

National Trends in the Treatment for Depression From 1998 to 2007

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Context: The rate of outpatient treatment of depression increased markedly in the United States between 1987 and 1997; it is not known whether this trend has continued.

Objective: To assess national trends in the outpatient treatment of depression between 1998 and 2007.

Design and Setting: Analysis of service utilization data from 2 nationally representative surveys of the US household population, the 1998 (n=22 953) and 2007 (n=29 370) Medical Expenditure Panel Surveys.

Participants: Nationally representative sample of the US household population.

Main Outcome Measures: The rate of depression treatment and, among patients who received treatment, the rate of antidepressant medication use, psychotherapy, number of outpatient treatment visits, and expenditures.

Results: The rate of outpatient treatment for depression increased from 2.37 per 100 persons in 1998 to 2.88

per 100 persons in 2007 (adjusted odds ratio [AOR], 1.18; 95% confidence interval [CI], 1.03-1.35). The percentage of treated patients who used antidepressants was little changed from 73.8% (1998) to 75.3% (2007) (AOR, 1.14; 95% CI, 0.85-1.51), but the percentage of those receiving psychotherapy declined from 53.6% (1998) to 43.1% (2007) (AOR, 0.71; 95% CI, 0.53-0.95). National expenditures for the outpatient treatment of depression increased from \$10.05 billion to \$12.45 billion ($z=1.73$, $P=.08$). This was primarily driven by an increase in medication expenditures from \$4.59 billion (1998) to \$6.60 billion (2007) ($z=2.88$, $P=.004$), which in turn was related to an increase in Medicare expenditures for depression treatment from \$0.52 billion (1998) to \$2.25 billion (2007) ($z=5.62$, $P<.001$).

Conclusions: Rapid increases in depression treatment from 1987 to 1997 were followed by more modest increases during the following decade. Although there was little change in the proportion of patients receiving antidepressants, treatment with psychotherapy has declined.

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DEPRESSION IS A LEADING cause of disability, lost productivity, and health care expenditure.¹⁻³ During the 1990s, there was a substantial increase in the rate of outpatient treatment of depression.^{4,5} The percentage of the US population that received treatment for depression increased from 0.73% in 1987 to 2.33% in 1997. Among these individuals, there was an increase in the use of antidepressant medications from 37.3% (1987) to 74.5% (1997) and a decline in the use of psychotherapy from 71.1% (1987) to 60.2% (1997).⁴ These trends have been attributed to the introduction⁶ and promotion⁷ of selective serotonin reuptake inhibitors (SSRIs) and other newer antidepressants, publication of practice guidelines to diagnose and treat depression,⁸ and the development of efficient screening tools for depression in primary care.⁹ It is not known whether the rapid growth in the rate of outpatient depression treatment and

shifts in treatment modalities have continued into the following decade.

Several factors may have impeded the growth of outpatient depression treatment in the most recent decade. The proliferation of managed behavioral care organizations that exert administrative control over services and seek to control costs may have slowed the growth of depression treatment. The number of Americans whose mental health benefits are managed by behavioral health organizations increased from 53 million in 1994 to 170 million in 2007.¹⁰ In addition, an increasing number of private mental health insurance plans have imposed visit limits on outpatient mental health care, excluded coverage for psychotherapy and intensive outpatient mental health care, and implemented cost-sharing policies.¹¹ Emerging concerns about the safety of antidepressant treatment in young people^{12,13} may also have curtailed treatment of depression in some patient groups.

During the same period, however, several public health policies have sought to expand access to health care services, including mental health services. There has been a steady increase in the number of near poor and previously uninsured youth who have participated in the Children's Health Insurance Program,¹⁴ which includes access to mental health services.¹⁵ Through Medicare Part D, which started in 2006, large numbers of elderly persons who did not previously have drug benefits received subsidies to purchase prescription medications, including antidepressants. The federal Mental Health Parity Act, which first took effect in 1998, required many employer-based group health plans to offer similar benefit limits for psychiatric and general medical diseases.¹⁶ Perhaps most important, the past-year prevalence of major depressive episodes among US adults appears to have doubled between 1991-1992 and 2001-2002.¹⁷

In view of the large number of complex developments that have potentially shaped depression care in the United States, it is difficult to predict the direction and nature of recent national trends in depression treatment. The study reported here is an analysis of national trends in outpatient depression treatment between 1998 and 2007. We describe changes in rates of treatment, the composition of the patient population receiving care, the treatments they receive, and the costs of their care.

METHODS

Data were analyzed from the household component of the 1998¹⁸ and 2007¹⁹ Medical Expenditure Panel Survey (MEPS). Both surveys were sponsored by the Agency for Healthcare Research and Quality (AHRQ) to provide national estimates of the use, expenditures, and financing of health care services. These surveys were conducted as national probability samples of the US civilian, noninstitutionalized population and were designed to provide nationally representative estimates to be compared over time. The MEPS represents the largest available nationally representative study of health service utilization and expenditure. The survey data, which are publicly available and deidentified, were determined to be exempt from human subjects review by the Institutional Review Board of the New York State Psychiatric Institute.

STUDY SAMPLES

A sample of 22 953 participants provided data for the 1998 survey from 2 separate overlapping panels, each of which included 3 rounds of interviews. The full-year response rate was 67.9% after factoring in the effects of nonresponse from all sources.¹⁸ A sample of 29 370 participants provided data for the 2007 survey, the most recent available data, for a full-year response rate of 56.9%.¹⁹ For both surveys, a designated informant was queried about all related persons who lived in the household.

The MEPS included a series of 3 in-person interviews during each study year. Respondents were asked to record medical events as they occurred in a calendar/diary that was reviewed during each in-person interview.

The AHRQ devised weights to adjust for the complex survey designs and yield unbiased national estimates. The sampling weights also adjust for nonresponse and poststratification to population totals based on US census data. More complete discussions of the design, sampling, and adjustment methods are presented elsewhere.^{18,19}

BACKGROUND CHARACTERISTICS

All respondents were classified according to sex, age group, respondent-identified race/ethnicity, and health insurance group. Four overlapping groups captured health insurance coverage during the survey year: any private insurance, any Medicare, any Medicaid or other public insurance programs, and no health insurance. Persons aged 21 years and older were also classified with respect to marital status and highest education grade and persons aged 21 to 65 years were classified according to employment status.

DEPRESSION

The MEPS collected information on the diagnosis for each visit to hospital outpatient departments and office-based outpatient care. This information, which was professionally coded into 4-digit *International Classification of Diseases, Ninth Revision*²⁰ categories, is available at the AHRQ Data Center. Outpatient visits and prescribed medications for major depressive disorder, single episode (diagnostic code 296.2); major depressive disorder, recurrent episode (diagnostic code 296.3); neurotic depression (*DSM-IV* dysthymic disorder) (diagnostic code 300.4); or depressive disorder, not elsewhere classified (diagnostic code 311) are considered as treatment of depression. However, outpatient visits and prescribed medications for bipolar depression are not considered as treatment of depression.

PSYCHOTHERAPY

The MEPS asked respondents about the type of care provided during each outpatient visit using a set of response categories. Mental health counseling or psychotherapy is defined in MEPS as "a treatment technique for certain forms of mental disorders relying principally on talk/conversation between the mental health professional and the patient."²¹

PSYCHOTROPIC MEDICATIONS

The MEPS included data on medicines bought or otherwise obtained by participants during the survey year. Psychotropic medications that were specifically associated with treatment of depression were grouped by therapeutic classes as antidepressants, antipsychotics, anxiolytics/hypnotics, stimulants, and mood stabilizers that included lithium carbonate and lithium citrate as well as lamotrigine, carbamazepine, and divalproex sodium/valproic acid/valproate sodium. Antidepressants were subcategorized as SSRIs, other newer antidepressants (venlafaxine hydrochloride, duloxetine hydrochloride, mirtazapine, bupropion hydrochloride), and tricyclic antidepressants and other older antidepressants.

PROVIDERS

The MEPS solicits information on the type of health care professionals providing treatment at each visit. We classified providers as social workers, psychologists, and physicians. In 2007, physician specialty was also available, which permitted an analysis of treatment provision by psychiatrists.

EXPENDITURES AND SOURCE OF PAYMENT

The MEPS collects information on expenditures for each health care service. From these data, total expenditures for outpatient depression care were calculated as the sum of outpatient depression visits and medications for the treatment of depression. Expenditures were also considered separately for outpa-

Table 1. National Rates of Outpatient Treatment of Depression in 1998 (n=22 953) and 2007 (n=29 370) Stratified by Sociodemographic Characteristics^a

Characteristic	1998 Rate per 100 Persons (95% CI)	2007 Rate per 100 Persons (95% CI)	Adjusted Odds Ratio (95% CI) ^b
Total (n ₁ =22 953, n ₂ =29 370)	2.37 (2.12-2.61)	2.88 (2.64-3.12)	1.18 (1.03-1.35)
Sex			
Male (n ₁ =10 859, n ₂ =14 003)	1.47 (1.16-1.77)	2.12 (1.82-2.43)	1.39 (1.08-1.78)
Female (n ₁ =12 094, n ₂ =15 367)	3.23 (2.83-3.63)	3.61 (3.29-3.94)	1.08 (0.92-1.28)
Age, y			
<18 (n ₁ =6947, n ₂ =8543)	0.60 (0.41-0.80)	0.57 (0.39-0.75)	0.92 (0.58-1.46)
18-34 (n ₁ =5039, n ₂ =6190)	2.35 (1.77-2.92)	2.59 (2.09-3.08)	1.11 (0.81-1.54)
35-49 (n ₁ =4944, n ₂ =6006)	3.92 (3.28-4.57)	4.05 (3.43-4.66)	1.00 (0.79-1.26)
50-64 (n ₁ =3145, n ₂ =4916)	3.52 (2.85-4.19)	4.95 (4.32-5.59)	1.48 (1.15-1.89)
≥65 (n ₁ =2646, n ₂ =3357)	2.17 (1.57-2.78)	3.33 (2.68-3.97)	1.57 (1.09-2.25)
Race/ethnicity			
White (n ₁ =13 938, n ₂ =16 758) ^c	2.70 (2.39-3.00)	3.21 (2.90-3.52)	1.10 (0.78-1.58)
Black (n ₁ =3430, n ₂ =4953)	1.00 (0.59-1.42)	2.20 (1.72-2.69)	2.07 (1.27-3.37)
Hispanic (n ₁ =5585, n ₂ =7659)	1.71 (1.23-2.19)	1.90 (1.48-2.31)	1.13 (0.98-1.59)
Marital status ^d			
Married (n ₁ =8810, n ₂ =11 331)	2.36 (2.00-2.73)	2.96 (2.57-3.35)	1.24 (1.01-1.53)
Sep/Div/Wid (n ₁ =3323, n ₂ =4077)	5.06 (4.17-5.95)	5.89 (5.12-6.66)	1.18 (0.92-1.51)
Not married (n ₁ =2698, n ₂ =3835)	3.26 (2.36-4.15)	3.93 (3.46-4.67)	1.15 (0.81-1.63)
Educational level, highest grade ^d			
0-11 (n ₁ =3813, n ₂ =4379)	2.66 (2.11-3.21)	4.17 (3.44-4.90)	1.65 (1.24-2.10)
12 (n ₁ =4892, n ₂ =5924)	2.84 (2.31-3.37)	3.41 (2.91-3.90)	1.18 (0.93-1.49)
13-16 (n ₁ =4851, n ₂ =6991)	3.55 (3.00-4.11)	3.79 (3.30-4.28)	1.00 (0.80-1.23)
≥17 (n ₁ =1092, n ₂ =1768)	3.43 (2.17-4.69)	4.33 (3.12-5.54)	1.25 (0.78-2.01)
Health insurance			
Private, any (n ₁ =14 526, n ₂ =16 377)	2.21 (1.93-2.48)	2.63 (2.35-2.90)	1.16 (0.99-1.37)
Medicare, any (n ₁ =3192, n ₂ =4191)	3.18 (2.52-3.84)	5.50 (4.74-6.25)	1.66 (1.27-2.17)
Medicaid, any (n ₁ =4930, n ₂ =8061) ^e	4.04 (3.22-4.86)	4.31 (3.70-4.92)	1.18 (0.91-1.53)
None (n ₁ =3393, n ₂ =4591)	1.57 (1.08-2.06)	1.85 (1.34-2.37)	1.14 (0.74-1.76)
Employment status ^f			
Employed (n ₁ =9633, n ₂ =12 477)	2.58 (2.16-3.00)	2.80 (2.47-3.14)	1.11 (0.91-1.36)
Not employed (n ₁ =2550, n ₂ =3441)	7.02 (5.76-8.28)	8.85 (7.76-9.94)	1.32 (1.04-1.67)

Abbreviations: CI, confidence interval; Sep/Div/Wid, separated/divorced/widowed.

^aData from Medical Expenditure Panel Surveys. n₁ Denotes number of observations in the 1998 stratum and n₂ denotes number in the 2007 stratum. Missing observations include age (n₁=232; n₂=358), marital status (n₁=466; n₂=612), educational level (n₁=649; n₂=793), and employment status (n₁=425; n₂=560).

^bAdjusted for age, sex, race/ethnicity, and health insurance status.

^cIncludes white, American Indian, Alaska native, and Asian or Pacific Islander.

^dLimited to respondents aged 21 y and older.

^eIncludes Medicaid and public insurance programs other than Medicare.

^fLimited to respondents aged 21 to 65 years.

tient depression care visits that included psychotherapy. Summary variables were constructed for 6 payment sources of outpatient depression care including self-payment, private insurance, Medicaid, Medicare, other federal programs, and a residual group of other sources.

ANALYSIS PLAN

Table 1 shows the rates of outpatient depression treatment per 100 persons for each survey year that were determined overall and stratified by sociodemographic characteristics. A corresponding series of logistic regression models were fit to evaluate the effect of survey year on the adjusted odds ratio of outpatient depression treatment controlling for age, sex, race/ethnicity, and health insurance group. Among respondents who received treatment for depression, differences in the distributions of sociodemographic and clinical characteristics were compared for the categorical variables across survey years using logistic regression models (**Table 2** and **Table 3**). For the continuous variables, which included mean number of treatments and expenditures, linear regression was used to assess change over time (**Table 3**). In **Table 4**, proportions of patients treated for depression with psychotherapy, antidepressants, or both are compared by sur-

vey year overall and stratified by sociodemographic characteristics with corresponding odds ratios. **Table 5** shows trends in total national expenditures for outpatient depression care overall and partitioned by payment source. Changes in total national expenditures were evaluated using *z* tests. The Consumer Price Index for medical care was used to adjust 1998 expenditures to 2007 dollars.²²

All statistical analyses were performed using the SAS 9.2 software package (SAS Institute, Cary, North Carolina) using SURVEY procedures to accommodate the complex sample design and the weighting of observations. All tests were 2-sided, α level was set at .05, and confidence intervals were set at 95%.

RESULTS

TRENDS IN THE RATE OF OUTPATIENT TREATMENT OF DEPRESSION

There was a significant overall increase in the proportion of Americans receiving outpatient depression treatment, from 2.37 per 100 persons in 1998 to 2.88 per 100

Table 2. Sociodemographic Characteristics of Persons Diagnosed and Receiving Outpatient Treatment for Depression in the United States, 1998 and 2007^a

Characteristic	% (95% CI)		Adjusted Risk Ratio ^b (95% CI)
	1998 (n=550)	2007 (n=842)	
Sex			
Male	30.3 (25.1-35.5)	36.1 (32.5-39.6)	1.28 (0.95-1.73)
Female	69.7 (64.5-74.9)	63.9 (60.4-67.5)	0.78 (0.58-1.05)
Age, y			
<18	6.8 (4.7-8.9)	4.8 (3.5-6.3)	0.66 (0.41-1.05)
18-34	23.2 (18.2-28.2)	20.6 (17.3-23.9)	0.85 (0.59-1.22)
35-49	38.1 (33.5-42.7)	29.7 (2.57-3.36)	0.71 (0.54-0.93)
50-64	20.8 (17.0-24.6)	30.9 (2.74-3.45)	1.69 (1.24-2.29)
≥65	11.1 (8.2-13.9)	14.0 (11.4-16.5)	1.31 (0.90-1.90)
Race/ethnicity			
White ^c	86.2 (83.2-89.2)	80.6 (77.7-83.4)	0.67 (0.48-0.94)
Black	5.3 (3.1-7.6)	9.3 (7.1-11.5)	1.70 (0.99-2.91)
Hispanic	8.5 (6.1-10.8)	10.1 (8.0-12.3)	1.25 (0.85-1.86)
Marital status ^d			
Married	44.3 (38.8-49.7)	44.8 (40.5-49.1)	1.05 (0.78-1.42)
Sep/Div/Wid	35.0 (29.8-40.1)	32.7 (28.6-36.8)	0.79 (0.58-1.07)
Not married	20.7 (15.9-25.5)	22.5 (18.7-26.3)	1.33 (0.89-1.98)
Educational level, highest grade ^d			
0-11	16.9 (13.7-20.0)	17.6 (14.6-20.6)	0.82 (0.59-1.15)
12	30.7 (26.1-35.4)	27.7 (24.1-31.2)	0.85 (0.64-1.13)
13-16	42.7 (37.3-48.1)	41.8 (37.7-45.9)	1.07 (0.80-1.44)
≥17	9.7 (6.3-13.2)	12.9 (9.5-16.3)	1.56 (0.96-2.55)
Health insurance			
Private, any	66.7 (62.2-71.2)	59.8 (56.1-63.5)	0.83 (0.64-1.08)
Medicare, any	18.8 (15.4-22.2)	28.2 (24.7-31.6)	1.78 (1.19-2.65)
Medicaid, any ^e	26.5 (21.7-31.3)	28.9 (25.4-32.4)	1.09 (0.79-1.51)
None	7.9 (5.5-10.2)	8.6 (6.4-10.7)	1.09 (0.69-1.71)
Employment status ^d			
Employed	64.6 (58.5-70.8)	59.4 (55.1-63.6)	0.95 (0.63-1.43)
Not employed	35.4 (29.2-41.5)	40.6 (36.4-44.9)	1.05 (0.70-1.58)

Abbreviations: CI, confidence interval; Sep/Div/Wid, separated/divorced/widowed.

^aData from Medical Expenditure Panel Surveys.

^bAdjusted for age, sex, race/ethnicity, and health insurance status.

^cIncludes white, American Indian, Alaska native, and Asian or Pacific Islander.

^dLimited to persons aged 21 years and older.

^eIncludes Medicaid and public insurance programs other than Medicare.

persons in 2007 (Table 1). This corresponds to approximately 6.48 million (1998) and 8.69 million (2007) persons, respectively (data not shown).

After adjustment for several potentially confounding background characteristics, there were significant increases in the rates of outpatient depression treatment overall and among several sociodemographic groups. The largest increases were in the categories of African Americans, Medicare beneficiaries, and adults with fewer than 12 years of education (Table 1).

TRENDS IN THE CHARACTERISTICS OF OUTPATIENTS RECEIVING TREATMENT FOR DEPRESSION

During the study period, there were several significant declines in the composition of outpatients receiving treatment for depression, including a decrease in the percentage who were white and an increase in the percentage who were Medicare beneficiaries (Table 2). A declining percentage of people undergoing treatment for depression received psychotherapy. Of those who received psycho-

therapy, the average number of psychotherapy visits and expenditures for these visits also significantly decreased (Table 3). There was also a significant decline in the mean number of outpatient depression care visits per treated person. A trend toward declining average-per-person expenditures for these visits was not significant.

In both survey years, approximately three-quarters of individuals who received treatment for depression were given antidepressant medications at some point during the year. Consistent with findings from previous research,²³ the percentage of individuals who received SSRIs or tricyclic antidepressants significantly fell and the percentage of those given newer antidepressants increased (Table 3). Among individuals who received psychotropic medications, there was not a significant change in the number of prescriptions for psychotropics or expenditures for these prescriptions.

During the survey year, a decreasing proportion of outpatients who received treatment for depression were hospitalized for treatment of a psychiatric disorder. This contrasts with an overall increase in the population-based rate of inpatient treatment of mental disorders in short-

Table 3. Treatment Characteristics of Persons Diagnosed and Receiving Outpatient Treatment for Depression in the United States, 1998 and 2007^a

Treatment	% (95% CI)		Adjusted Odds Ratio/ β (95% CI)/P Value ^b
	1998 (n=550)	2007 (n=842)	
Psychotherapy	53.6 (48.3-59.0)	43.1 (38.9-47.3)	0.71 (0.53-0.95)
Pharmacotherapy, any	80.1 (76.4-83.8)	81.9 (78.7-85.0)	1.12 (0.83-1.52)
Antidepressants	73.8 (69.5-78.0)	75.3 (71.6-78.9)	1.14 (0.85-1.51)
SSRIs	59.2 (54.9-63.5)	49.7 (45.3-54.0)	0.71 (0.56-0.91)
Other newer antidepressants	16.3 (12.2-20.4)	34.4 (30.4-38.4)	2.87 (2.00-4.11)
Tricyclic antidepressants	18.4 (14.0-22.7)	7.5 (5.6-9.4)	0.34 (0.23-0.51)
Anxiolytics	15.1 (11.6-18.6)	13.7 (11.1-16.2)	0.85 (0.60-1.22)
Antipsychotics	6.7 (4.1-9.2)	8.7 (6.6-10.9)	1.21 (0.74-2.02)
Mood stabilizers	7.8 (4.6-11.0)	7.2 (5.1-9.2)	0.96 (0.57-1.63)
Stimulants	1.3 (0.2-2.4)	2.5 (0.8-1.0)	2.25 (0.79-6.44)
Psychotherapy and pharmacotherapy	42.1 (36.9-47.2)	34.5 (30.7-38.2)	0.77 (0.59-1.01)
Psychotherapy and antidepressants	39.4 (34.2-44.6)	32.3 (28.7-35.9)	0.79 (0.60-1.04)
Provider type, mental health visits			
Physician	85.6 (82.0-89.3)	84.6 (81.8-87.4)	0.79 (0.54-1.16)
Psychiatrist		41.9 (38.0-45.7)	
Psychologist	21.4 (17.3-25.6)	19.3 (15.9-22.7)	1.00 (0.71-1.41)
Social worker	6.8 (4.1-9.5)	6.7 (5.0-8.5)	1.13 (0.68-1.85)
Acute psychiatric services			
Inpatient treatment	6.3 (3.8-8.9)	3.5 (2.0-5.0)	0.50 (0.26-0.95)
Emergency department	2.0 (1.0-3.0)	4.0 (2.2-5.8)	1.52 (0.96-2.40)
	Mean per Year (95% CI)	Mean per Year (95% CI)	Adjusted β (P Value)^c
Depression treatment expenditures, \$ ^d	1551 (1331-1771)	1433 (1286-1580)	-107.0 (.46)
Depression visits, expenditures, \$ ^d	843 (651-1035)	674 (563-785)	-161.2 (.14)
Depression visits, mean No. ^d	7.36 (6.21-8.51)	6.35 (5.43-7.28)	0.92 (<.001)
Psychotherapy, expenditures, \$ ^b	1053 (753-1353)	757 (600-914)	-301.3 (<.001)
Psychotherapy visits, mean No. ^b	9.17 (7.71-10.64)	8.16 (6.51-9.80)	0.89 (<.001)
Prescriptions, expenditures, \$ ^d	708 (600-817)	759 (662-855)	54.2 (.47)
Prescriptions, mean No. ^d	8.63 (7.55-9.72)	8.76 (8.10-9.42)	0.07 (.88)

Abbreviations: CI, confidence interval; SSRIs, selective serotonin reuptake inhibitors.

^aData from Medical Expenditure Panel Surveys.

^bAnalysis limited to persons with 1 or more psychotherapy visit for depression.

^cBeta values are adjusted for age, sex, race/ethnicity, and health insurance status.

^dValues are annual means per treated person for depression. Prescriptions are limited to medications used to treat depression.

stay hospitals between 1998 (72.3 per 10 000) and 2006 (81.1 per 10 000).^{24,25}

TRENDS IN PSYCHOTHERAPY AND ANTIDEPRESSANT TREATMENT

A closer look at the declining use of any psychotherapy revealed that this trend was significant for persons aged 35 to 49 years, individuals of Hispanic ancestry, adults with 12 or fewer than 12 years of education, Medicaid beneficiaries, and unemployed adults (Table 4). Treatment with antidepressants significantly increased among persons aged 50 to 64 years and uninsured individuals. Several patient groups treated for depression, especially Medicare beneficiaries and adults with 12 years of education, became significantly less likely to receive both psychotherapy and antidepressant medication in 2007 than in 1998 (Table 4).

TRENDS IN CUMULATIVE EXPENDITURES FOR DEPRESSION CARE

During the study period, there was an impressive increase in national outpatient medical care expenditures

from approximately \$361 billion (1998) to \$592 billion (2007) (data not shown). In relation to this increase, growth in total expenditures for the outpatient treatment of depression was more modest, from \$10.05 billion (1998) to \$12.45 billion (2007) (Table 5). These trends are in line with previously reported long-term slower growth rates of mental health expenditures than total medical expenditures.²⁶ A nonsignificant trend toward declining psychotherapy expenditures was more than offset by a significant increase in expenditures for psychotropic medications used to treat depression.

When total outpatient depression care expenditures were considered by source of payment, a significant increase was observed in Medicare expenditures, from \$0.52 billion (1998) to \$2.25 billion (2007). This increase was largely attributable to an increase from \$0.08 billion (1998) to \$1.46 billion (2007) in Medicare expenditures for medications prescribed to treat depression (data not shown).

As a result of changes in the distribution of payer burdens, the share of total outpatient depression treatment expenditures accounted for by public sources

Table 4. Rates of Antidepressant Medication Use, Psychotherapy, and Both per 100 Persons Diagnosed and Receiving Outpatient Treatment for Depression in the United States, 1998 and 2007, Stratified by Sociodemographic Characteristics^a

Characteristic	Psychotherapy			Antidepressants			Both		
	1998	2007	AOR (95% CI) ^b	1998	2007	AOR (95% CI) ^b	1998	2007	AOR (95% CI) ^b
Total	53.6	43.1	0.71 (0.53-0.95)	73.8	75.3	1.14 (0.85-1.51)	39.4	32.3	0.79 (0.60-1.04)
Sex									
Male	56.2	42.5	0.62 (0.37-1.02)	68.8	73.3	1.16 (0.72-1.87)	38.7	30.1	0.70 (0.44-1.14)
Female	52.5	43.4	0.73 (0.51-1.03)	75.9	76.4	1.16 (0.80-1.68)	39.7	33.6	0.81 (0.58-1.13)
Age, y									
<18	75.4	65.7	0.70 (0.25-1.92)	60.5	52.0	0.82 (0.33-2.03)	46.5	34.9	0.69 (0.25-1.90)
18-34	54.8	49.9	0.82 (0.43-1.57)	77.1	75.6	1.14 (0.57-2.31)	45.7	35.9	0.70 (0.39-1.28)
35-49	62.6	45.9	0.52 (0.33-0.83)	78.1	72.5	0.73 (0.44-1.22)	46.6	33.2	0.58 (0.38-0.90)
50-64	42.2	38.7	0.89 (0.56-1.41)	67.6	81.9	2.20 (1.26-3.82)	26.6	34.0	1.46 (0.89-2.41)
≥65	28.2	29.1	1.00 (0.42-2.39)	71.6	73.9	1.22 (0.51-2.96)	20.9	20.7	0.93 (0.38-2.29)
Race/ethnicity									
White ^c	53.5	43.1	0.73 (0.53-1.01)	75.3	77.6	1.16 (0.82-1.64)	40.1	32.9	0.80 (0.59-1.08)
Black	45.3	43.0	0.83 (0.33-2.08)	63.1	61.1	1.07 (0.43-2.66)	36.4	26.9	0.60 (0.24-1.46)
Hispanic	59.8	42.8	0.40 (0.19-0.85)	65.3	69.8	1.29 (0.61-2.75)	34.3	32.3	0.92 (0.43-1.96)
Marital status ^d									
Married	46.4	40.1	0.83 (0.54-1.27)	75.3	78.6	1.26 (0.77-2.06)	33.5	30.0	0.92 (0.61-1.39)
Sep/Div/Wid	55.1	35.8	0.50 (0.31-0.80)	76.3	74.1	0.93 (0.56-1.54)	43.1	27.5	0.56 (0.34-0.92)
Not married	56.8	55.9	0.92 (0.46-1.88)	73.1	75.0	1.21 (0.59-2.50)	42.7	43.8	0.98 (0.51-1.88)
Educational level, grade ^d									
0-11	40.6	28.5	0.50 (0.26-0.94)	73.5	66.3	0.71 (0.37-1.35)	29.9	24.9	0.70 (0.35-1.40)
12	52.7	37.1	0.50 (0.30-0.81)	79.8	73.9	0.78 (0.44-1.41)	41.3	26.4	0.50 (0.29-0.87)
13-16	57.6	47.5	0.76 (0.44-1.32)	74.3	80.2	1.42 (0.86-2.38)	43.7	37.1	0.85 (0.54-1.36)
≥17	44.8	55.1	1.93 (0.77-4.82)	70.7	82.1	1.80 (0.65-4.98)	27.0	39.4	2.09 (0.86-5.05)
Health insurance ^d									
Private, any	50.8	45.6	0.90 (0.63-1.30)	79.7	77.2	0.88 (0.59-1.31)	38.7	34.4	0.92 (0.65-1.29)
Medicare, any	46.1	34.1	0.59 (0.34-1.02)	76.2	76.1	1.02 (0.53-1.95)	38.5	26.2	0.52 (0.29-0.95)
Medicaid, any ^e	54.9	41.9	0.61 (0.38-0.98)	71.7	71.6	1.04 (0.64-1.69)	41.6	31.9	0.68 (0.42-1.10)
None	63.7	48.0	0.61 (0.25-1.48)	52.2	75.0	3.21 (1.19-8.60)	33.2	35.0	1.28 (0.47-3.50)
Employment ^d									
Employed	55.6	49.9	0.85 (0.57-1.28)	77.9	76.9	0.98 (0.62-1.54)	40.8	38.1	0.96 (0.66-1.38)
Not employed	53.6	36.8	0.52 (0.35-0.77)	71.8	76.5	1.29 (0.79-2.10)	42.1	28.9	0.58 (0.38-0.89)

Abbreviations: AOR, adjusted odds ratio; CI, confidence interval; Sep/Div/Wid, separated/divorced/widowed.

^aData from Medical Expenditure Panel Surveys.

^bAdjusted for age, sex, race/ethnicity, and health insurance status.

^cIncludes white, American Indian, Alaska native, and Asian or Pacific Islander.

^dLimited to respondents aged 21 y and older.

^eIncludes Medicaid and public insurance programs other than Medicare.

Table 5. Trends in Total Estimated Expenditures for Outpatient Treatment of Depression, Mental Health Visits, Psychotherapy, Medications, and Sources of Payment, United States, 1998 and 2007^a

Payment Source	Annual Expenditures, \$ (in Billions)		Change, %	z Score	P Value
	1998	2007			
Total outpatient treatment of depression	10.05	12.45	+23.9	1.73	.08
Mental health visits for depression	5.46	5.85	+7.1	0.43	.67
Psychotherapy for depression	3.66	2.83	-22.7	1.10	.27
Medications for depression	4.59	6.60	+43.8	2.88	.004
Sources of payment, treatment of depression					
Self-payment	3.21	2.85	-11.2	0.60	.55
Private insurance	3.85	4.89	+27.0	1.46	.15
Medicare	0.52	2.25	+332.7	5.62	<.001
Medicaid	1.90	1.47	-22.6	1.06	.28
Other public sources	0.39	0.84	+115.4	1.69	.09
Other	0.18	0.15	-16.7	0.34	.73

^aData from the 1998 and 2007 Medical Expenditure Panel Surveys. The 1998 expenditures have been inflated by the Consumer Price Index for medical care between 1998 and 2007.

(Medicare, Medicaid, and other public sources) increased from 28.0% (1998) to 36.6% (2007) ($t=1.82$, $P=.07$) (data not shown).

COMMENT

In relation to the rapid growth of depression treatment that occurred between 1987 and 1997,⁴ the period between 1998 and 2007 was characterized by a far more modest increase in the rate of outpatient treatment of depression. Nevertheless, the number of Americans who received outpatient treatment for depression increased from approximately 6.5 million to 8.7 million, which was driven by an increase in the US population and an increase in the rate of depression treatment. Among patients treated for depression, the likelihood of receiving antidepressant medications remained essentially unchanged and the proportion receiving psychotherapy declined. After adjustment for the effects of inflation, there was an increase in overall national expenditures for outpatient depression treatment between 1998 and 2007; this included increased medication costs that were especially evident within the Medicare population.

Despite continued growth in the percentage of Americans receiving treatment for depression, it is likely that a substantial number of individuals with depression remain untreated for their symptoms. Even in 2007, the MEPS-derived treated prevalence of adult depression (2.59%-4.95%) remained below community prevalence estimates of 6.6% to 7.1% for past-year adult major depression.^{5,17}

Disproportionate increases in outpatient treatment of depression occurred among several sociodemographic groups that have historically received low rates of depression treatment. Older adults, African Americans, and males, among others, experienced particularly substantial increases in outpatient treatment of depression. The National Comorbidity Survey–Replication, which was conducted in 2001–2003, suggests that untreated mood disorders are more common in older than younger adults, African Americans than whites, and males than females.²⁷ The findings reported here are consistent with those from previous research²⁸ in indicating that some historical disparities in depression care have recently narrowed.

There was little change in the overall percentage of outpatients who received antidepressant medications between 1998 and 2007. During this period, use of tricyclic antidepressants and SSRIs declined while use of other newer antidepressant medications increased. Some evidence indicates that SSRIs and other newer antidepressant medications do not differ significantly in overall effectiveness.^{29,30} After unsuccessful treatment with citalopram hydrobromide, for example, the clinical course of adults with depression that is treated with paroxetine hydrochloride, venlafaxine, or bupropion does not differ significantly in symptoms, drug tolerability, or adverse events.²⁹ Compared with tricyclic antidepressants, SSRIs³¹ and other newer antidepressants³² tend to be better tolerated, although class differences in acute phase efficacy have not been consistently found.^{30,33,34} A

shift away from the use of SSRIs may be related to changes in pharmaceutical marketing during the study period.³⁵ Between 1998 and 2007, the patents expired for fluoxetine hydrochloride (2001), paroxetine (2003), citalopram (2004), and sertraline hydrochloride (2006), with a consequent decrease in overall promotional spending by the manufacturers, despite subsequent introduction of several branded reformulations of these drugs.³⁶

There was a significant decline between 1998 and 2007 in the proportion of outpatients with depression who received psychotherapy. A similar trend has been reported for visits to office-based psychiatrists for major depression.³⁷ Despite progress by academic researchers in demonstrating the efficacy of several specific forms of psychotherapy for depression,³⁸ only a minority (43.1%) of outpatients who received treatment for depression in 2007 received any psychotherapy. A set of nationally representative psychiatric epidemiologic surveys recently revealed that a similar percentage (44.4%) of adults meeting criteria for a major depressive episode received any psychotherapy during the course of 1 year.³⁹ In the study reported here, declining rates of psychotherapy treatment were prominent among unemployed adults, Medicaid beneficiaries, Hispanics, and adults with 12 or fewer years of formal education. For these groups, depression care may be becoming more narrowly focused on pharmacotherapy. African Americans were a notable exception to the trend; the percentage of African Americans with depression who received psychotherapy was little changed between 1998 (45.3%) and 2007 (43.0%). Compared with white adults, African American adults have been found to more commonly prefer psychotherapy over antidepressant medications.^{40,41}

It is not possible to determine whether declining use of psychotherapy reflects patient preferences for antidepressant medications or difficulties with access to psychotherapy related to a scarcity of local psychotherapists, financial or insurance coverage considerations, or other barriers.⁴² A review of the literature concerning treatment preferences, however, revealed that most patients with depression prefer psychotherapy or counseling over antidepressant medications.⁴³ However, although third-party coverage of antidepressants and other psychotropic medications is typically generous,^{44,45} significant limits commonly exist on coverage of psychotherapy services.¹¹ With the exception of treatment for children and adolescents, antidepressants rather than psychotherapy are the modal form of outpatient treatment for depression in the United States. The significant decline in psychotherapy among several traditionally underserved patient populations suggests that psychotherapy may be becoming increasingly difficult to access for these groups. According to a recent survey, approximately two-thirds of primary care physicians indicate that they are unable to access psychotherapy or other outpatient specialty mental health care for their patients with mental health problems.⁴⁶

Antidepressants in combination with psychotherapy tend to be associated with greater improvement of depression than medication therapy alone.^{47,48} In the community, approximately one-third of outpatients who undergo treatment for depression receive antidepressant medications and psychotherapy during the course of 1

year. For several demographic groups, the probability of receiving combined treatment has declined significantly in recent years. This trend raises concerns about access to combined treatment for these groups. Some psychiatrists no longer offer psychotherapy,³⁷ requiring patients who desire combined treatment to seek care from another mental health professional.

After adjustment for inflation, the average annual costs of treatment for an individual with depression were little changed between 1998 and 2007. Because of population growth and an increasing rate of depression treatment, aggregate national expenditures for depression treatment increased. This increase was especially apparent for the Medicare program. The implementation of Medicare Part D in 2006, which extended prescription pharmacy benefits to elderly persons, increased overall medication use by elderly Medicare beneficiaries.⁴⁹ It is likely that Medicare Part D contributed to the 4-fold increase in Medicare spending on outpatient depression during the study period. The disproportionate increase in Medicare spending on medications to treat depression following implementation of Part D suggests that health care policies tilted toward medications may affect the balance between pharmacologic and psychological treatments. In assessing the potential impact of Medicare Part D on depression care, a factor to consider is that the current analysis does not focus on the vulnerable subgroup of psychiatrically disabled Medicare and Medicaid beneficiaries who are widely believed to have experienced difficulties in accessing prescription medications under Medicare Part D.⁵⁰

The MEPS is the largest and most methodologically rigorous nationally representative survey of health service use and expenditures in the United States. Nevertheless, the results of our analysis should be considered in the context of several general limitations. First, the MEPS collects data from household informants who may not be fully aware of all the services used by household members. Recall problems and stigma may contribute to an underestimation of depression treatment in both surveys analyzed here. Second, without independent expert assessments, it is not possible to determine whether individuals who received treatment for a depressive disorder actually met diagnostic criteria for the disorder or whether changes have occurred in the underlying population prevalence of severe depression. Third, homeless persons, nursing home residents, inmates in correctional facilities, and people in other institutional settings are not represented in the surveys. Fourth, incomplete response to the surveys opens the results to potential selection bias. However, separate weighting adjustments were performed to reduce bias in survey estimates associated with nonresponse among sampled households and associated with attrition at the person level across survey rounds, and evaluations provide no evidence of nonresponse bias.⁵¹ Finally, rates of any psychotherapy or antidepressant use are not equivalent to rates of adequate depression treatment,^{6,52} although it is difficult to make inferences concerning the quality of care in the study reported here without more clinical information. Nevertheless, because rates of adequate care tend not to vary once treatment is initiated,⁵³ disparities in the

quality of depression treatment are likely related to differences in the rates of treatment initiation.

Rational mental health care policy involves aligning incentives with the known comparative effectiveness of available treatments. Recent research has questioned the superiority of antidepressants over placebo for patients with less severe depression.⁵⁴⁻⁵⁶ Concerns also exist regarding the effectiveness of psychotherapy as practiced in the community.⁵⁷ As national health care reform unfolds, it will be important to develop clinical policies that promote access to effective treatments for depression. Health care reform will extend coverage to an estimated 32 million uninsured Americans.⁵² Meeting the mental health care needs of these individuals, who currently have a low rate of depression treatment, will pose a formidable challenge to general medical and mental health educators and practitioners.

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