stratified *across* age groups. In this way, an individual's health status may be interpreted relative both to a representative sample of adults in the individual's age cohort and to a representative U.S. population of adults in general.

First, the standardization sampling plan ensured that all age groups were sufficiently represented and, therefore, that the norms adequately represented each group. The standardization sample included equal numbers of participants by sex ( $n = 100$  per sex) within each of the four age groups, 18–24, 25–44, 45–64, and  $\geq 65$  years. Each age group was also stratified by race/ethnicity and level of education according to U.S. population proportions. Thus, four age groups of 200 participants each composed the total age-based standardization sample of 800. Age-specific *T*-score norms and descriptive cumulative percentages are based on the data from this sample. (The norming procedure is discussed in Chapter 4; raw-score-to-*T*-score norms tables and cumulative percentage data are presented in Appendixes B and C, respectively.)

Second, for the purpose of standardization across age groups, a subsample of 500 participants was selected and stratified by age, race/ethnicity, and educational level according to U.S. population proportions. The required number of participants for each demographic variable was randomly selected from the total age-based standardization sample. The subsample included 255 female and 245 male participants. Data from this age-stratified sample were used to generate norms for the overall population and by sex.

Thus, the age-based normative sample included 200 participants in each age group, whereas the age-stratified sample included the same percentages of individuals in each age group as existed in the U.S. population. The age-based sample was stratified by race/ethnicity and educational level within each of the four age bands; the age-stratified sample was stratified by age, race/ethnicity, and educational level across that total sample. Use of the age-based norms yields a score that reflects the person's standing relative to others in the same age group. Use of the age-stratified norms yields a score that reflects the person's standing relative to the total population or to the total population of men or women. The provision of both age-based specific and general norms reflects the reality that health status may be viewed both from the perspective of what is characteristic at given points within the life cycle and from the perspective of changes that occur across the life cycle.

Regional geographic representation was controlled by the selection of 100 individuals in each of eight cities in four different regions of the country. In each of the four regions, two cities were selected, one larger and one smaller. Participants were initially selected by random telephone calling. Potential participants were screened by telephone, and those selected participated in small groups assembled by professional marketing research firms. Each participant received monetary reimbursement for 1–2 hours of participation. Each responded to a questionnaire developed by The Psychological Corporation, which consisted of several test instruments and demographic and life-history items.

McHorney, Ware, et al. (1994) have raised the issue that generalization from previous studies posed difficulties due to differences in data completeness among groups such as racial/ethnic minorities, older persons, and socioeconomically disadvantaged persons. For the standardization of the RAND–36 HSI reported in this Manual, this potential problem was addressed, first, by the initial stratification criteria for sample selection and, second, by the systematic replacement of cases with missing data with demographically matched cases.

### **Demographic Characteristics of the Age-Based Sample**

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Table 2.1 presents the racial/ethnic characteristics of the RAND–36 HSI age-based standardization sample and the U.S. population by age group. Table 2.2 presents the educational characteristics of the age-based sample and the U.S. population by age group. Table 2.3 presents the median ages of the RAND–36 HSI age-based sample by age group and sex. The data in Table 2.3 show that the median age for each age group is close to the center of each age band and is comparable for female and male participants.

**Table 2.1. Percentages of the RAND-36 HSI Age-Based Standardization Sample and the U.S. Population by Race/Ethnicity**

Age Group	White	African American	Hispanic	Other
<b>18-24</b>				
RAND-36 HSI	70.0	14.5	12.0	3.5
U.S. Population	69.9	14.5	11.7	3.9
<b>25-44</b>				
RAND-36 HSI	75.0	12.0	9.0	4.0
U.S. Population	74.4	12.2	9.4	4.0
<b>45-64</b>				
RAND-36 HSI	80.5	10.0	6.5	3.0
U.S. Population	79.8	10.2	6.7	3.3
<b>≥65</b>				
RAND-36 HSI	87.0	8.5	3.5	1.0
U.S. Population	85.2	8.6	4.0	2.2

Note. N = 800; for each age group, n = 200 (100 female and 100 male participants). U.S. population data are from the *Current Population Survey, March 1993, on CD-ROM [CD-ROM]* by U.S. Bureau of the Census, 1993, Washington, DC: U.S. Bureau of the Census [Producer/Distributor].

**Table 2.2. Percentages of the RAND-36 HSI Age-Based Standardization Sample and the U.S. Population by Education Level**

Age Group	Years of Education		
	≤12 Years	13-15 Years	≥16 Years
<b>18-24</b>			
RAND-36 HSI	56.0	37.0	7.0
U.S. Population	52.4	39.8	7.8
<b>25-44</b>			
RAND-36 HSI	46.5	28.0	25.5
U.S. Population	47.0	27.6	25.4
<b>45-64</b>			
RAND-36 HSI	57.5	19.5	23.0
U.S. Population	56.2	21.2	22.6
<b>≥65</b>			
RAND-36 HSI	67.0	18.0	15.0
U.S. Population	73.8	14.2	12.1

Note. N = 800; for each age group, n = 200 (100 female and 100 male participants). U.S. population data are from the *Current Population Survey, March 1993, on CD-ROM [CD-ROM]* by U.S. Bureau of the Census, 1993, Washington, DC: U.S. Bureau of the Census [Producer/Distributor]. Due to rounding, percentages may not sum to 100.

**Table 2.3. Median Ages of the RAND-36 HSI Age-Based Standardization Sample by Age Group and Sex**

Age Group	Combined	Female	Male
18-24	20.0	20.5	20.0
25-44	34.0	36.0	33.0
45-64	53.0	52.0	55.0
≥65	72.0	71.0	73.0

Note.  $N = 800$ ; for each age group,  $n = 200$  (100 female and 100 male participants).

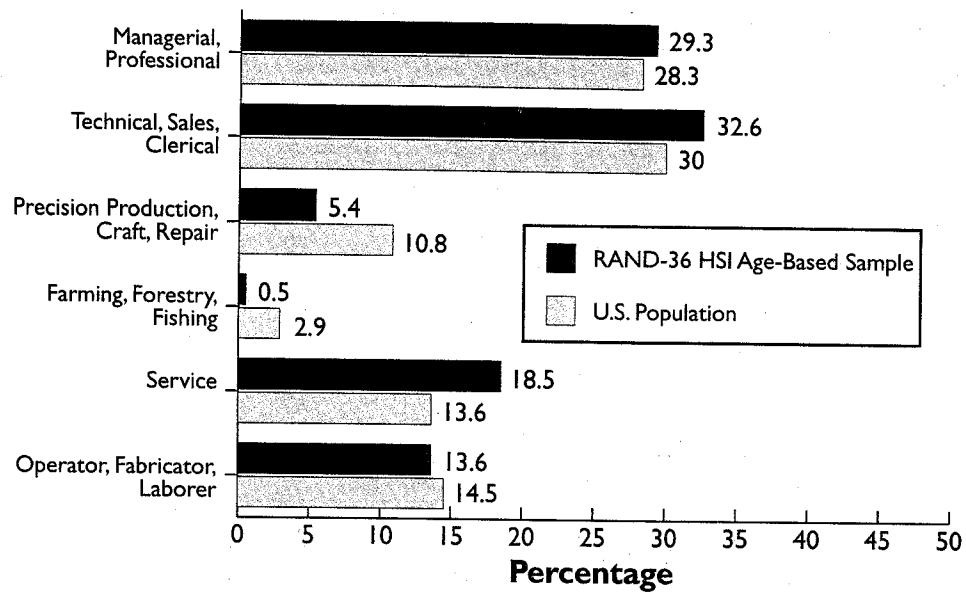
Table 2.4 presents the percentages of unemployed participants in the RAND-36 HSI age-based standardization sample and the U.S. population by total sample and by sex. Figure 2.1 graphically presents the occupational characteristics of the RAND-36 HSI age-based sample compared with the U.S. population characteristics. Although the standardization sample was not selected according to occupational characteristics, it was important to ensure that the sample was representative of the U.S. population in this respect.

**Table 2.4. Percentages of Unemployed Participants in the RAND-36 HSI Age-Based Standardization Sample and the U.S. Population by Sex**

Sample	Combined	Female	Male
RAND-36 HSI	5.8	5.3	6.3
U.S. Population	5.6	5.6	5.6

Note.  $N = 800$ ; for each age group,  $n = 200$  (100 female and 100 male participants). U.S. employment data for civilian noninstitutional population 16 years old and older are from the *Statistical Abstract of the United States 1995*, by U.S. Bureau of the Census, 1995, Washington, DC: Author.

**Figure 2.1. Percentages of the RAND-36 HSI Age-Based Standardization Sample and the U.S. Population by Occupation**



Note. N = 800 (400 female and 400 male participants). U.S. employment data for civilian noninstitutional population 16 years old and older are from the *Statistical Abstract of the United States 1995*, by U.S. Bureau of the Census, 1995, Washington, DC: Author.

## **Demographic Characteristics of the Age-Stratified Sample**

As stated previously, the age-stratified sample was specifically designed to represent the U.S. population distribution by age for the development of age-stratified norms. Table 2.5 presents the distribution of the age-stratified sample and the U.S. population by age group and sex. Table 2.6 presents the distribution of the age-stratified sample and the U.S. population by race/ethnicity and sex. Table 2.7 presents the distribution of the age-stratified sample and the U.S. population by education level and sex. As the data in these tables show, the proportions of the RAND-36 HSI age-stratified sample closely matched those of the U.S. population on the selected demographic variables.

**Table 2.5. Percentages of the RAND-36 HSI Age-Stratified Sample and the U.S. Population by Age Group and Sex**

Age Group	Overall	Female	Male	U.S. Population
18-24	15.0	14.5	15.5	13.0
25-44	40.0	39.2	40.8	43.9
45-64	27.0	26.7	27.4	26.6
≥65	18.0	19.6	16.3	16.5

Note. *N* = 500 for the overall sample. U.S. population data are from the *Current Population Survey, March 1993, on CD-ROM [CD-ROM]* by U.S. Bureau of the Census, 1993, Washington, DC: U.S. Bureau of the Census [Producer/Distributor].

**Table 2.6. Percentages of the RAND-36 HSI Age-Stratified Sample and the U.S. Population by Race/Ethnicity and Sex**

Race/Ethnicity	Overall	Female	Male	U.S. Population
White	77.6	78.4	76.7	77.0
African American	11.2	11.0	11.4	11.4
Hispanic	8.0	8.2	7.8	8.1
Other	3.2	2.4	4.1	3.5

Note. *N* = 500 for the overall sample. U.S. population data are from the *Current Population Survey, March 1993, on CD-ROM [CD-ROM]* by U.S. Bureau of the Census, 1993, Washington, DC: U.S. Bureau of the Census [Producer/Distributor].

**Table 2.7. Percentages of the RAND-36 HSI Age-Stratified Sample and the U.S. Population by Education Level and Sex**

Education Level	Overall	Female	Male	U.S. Population
≤12 Years	55.0	52.9	57.1	54.6
13-15 Years	25.4	27.1	23.7	25.3
≥16 Years	19.6	20.0	19.2	20.2

Note. *N* = 500 for the overall sample. U.S. population data are from the *Current Population Survey, March 1993, on CD-ROM [CD-ROM]* by U.S. Bureau of the Census, 1993, Washington, DC: U.S. Bureau of the Census [Producer/Distributor].

## Disability Status and Physical Conditions

The RAND-36 HSI sampling procedure described previously also provided for limited screening for physical health. Specifically, participants had to be sufficiently ambulatory to travel or to be transported to the testing site and had to have adequate visual and hearing acuity to participate in the testing. Although the standardization sample was nonclinical, some medically diagnosed physical conditions were anticipated. Self-reported disabilities in vision, hearing, and mobility and the presence of other physically disabling conditions were

queried as part of the initial questionnaire. Table 2.8 presents percentages of those having a visual, auditory, mobility, or other type of disability by age group for those in the age-based sample and by sex for the age-stratified sample. From these data, it can be concluded that the standardization samples (both age-based and age-stratified), although nonclinical, have some representation of nondebilitating disabilities.

**Table 2.8. Percentages of RAND-36 HSI Participants Reporting Disabilities**

Group	Type of Disability			
	Visual	Auditory	Mobility	Other <sup>a</sup>
<b>Age-Based Sample</b>				
18-24 (n = 200)	5.0	0.5	1.0	1.0
25-44 (n = 200)	6.0	0.5	3.5	1.0
45-64 (n = 200)	5.5	2.0	4.5	5.5
≥65 (n = 200)	6.0	8.0	6.0	5.0
<b>Age-Stratified Sample</b>				
Overall (N = 500)	4.8	2.0	3.6	2.8
Female (n = 255)	3.9	1.6	2.7	1.6
Male (n = 245)	5.7	2.4	4.5	4.1

Note. Disability categories are not mutually exclusive.

<sup>a</sup>Type of disability was unspecified.

Table 2.9 presents a list of the physical conditions queried during the standardization study and the percentages of the participants reporting each symptom. Data are presented for the age-based sample by age group and for the age-stratified sample overall and by sex. Also indicated is the mean level of self-reported severity of interference in functioning experienced for each condition. The severity of interference is based on a scale from 1 (*diagnosed, no interference*) to 4 (*diagnosed, severe interference*). Mean severity of interference was calculated only for those participants who indicated the presence of the physical condition. Disability status and self-reported physical conditions reported here were used to define criterion groups for construct validation of the RAND-36 HSI measures. The relationship of disability status and physical condition to RAND-36 HSI scales is described further in Chapter 5.

**Table 2.9. Percentages of Physical Conditions and Mean Level of Interference in Functioning Reported by RAND-36 HSI Standardization Participants**

Physical Condition	Age-Stratified Sample													
	Age-Based Sample						Overall							
	18-24 Years (n = 200)		25-44 Years (n = 200)		45-64 Years (n = 200)		≥65 Years (n = 200)		Overall (n = 500)		Female (n = 255)		Male (n = 245)	
%	Mean	%	Mean	%	Mean	%	Mean	%	Mean	%	Mean	%	Mean	
Back Trouble/Pain/Dislocation	10.5	2.05	15.0	2.30	15.5	2.39	17.0	2.18	14.6	2.34	14.9	2.32	14.3	2.37
High Blood Pressure	1.5	1.00	6.0	1.17	19.5	1.18	24.0	1.25	10.6	1.19	9.8	1.32	11.4	1.07
Arthritis	2.5	1.80	3.0	2.00	11.5	1.87	24.5	1.63	8.2	1.73	10.6	1.81	5.7	1.57
Asthma	9.0	1.83	6.0	1.33	4.5	1.44	4.0	1.75	6.0	1.43	7.5	1.53	4.5	1.27
Heart Problem	3.5	1.43	2.0	1.00	9.0	1.78	11.5	1.70	5.6	1.64	4.7	1.58	6.5	1.69
Diabetes	3.0	1.33	3.0	1.83	7.5	1.53	11.5	1.78	4.6	1.83	3.5	2.33	5.7	1.50
Thyroid Problem	2.0	1.25	2.5	1.20	4.5	1.22	6.5	1.00	4.2	1.19	5.9	1.13	2.4	1.33
Irritable Bowel Syndrome	3.0	1.67	5.5	1.73	4.0	1.38	3.0	1.50	4.0	1.55	5.9	1.53	2.0	1.60
Kidney Problems/Stones/Infections	2.0	2.25	3.0	2.17	5.0	1.80	2.5	1.20	3.8	1.95	2.0	2.00	5.7	1.93
Ulcer	2.0	2.00	3.0	1.83	2.5	1.20	3.5	1.29	3.4	1.47	3.5	1.33	3.3	1.63
Chronic Headache	5.5	2.27	3.5	2.43	2.5	1.80	3.5	1.86	3.2	2.25	4.7	2.42	1.6	1.75
Anemia	3.5	1.29	2.5	1.00	1.0	2.00	2.0	1.50	2.4	1.17	3.9	1.00	0.8	2.00
Other Neurological Problem	2.5	2.20	2.5	2.20	2.0	2.75	2.5	1.80	2.4	2.17	2.4	1.83	2.4	2.50
Head Injury	4.5	1.78	2.0	1.25	1.0	1.00	1.0	2.00	2.0	1.60	2.0	1.40	2.0	1.80
Chronic Fatigue Syndrome	2.0	2.00	1.5	3.33	2.0	2.50	2.5	2.00	1.8	2.44	2.0	2.20	1.6	2.75
Colitis	1.5	1.33	1.5	1.67	2.5	1.40	1.5	1.00	1.8	1.33	2.4	1.33	1.2	1.33
Other Immune System Disorder	2.0	1.75	1.5	2.00	1.5	2.67	1.5	2.67	1.6	2.25	2.0	2.60	1.2	1.67
Cancer	1.5	2.00	1.0	1.50	2.0	2.00	5.5	1.36	1.6	1.25	1.6	1.25	1.6	1.25
Other Respiratory Problems	3.5	1.86	2.0	2.25	1.5	1.33	3.0	1.50	1.6	2.00	2.4	1.83	0.8	2.50
Stroke	1.5	2.00	1.0	1.00	0.5	2.00	3.0	2.33	1.4	1.86	1.2	1.67	1.6	2.00
Epstein-Barr	1.5	1.00	1.0	2.50	1.0	4.00	1.5	1.33	1.2	2.50	1.6	2.50	0.8	2.50
Emphysema	1.5	1.33	0.5	1.00	1.0	2.50	3.0	1.83	1.2	1.67	1.6	2.00	0.8	1.00
Tachycardia	1.5	1.00	0.5	1.00	1.0	1.50	3.0	1.83	1.0	1.80	1.2	2.00	0.8	1.50
HIV	1.5	1.00	0.5	1.00	0.5	2.00	0.5	1.00	0.8	1.25	0.8	1.00	0.8	1.50
Epilepsy	2.5	1.40	0.5	1.00	1.5	2.00	1.0	1.50	0.8	1.00	1.2	1.00	0.4	1.00

Note. Mean level of interference was calculated only for those participants who indicated the presence of the condition; therefore, mean levels are based on different sample sizes, depending on the frequency of the symptom. Severity of interference in functioning is based on the following scale: 1 = diagnosed, no interference; 2 = diagnosed, mild interference; 3 = diagnosed, moderate interference; and 4 = diagnosed, severe interference.