

# Quality-of-Life Weights for the US Population

## *Self-Reported Health Status and Priority Health Conditions, by Demographic Characteristics*

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**Background:** Many of the large ongoing national surveys of the US population contain a question that asks for the respondent's self-reported health status: "excellent," "very good," "good," "fair," or "poor." These surveys could be used to conduct cost-utility analyses of health care policies, treatments or other interventions if quality-of-life (QOL) weights for the self-reported health statuses were also available.

**Objective:** The objective of this study was to produce nationally representative QOL weights for self-reported health status and for 10 "priority" health conditions, by a series of demographic variables.

**Research Design:** The Medical Expenditure Panel Survey contains the questions from the EQ-5D health status measure. A recent study has calculated time-trade-off-derived QOL weights corresponding to the EQ-5D health states for a large sample of Americans. We use these data to construct QOL weights for the 5 self-reported health status categories and 10 priority health conditions, by a series of demographic variables.

**Results:** Mean and median QOL weights were produced for self-reported health status, the 10 priority health conditions, and the demographic variables. We also report mean QOL weights for the self-reported health state and priority health conditions, by the demographic variables. Finally, ordinary least squares and censored least absolute deviation regression equations were used to estimate adjusted QOL weights for these variables.

**Conclusions:** By providing nationally representative QOL weights for self-reported health status and 10 priority health conditions, by demographic variable, we have facilitated the use of large national

surveys for conducting cost-utility analysis and increased their value to researchers and policy makers.

**Key Words:** quality-of-life, cost-effectiveness analysis, cost-utility analysis, preference weights, economic evaluation

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According to the recommendations of the US Public Health Service's Panel on Cost-Effectiveness in Health and Medicine,<sup>1</sup> cost-utility analysis (CUA) is the preferred method of economic evaluation of new health care policies, medical treatments, and other interventions. In CUA, the quality-adjusted life year (QALY) gains from an intervention are typically determined by disaggregating the life-expectancy gains into time periods that are characterized by the same health status. The various periods of the same health status are then assigned quality-of-life (QOL) weights, and the difference between the summed QOL-weighted life expectancies, with and without the intervention in question, determines the marginal effectiveness of an intervention.

QOL weights are sometimes determined through the direct application of preference elicitation procedures (via time trade-off [TTO], standard gamble, or visual analogue scales) to the participants of a specific study.<sup>1,2</sup> Although this approach has the advantage that a health state can be evaluated directly, increasingly studies of specific interventions use the alternative approach of first translating the participant's health state into the dimensions captured by a specific health status questionnaire—the EQ-5D,<sup>3</sup> the Health Utilities Index III,<sup>4</sup> the Quality of Well-Being scale,<sup>5</sup> or the SF-6D<sup>6</sup>—and then assigning a QOL weight corresponding to that health state based on a previous valuation study of that survey instrument. This approach is less expensive and can be more reliable because the previously calibrated weights are often based on a larger and more representative sample of the population than would be possible in the study of a specific intervention.

Although the use of health status questionnaires such as the EQ-5D is becoming increasingly common, an older and even more common health status classifier is the self-reported health status question (HS5). This question simply and di-

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rectly asks the respondent to categorize his or her health into 1 of 5 levels: “excellent,” “very good,” “good,” “fair,” or “poor.” Many of the large-scale, ongoing surveys of the US population—such as the Behavioral Risk Factor Surveillance System, the National Health Interview Survey, the Current Population Survey, the Health and Retirement Survey, the Survey of Income and Program Participation, the Panel Survey of Income Dynamics, and the National Survey on Drug Use and Health—request self-reported health status information using this question. None of these surveys, however, goes beyond this to query respondents directly regarding the QOL associated with their answers.

These large data sets also contain diverse information that can be used to measure various interventions, policies, and treatments, such as whether the respondent has health insurance, resides in a state with a certain health policy, or has access to or is receiving a certain type of preventive treatment. The juxtaposition of the intervention/policy/prevention treatment variables to the HS5 makes these data sets useful for conducting large-scale cost-utility analyses on a variety of issues.

The missing component in these potential studies, however, is a measure of the health-related QOL weight for the health status categories from the HS5 question, especially one that is representative of the national US population. With this information, the QALY gains could be determined and CUAs could be performed. Such information has recently been provided for the United Kingdom.<sup>7</sup> The present study seeks to do the same for the US population. Specifically, this study uses: (1) the EQ-5D responses corresponding to the HS5 categories from respondents of the Medical Expenditure Panel Survey (MEPS),<sup>8</sup> and (2) the time-trade-off-derived QOL weights corresponding to the EQ-5D responses from individuals participating in a recent US valuation study of the EQ-5D health states,<sup>9</sup> to produce a set of QOL weights for the HS5 health status categories that are representative of the US population. These QOL weights for the HS5 categories can then be used to calculate the changes in QOL and QALYs that are associated with various interventions that are documented in the large national data sets referred to above.

This article generates 4 additional sets of QOL information. First, QOL weights are estimated for a number of important demographic characteristics: (1) sex, (2) race/ethnicity, (3) age, (4) income, (5) education, and (6) marital status. QOL weights at various ages, for example, would be useful in determining the QALY value of saving a life of a given age (see the methodology used by Hirth et al, 2000<sup>10</sup>). Second, many of the large national surveys also include questions regarding whether or not the respondent has a specific health condition. Accordingly, we report QOL weights for 10 health diagnoses designated as “priority conditions” by the MEPS: (1) diabetes, (2) asthma, (3) coronary heart disease, (4) angina, (5) myocardial infarction, (6) other heart disease, (7) high blood pressure, (8) stroke, (9) emphysema, and (10) joint pain in the last 12 months. Third, the HS5 QOL weights are broken down by demographic variables. For example, men who report that their health is excellent may have different QOL weights than women. And fourth, the health condition QOL weights are also broken down by demographic

characteristics. For example, patients with diabetes may exhibit different QOL weights at different ages.

## METHODS

### MEPS Data

The MEPS contains the items that comprise the EQ-5D. The EQ-5D, formerly called the EuroQOL, is a questionnaire that was developed in 1987 for use in determining the health status and QOL of populations.<sup>11</sup> It was originally intended to track changes in a country’s population health over time, but is now also used to inform coverage and payment decisions for some national health insurance programs.<sup>12</sup> In recent years, it has become an increasingly accepted international standard for measuring health status.

The EQ-5D health status system consists of 5 dimensions (“mobility,” “self-care,” “usual activities,” “pain/discomfort,” and “anxiety/depression”) with 3 ordinal response levels (“no health problems,” “some health problems,” and “extreme health problems”) for each. EQ-5D weights are often expressed as a 5-digit descriptor, indicating the level of response (1, 2, or 3, as specified above) for each of the 5 dimensions in the order they appear above. For example, a descriptor of 21111 would indicate “some problems” with mobility and “no problems” with self-care, usual activities, pain/discomfort, and anxiety/depression.

### Time Trade-Off Preference Weights

The present study bases the HS5 preference weights on Shaw et al,<sup>9</sup> the first study to produce population-based preference weights for the EQ-5D health states using a TTO approach in the United States. Patterning their approach on a similar study to obtain QOL weights in the United Kingdom,<sup>13,14</sup> the US authors obtained TTO QOL weights for a series of 13 hypothetical EQ-5D health states (out of a set of 45) from each of 4048 respondents. A modeling approach (reviewed and approved by the project’s Scientific Advisory Board and other consultants) was used to estimate QOL weights for all of the 243 unique health states that were possible in the EQ-5D. The final model specification that the authors recommended (and that was used as the basis of our analysis) was successfully validated using a portion of observations reserved from the original sample. Although a detailed description and evaluation of this study is beyond the scope of the present article, it can be argued that this rigorous Agency for Healthcare Research and Quality (AHRQ)-funded study represented the best existing and only nationally representative TTO calibration of the EQ-5 available.

The QOL values for the various HS5 categories were determined by finding the corresponding EQ-5D health states for the respondent, and then assigning the TTO QOL weight from the Shaw et al<sup>9</sup> study to that individual. For example, if a respondent reported that her health status is very good on the HS5 and that she had a health status of 21111 on the EQ-5D, then the TTO QOL weight for the 21111 health state from this valuation study, 0.854, would be assigned as that person’s QOL weight for very good. This value would then represent this respondent’s contribution in determining the

**TABLE 1.** Results for Mean QOL Weights for HR5 Health Status Categories, Demographic Variables, and Priority Health Conditions

	Mean TTO-Derived QOL Weight Using EQ-5D	95% Confidence Interval
Self reported health status		
Excellent	0.941	0.938–0.944
Very good	0.903	0.901–0.906
Good	0.844	0.841–0.848
Fair	0.711	0.704–0.718
Poor	0.498	0.481–0.516
Sex		
Female	0.854	0.851–0.858
Male	0.880	0.877–0.883
Race/ethnicity		
White non-Hispanic	0.865	0.862–0.868
Black non-Hispanic	0.858	0.850–0.865
Asian/Pacific Islander non-Hispanic	0.903	0.893–0.913
American Indian/Alaskan Native	0.828	0.796–0.860
Multiple races reported	0.813	0.788–0.838
Hispanic	0.877	0.871–0.883
Age, yrs		
18–24	0.925	0.920–0.930
25–34	0.912	0.908–0.917
35–44	0.887	0.883–0.891
45–54	0.854	0.849–0.859
55–64	0.829	0.822–0.835
65–74	0.811	0.803–0.818
75+	0.755	0.747–0.763
Income (% of Federal poverty level)		
<100	0.789	0.781–0.798
100–124.9	0.801	0.788–0.813
125–199.9	0.836	0.829–0.843
200–399.9	0.872	0.868–0.875
>400	0.896	0.894–0.899
Education (highest degree earned)		
No degree	0.818	0.812–0.824
GED	0.823	0.813–0.833
High school diploma	0.866	0.863–0.869
Bachelor's degree	0.907	0.903–0.911
Graduate degree	0.908	0.902–0.915
Other degree	0.883	0.877–0.889
Marital status		
Married	0.872	0.868–0.875
Widowed	0.770	0.761–0.778
Divorced	0.838	0.833–0.844
Separated	0.807	0.791–0.822
Never married	0.901	0.896–0.905
Diabetes		
No	0.875	0.873–0.878
Yes	0.758	0.749–0.766
Asthma		
No	0.873	0.870–0.875
Yes	0.820	0.812–0.827

	Mean TTO-Derived QOL Weight Using EQ-5D	95% Confidence Interval
Coronary heart disease		
No	0.873	0.870–0.875
Yes	0.725	0.712–0.738
Angina		
No	0.872	0.869–0.874
Yes	0.709	0.693–0.725
Myocardial infarction		
No	0.872	0.870–0.875
Yes	0.725	0.712–0.738
Other heart disease		
No	0.875	0.872–0.877
Yes	0.764	0.755–0.774
High blood pressure		
No	0.891	0.888–0.893
Yes	0.794	0.870–0.875
Stroke		
No	0.872	0.870–0.875
Yes	0.694	0.679–0.709
Emphysema		
No	0.870	0.868–0.873
Yes	0.680	0.662–0.699
Joint pain		
No	0.909	0.907–0.912
Yes	0.786	0.782–0.790

nationally representative QOL weight associated with the HS5 health state of very good.

Shaw et al<sup>9</sup> also developed the QOL scoring algorithms for the various statistical software packages. Accordingly, we obtained the algorithm for the Stata statistical software package from the AHRQ<sup>15</sup> and used it to obtain predicted QOL weights for each individual who had completed the EQ-5D questions. Note that these authors over-sampled the 2 largest minority populations, but then generated QOL weights that were adjusted for the racial/ethnic make-up of the US population.

### Population Weighting

The EQ-5D data were drawn from the 2000 and 2002 MEPS full-year consolidated data files. The 2000 panel includes data for 25,096 individuals, whereas the 2002 panel includes data for 39,165 individuals. The 2000 MEPS was the first wave of the survey to include the questions from the EQ-5D. The EQ-5D questions, however, were only included in the self-administered questionnaire (SAQ), and that questionnaire was only used to survey respondents ages 18 or older. This reduced the number of observations from 64,261 respondents to 39,751 respondents ages 18 or older, with 18,618 individuals from the 2000 panel and 19,611 from the 2002 panel.

Because key variables are all drawn from the SAQ, the SAQ sampling weights were used in all analyses to ensure that the data were representative of the US civilian, non-institutionalized adult population at the time the data were collected. These weights are provided in the MEPS data and take into account questionnaire nonresponse. Variables considered in accounting for nonresponse were region, metropolitan

**TABLE 2. Mean QOL Weights for HS5 Health Statuses by Demographic Variables**

Group	Self-Reported Health Status				
	Excellent	Very Good	Good	Fair	Poor
All participants	0.941 (0.938–0.944)	0.903 (0.901–0.906)	0.844 (0.841–0.848)	0.711 (0.704–0.718)	0.498 (0.481–0.516)
Sex					
Male	0.945 (0.941–0.949)	0.910 (0.907–0.913)	0.858 (0.853–0.863)	0.727 (0.715–0.739)	0.512 (0.485–0.538)
Female	0.937 (0.933–0.941)	0.897 (0.893–0.900)	0.833 (0.829–0.838)	0.699 (0.691–0.707)	0.487 (0.468–0.506)
Race/ethnicity					
White non-Hispanic	0.940 (0.937–0.943)	0.900 (0.897–0.902)	0.837 (0.832–0.841)	0.702 (0.693–0.711)	0.500 (0.480–0.520)
Black non-Hispanic	0.938 (0.929–0.946)	0.913 (0.905–0.921)	0.848 (0.838–0.857)	0.705 (0.689–0.721)	0.505 (0.458–0.552)
Asian/Pacific Islander non-Hispanic	0.952 (0.940–0.965)	0.928 (0.914–0.941)	0.886 (0.871–0.901)	0.758 (0.719–0.798)	0.524* (0.417–0.631)
American Indian/Alaskan Native	0.954* (0.925–0.983)	0.869* (0.842–0.896)	0.830* (0.772–0.888)	0.664* (0.561–0.767)	0.468* (0.283–0.652)
Multiple races reported	0.951* (0.926–0.977)	0.869* (0.837–0.901)	0.810* (0.775–0.846)	0.711* (0.633–0.788)	0.511* (0.430–0.592)
Hispanic	0.948 (0.942–0.954)	0.917 (0.911–0.924)	0.874 (0.867–0.881)	0.750 (0.735–0.766)	0.477 (0.430–0.523)
Age, yrs					
18–24	0.954 (0.948–0.961)	0.930 (0.924–0.937)	0.897 (0.887–0.907)	0.795 (0.769–0.822)	0.649* (0.531–0.766)
25–34	0.955 (0.950–0.961)	0.932 (0.927–0.936)	0.876 (0.867–0.885)	0.760 (0.737–0.784)	0.524* (0.424–0.623)
35–44	0.947 (0.942–0.951)	0.913 (0.908–0.917)	0.860 (0.852–0.868)	0.735 (0.716–0.754)	0.530 (0.484–0.576)
45–54	0.933 (0.928–0.939)	0.896 (0.891–0.901)	0.838 (0.832–0.845)	0.707 (0.689–0.726)	0.471 (0.442–0.499)
55–64	0.933 (0.925–0.941)	0.881 (0.874–0.889)	0.825 (0.817–0.833)	0.686 (0.669–0.703)	0.483 (0.452–0.514)
65–74	0.912 (0.900–0.924)	0.867 (0.860–0.874)	0.815 (0.805–0.826)	0.697 (0.680–0.714)	0.509 (0.469–0.548)
75+	0.856 (0.835–0.877)	0.828 (0.815–0.841)	0.762 (0.750–0.774)	0.666 (0.648–0.683)	0.489 (0.453–0.524)
Income as % of Federal poverty level					
<100	0.913 (0.900–0.925)	0.884 (0.874–0.893)	0.813 (0.802–0.824)	0.664 (0.646–0.682)	0.444 (0.415–0.473)
100–124.9	0.911 (0.883–0.939)	0.880 (0.867–0.894)	0.827 (0.811–0.843)	0.674 (0.648–0.700)	0.442 (0.382–0.503)
125–199.9	0.935 (0.927–0.943)	0.889 (0.880–0.897)	0.837 (0.828–0.847)	0.689 (0.673–0.705)	0.517 (0.479–0.554)
200–399.9	0.942 (0.938–0.947)	0.903 (0.899–0.907)	0.847 (0.841–0.853)	0.737 (0.723–0.751)	0.514 (0.483–0.546)
>400	0.947 (0.943–0.950)	0.911 (0.908–0.915)	0.858 (0.853–0.864)	0.741 (0.727–0.755)	0.564 (0.523–0.605)
Education (highest degree earned)					
No degree	0.922 (0.913–0.932)	0.892 (0.884–0.899)	0.830 (0.821–0.838)	0.697 (0.685–0.710)	0.484 (0.460–0.509)
GED	0.925 (0.907–0.944)	0.883 (0.870–0.895)	0.826 (0.811–0.841)	0.694 (0.664–0.723)	0.462 (0.396–0.527)
High school diploma	0.939 (0.935–0.943)	0.899 (0.896–0.903)	0.845 (0.840–0.850)	0.711 (0.700–0.722)	0.508 (0.478–0.538)
Bachelor's degree	0.954 (0.949–0.959)	0.918 (0.913–0.924)	0.860 (0.851–0.868)	0.752 (0.726–0.779)	0.577* (0.525–0.628)
Graduate degree	0.950 (0.944–0.957)	0.919 (0.911–0.926)	0.868 (0.857–0.879)	0.748 (0.715–0.782)	0.643* (0.521–0.766)
Other degree	0.945 (0.936–0.953)	0.906 (0.897–0.914)	0.854 (0.842–0.866)	0.718 (0.684–0.752)	0.437* (0.377–0.497)
Marital status					
Married	0.943 (0.940–0.947)	0.903 (0.901–0.906)	0.849 (0.845–0.853)	0.725 (0.715–0.734)	0.511 (0.488–0.534)
Widowed	0.885 (0.869–0.901)	0.840 (0.826–0.853)	0.771 (0.760–0.782)	0.661 (0.641–0.680)	0.505 (0.467–0.543)
Divorced	0.934 (0.926–0.943)	0.895 (0.887–0.903)	0.828 (0.819–0.837)	0.664 (0.644–0.683)	0.470 (0.436–0.503)
Separated	0.910 (0.881–0.939)	0.885 (0.869–0.901)	0.819 (0.797–0.841)	0.711 (0.661–0.762)	0.407* (0.344–0.470)
Never married	0.948 (0.943–0.953)	0.923 (0.917–0.928)	0.872 (0.864–0.880)	0.745 (0.728–0.762)	0.511 (0.455–0.567)

Values inside parentheses indicate 95% confidence interval.  
 \*An unstable estimate derived from fewer than 100 data points.

**TABLE 3.** Mean QOL Weights for Health Conditions by Demographic Variable

	Diabetes Diagnosis (n = 2854)	Asthma Diagnosis (n = 3504)	Coronary Heart Disease Diagnosis (n = 1234)	Angina Diagnosis (n = 913)	Myocardial Infarction Diagnosis (n = 1211)
All participants	0.758 (0.749–0.766)	0.820 (0.812–0.827)	0.725 (0.712–0.738)	0.709 (0.693–0.725)	0.725 (0.712–0.738)
Sex					
Male	0.782 (0.768–0.796)	0.853 (0.841–0.866)	0.757 (0.741–0.774)	0.733 (0.711–0.755)	0.754 (0.736–0.773)
Female	0.734 (0.723–0.746)	0.797 (0.789–0.806)	0.668 (0.645–0.691)	0.680 (0.657–0.703)	0.675 (0.652–0.698)
Race/ethnicity					
White non-Hispanic	0.760 (0.750–0.771)	0.827 (0.818–0.835)	0.737 (0.723–0.750)	0.715 (0.697–0.732)	0.735 (0.720–0.750)
Black non-Hispanic	0.734 (0.713–0.755)	0.786 (0.760–0.811)	0.638 (0.603–0.674)	0.670 (0.625–0.715)	0.672 (0.636–0.708)
Asian/Pacific Islander non-Hispanic	0.822* (0.776–0.869)	0.875* (0.835–0.916)	0.828* (0.754–0.902)	0.817* (0.769–0.864)	0.833* (0.752–0.915)
American Indian/Alaskan Native	0.839* (0.795–0.882)	0.709* (0.596–0.822)	0.606* (0.410–0.802)	0.496* (0.325–0.667)	0.452* (0.281–0.623)
Multiple races reported	0.718* (0.618–0.819)	0.799* (0.744–0.853)	0.693* (0.598–0.789)	0.736* (0.663–0.808)	0.618* (0.503–0.733)
Hispanic	0.753 (0.725–0.780)	0.809 (0.790–0.829)	0.681 (0.612–0.750)	0.695* (0.643–0.747)	0.690 (0.622–0.757)
Age, yrs					
18–24	0.865* (0.805–0.924)	0.895 (0.879–0.911)	0.669* (0.507–0.832)	0.669* (0.436–0.902)	no obs
25–34	0.841 (0.802–0.881)	0.879 (0.863–0.896)	0.464* (0.214–0.714)	0.803* (0.768–0.837)	0.935* (0.875–0.996)
35–44	0.815 (0.790–0.839)	0.832 (0.818–0.847)	0.775* (0.710–0.840)	0.703* (0.629–0.776)	0.763* (0.690–0.836)
45–54	0.768 (0.752–0.785)	0.794 (0.776–0.811)	0.719 (0.674–0.763)	0.709 (0.668–0.749)	0.719 (0.679–0.760)
55–64	0.753 (0.735–0.771)	0.768 (0.748–0.787)	0.707 (0.678–0.736)	0.673 (0.641–0.705)	0.733 (0.698–0.767)
65–74	0.751 (0.733–0.770)	0.756 (0.735–0.776)	0.756 (0.734–0.779)	0.736 (0.705–0.766)	0.744 (0.718–0.770)
75+	0.693 (0.672–0.715)	0.696 (0.664–0.728)	0.708 (0.688–0.728)	0.706 (0.679–0.734)	0.696 (0.673–0.719)
Income as % of Federal poverty level					
<100	0.674 (0.648–0.700)	0.714 (0.689–0.738)	0.631 (0.591–0.670)	0.627 (0.584–0.670)	0.638 (0.600–0.675)
100–124.9	0.657 (0.621–0.694)	0.727 (0.689–0.764)	0.652* (0.600–0.704)	0.610* (0.552–0.669)	0.645* (0.592–0.698)
125–199.9	0.713 (0.689–0.738)	0.756 (0.732–0.779)	0.647 (0.608–0.686)	0.649 (0.607–0.691)	0.666 (0.629–0.704)
200–399.9	0.769 (0.755–0.784)	0.838 (0.827–0.850)	0.740 (0.715–0.765)	0.725 (0.696–0.754)	0.738 (0.713–0.762)
>400	0.821 (0.809–0.833)	0.873 (0.865–0.881)	0.794 (0.775–0.813)	0.775 (0.753–0.798)	0.804 (0.785–0.822)
Education (highest degree earned)					
No degree	0.693 (0.675–0.712)	0.743 (0.725–0.762)	0.640 (0.614–0.665)	0.638 (0.607–0.668)	0.642 (0.620–0.664)
GED	0.722 (0.681–0.763)	0.763 (0.723–0.802)	0.721* (0.669–0.772)	0.664* (0.595–0.733)	0.723* (0.662–0.783)
High school diploma	0.767 (0.754–0.781)	0.817 (0.807–0.827)	0.737 (0.717–0.757)	0.725 (0.701–0.750)	0.749 (0.727–0.770)
Bachelor's degree	0.844 (0.822–0.867)	0.885 (0.871–0.900)	0.807 (0.774–0.841)	0.788* (0.742–0.834)	0.800 (0.767–0.834)
Graduate degree	0.824 (0.789–0.860)	0.889 (0.867–0.910)	0.825* (0.787–0.863)	0.808* (0.753–0.863)	0.818* (0.771–0.865)
Other degree	0.788 (0.755–0.821)	0.863 (0.842–0.884)	0.776* (0.724–0.827)	0.755* (0.692–0.818)	0.783* (0.727–0.839)
Marital status					
Married	0.773 (0.762–0.785)	0.829 (0.820–0.838)	0.751 (0.734–0.768)	0.722 (0.702–0.742)	0.749 (0.731–0.768)
Widowed	0.706 (0.685–0.727)	0.686 (0.656–0.716)	0.685 (0.656–0.714)	0.701 (0.664–0.739)	0.683 (0.655–0.711)
Divorced	0.744 (0.718–0.771)	0.790 (0.771–0.810)	0.674 (0.636–0.711)	0.658 (0.622–0.694)	0.683 (0.641–0.726)
Separated	0.693 (0.620–0.766)	0.724 (0.672–0.776)	0.691* (0.591–0.791)	0.750* (0.598–0.903)	0.669* (0.570–0.769)
Never married	0.781 (0.752–0.810)	0.864 (0.850–0.878)	0.616* (0.522–0.709)	0.692* (0.617–0.768)	0.721* (0.655–0.787)

Values inside parentheses indicate 95% confidence interval.

\*An unstable estimate derived from fewer than 100 data points.

statistical area status, family size, marital status, level of education, health status, health insurance status, and age. After adjusting for questionnaire nonresponse, the weights were poststratified to correspond to Current Population Survey population estimates. Poststratification variables were region, metropolitan statistical area status, age, sex, and race/ethnicity.

### Missing Data

Some observations had missing data for key variables, such as responses to the EQ-5D. Of the 39,751 observations with nonzero person weights, 1522 had missing data for 1 or more variables of interest and were therefore excluded from analyses. Most of these individuals (1073) were missing 1 or more of the EQ-5D responses and therefore were missing the QOL weight. Nine individuals were missing the HS5 variable. The education variable was missing for 158 individuals and at least 1 health

condition variable was missing for 317 individuals. Seven individuals were missing more than 1 variable. This left a sample of 38,229 observations with complete data. Observations with missing data were excluded from each analysis. The number of respondents varies slightly across the analyses due to the varying numbers of respondents with missing data on the variables of interest in each analysis (see Appendix).

### Methods

Mean and regression-adjusted QOL weights for the HS5 health status categories, priority health conditions, and demographic characteristics were calculated. Mean QOL weights represent the average weights of those respondents with that characteristic. For example, if most of those who respond that their health status is excellent were also 18–24 years old, then the mean weight for “excellence” would

TABLE 3. (Continued)

Other Heart Disease Diagnosis (n = 2272)	High Blood Pressure Diagnosis (n = 9472)	Stroke Diagnosis (n = 995)	Emphysema Diagnosis (n = 597)	Joint Pain in Last 12 mo (n = 12,969)
0.764 (0.755–0.774)	0.794 (0.789–0.799)	0.694 (0.679–0.709)	0.680 (0.662–0.699)	0.786 (0.782–0.790)
0.777 (0.762–0.792)	0.814 (0.807–0.821)	0.722 (0.702–0.743)	0.696 (0.672–0.720)	0.802 (0.796–0.808)
0.755 (0.744–0.767)	0.776 (0.770–0.782)	0.670 (0.649–0.690)	0.663 (0.635–0.691)	0.774 (0.768–0.779)
0.770 (0.760–0.780)	0.799 (0.793–0.805)	0.707 (0.690–0.725)	0.693 (0.676–0.711)	0.792 (0.787–0.797)
0.716 (0.683–0.749)	0.780 (0.766–0.795)	0.668 (0.628–0.709)	0.641* (0.591–0.691)	0.751 (0.737–0.765)
0.844* (0.790–0.898)	0.831 (0.808–0.854)	0.698* (0.569–0.828)	0.643* (0.337–0.949)	0.823 (0.801–0.846)
0.740* (0.593–0.887)	0.717* (0.644–0.790)	0.598* (0.469–0.726)	0.241* (0.174–0.309)	0.758* (0.710–0.806)
0.709* (0.621–0.796)	0.689* (0.636–0.741)	0.589* (0.444–0.735)	0.685* (0.544–0.826)	0.746 (0.705–0.788)
0.737 (0.689–0.785)	0.768 (0.752–0.785)	0.585 (0.509–0.661)	0.531* (0.376–0.685)	0.762 (0.749–0.775)
0.819* (0.748–0.890)	0.865 (0.824–0.905)	0.775* (0.775–0.775)	1.000* (1.000–1.000)	0.862 (0.844–0.880)
0.846 (0.806–0.886)	0.862 (0.841–0.882)	0.844* (0.745–0.942)	0.855* (0.812–0.898)	0.835 (0.822–0.849)
0.817 (0.788–0.847)	0.832 (0.819–0.845)	0.745* (0.689–0.801)	0.647* (0.547–0.746)	0.819 (0.812–0.827)
0.773 (0.747–0.799)	0.803 (0.792–0.814)	0.689 (0.646–0.732)	0.616* (0.558–0.673)	0.788 (0.780–0.796)
0.739 (0.719–0.760)	0.789 (0.779–0.798)	0.666 (0.632–0.699)	0.653 (0.614–0.692)	0.769 (0.761–0.778)
0.765 (0.748–0.782)	0.793 (0.784–0.803)	0.718 (0.691–0.746)	0.712 (0.678–0.745)	0.765 (0.755–0.775)
0.711 (0.691–0.732)	0.740 (0.730–0.751)	0.677 (0.651–0.703)	0.682 (0.649–0.714)	0.715 (0.703–0.727)
0.647 (0.617–0.676)	0.690 (0.674–0.705)	0.630 (0.601–0.659)	0.597 (0.549–0.644)	0.672 (0.658–0.686)
0.716 (0.673–0.759)	0.704 (0.681–0.726)	0.636* (0.566–0.706)	0.608* (0.548–0.668)	0.685 (0.664–0.705)
0.688 (0.656–0.719)	0.748 (0.735–0.760)	0.645 (0.608–0.682)	0.667 (0.631–0.703)	0.747 (0.735–0.759)
0.774 (0.757–0.791)	0.798 (0.790–0.805)	0.723 (0.697–0.749)	0.686 (0.647–0.725)	0.795 (0.789–0.801)
0.822 (0.810–0.835)	0.848 (0.842–0.855)	0.755 (0.730–0.780)	0.764 (0.734–0.794)	0.833 (0.828–0.838)
0.669 (0.646–0.692)	0.723 (0.713–0.733)	0.638 (0.608–0.668)	0.639 (0.610–0.668)	0.711 (0.702–0.721)
0.732 (0.698–0.767)	0.747 (0.727–0.768)	0.672* (0.621–0.723)	0.666* (0.604–0.728)	0.739 (0.719–0.759)
0.771 (0.757–0.785)	0.800 (0.793–0.806)	0.717 (0.698–0.737)	0.708 (0.680–0.735)	0.788 (0.783–0.794)
0.843 (0.821–0.865)	0.859 (0.848–0.870)	0.733* (0.679–0.788)	0.782* (0.719–0.845)	0.842 (0.833–0.851)
0.841 (0.815–0.866)	0.868 (0.854–0.882)	0.817* (0.757–0.877)	0.678* (0.564–0.793)	0.855 (0.844–0.866)
0.772 (0.742–0.803)	0.824 (0.808–0.839)	0.718* (0.647–0.788)	0.748* (0.654–0.841)	0.818 (0.807–0.830)
0.790 (0.780–0.800)	0.815 (0.808–0.821)	0.706 (0.685–0.727)	0.701 (0.678–0.725)	0.803 (0.798–0.808)
0.705 (0.679–0.731)	0.740 (0.728–0.752)	0.672 (0.641–0.702)	0.663 (0.627–0.700)	0.719 (0.707–0.731)
0.729 (0.699–0.759)	0.766 (0.754–0.779)	0.698 (0.664–0.733)	0.638* (0.586–0.691)	0.760 (0.748–0.772)
0.677* (0.605–0.749)	0.713 (0.672–0.754)	0.626* (0.485–0.766)	0.600* (0.444–0.756)	0.700 (0.672–0.728)
0.780 (0.744–0.816)	0.811 (0.795–0.827)	0.691* (0.617–0.766)	0.702* (0.601–0.802)	0.807 (0.795–0.820)

represent the predominance of those 18–24 years old in calculating the mean QOL.

Because the QOL weights are subject to various selection biases, the biases can be adjusted out by treating them as covariates in a multivariate framework. Accordingly, the QOL weights were also derived from a regression analysis that included a number of demographic factors and the year of data collection. The regression-generated QOL weights would then represent the marginal effect of diabetes on the QOL of any individual and not just those individuals who typically have diabetes.

QOL weights were estimated using 3 regression specifications: (1) only including the demographic variables as right-hand-side variables, (2) including demographic variables and the HS5 variables but excluding the priority health conditions, and (3) including the demographic variables and the priority health conditions but excluding the HS5 variables. The regression coefficients represent the changes in

QOL weights associated with a 1 unit change in each explanatory variable (eg, the effect of removing asthma from an asthmatic person), controlling for the effects of the other explanatory variables. Because we have assumed a linear model, these effects are constrained to be the same, regardless of the levels of other explanatory variables. In other words, there are no interactions among the explanatory variables. These results can be used to estimate the HS5 or priority health condition weights for a person with a number of specific demographic characteristics by taking the estimate of the constant (intercept) term and then adding or subtracting the appropriate coefficients. Average effects for a variable can be calculated by taking an average of the coefficients, weighted by the proportion of observations in each subcategory.

The mean HS5 health states and priority health conditions are also presented by demographic characteristic. In the tables presenting the means we indicate cells that are based on fewer than 100 data points and are thus considered

unreliable. The means weight may be useful in studies that focus on specific demographic groups. For example, in a study focused on preventing asthma among non-Hispanic blacks, it may be preferred to use the change in the race-specific mean QOL weight for each case of diabetes prevented in non-Hispanic black individuals, rather than using the regression coefficients, because the mean already captures the distribution of all other characteristics that is typical of asthmatics in this racial group.

Given that the distribution of the QOL weights is censored at an upper limit value of 1, and given that 45.2% of respondents have a QOL at the upper limit, there is cause for concern regarding the effect of censoring on the estimates obtained using ordinary least squares (OLS) regression. If unaccounted for, a large number of observations at the upper limiting value would result in OLS estimates that are biased toward zero.

To account for the large number of observations at the upper limit of QOL, a Tobit model was initially tried. Unfortunately, 2 specification tests, the Pagan and Vella<sup>16</sup> test for normality and the Fin and Schmitz<sup>17</sup> test, failed to support the assumptions of the Tobit model. Accordingly, we re-estimated the equations using the censored least absolute deviations (CLAD) estimator developed by Powell<sup>18</sup> and used successfully by Sullivan et al<sup>19</sup> and Sullivan and Ghushchyan<sup>20</sup> in 2 similar studies estimating QOL weights for the various Clinical Classification Category codes and International Classification of Diseases, 9th Revision codes found in the MEPS. Stata statistical software was used,<sup>21</sup> with the add-on developed by Sullivan et al<sup>19</sup> to adjust for sample weights.

A caution about both the OLS and CLAD results concerns causal relationships among the explanatory variables. It could be the case that removing, for example, asthma from asthmatics affects the probability of other health conditions. It is important, therefore, to remember that the effects we estimate are the effects assuming that is *not* the case. If eliminating 1 adverse health condition reduces the probability of other adverse health conditions, then our estimated effects on quality of life will likely be conservative.

## RESULTS

The mean QOL weight for the US adult population during the 2000 to 2002 period was 0.867, with a 95% confidence interval of 0.864–0.869. Confidence intervals are presented to facilitate sensitivity analysis.

Table 1 presents unadjusted mean QOL weights and 95% confidence intervals for the HS5 health states, the priority health conditions, and the demographic variables. For the HS5 variables, means range from 0.941 for those who describe themselves as being in excellent health, to 0.498 for those in poor health. To place this in perspective, an intervention that raised a person's health status from poor to excellent for 1 year could cost as much as \$44,300 and be justified from a societal perspective, given a value of \$100,000 per QALY.

Table 1 also shows the means for the demographic variables. Men have a mean health-related QOL weight that is 0.026 greater than that of women. White non-Hispanics have a lower QOL weight than Asian/Pacific Islanders, but a higher QOL than black non-Hispanics, American Indians/

Alaskan Natives, and those of multiple racial backgrounds. As would be anticipated, mean QOL weights decline monotonically with age, so that those 75 years and older have a 0.170 lower QOL weight than those 18–24 years old. Similarly, QOL weights increase with income, measured in terms of the percent of the federal poverty level. For 2006, the federal poverty level for a family of 4 is \$20,000.<sup>22</sup> Applying this value suggests that those who make over \$80,000 a year have QOL weights that are 0.107 greater than those making \$20,000 or less. QOL weights generally increase with education; individuals with a graduate degree have a QOL that is 0.090 greater than individuals with no degree. Finally, those who are married have higher mean QOL weights than those who are widowed, divorced, or separated, but a lower mean QOL weight than those who have never married.

Table 1 also shows that those with health conditions generally have lower QOL weights than those without a condition. Of the conditions considered, those with asthma have the highest QOL weight, whereas those with emphysema have the lowest. The difference between the weights of those with and without the disease in question range from negligible for asthma to 0.190 for emphysema.

Table 2 presents the mean HS5 weights by the demographic variables along with the confidence intervals. The weights derived from fewer than 100 observations are indicated. A QOL weight differential favoring males is preserved at all HS5 levels. Among whites, blacks, and Hispanics (the racial groups with reliably populated cells), Hispanics had the largest range in mean weights with 0.948 for those in excellent health to 0.477 for those in poor health. For each HS5 category except poor, the QOL weights generally diminished with age, perhaps indicating that individuals adjust their evaluation of what constitutes an excellent health state based on age. Similarly, at each HS5 category, QOL weights generally increase with income and educational achievement level. At each HS5 category, those who were never married have the highest QOL weight.

Table 3 presents the mean QOL weights for priority health conditions by demographic characteristics and the associated confidence intervals. The QOL differential favoring males persists across all conditions, and is the greatest for coronary heart disease. Non-Hispanic whites with the various diseases have QOL weights that are uniformly higher than non-Hispanic blacks or Hispanics with the same disease. As expected, QOL weights associated with the various diseases decline with age, but QOL weights tend to become larger with increases in income and educational achievement. Those who are married or were never married tend to have higher QOL weights.

Table 4 presents the marginal effect of variables on the QOL weight from OLS and CLAD regression models, holding constant the other variables. The proportion of weighted observations in that variable category is reported in column number (1). Means (identical to Table 1) and medians are reported in columns (2) and (3), respectively. Columns (4) and (5) show the marginal effects of each of the demographic variables, holding the other demographic variables constant, using OLS and CLAD estimation procedures, respectively.

**TABLE 4.** Adjusted QOL Weights

	Proportion of Observations	Mean HRQOL Score	Median HRQOL Score	Marginal Effect of Variable on HRQOL Score					
				Demographic Variables Only		Self-reported Health Status and Demographics		Health Conditions and Demographics	
				OLS	CLAD	OLS	CLAD	OLS	CLAD
Column	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Constant				0.833‡	0.898*	0.913‡	0.998*	0.861‡	0.930*
Panel year									
2000	0.491	0.863	0.844	—	—	—	—	—	—
2002	0.510	0.870	0.844	0.010‡	-0.000	0.011‡	-0.000	0.013‡	-0.000
Self-reported health status									
Excellent	0.251	0.941	1.000	—	—	—	—	—	—
Very good	0.352	0.903	1.000	—	—	-0.030‡	-0.000	—	—
Good	0.271	0.844	0.827	—	—	-0.078‡	-0.153*	—	—
Fair	0.095	0.711	0.778	—	—	-0.194‡	-0.200*	—	—
Poor	0.032	0.498	0.446	—	—	-0.392‡	-0.511*	—	—
Sex									
Female	0.520	0.854	0.844	—	—	—	—	—	—
Male	0.480	0.880	1.000	0.017‡	-0.000	0.013‡	0.000	0.014‡	-0.000
Race/ethnicity									
White non-Hispanic	0.723	0.865	0.844	—	—	—	—	—	—
Black non-Hispanic	0.113	0.858	0.844	0.007	-0.000	0.012‡	0.000	0.005	0.000
Asian/Pacific Islander non-Hispanic	0.037	0.903	1.000	0.016†	-0.000	0.018‡	-0.000	0.002	0.000
American Indian/Eskimo	0.006	0.828	0.844	-0.019	-0.017*	-0.012	-0.012*	-0.015	0.000
Multiple races reported	0.005	0.813	0.827	-0.053‡	-0.071*	-0.024*	-0.020*	-0.032†	-0.033*
Hispanic	0.115	0.877	1.000	0.022‡	0.000	0.022‡	-0.000	0.007*	-0.000
Age, yrs									
18–24	0.125	0.925	1.000	—	—	—	—	—	—
25–34	0.187	0.912	1.000	-0.034‡	0.000	-0.017‡	-0.000	-0.024‡	-0.000
35–44	0.213	0.887	1.000	-0.063‡	0.000	-0.034‡	-0.000	-0.042‡	-0.000
45–54	0.189	0.854	0.827	-0.102‡	-0.156*	-0.058‡	-0.020*	-0.060‡	-0.006*
55–64	0.124	0.829	0.827	-0.121‡	-0.173*	-0.068‡	-0.020*	-0.060‡	-0.017*
65–74	0.088	0.811	0.827	-0.127‡	-0.173*	-0.071‡	-0.042*	-0.047‡	-0.017*
75+	0.075	0.755	0.800	-0.170‡	-0.190*	-0.106‡	-0.111*	-0.084‡	-0.062*
Income as % of Federal poverty level									
<100	0.100	0.789	0.827	—	—	—	—	—	—
100–124.9	0.039	0.801	0.827	0.021†	0.054*	0.014*	0.001*	0.024‡	0.039*
125–199.9	0.128	0.836	0.827	0.049‡	0.086*	0.029‡	0.002*	0.046‡	0.070*
200–399.9	0.317	0.872	0.844	0.073‡	0.102*	0.039‡	0.002*	0.064‡	0.070*
>400	0.415	0.896	1.000	0.092‡	0.102*	0.047‡	0.002*	0.080‡	0.070*
Education (highest degree earned)									
No degree	0.184	0.818	0.827	—	—	—	—	—	—
GED	0.045	0.823	0.827	-0.000	-0.027*	-0.006	-0.002*	0.001	-0.017*
High school diploma	0.467	0.866	0.844	0.031‡	-0.000	0.010‡	-0.000	0.025‡	-0.000
Bachelor's degree	0.159	0.907	1.000	0.058‡	-0.000	0.024‡	-0.000	0.047‡	-0.000
Graduate degree	0.077	0.908	1.000	0.070‡	-0.000	0.032‡	0.000	0.056‡	0.000
Other degree	0.069	0.883	0.854	0.041‡	-0.000	0.014‡	0.000	0.037‡	-0.000
Marital status									
Married	0.558	0.872	0.844	—	—	—	—	—	—
Widowed	0.069	0.770	0.810	-0.006	-0.000	-0.010*	-0.027*	-0.001	-0.004*
Divorced	0.111	0.838	0.827	-0.017‡	-0.000	-0.012‡	-0.002*	-0.013‡	-0.000
Separated	0.019	0.807	0.827	-0.039‡	-0.027*	-0.025‡	-0.026*	-0.035‡	-0.033*
Never married	0.242	0.901	1.000	-0.010‡	0.000	-0.009‡	-0.000	-0.011‡	-0.000
Diabetes									
No	0.935	0.875	0.844	—	—	—	—	—	—
Yes	0.065	0.758	0.800	—	—	—	—	-0.039‡	-0.036*

(Continued)

TABLE 4. (Continued)

	Proportion of Observations	Mean HRQOL Score	Median HRQOL Score	Marginal Effect of Variable on HRQOL Score					
				Demographic Variables Only		Self-reported Health Status and Demographics		Health Conditions and Demographics	
				OLS	CLAD	OLS	CLAD	OLS	CLAD
Asthma									
No	0.906	0.873	0.844	—	—	—	—	—	—
Yes	0.094	0.820	0.827	—	—	—	—	-0.026 <sup>‡</sup>	-0.011*
High blood pressure									
No	0.763	0.891	1.000	—	—	—	—	—	—
Yes	0.238	0.794	0.816	—	—	—	—	-0.028 <sup>‡</sup>	-0.017*
Coronary heart disease									
No	0.968	0.873	0.844	—	—	—	—	—	—
Yes	0.032	0.725	0.778	—	—	—	—	-0.022 <sup>†</sup>	-0.021*
Angina									
No	0.976	0.872	0.844	—	—	—	—	—	—
Yes	0.024	0.709	0.778	—	—	—	—	-0.036 <sup>‡</sup>	-0.043*
Myocardial infarction									
No	0.968	0.872	0.844	—	—	—	—	—	—
Yes	0.032	0.725	0.778	—	—	—	—	-0.020 <sup>†</sup>	-0.011*
Other heart disease									
No	0.938	0.875	0.844	—	—	—	—	—	—
Yes	0.062	0.764	0.810	—	—	—	—	-0.040 <sup>‡</sup>	-0.021*
Stroke									
No	0.975	0.872	0.844	—	—	—	—	—	—
Yes	0.025	0.694	0.775	—	—	—	—	-0.066 <sup>‡</sup>	-0.071*
Emphysema									
No	0.986	0.870	0.844	—	—	—	—	—	—
Yes	0.014	0.680	0.761	—	—	—	—	-0.076 <sup>‡</sup>	-0.103*
Joint pain									
No	0.664	0.909	1.000	—	—	—	—	—	—
Yes	0.337	0.786	0.816	—	—	—	—	-0.086 <sup>‡</sup>	-0.156*

\* $P < 0.05$ , <sup>†</sup> $P < 0.01$ , <sup>‡</sup> $P < 0.001$ .

For multiple categorical variables (eg, race/ethnicity, sex, age), the results indicate the change from the excluded reference variable (the blank row). For example, the OLS estimate shows that males have a 0.017 greater QOL than females, significant at the 0.001 level. The results in columns (4) and (5) do not include either the HS5 or the chronic health conditions. Columns (6) and (7) report the OLS and CLAD results for equations that include HS5 self-reported health status and the demographic variables, and columns (8) and (9) show similar results for equations that control for the priority health conditions and the demographic variables.

## DISCUSSION

This study presents mean QOL weights for self-reported health status, for 10 priority health conditions, and for a series of demographic variables, weights that are representative of the US population for the period 2000 to 2002. It also presents the mean QOL weights for health status and priority health conditions by different demographic variables. Finally, it presents estimates of the marginal effect of demographic variables on these QOL weights, using 2 estimation procedures.

The mean weights of the HS5 or priority health condition variables capture the distribution of demographic characteristics of those who are in that health state. The mean weights by demographic variable can be thought of as holding 1 certain demographic variable constant, but capturing the distribution of all the other demographic characteristics. The regression results from Table 4 can hold multiple characteristics constant at once. For example, from column (6) the calculation of the QOL weight, based on both data collection years, for a person in very good health who is male and white non-Hispanic would proceed as follows: the constant (0.913) plus the adjustment for using both years of data [ $0.491 \times 0.000 + 0.510 \times 0.011$ ], minus the adjustment for very good (-0.030), plus the adjustment for white non-Hispanic (0.000), plus other adjustments as they would be specified.

These QOL weights would be useful for conducting cost-utility analyses for the impact of government policies or other "large" interventions on the health of populations. For example, if Medicaid expanded eligibility, then an analysis of the effect of this policy on changing the probabilities of being in each of the HS5 health states could be conducted, using the

new Medicaid beneficiaries as the basis of the analysis. The expected gain in QOL could then be estimated by finding the product of the change in probability of being in each of the HS5 health states and the corresponding QOL weight from the present study and summing these products. This gain could then be converted into quality-adjusted life years and evaluated against the cost of the additional health care consumption associated with Medicaid eligibility.

Prevention studies would also find the information in this study useful. For example, population level interventions exist—such as, reducing the availability of soft drinks in schools—for reducing the incidence of diabetes among school children. If a study determined that an intervention prevented diabetes among school children, then to assess the morbidity implications, the difference in QOL between those with diabetes and those without could be calculated at each age throughout the expected lifetimes. Differences in life expectancy would be added to the analysis to construct the total QALY gains, a more comprehensive measure of the health consequences of this diabetes prevention program than would be captured in the disease-specific mortality, the measure often used in such prevention studies.

The usefulness of these data, however, is limited. These data would probably not be appropriate for evaluating the impact of an intervention on those with a specific chronic disease. For example, whereas these QOL data in this study would be useful for evaluating an intervention for the improved prevention of diabetes, it would probably be much less so for evaluating an intervention for the improved management of diabetes. Although the HS5 could be used in such an evaluation, such a broad and general measure as HS5 health status may not be sufficiently sensitive to capture subtle improvements in health of those with specific diseases.

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## APPENDIX

This table shows the proportion of individuals in each demographic category based on status of missing data (ie, none or some missing). The numbers in the table are weighted according to the MEPS-provided SAQ weights. Reported *P* values are for a Pearson's  $\chi^2$  test for independence corrected for survey design. Only sex was found to be unrelated to missing data. Although these differences were a matter of some concern, with less than 4% of the sample missing and 38,229 observations with complete data, our data generated a large degree of confidence in the results.

**APPENDIX** Missing Observations by Demographic Variable

	No Missing Data (n = 38,229)	Missing Data (n = 1522)	P*
Year collected			
2000	0.487	0.597	<0.001
2002	0.513	0.403	
Sex			
Male	0.480	0.486	0.696
Female	0.520	0.514	
Race/ethnicity			
White non-Hispanic	0.728	0.586	<0.001
Black non-Hispanic	0.110	0.201	
Asian/Pacific Islander non-Hispanic	0.037	0.038	
American Indian/Alaskan Native	0.006	0.005	
Multiple races reported	0.005	0.004	
Hispanic	0.113	0.166	
Age, yrs			
18–24	0.125	0.125	<0.001
25–34	0.189	0.119	
35–44	0.214	0.183	
45–54	0.189	0.173	
55–64	0.123	0.128	
65–74	0.086	0.124	
75+	0.073	0.149	
Income as % of Federal poverty level			
<100	0.098	0.158	<0.001
100–124.9	0.038	0.073	
125–199.9	0.125	0.211	
200–399.9	0.319	0.282	
>400	0.420	0.276	
Education (highest degree earned)			
No degree	0.177	0.419	<0.001
GED	0.045	0.047	
High school diploma	0.469	0.397	
Bachelor's degree	0.162	0.067	
Graduate degree	0.078	0.032	
Other degree	0.070	0.038	
Marital status			
Married	0.561	0.492	<0.001
Widowed	0.067	0.129	
Divorced	0.111	0.103	
Separated	0.019	0.020	
Never married	0.242	0.257	

Missing observations by demographic variable.  
\*P value from design based on the Pearson  $\chi^2$  statistic.