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# The Most Expensive Medical Conditions In America

This nationwide study finds that the most disabling conditions are not necessarily the ones we spend the most to treat.

**by Benjamin G. Druss, Steven C. Marcus, Mark Olfson, and Harold Alan Pincus**

**ABSTRACT:** This study uses a nationally representative survey to identify the most expensive conditions in the United States and to examine the association between spending and disability. The most expensive conditions at a population level were ischemic heart disease and motor vehicle accidents; at the per capita level they were respiratory malignancies. There was not a significant association between rank order of treatment costs and disability; the conditions with the greatest disability relative to expenditures were mood disorders, chronic obstructive pulmonary disease, and arthropathies. We use the findings to discuss the role for cost-of-illness and burden-of-disease estimates in setting priorities.

ESTIMATES OF COST ARE INCREASINGLY USED by policymakers, advocacy groups, and medical specialty organizations to quantify the burden of disease.<sup>1</sup> However, critics have enumerated three important concerns that limit the applicability of such estimates in setting health system priorities.<sup>2</sup> First, the policy implications of cost-of-illness estimates are complicated by the fact that while treatment costs represent a financial burden, they also are an indicator of how society allocates its resources.<sup>3</sup> That is, a condition may incur low treatment costs either because of a modest clinical need or because it is insufficiently funded; high-cost illnesses may represent either opportunities for cost containment or high-priority conditions requiring further resources.

Second, comparisons of spending across specific illnesses have required the combination of multiple studies of single diseases, each using separate methodologies. This is particularly problematic because many of the estimates are provided by specialty organizations and advocacy groups, which, while well intentioned, have an incentive to highlight the importance of particular conditions. As a con-

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gressionally mandated National Institutes of Health (NIH) report on cost of illnesses warned, “disease-specific cost of illness estimates...are...essentially noncomparable.”<sup>4</sup>

Finally, most standard economic methods, such as cost-effectiveness analysis and cost-utility analysis, focus exclusively on the marginal costs and benefits of treatment rather than the absolute costs and burdens of disease. These techniques seek to identify treatments that result in the most aggregate health improvement per dollar spent. What, if any, consideration should be given to absolute, rather than marginal, treatment costs and burden of disease in priority setting?

This study uses a nationally representative survey to provide a consistent assessment of cost and disability burden across multiple conditions. We then use this assessment to consider the appropriate role of burden-of-disease and cost-of-illness estimates in health care priority setting.

■ **Study methods.** Using the 1996 Medical Expenditure Panel Survey (MEPS), a nationally representative sample of the U.S. civilian, noninstitutionalized population, we determined the fifteen most expensive conditions nationally and then examined the cost and disability rankings among them.<sup>5</sup> We classified diseases based on slightly modified *Global Burden of Disease* categories.<sup>6</sup> Expenditures for each health care service were directly linked to the conditions reported by the participant as prompting the service use and summed across all individuals. We calculated a summary disability variable for each condition at the population level as the mean of the ranks for bed days, missed workdays, and rates of impairment in activities of daily living (ADLs) and instrumental activities of daily living (IADLs).

First, we compared the association between national rankings of cost and disability (summed across individuals) and per capita (mean) rankings for treatment costs and disability among affected individuals. Next, we assessed the relationship between the condition ranks for costs and disability, first for national rankings and then for per capita rankings. We used the nonparametric Wilcoxon Signed Rank Test to assess the statistical significance of these comparisons. Finally, to identify the conditions with the largest gap between spending and disability level, we calculated the difference in ranks between disability and treatment costs (disability rank minus cost rank) across the fifteen conditions.<sup>7</sup>

## Study Results

■ **Population-based estimates of cost and disability.** Spending for the fifteen highest-cost conditions outlined in Exhibit 1 accounted for 44.2 percent of total U.S. health care spending in 1996. These conditions spanned a broad spectrum of both chronicity and severity. For instance, three chronic conditions (ischemic heart disease, arthropathies, and hypertension) and two acute conditions (motor vehicle accidents and acute respiratory conditions) were the most costly. Similarly, the list included both life-threatening conditions (malignancies) and prevalent but milder conditions (such as respiratory infections).

**EXHIBIT 1**  
**The Most Costly Conditions In The United States: National Expenditures, Bed Days, Work-Loss Days, And Activity Impairments, 1996**

Condition	Estimated number with condition (millions)	National cost		Bed days		Work-loss days		Any ADL/IADL impairment	
		Billions	Rank	Millions	Rank	Millions	Rank	Thousands	Rank
Ischemic heart disease	3.4	\$21.5	1	70.1	10	21.8	9	638.3	10
Motor vehicle accidents	7.3	21.2	2	102.9	7	70.0	3	808.6	8
Acute respiratory infection	44.5	17.9	3	196.4	4	69.2	4	1,949.6	3
Arthropathies	16.8	15.9	4	359.7	1	67.2	5	3,070.5	1
Hypertension	26.0	14.8	5	61.1	12	12.0	11	544.3	12
Back problems	13.2	12.2	6	191.6	5	83.0	1	1,380.9	5
Mood disorders	9.0	10.2	7	227.3	2	78.2	2	1,400.9	4
Diabetes	9.2	10.1	8	210.5	3	27.5	8	1,954.0	2
Cerebrovascular disease	2.0	8.3	9	97.0	9	5.2	13	1,084.1	6
Cardiac dysrhythmias	2.9	7.2	10	66.5	11	7.2	12	528.7	13
Peripheral vascular disorders	3.4	6.8	11	55.1	13	12.8	10	591.4	11
COPD	12.4	6.4	12	176.3	6	57.5	6	889.3	7
Asthma	8.6	5.7	13	102.0	8	31.4	7	690.4	9
Congestive heart failure	1.1	5.2	14	48.7	14	1.1	15	494.6	14
Respiratory malignancies	0.3	5.0	15	21.7	15	2.5	14	121.5	15

**SOURCE:** Authors' analysis of 1996 Medical Expenditure Panel Survey data.

**NOTES:** COPD is chronic obstructive pulmonary disease. ADL is activity of daily living. IADL is instrumental activity of daily living.

■ **Cost and disability among affected persons.** On a per capita basis, the two most expensive conditions were respiratory malignancies and ischemic heart disease (Exhibit 2). The association between rankings of population-based spending and spending per affected person was not statistically significant ( $S = -3.5, p = .85$ ).

■ **Association between cost and disability rankings.** The association between cost and disability rankings was not statistically significant either nationally ( $S = 6.5, p = 6.63$ ) or per affected person ( $S = -0.5, p = .98$ ). The three conditions with the lowest treatment costs relative to their associated disability level were mood disorders, chronic obstructive pulmonary disease, and arthropathies. The three conditions with the highest expenditures relative to their disability level were genitourinary cancers, motor vehicle accidents, and cardiac dysrhythmias (Exhibit 3).

## Discussion

The most expensive conditions during 1996 spanned a broad range of characteristics, sharing little in common except their high national health costs. The rank order of the conditions in terms of both cost and disability changed markedly

**EXHIBIT 2**  
**Mean Spending, Bed Days, Work-Loss Days, And Activity Impairments Per Person Affected By A Costly Condition, 1996**

Condition	Mean annual treatment costs		Mean annual bed days		Mean annual work-loss days		Any ADL/IADL impairment	
	Dollars	Rank	Days	Rank	Days	Rank	Percent	Rank
Respiratory malignancies	\$17,816	1	76.6	1	71.4	1	45	3
Ischemic heart disease	6,463	2	20.4	7	20.7	3	19	5
Congestive heart failure	4,908	3	45.6	3	7.1	15	48	2
Cerebrovascular disease	4,257	4	49.0	2	21.4	2	55	1
Motor vehicle accidents	3,081	5	14.0	12	14.6	5	11	11
Cardiac dysrhythmias	2,467	6	22.9	6	8.8	11	18	6
Peripheral vascular disorders	2,074	7	16.3	9	10.5	6	18	8
Mood disorders	1,122	8	25.1	4	15.7	4	15	9
Diabetes	1,097	9	22.9	5	8.2	12	21	4
Back problems	956	11	14.5	10	9.6	9	8	12
Arthropathies	954	10	18.5	8	9.9	8	14	7
Asthma	663	12	11.8	14	9.2	10	8	13
Hypertension	569	14	13.9	13	7.6	13	14	10
COPD	529	13	14.2	11	9.9	7	7	14
Acute respiratory infection	415	15	8.8	15	7.7	14	4	15

**SOURCE:** Authors' analysis of 1996 Medical Expenditure Panel Survey data.

**NOTES:** COPD is chronic obstructive pulmonary disease. ADL is activity of daily living. IADL is instrumental activity of daily living.

when shifting between national and individual estimates. Health expenditures were not significantly associated with burden of disability across conditions, either nationally or per affected person. In other words, the most costly conditions are not necessarily the most disabling ones.

■ **Role of disease burden in priority setting.** The potential role of disease burden in priority setting can best be understood in the context of two philosophical schools: utilitarianism and egalitarianism.<sup>8</sup> In its goal of maximizing population health outputs for each dollar spent, cost-effectiveness analysis is rooted in a utilitarian value system. Under such a framework, which emphasizes aggregate health improvement rather than how health is distributed across individuals, there is little role for measuring total disease burden in setting priorities.<sup>9</sup> In contrast, egalitarianism, an outgrowth of Rawls's "Difference Principle," seeks to allocate resources so as to maximize the well-being of the worst-off. This approach serves as an implicit basis for burden-of-disease studies. Populations with the greatest burden of disease are the "least well-off" and thus potentially deserve attention in policy and research initiatives.

Few would take a strictly egalitarian approach in allocating health resources. Funding ineffective therapies is inappropriate, however serious the disease is that the therapies are intended to treat. However, a purely utilitarian approach may also result in conclusions that appear ethically questionable. Perhaps the best example of these potential pitfalls became evident during the initial Oregon

**EXHIBIT 3**  
**Difference Between Rankings For Spending And Disability Levels, National And Per Person Estimates, 1996**

Condition	Rank for national estimates			Rank for mean estimates among affected persons			Total difference
	Disability	Cost	Difference	Disability	Cost	Difference	
Mood disorders	2	7	-5	4	8	-4	-9
COPD	6	12	-6	11	14	-3	-9
Arthropathies	1	4	-3	6	11	-5	-8
Diabetes	4	8	-4	7	9	-2	-6
Asthma	8	13	-5	14	12	2	-3
Cerebrovascular disease	9	9	0	2	4	-2	-2
Back problems	3	6	-3	11	10	1	-2
Respiratory malignancies	15	15	0	1	1	0	0
Congestive heart failure	14	14	0	5	3	2	2
Respiratory infections	5	3	2	15	15	0	2
Peripheral vascular disease	11	11	0	9	7	2	2
Cardiac dysrhythmias	13	10	3	8	6	2	5
Hypertension	12	5	7	13	13	0	7
Ischemic heart disease	10	1	9	3	2	1	10
Motor vehicle accidents	7	2	5	10	5	5	10

**SOURCE:** Authors' analysis of 1996 Medical Expenditure Panel Survey data.

**NOTES:** At the top of the list, disability level exceeds spending. Moving down the list, spending exceeds disability level. COPD is chronic obstructive pulmonary disease.

Medicaid priority-setting process. An initial effort to rank interventions solely on the basis of cost-effectiveness led to several counterintuitive rankings, such as the prioritization of tooth capping over appendectomy.<sup>10</sup> Under a pure cost-effectiveness approach, either high costs of treatment or low prevalence of illness can result in lifesaving treatments' going unfunded. The second problem that emerged, which resulted in a rejection of the initial waiver for the Oregon plan, was that the scheme accorded less value to the well-being of disabled persons than to that of healthy persons. Ranking schemas that rely solely on cost-effectiveness or treatment benefits invariably run the risk of according lower value to the lives of persons who are chronically ill or disabled.<sup>11</sup>

■ **Assessing disease burden.** Assuming that disease burden has a role in priority setting, how should it be measured? The use of MEPS for disability and cost estimates made it possible to directly compare these two domains, but also imposed limits on the disability measures and did not make it possible to include mortality as an indicator of burden. The majority of conditions that were highest in the MEPS disability rankings were also among the top national causes of mortality and estimated disability-adjusted life years (DALYs) in 1996.<sup>12</sup> As with MEPS disability ratings, population expenditures were not significantly associated with either the top causes of mortality ( $S = -4, p = .8$ ) or DALYs ( $S = 3.5, p = .84$ ). However, specific rankings of disease burden varied considerably across the three measures.

Even after a metric for assessing disease burden is chosen, there remains the question of whether burden and treatment costs should be examined at the level of the individual or population. Clinical studies, such as the Medical Outcomes Study, have emphasized the former approach, whereas those taking a public health perspective, such as the *Global Burden of Disease* study, have stressed the latter.<sup>13</sup> In our study the vast difference in rankings between mean per capita and total national cost and burden estimates underscores the need to carefully consider the perspective taken in such estimates.

Decisions about how to weigh different domains of disease burden and what perspective to take when comparing across conditions involve more than methodological considerations. Rather, they involve choosing among basic values. Our findings demonstrate that how these decisions are made is likely to have a major impact on how priorities are set.

■ **Combining measurement methods.** Quantitative methods have been developed to combine treatment effectiveness, cost, and illness burden into a single index.<sup>14</sup> However, these methods may still be subject to the basic problem that different methods of measuring illness severity and treatment benefits will inevitably result in different prioritization rankings. Thus, it may be less helpful to use a single quantitative method than to consider several different perspectives with an eye toward the basic ethical trade-offs involved in choosing among them. For instance, the Norwegian Health Service has explicitly identified both disease severity and treatment effectiveness as guiding principles in resource allocation but has allowed decisionmakers to decide how to weigh each of these considerations.<sup>15</sup>

■ **The gap between spending and disability.** We found a substantial gap between spending and disability burden overall and identified a series of outlier conditions for which this gap was greatest. To understand the potential implications of this gap, let us consider the case of mood disorders, one of the conditions with the greatest disability relative to expenditures. If therapies for these conditions were ineffective or prohibitively expensive, then the distribution could be regarded as efficient—the free market would simply be diverting resources toward more cost-effective treatments. However, studies have demonstrated that treatments for this class of disorders are similarly cost-effective relative to other conditions.<sup>16</sup> This suggests that factors other than treatment effectiveness, such as stigma and underinsurance, may be contributing to the gap.

**P**OLICY EXPERIENCE AND COMMON SENSE argue against mechanically applying either cost-effectiveness or disease burden as tools in priority setting. The ethical issues are too complex and too important for any quantitative technique to remove the key role of human decisionmakers. However, that does not mean that data cannot be used to inform and improve this process. Norman Daniels has argued that rather than relying on any one approach, a variety of data sources, in the context of basic ethical principles, can be used to promote a

more fair and transparent deliberative process.<sup>17</sup> We hope that the findings from this study can serve as one such tool in achieving that larger goal.

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