

## Appendix B

### Detailed Methods for Estimating Missed Work Days and Bed Days Attributable to Stroke, Heart Disease, and Chronic Lung Disease

In Section 3, we provided a general description of our methods for estimating the indirect costs resulting from increased morbidity. This appendix provides additional details on our approach for estimating the missed work days attributable to stroke, heart disease, and chronic lung disease.

We used the 2001 NHIS to predict days of work missed and bed days attributable to each condition. For the work-loss days analysis, we restricted our sample to those 65 years and older who were employed in the labor market. We also excluded those with missing data. Our final analysis sample included only 524 adults. For our bed-days analysis, we restricted the sample to all those 65 years and older, regardless of employment status. Our final sample for this analysis included 3,930 older adults.

Because of the discrete nature of the variables of interest for our analysis (i.e., counts of days of work lost and days spent in bed), we used a negative binomial regression with a log link to estimate missed work days and bed days for people 65 years and older. By including indicator variables for stroke, heart disease, and chronic lung disease, we were able to estimate the impact of each condition on work loss and bed days. The regressions also controlled for other factors expected to influence the number of missed work days, including sex, race, education, income, smoking status, and a variable indicating the presence of a functional limitation (e.g., difficulty walking or standing). The work-loss days regression also included variables to control for hourly versus salaried workers and specific categories of occupations. The bed-days regression included variables to control for labor-force participation status (i.e., working, retired, never worked, etc.).

Results from these regressions are shown in Tables B-1 and B-2. In the work-loss days analysis, our estimates are positive, suggesting that people with a reported stroke, chronic lung disease, and/or heart disease have more work-loss days than those with none of these conditions. However, these estimates are not statistically significant for any of the conditions. Results from the bed-days regression are positive and highly statistically significant for stroke and heart disease, suggesting that those with these conditions experience more bed days than those without, even controlling for a number of other factors likely to affect serious illness.

To estimate the dollar value of work-loss and bed days attributable to stroke, heart disease, and chronic lung disease, we used the following procedure:

1. Predicted annual work-loss (bed) days for each person in the sample.
2. For those with reported stroke, heart disease, and/or chronic lung disease, repeat Step 1 setting the indicator variable for the condition to zero. The resulting predictions represent estimated work-loss (bed) days for those without the condition of interest who have similar characteristics (i.e., sex, race, employment status, etc.).
3. Calculate the difference between predicted work-loss (bed) days for those with and without the condition of interest (i.e., subtract value calculated in Step 2 from Step 1 value). This calculation produces an estimate of the work-loss (bed) days attributable to each condition.
4. Multiply estimated sex-specific labor earnings (household productivity values) (Grosse, 2003) by estimates of work-loss days attributable to each condition from Step 3.

**Table B-1. Missed Work Days Analysis—Negative Binomial Regression (NBR) Results**

<b>Variable Descriptions. All except constant term are indicator variables that = 1 if:</b>	<b>NBR Coefficients</b>	<b>Robust Standard Errors</b>	<b>P-value</b>
High school grad	-1.04	0.40	0.01
Had some college	-0.77	0.42	0.07
College grad	-0.72	0.59	0.22
Graduate degree	0.08	0.81	0.92
Female	0.20	0.43	0.64
Low income (<200% of poverty line)	-1.74	0.90	0.06
Middle income (<500% of poverty line)	-1.72	0.84	0.04
High income (≥500% of poverty line)	-1.47	0.87	0.09
Former smoker	0.31	0.52	0.55
Never smoked	0.33	0.48	0.50
Non-Hispanic white	-0.88	0.53	0.10
Non-Hispanic black	0.28	0.68	0.68
Non-Hispanic other	-2.64	1.04	0.01
Salaried employee	0.31	0.37	0.40
No functional limitation reported	-1.05	0.31	0.00
Professional specialty occupation	1.47	0.64	0.02
Technician or related support occupation	1.33	0.95	0.16
Sales occupation	1.28	0.53	0.02
Administrative support occupation	0.91	0.45	0.04
Private household occupation	-3.26	0.89	0.00
Protective services occupation	-1.76	0.85	0.04
Household	0.27	0.53	0.61
Farming, forestry, and fishing occupation	0.27	0.95	0.77
Precision production, craft, and repair occupation	0.56	0.60	0.35
Operator, fabricator, or laborer	1.37	0.59	0.02
Transportation or material-moving occupation	0.33	0.82	0.68
Handler, equipment cleaner, helper, or laborer	-0.30	0.89	0.74
<b>Self-report of STROKE</b>	<b>0.54</b>	<b>0.92</b>	<b>0.56</b>
<b>Self-report of CHRONIC LUNG DISEASE</b>	<b>0.98</b>	<b>0.69</b>	<b>0.15</b>
<b>Self-report of HEART DISEASE</b>	<b>0.30</b>	<b>0.39</b>	<b>0.44</b>
Constant term	2.53	1.14	0.03

Notes: Estimates only for those 65 years and older in the 2001 NHIS who were currently working. Unweighted sample size is 524.

**Table B-2. Bed-Days Analysis—Negative Binomial Regression (NBR) Results**

<b>Variable Descriptions. All except constant term are indicator variables that = 1 if:</b>	<b>NBR Coefficients</b>	<b>Robust Standard Errors</b>	<b>P-value</b>
High school grad	-0.19	0.23	0.40
Had some college	-0.13	0.25	0.60
College grad	-0.47	0.26	0.07
Graduate degree	-0.11	0.31	0.72
Female	0.27	0.16	0.10
Low income (<200% of poverty line)	0.04	0.24	0.86
Middle income (<500% of poverty line)	0.11	0.26	0.68
High income (>=500% of poverty line)	-0.49	0.31	0.12
Former smoker	0.32	0.21	0.13
Never smoked	0.04	0.21	0.85
Smoking status unknown	-16.14	0.83	0.00
Non-Hispanic white	-0.26	0.23	0.26
Non-Hispanic black	0.19	0.29	0.50
Non-Hispanic other	0.36	0.44	0.42
Retired	0.81	0.22	0.00
Not working but previously worked	2.10	0.30	0.00
Never worked	1.38	0.38	0.00
No functional limitation reported	-1.34	0.18	0.00
<b>Self-report of STROKE</b>	<b>0.96</b>	<b>0.26</b>	<b>0.00</b>
<b>Self-report of CHRONIC LUNG DISEASE</b>	<b>0.32</b>	<b>0.21</b>	<b>0.12</b>
<b>Self-report of HEART DISEASE</b>	<b>0.78</b>	<b>0.18</b>	<b>0.00</b>
Constant term	0.57	0.38	0.14

Notes: Estimates only for those 65 years and older in the 2001 NHIS. Unweighted sample size is 3930.

Our estimates of work loss and bed days attributable to each condition are shown by sex in Tables B-3 and B-4, respectively. Among older adults who worked, chronic lung disease was responsible for the largest impact on work loss, or about 3 to 4.5 days of missed work per year. Considering bed days, stroke was responsible for the largest number of bed days among the three conditions—13 annual bed days for males and 20 annual bed days for females.

Note that, although our estimates for attributable work-loss days are not statistically different from zero, we used them to estimate the cost associated with work loss in the 65 and older population that works. We chose to include these work-related cost estimates because it is likely that our lack of statistically significant results is due to the small overall sample size and the small number with each condition of interest. In addition, because only about 5 to 11 percent of those with any of the conditions worked, the estimated cost of losing 1 to 4.6 work days per year was low.

**Table B-3. Predicted Missed-Work Days for Workers 65 Years and Older by Condition and Sex**

<b>Condition and Sex</b>	<b>Number of Respondents</b>	<b>Predicted Missed-Work Days Attributable to Condition</b>
Stroke		
Male	9	1.72
Female	4	3.19
Chronic Lung Disease		
Male	30	3.42
Female	26	4.59
Ischemic Heart Disease		
Male	72	0.93
Female	46	1.74

Note: Predictions of work days missed were calculated using NBR results in Table B-1.

**Table B-4. Predicted Bed Days for Respondents 65 Years and Older by Condition and Sex**

<b>Condition and Sex</b>	<b>Number of Respondents</b>	<b>Predicted Missed Work Days Attributable to Condition</b>
Stroke		
Male	135	13.45445
Female	209	20.43143
Chronic Lung Disease		
Male	209	3.036422
Female	316	4.85797
Ischemic Heart Disease		
Male	561	6.198227
Female	669	10.35484

Note: Predictions of bed days were calculated using NBR results in Table B-2.