

Comparing The National Economic Burden Of Five Chronic Conditions

One-quarter of the U.S. population has one or more of these five chronic conditions, which cost \$62.3 billion in 1996.

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ABSTRACT: Using a nationally representative sample of 23,230 U.S. residents, we examine patterns of economic burden across five chronic conditions: mood disorders, diabetes, heart disease, asthma, and hypertension. Almost half of U.S. health care costs in 1996 were borne by persons with one or more of these five conditions; of that spending amount, only about one-quarter was spent on treating the conditions themselves and the remainder on coexistent illnesses. Each condition demonstrated substantial economic burden but also unique characteristics and patterns of service use driving those costs. The findings highlight the differing challenges involved in understanding needs and improving care across particular chronic conditions.

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THE VAST MAJORITY OF HEALTH EXPENDITURES in the United States are concentrated in a small number of persons, a large portion of whom are diagnosed with one or more chronic conditions.¹ These high costs have been used as a rationale for many of the initiatives established to improve the care of chronic conditions.² Total costs, however, provide limited information about the mechanisms leading to these conditions' economic burden. A deeper understanding of demographic and clinical characteristics and patterns of service use is needed to understand the needs and to improve the care of persons with chronic conditions.

This study uses a nationally representative sample of the U.S. population to compare demographic characteristics and costs and

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patterns of service use across five prevalent, costly, and disabling chronic conditions: mood disorders (that is, depressive and manic-depressive disorders), diabetes, heart disease, hypertension, and asthma.³ We hypothesized that while all would entail substantial economic burden, each would also have unique features resulting in distinct clinical and health policy challenges.

Study Data And Methods

The 1996 Medical Expenditure Panel Survey (MEPS) was conducted by the Agency for Healthcare Research and Quality (AHRQ) to provide nationally representative estimates of health care use, spending, sources of payment, and insurance coverage for the U.S. civilian noninstitutionalized population.⁴ Overall, 23,200 eligible persons responded to the core MEPS, which represented a final response rate of 70.2 percent.

Analyses calculated the proportion of persons with a given condition who received any treatment for it and, among those who received any treatment, the costs for treatment for the condition. Costs included (1) mean per capita health costs for services directly resulting from each condition (both across the total sample and stratified by insurance status), (2) mean per capita health costs for persons with the condition, and (3) costs associated with work loss for persons with the condition. We estimated these three components as the sum of the individual costs weighted to represent the entire U.S. population. Statistical tests for comparisons across conditions were made using Z-tests comparing a given disorder to the condition closest to it on a given parameter. To provide nationally representative estimates and to account for the multistage sampling design of MEPS, all analyses used the SUDAAN statistical package, with appropriate weighting and nesting variables.⁵

Study Results

■ **Prevalence and characteristics.** Participants with one or more of the five conditions represented an estimated 25 percent of the U.S. population. Hypertension was by far the most prevalent condition, with an estimated national prevalence of 10.2 percent ($p < .001$ compared with mood disorders).⁶ This was followed by mood disorders (the vast majority of which were depressive disorders), asthma, diabetes, and ischemic heart disease (Exhibit 1). Comorbidity among the conditions was most common in patients with diabetes and ischemic heart disease, of whom 55.5 percent and 60.8 percent, respectively, had at least one of the other four conditions ($p < .001$ for diabetes compared with hypertension). Those with asthma were most likely to be younger ($p < .001$ compared with mood disorders) and nonwhite ($p < .001$ compared with hypertension) than those

EXHIBIT 1**Characteristics Of The Study Population: Persons With One Or More Of Five Chronic Conditions, 1996**

	Mood disorder (n = 1,021)	Diabetes (n = 825)	Heart disease (n = 273)	Hypertension (n = 2,161)	Asthma (n = 896)
Prevalence	5.0%	3.6%	1.3%	10.2%	3.9%
Comorbidity					
Mood disorders	-	11.1	14.3	8.5	7.9
Diabetes	8.0	-	21.2	16.2	3.6
Heart disease	3.8	7.9	-	5.8	1.9
Hypertension	17.3	45.8	44.0	-	13.1
Asthma	6.1	3.9	5.6	5.0	-
Demographics					
Female	65.4	54.8	41.7	57.9	52.1
Under age 18	6.1	1.4	0.1	0.1	39.1
Ages 18–64	79.5	55.7	47.6	55.8	49.9
Age 65 or older	14.4	42.9	52.3	44.1	10.9
Hispanic	8.0	11.4	4.6	5.5	11.6
Black	9.1	17.1	9.1	15.7	17.6
White/other	83.0	71.5	86.3	78.8	70.7
Married	44.6	59.6	65.0	61.9	45.3
Divorced	19.8	12.6	10.4	12.8	16.1
Widowed	8.8	18.6	21.2	18.8	7.8
Not married	26.7	9.3	3.4	6.6	30.6
Less than high school	27.1	39.3	38.1	33.1	49.9
High school	30.6	32.8	29.9	34.5	22.8
More than high school	42.2	27.9	32.0	32.4	27.3
Unemployed	40.1	62.1	69.9	56.0	26.3
Northeast	18.4	18.9	22.2	18.9	22.0
Midwest	27.4	23.8	22.4	24.0	25.1
South	32.0	38.1	35.6	38.2	28.5
West	22.2	19.2	19.8	18.9	24.4
Nonurban	16.5	22.8	22.7	23.7	20.5
Below poverty level	19.5	20.6	15.8	15.6	24.6
Insurance status^a					
Private	66.3	59.1	68.0	67.3	61.1
Medicaid	13.4	16.2	10.9	10.5	20.6
Medicare	18.7	45.8	54.1	45.1	12.4
Uninsured	14.8	10.1	5.4	7.8	14.6
Managed care ^b	38.2	31.0	31.0	34.2	46.5

SOURCE: All estimates are from the 1996 Medical Expenditure Panel Survey, using appropriate weighting to adjust for the complex sampling design.

^a These categories are not mutually exclusive; hence, the percentages add to more than 100 percent.

^b The primary insurance plan was defined as “managed care” if the respondent reported receiving care in a health maintenance organization (HMO) or if there was a requirement to go through a gatekeeper for all health care.

with the other four conditions, and almost a quarter were living below the federal poverty level ($p = .02$ compared with diabetes).

■ **Health costs.** Costs for health services directly resulting from one or more of the five conditions amounted to \$62.3 billion annually in the United States in 1996 (Exhibit 2). Persons with one or more of the five conditions accrued total health costs—for the index

EXHIBIT 2
Health Costs, In 1996 Dollars, Among Persons With One Or More Of Five Chronic Conditions, 1996

Condition	Direct per capita health costs for treatment of condition ^a	Total U.S. costs for treatment of condition (billions) ^b	Percent paid out of pocket for payments associated with condition ^c	Mean per capita health costs for persons with condition ^d	Estimated total health costs (billions) for persons with condition ^e
Mood disorder	\$1,122	\$10.2	39%	\$ 4,328	\$ 54.9
Diabetes	1,097	10.1	39	5,646	54.2
Heart disease	6,463	21.5	29	10,823	38.5
Hypertension	569	14.8	43	4,073	110.3
Asthma	663	5.74	38	2,779	27.7

SOURCE: All estimates are from the 1996 Medical Expenditure Panel Survey, using appropriate weighting to adjust for the complex sampling design.

^a Mean per capita costs of health services that a person identified as resulting from the specific condition.

^b Calculated as the per capita costs for the condition (column 1) weighted to reflect the entire U.S. population.

^c The proportion of direct costs (column 1) paid out of pocket.

^d Cells in this column contain all costs borne by persons with the particular condition, including both direct costs (column 1) and costs for comorbid conditions.

^e Calculated as the mean per capita costs for persons with the condition (column 4) weighted to reflect the entire U.S. population.

conditions and other coexistent illness—of \$270 billion, or 49 percent of the total health care costs estimated by MEPS for 1996.

Ischemic heart disease had higher per capita and national costs for services directly resulting from the condition than did any of the other four conditions ($p < .001$ compared with mood disorders). These high costs were largely attributable to elevated rates of hospitalization compared with the other conditions. Nearly one-fourth of respondents with ischemic heart disease were hospitalized for their condition at least once during the past year, significantly more than for any of the other conditions ($p < .001$). Only 3.9 percent of those with diabetes had inpatient treatment for their condition, and the other three conditions had even lower rates of hospitalization.

When we examined the costs of all health services used by persons with a given condition, we found a different pattern. At the national level, persons with hypertension accrued almost twice the per capita costs of those with any of the other conditions—largely because of the condition’s high prevalence. Only 13.4 percent of spending among persons with hypertension nationally was for direct treatment for the disorder; the remainder was for treatment for coexistent conditions. In contrast, 18.6 percent of the total spending among persons with mood disorders and with diabetes, 20.7 percent among persons with asthma, and 55.8 percent among persons with heart disease was for direct treatment of the index condition.

Persons with heart disease paid the least out of pocket for treatment of their condition ($p < .001$ compared with diabetes). Those with the other conditions all paid approximately 40 percent of total

health costs out of pocket (Exhibit 2).

■ **Work loss and total costs.** Ischemic heart disease was almost twice as likely as any of the other conditions to be the cause of one or more missed workdays ($p < .001$ compared with asthma). However, because of its relatively low prevalence, persons with this disease incurred relatively low work-loss costs nationally (Exhibit 3).

All told, persons with one or more of the five chronic conditions lost \$36.2 billion in wages in 1996, or 42 percent of the total illness-related wage costs in the United States. Total health and work-loss costs for persons with one or more of the five conditions amounted to \$306 billion, with an identical rank order across conditions as for the estimated health costs: in decreasing order, hypertension, mood disorders, diabetes, heart disease, and asthma.

■ **Use of services and costs by type of coverage.** Aggregated across all types of insurance, more than four-fifths of persons with diabetes, heart disease, asthma, and hypertension received at least some care (outpatient, inpatient, or medication) for the condition (Exhibit 4). In contrast, only two-thirds of persons with mood disorders received any treatment for their condition during the year ($p < .001$ compared with asthma).

The impact of insurance on receipt and intensity of treatment was greater for respondents with mood disorders than for those with any of the other disorders. Whereas an estimated 67.4 percent of all persons with mood disorders received at least some treatment, the rate was much lower ($p < .001$) for those without insurance. On average, all persons with mood disorders incurred \$1,122 each in medical costs, while those without insurance incurred less than half that amount (Exhibit 4). Among those with insurance, the presence

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EXHIBIT 3

Work Loss And Total Societal Costs Among Persons With One Of Five Chronic Conditions, 1996

Condition	Percent of workers missing workdays for condition ^a	Estimated work-loss costs for persons with condition (billions) ^b	Total costs for persons with condition (billions) ^c
Mood disorder	18.4%	\$11.5	\$ 66.4
Diabetes	10.0	3.5	57.6
Heart disease	37.4	3.8	42.4
Hypertension	8.1	11.5	121.8
Asthma	19.8	3.4	31.2

SOURCE: All estimates are from the 1996 Medical Expenditure Panel Survey, using appropriate weighting to adjust for the complex sampling design.

^a Proportion of persons with the condition reporting one or more missed work days resulting from that condition.

^b Total work-loss days among persons with the condition (for any health-related cause), multiplied by the person's daily income, and then weighted to reflect the entire U.S. population.

^c Calculated as total health costs for persons with the condition (column 5 from Exhibit 2) plus the total work-loss costs among persons with the condition (column 2).

EXHIBIT 4
Proportion Of Persons With One Of Five Chronic Conditions Who Received Any Treatment For The Condition, And Amount Spent, By Insurance Status, 1996

Type of coverage	Percent treated				
	Mood disorder	Diabetes	Heart disease	Hypertension	Asthma
All types	67.4%	95.3%	92.6%	95.3%	83.4%
Private insurance	71.4	95.5	93.6	95.8	86.9
Medicaid	72.5	96.6	83.7	94.9	81.0
Medicare	72.8	97.2	94.0	97.7	92.8
Uninsured	46.2	86.1	93.9	86.3	73.1
Managed care ^a	67.0	94.1	92.5	95.7	84.6

Amount spent (1996 dollars)					
Private insurance	\$1,157	\$ 838	\$8,037	\$523	\$ 635
Medicaid	1,957	1,563	2,328	660	472
Medicare	1,609	1,084	2,448	604	1,515
Uninsured	529	1,170	3,136	530	459
Managed care ^a	1,323	863	7,400	554	427

SOURCE: All estimates are from the 1996 Medical Expenditure Panel Survey, using appropriate weighting to adjust for the complex sampling design.

NOTES: Each cell contains an adjusted estimate reflecting mean per capita costs of health services resulting from the specific condition (analogous to Exhibit 2, column 1) stratified by insurance status. Insurance categories are not mutually exclusive.

^a The primary insurance plan was defined as “managed care” if the respondent reported receiving care in a health maintenance organization (HMO) or if there was a requirement to go through a gatekeeper for all health care.

of managed care mechanisms was not associated with a statistically significant difference in either use of services or costs for any of the five conditions.

Discussion And Policy Implications

The five conditions we examined all demonstrated substantial costs, but each also varied along key characteristics. Each of these five parameters plays an important role in determining total costs in patients with chronic illnesses; each, in turn, may have distinct implications for improving their medical care.

■ **Comorbidity and prevalence.** We found a large difference between costs directly attributed to the five conditions and the total costs borne by persons with these conditions. This gap is primarily a function of the number and costs of coexistent illnesses. Since a comorbid disorder may be either independent or caused by an index condition, the “true” costs of any chronic condition likely fall somewhere between those attributed to a particular condition and the total costs incurred by persons with that condition.

Diabetes exemplifies how comorbid conditions such as infections, peripheral vascular disease, and microvascular damage account for much of the clinical and economic burden of disease. Therefore, these sequelae represent an important target for secondary prevention among diabetics, including screening and early in-

tervention for complications.⁷ Because most health care settings are poorly equipped to provide these coordinated services, disease management team models have been developed.⁸ These teams have rapidly proliferated in managed care settings; however, many bear little resemblance to the best-practice models described in the literature and hence may be limited in their effectiveness and reach.⁹

For hypertension, the primary cost driver was its prevalence—more than twice that of any of the other four conditions. High disease prevalence is one of the most important factors determining appropriateness of population-based screening efforts, since it increases diagnostic yield and also the public health benefits of early detection.¹⁰ However, public funding for primary prevention is limited; Medicare does not cover screening for hypertension, and adding new preventive services requires an act of Congress. The Medicare Wellness Act of 2001, under review in Congress, would add coverage for hypertension screening (as well as for cholesterol screening and smoking-cessation counseling) and also would streamline the process for including new preventive services in the future.

■ **Treatment costs.** Ischemic heart disease posed the highest direct treatment costs, largely because of the disproportionate use of inpatient care. Many of the treatments available to treat ischemic heart disease, from angiography to cardiac surgery, are among the most costly medical treatments today. In part because these treatments are both expensive and highly visible to insurers (who shoulder most of the expenditures), they have become priority areas for clinical guideline development. If there is even a small increase in the prevalence of ischemic heart disease as the U.S. population ages, there will be a major increase in spending for this condition. The high cost of these interventions, and the potential for even higher costs to society in the coming years, make rigorous cost-effectiveness/cost-benefit analysis of paramount importance.¹¹

■ **Sociodemographics.** The importance of sociodemographic variables in chronic conditions is best illustrated by asthma. Low-income and minority patients, as well as children, may be at increased risk not only for developing asthma but also for reduced access to appropriate care.¹² Quality improvement programs for chronic illness will be most useful when targeted toward subpopulations with elevated prevalence of disease or barriers to treatment. For asthma, educational programs for poor and minority patients have been shown not only to improve clinical outcomes but also to redistribute services away from emergency room and inpatient visits and toward more appropriate and less costly outpatient care.¹³

■ **Coverage.** The impact of lack of insurance on access to and intensity of treatment was greatest for mood disorders. Further-

more, because the presence of general health insurance is only a weak proxy for mental health coverage, the findings likely underestimate the actual gap in access to services between patients with and without full mental health benefits. While much of the mental health policy debate in recent years has focused on achieving parity of mental health benefits among insured persons, this study's findings serve as a reminder that many persons with mental disorders have no insurance at all.¹⁴ Increasing rates of coverage, important for all persons with chronic conditions, may be a particular priority for those with mental disorders.

■ **Managed care.** There was not a significant difference in treatment under managed and unmanaged plans for any of the five conditions. This finding likely reflects a progressive blurring of the lines between traditional health maintenance organizations (HMOs) and fee-for-service plans, occurring as traditional indemnity plans have adopted managed care techniques and as managed care plans have adopted a host of blended payment methods.¹⁵

■ **Study limitations.** Several limitations should be discussed. First, the health conditions were determined by self-report. Reassuringly, internal MEPS studies have found an approximately 70 percent correlation between patient- and provider-reported diagnoses and also have found that the correlation is highest for inpatient hospitalizations, which comprise the bulk of expenditures.¹⁶ Second, measures of indirect costs were more limited than were measures of health costs. These costs were calculated only among workers (and so did not account for persons who were unemployed), and work loss could only be calculated as a total per person, rather than being attributed to specific conditions. Finally, the study design necessitated a focus on a finite number of conditions and thus an inevitable exclusion of other important conditions.

IN PLACE OF AGGREGATE cost-of-disease figures, policymakers would be better served by data that provide insight into the factors driving those costs. Several parameters, including comorbidity and prevalence, available treatments, socioeconomic factors, and impact of insurance, appear to be examples of such domains in chronic conditions. Better understanding of these factors can provide a first step both in understanding and ameliorating the burden of chronic disease in the United States.

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