APPENDIX D:
COMPARING DIFFERENT MEASURES OF 1996 DISEASE BURDEN IN THE UNITED STATES FOR 20 DISEASES

Table D-1 shows the number of deaths and disability-adjusted life years (DALYs) attributable to 20 high-burden diseases in the United States, all drawn from the Michaud et al. (2006) Global Burden of Disease (GBD) analysis for the United States. The diseases in the table are shown in order of their (DALY) rank, where the most burdensome disease is ischemic heart disease, which was responsible for more than 3.1 million DALYs in 1996. The two components of DALYs, years of life lost (YLL) and years of life in disability (YLD), are also shown in the table. It is notable that the diseases with the highest burden when you consider only one of the individual components of the DALY, YLL or YLD, are not always the same diseases that cause the highest burden when the DALY is used to create rankings. For example, in terms of YLL and total DALYs, heart disease is clearly the most burdensome disease in the United States. But in terms of YLD, major depression is the most burdensome, followed by alcohol use and osteoarthritis. For depression, almost all of the burden comes from the disease's impact on YLD. If deaths or YLL alone were used to assess disease burden, depression, alcohol use, and arthritis would likely be viewed as diseases with little or no significant burden.

Table D-2 provides additional measures of disease burden for the same 20 conditions—disease costs in 1996 dollars, mean hospital bed days attributable to each condition, and mean annual work loss days attributable to each condition, all using 1996 impacts. The table again shows the importance of looking across different measures of burden to fully comprehend the nature of the impact of each disease. Although heart disease accounts for high disease costs in the United States, its impact on quality of life in terms of bed days and work loss days is lower than the same impacts for many of the other conditions. The annual number of work days lost to disease is greatest for depression, perhaps not surprisingly given that many of the other high-burden conditions largely affect older adults. Other key points to note in comparisons of burden across various measures are the lack of data for many high-burden diseases from the same study and differences in burden estimates for the same condition across studies. The lack of consistently estimated and reported burden estimates across all high burden conditions limits our ability to make comparative assessments of burden across diseases. The differences in burden estimates, in particular costs in Table D-2, make it difficult to assess the quality of the methodologies used in the underlying studies (i.e., how to gauge which estimates are better?) and may lead to reluctance on the part of policy makers to consider burden estimates in decision making. Another challenge is the delay in obtaining burden estimates, especially for a broad range of diseases. The burden estimates shown in Tables D-1 and D-2 are for 1996, and those were published in 2006. To our knowledge, this is the most recent set of consistently estimated, published burden estimates. To overcome the challenges of interpreting and using burden of illness measures, guidance on consistent methodologies for estimating disease burden, especially costs, and transparency in the reporting of methods and burden findings may be needed to better inform policy. To overcome these challenges, guidance on consistent

methodologies for estimating disease burden, especially costs, and transparency in the reporting of methods and burden findings may be needed to better inform policy.

Table D-1. Measures of Burden for the 20 Most Burdensome Illnesses in the United States in 1996, Ranked According to Disability-Adjusted Life Years

#	Condition	DALY	% of Total, DALYs (%)	YLD	YLL	Deaths	% of Total, Deaths (%)
1	Ischemic heart disease	3,134,732	9.5	275,988	2,858,744	536,314	23.2
2	Cerebrovascular disease	1,510,287	4.6	725,844	784,443	161,678	7.0
3	Motor vehicle accidents	1,393,278	4.0	366,273	1,027,005	43,735	1.9
4	Unipolar major depression	1,370,285	4.1	1,370,070	214	37	0.0
5	Lung trachea or bronchial cancer	1,362,712	4.1	61,530	1,301,182	168,206	7.3
6	Chronic obstructive pulmonary disease	1,253,491	3.8	727,272	526,219	99,982	4.3
7	Alcohol use	1,141,193	3.4	1,037,529	103,664	6,675	0.3
8	HIV	956,418	2.9	237,443	718,975	31,188	1.3
9	Diabetes mellitus	946,291	2.9	495,377	450,913	62,452	2.7
10	Osteoarthritis	942,682	2.8	940,612	2,070	690	0.0
11	Dementia	889,242	2.7	755,925	133,318	43,190	1.9
12	Congenital abnormalities	761,951	2.3	443,004	318,948	12,000	0.5
13	Homicide and violence	714,621	2.2	99,290	615,332	22,351	1.0
14	Self-inflicted	674,443	2.0	13,527	660,917	31,725	1.4
15	Asthma	665,103	2.0	593,233	71,870	5,789	0.3
16	Drug use	543,841	1.6	504,718	39,122	1,692	0.1
17	Breast cancer	514,786	1.6	64,459	450,327	46,649	2.0
18	Perinatal conditions	493,958	1.5	29,828	464,131	13,840	0.6
19	Cancer colon or rectum	483,931	1.5	74,398	409,534	61,189	2.6
20	Cirrhosis of the liver	411,539	1.2	89,950	321,588	25,488	1.1
—	—	Michaud et al. (2006)	—	Michaud et al. (2006)	Michaud et al. (2006)	Michaud et al. (2006)	—

—Cell has no data.

Table D-2. Measures of Costs and Other Impacts of the 20 Most Burdensome Illnesses in the United States in 1996, Ranked According to Disability-Adjusted Life Years

#	Condition	Costs, 1996, $B	Costs, 1996, $B	Mean Annual Hospital Bed Days	Mean Annual Work Loss Days
1	Ischemic heart disease	21.5	81	70.1	21.8
2	Cerebrovascular disease	8.3	22.9	97	5.2
3	Motor vehicle accidents	21.2	—	102.9	70
4	Unipolar major depression	10.2	30.5	227.3	78.2
5	Lung trachea or bronchial cancer	—	6.3	—	—
6	Chronic obstructive pulmonary disease	6.4	11.8	176.3	57.5
7	Alcohol use	—	0.185[1]	—	—
8	HIV	—	7.5[2]	—	—
9	Diabetes mellitus	10.1	—	210.5	27.5
10	Osteoarthritis	15.9	23.5	359.7	67.2
11	Dementia	—	19.5	—	—
12	Congenital abnormalities	—	3.8	—	—
13	Homicide and violence	—	4.5[3]	—	—
14	Self-inflicted	—	—	—	—
15	Asthma	5.7	6.3	102	31.4
16	Drug use	—	—	—	—
17	Breast cancer	—	5	—	—
18	Perinatal conditions	—	—	—	—
19	Cancer colon or rectum	—	2.9	—	—
20	Cirrhosis of the liver	—	—	—	—
—	—	Druss et al. (2002)	Roehrig et al. (2009) and other sources as indicated	Druss et al. (2002)	Druss et al. (2002)

[1] From NIH: http://pubs.niaaa.nih.gov/publications/economic-2000/

[2] From AHRQ: http://archive.ahrq.gov/research/sep00/0900RA19.htm

[3] From http://www.netwellness.org/healthtopics/domesticv/violenceUS.cfm; year of estimates unclear.

—Cell has no data.

Sources:

Druss, B. G., Marcus, S. C., Olfson, M., & Pincus, H. A. (2002). The most expensive medical conditions in America. *Health Affairs (Millwood), 21*(4), 105−111.

Michaud, C. M., McKenna, M. T., Begg, S., Tomijima, N., Majmudar, M., Bulzacchelli, M. T., et al. (2006). The burden of disease and injury in the United States 1996. *Population Health Metrics, 4,* 11.

Roehrig, C., Miller, G., Lake, C., & Bryant, J. (2009). National health spending by medical condition, 1996−2005. *Health Affairs (Millwood), 28*(2), w358−367.