

The Costs and Benefits of Reducing Racial-Ethnic Disparities in Mental Health Care

Benjamin Lê Cook, Ph.D., M.P.H., Zimin Liu, M.A., Anna Sophia Lessios, B.A., Stephen Loder, B.A., Thomas McGuire, Ph.D.

Objective: Previous studies have found that timely mental health treatment can result in savings in both mental health and general medical care expenditures. This study examined whether reducing racial-ethnic disparities in mental health care offsets costs of care.

Methods: Data were from a subsample of 6,206 individuals with probable mental illness from the 2004–2010 Medical Expenditure Panel Survey (MEPS). First, disparities in mental health treatment were analyzed. Second, two-year panel data were used to determine the offset of year 1 mental health outpatient and pharmacy treatment on year 2 mental and general medical expenditures. Third, savings were estimated by combining results from steps 1 and 2.

Results: Compared with whites, blacks and Latinos with year 1 outpatient mental health care spent less on inpatient and emergency general medical care in year 2. Latinos receiving

mental health care in year 1 spent less than others on inpatient general medical care in year 2. Latinos taking psychotropic drugs in year 1 showed reductions in inpatient general medical care. Reducing racial-ethnic disparities in mental health care and in psychotropic drug use led to savings in acute medical care expenditures.

Conclusions: Savings in acute care expenditures resulting from eliminating disparities in racial-ethnic mental health care access were greater than costs in some but not all areas of acute mental health and general medical care. For blacks and Latinos, the potential savings from eliminating disparities in inpatient general medical expenditures are substantial (as much as \$1 billion nationwide), suggesting that financial and equity considerations can be aligned when planning disparity reduction programs.

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Members of racial-ethnic minority groups use less mental health care than whites use, even after adjustment for need (1–5). Disparities in mental health care are usually cast as an equity concern deserving of policy and clinical attention. However, disparities can also lead to inefficient patterns of service use (6). For example, because individuals from racial-ethnic minority groups often live in neighborhoods with fewer specialist mental health providers than are available in other neighborhoods (7) and because these individuals are less likely than whites to receive adequate mental health care (8), they may delay mental health treatment until they experience more acute symptoms and then may need more expensive care. In addition, misdiagnosis of mental disorders by primary care physicians may lead to unnecessary care (9).

“Medical cost offset” is based on the idea that timely mental health treatment reduces use of general medical services (10). Patients with a psychiatric diagnosis have higher overall medical care expenditures than those without a diagnosis (11–14). Given that a majority of those with a mental illness do not seek treatment for it (15), addressing unmet need for care can result in reduced medical costs (16). Prior work has

investigated medical cost offsets in psychological interventions (17–19) and found that treating mental illness can in some circumstances reduce overall health care expenditures.

One meta-analysis found greater potential for cost offsets among elderly adults (19), whereas another found higher potential for offsets among patients hospitalized for intensive treatments or surgical procedures (17). Other studies of collaborative depression treatment approaches found that early recognition and treatment of mental illness reduced medical care visits (20–22). Literature on psychosocial interventions for depression and panic disorder in primary care indicates greater savings in medical costs for those with greater symptom severity (18,23). More recently, offsets have been found with psychotropic drug use, similar to offsets from drug spending generally (24–27). Patients with cancer or chronic fatigue who receive antidepressant therapy have a cost offset in general medical services (28), as do patients who take antidepressants for the treatment of anxiety or depression (29).

Prior literature suggests that offset effects may differ by race-ethnicity, given that individuals from minority groups differ from whites in rates of comorbid psychiatric and general

illness (30), have greater illness severity at time of presentation (31), and have very different patterns of mental health care. Wide racial-ethnic disparities in mental health care access are well documented (2,32,33). Once in treatment, Latinos have fewer mental health care visits than whites have, and blacks are more likely than whites to terminate care in acute psychiatric care settings (34).

This study built upon studies of mental health care disparities and offsets in overall health care costs. We examined the “business case” for reducing disparities (35), simulating the net savings of eliminating disparities in mental health care access and psychotropic drug use with a nationally representative community sample. We recognize the critique that improving mental health and reducing disparities should be an end in itself for equity reasons (36,37), but we conducted this analysis to test whether there is also an efficiency justification. We hypothesized that the expense of reducing racial-ethnic disparities in mental health care and psychotropic drug treatment is offset by savings in acute general medical and mental health care expenditures.

METHODS

We estimated the net value of eliminating racial-ethnic disparities in mental health care in three steps. First, we quantified disparities in appropriate mental health care (any outpatient mental health care or any psychotropic medication use), estimating how many individuals would need to access care to eliminate disparities. We focused on the value of elimination of disparities in access to outpatient care and psychotropic medications because access disparities are significantly greater than disparities in use conditional on access (2,8). Second, we measured the offset in acute mental and acute general medical care expenditures associated with use of appropriate mental health care. Third, we combined data from steps 1 and 2 to determine the net benefit of eliminating disparities.

Step 1: Identification of Disparities

Data. We used data from the 2004–2010 Medical Expenditure Panel Survey (MEPS). We limited the sample to respondents with a probable need for mental health care, defined as having a score greater than 2 on the two-item Patient Health Questionnaire (PHQ-2) depression symptom checklist (indicating probable depressive disorder) or a score greater than 12 on the K-6 survey (indicating non-specific psychological distress) (38). The PHQ-2 is a sensitive (93%) and specific (75%) indicator for any depressive disorder (39). The K-6 scale is predictive of severe mental illness, defined as any individual with a *DSM-IV* diagnosis and severe impairment (38). MEPS data for years 2004–2010 include 6,206 individuals (3,111 whites, 1,390 blacks, and 1,705 Latinos) who fulfilled our criteria for probable mental illness. Native Americans and Asian Americans were excluded from the analysis because of small sample sizes.

The first indicator of appropriate care, any outpatient mental health care, was defined as outpatient or office-based treatment of a respondent-reported disorder covered by *ICD-9* codes 291, 292, or 295–314 (40). The second indicator was any fill of a prescription for a psychotropic medication. Multum classification codes were used to identify psychotropic medications in MEPS pharmacy data. This methodology of identifying mental health care in the MEPS—although subject to possible underreporting of mental disorders and misclassification of some medications—was shown to have strong sensitivity (88%) to provider reports of treatment of behavioral health disorders (41). On the basis of U.S. Bureau of the Census categorization, individuals of any race claiming to be of Hispanic or Latino origin were identified as Latino in our study. Other respondents were classified as black or non-Latino white by responses to the question about race.

Need for mental health care was measured by scores on four measures: self-reported mental health (excellent, very good, good, fair, or poor), the mental health component of the 12-Item Short Form (42), the two-item Patient Health Questionnaire (PHQ-2) (39), and the K-6 scale of psychological distress (38). General medical health indicators, included because of their association with greater severity of mental health status (43–45), were self-reported general medical health (excellent, very good, good, fair, or poor), any functional limitation, and indicators of diabetes, asthma, coronary heart disease, angina, myocardial infarction, stroke, emphysema, joint pain, arthritis, and other heart disease.

Other covariates known to be predictive of mental health care use are education level (less than high school, high school graduate, some college, and college graduate), income level (below federal poverty level [FPL], near poverty [100%–125% FPL], low income [125%–200% FPL], middle income [200%–400% FPL], and high income [$>400\%$ FPL]), residential region of the country (Northeast, South, Midwest, and West), insurance coverage (private; Medicare, Medicaid, or other public [military insurance and Tricare] coverage; and uninsured), and marital status. Demographic characteristics included gender and age category (18–24, 25–34, 35–44, 45–54, 55–64, 65–74, and ≥ 75).

Statistical methods. We assessed disparities in appropriate care, implementing the Institute of Medicine’s definition of racial-ethnic disparities and adjusting for need for treatment while allowing racial-ethnic differences in socioeconomic status to contribute to disparities (4,32). To do so, we first estimated a regression model of appropriate care conditional on need and nonneed variables. We transformed the distribution of need variables so they were equivalent between whites and minority groups to predict the probability of appropriate care of a counterfactual population with minority race-ethnicity and minority nonneed characteristics but the same need for care as whites. The difference between the counterfactual mean and the actual white mean constituted the disparity. These methods are described in more detail in previous publications (2,4,32). Using MEPS survey weights,

we transformed the percentage disparity into an actual number of individuals from racial-ethnic minority groups who would need to access appropriate care in order for disparities to be eliminated.

To approximate the average per capita cost of providing appropriate care for this group, we calculated the average expenditure for an outpatient mental health care visit (\$113.74) and psychotropic drug fill (\$99.20) using combined 2004–2010 medical event data from the MEPS household survey. Health care expenditures were the sum of payments from all sources (including out-of-pocket payments and excluding payments for over-the-counter drugs and insurance premiums), with the result adjusted with the consumer price index to 2010 dollars.

Step 2: Identifying Offset

Data. We used panels 9–14 of the MEPS to estimate the association between any appropriate mental health care in year 1 with acute care in year 2 (represented by expenditures for mental illness and general medical illness in emergency department or inpatient settings) and adjusted for need characteristics. Every panel contains a two-year longitudinal data set of service use elicited over five rounds of data collection. We used the same need covariates as those described above, choosing year 1 values (survey round 2 for PHQ-2 and K-6 measures and round 1 for other need variables) to represent baseline characteristics influencing year 2 acute mental health care.

Statistical methods. We estimated generalized linear models (GLMs) of year 2 acute care expenditures as a function of having any year 1 appropriate mental health care, conditional on need covariates, and included interactions between race-ethnicity and any outpatient mental health care or any psychotropic medication use to account for differences in cost offset by racial-ethnic group. Using model diagnostics (46,47), we identified that the optimal GLM had a log link and residual variance proportional to the squared mean. To estimate offset, we used a recycled predictions approach (48), predicting year 2 acute care expenditures for six groups (three racial-ethnic groups with and without year 1 appropriate mental health care). For each racial-ethnic group, we considered the predicted difference in acute care expenditures between those with and without year 1 mental health care to be the per capita offset.

Estimating offset by using this modeling strategy assumes that we identified the relationship between year 1 appropriate mental health care expenditure and year 2 acute care expenditures. This identification strategy has the advantage of using longitudinal data and thus reducing the threat of reverse causality. Multiple factors were also used as controls in the regression models. However, a limitation was the possibility that factors contributing to year 2 acute care expenditures would remain unidentified.

Step 3: Estimating Total Savings

We calculated savings as the offset per capita in emergency department and inpatient expenditures minus the cost per

capita of accessing appropriate mental health care. These savings (or losses) were weighted by the number of individuals from racial-ethnic minority groups who would have to receive care in order for the disparity to be eliminated. Finally, we assessed whether, on net, the magnitude of savings (if any) in acute care expenditures exceeded the costs of providing access to appropriate mental health care. The analysis was repeated for different treatment settings and subpopulations of insurance status (Medicare, Medicaid, private insurance, and uninsured) and chronic condition diagnosis (diabetes, asthma, high blood pressure, and heart disease).

Missing Data and Variance Calculation

In both steps 1 and 2, missing data among those with probable mental illness (as high as 2.4% of the population for some variables) were accounted for with multiple imputation methods (49) implemented via the Stata 12 MI procedure with sex, age, and race as covariates in the imputation models. To estimate variance at each analytical step, 500 bootstrap draws (50) were taken of the five multiple imputation data sets, leading to 100 sets of five disparity, offset, and savings estimates. Standard errors were then derived as the standard deviation of this set of estimates by incorporating standard rules to combine estimates and adjusting standard errors for the uncertainty due to imputation (51,52).

RESULTS

Compared with whites, blacks and Latinos with probable mental illness had lower inpatient general medical expenditures but greater psychiatric emergency department expenditures (Table 1). Compared with whites, a smaller proportion of blacks and Latinos with probable mental illness reported outpatient mental health care and, for blacks, psychotropic medication use. Blacks and Latinos were younger than whites, and a greater proportion of blacks and Latinos reported fair or poor mental health status, female gender, being unmarried, poor, poorly educated, uninsured or publicly insured, and living in the South (Table 1).

We identified significant black-white and Latino-white disparities in any outpatient mental health care expenditure and any psychotropic drug use expenditure (Table 2 and Table 3, step 1). Rates of outpatient mental health care expenditure in the population with probable mental illness were 28.4%, 20.8%, and 22.2% for whites, blacks, and Latinos, respectively. Rates of psychotropic drug use expenditure in the population with probable mental illness were 42.5%, 25.0%, and 27.6% for whites, blacks, and Latinos, respectively. Disparities persisted in all insurance categories and all chronic condition subgroups analyzed. [Appendix 1 in the online supplement provides details.]

For blacks, a significantly positive offset of year 1 outpatient treatment was identified for year 2 emergency department total expenditure, emergency department general medical expenditure, and inpatient expenditure (Table 3,

TABLE 1. Characteristics of 6,206 respondents to the 2004–2010 Medical Expenditure Panel Survey with probable mental illness

Variable	Whites (N=3,111)		Blacks (N=1,390)		Latinos (N=1,705)	
	N	Weighted measure ^a	N	Weighted measure ^a	N	Weighted measure ^a
Acute health care expenditures (\$)						
Inpatient total expenditures		3,178.68		2,205.62*		1,567.45*
Mental health		259.38		340.38		62.13*
General medical		2,919.31		1,865.24*		1,505.32*
ER total expenditures		263.17		294.53*		181.96*
Mental health		12.01		19.11*		19.38*
General medical		251.16		275.41		162.58*
Appropriate mental health care expenditures (%)						
Any outpatient mental health care	886	29.1	215	18.4*	310	19.2*
Any psychotropic drug use	1,363	43.3	295	22.7*	399	24.2
Mental health status (%)						
Poor	280	9.6	234	17.9*	246	16.5*
Fair	466	16.2	247	18.5*	323	19.3*
Good	1,033	32.5	451	31.4	606	33.8
Very good	949	29.5	348	23.3*	412	23.7*
Excellent	383	12.4	110	8.8*	118	6.7*
Sociodemographic characteristic						
Age (%)						
18–24	252	9.6	153	12.2*	191	12.3*
25–34	425	14.2	216	18.1*	332	21.9*
35–44	585	19.2	269	20.3	341	19.4
45–54	708	22.6	321	22.2	360	20.7*
55–64	570	17.6	231	15.3*	261	13.6*
65–74	267	7.6	111	6.2*	129	6.8*
≥75	304	9.1	89	5.7*	91	5.2*
Female (%)	1,862	58.4	927	62.2*	1,107	60.5*
Married (%)	1,447	46.6	376	26.6*	834	44.3*
Poverty level (%)						
Below poverty line	811	21.0	581	40.3*	634	32.4*
Near poverty	235	6.0	135	9.7*	189	9.2*
Low income	571	18.6	281	19.2	365	21.2*
Middle income	885	31.0	302	22.4*	393	27.2*
High income	609	23.4	91	8.5*	124	10.1*
Education (%)						
Less than high school	886	22.8	529	34.5*	1,020	50.6*
High school graduate	1,165	38.7	534	38.8*	403	26.4*
Some college	629	22.3	233	17.9*	195	15.6*
College graduate	431	16.2	94	8.8*	87	7.5*
Health insurance (%)						
Private	1,476	53.8	453	37.5*	435	31.4*
Medicare	946	26.9	354	22.4*	319	17.7*
Medicaid	790	20.2	546	36.2*	614	30.8*
Other insurance	10	.3	9	.7	12	.7
Uninsured	491	15.9	273	19.8*	565	32.0*
Region (%)						
Northeast	423	16.6	177	14.1*	257	17.7*
Midwest	867	27.8	229	17.9*	105	6.8*
South	1,230	36.4	872	59.6*	593	34.1*
West	591	19.3	112	8.5*	750	41.4*

^a Calculations were weighted to be representative of the U.S. population.

*p<.05, compared with whites

step 2). [Appendix 2 in the online supplement shows regression results.] For Latinos, a significantly positive offset of year 1 outpatient treatment was identified for year 2 inpatient total expenditure and inpatient general medical expenditure (Table 4, step 2). Also, for Latinos, a significantly

positive offset of year 1 psychotropic drug treatment was identified for year 2 inpatient total expenditure and inpatient general medical expenditure.

In Tables 3 and 4, the disparity and offset calculations were combined to estimate savings to the health care system for elimination of black-white and Latino-white disparities. Elimination of black-white disparities in any outpatient mental health care translated to providing care for 1.285 million black individuals with probable mental illness. If this were accomplished at the cost of \$114 per capita, then the U.S. health care system would save nearly \$30 million in emergency department expenditure (\$28 million of which would be in emergency department expenditure for treatment of general medical issues), and \$833 million in total inpatient expenditure (\$549 million in inpatient expenditure for general medical treatment) (Table 3, step 3).

Elimination of Latino-white disparities in any outpatient mental health care translated to providing care for 1.104 million Latinos with probable mental illness. Given the cost assumptions described above, this would lead to a savings of \$584 million in total inpatient expenditure (\$533 million in inpatient expenditure for general medical treatment) (Table 4, step 3). Elimination of Latino-white disparities in any psychotropic medication use translated to providing care for 2.625 million Latinos with probable mental illness. This would lead to a savings of \$1.57 billion in total inpatient expenditure (\$1.48 billion in inpatient expenditure for general medical treatment) (Table 4, step 3).

We also calculated black-white and Latino-white disparities, offset, and savings among subgroups determined by insurance status and other chronic conditions. [Appendices

3 and 4 of the online supplement provide detail.] In general, eliminating disparities led to acute care savings among Medicare and Medicaid populations but not among privately insured and uninsured populations. There was also consistent evidence for offsets in emergency department and inpatient expenditure from reducing mental health care disparities for populations with diabetes and any heart condition.

DISCUSSION

Eliminating disparities in any outpatient treatment would require providing additional care to approximately 1.3 million blacks and 1.1 million Latinos with probable mental illness. Reducing this gap requires major shifts in policy and clinical practice. Improved recognition of depression and anxiety in primary care settings where members of racial-ethnic minority groups disproportionately seek care may help (53,54), as would interventions to address stigma, shame, and cultural differences in care-seeking behaviors (55,56) and improvements in availability of specialty mental health providers in communities with a high percentage of residents from racial-ethnic minority groups (7).

Our simulations identified that the cost of reducing black-white disparities in outpatient mental health treatment would be offset by reductions in emergency department and inpatient general medical expenditure. Approximately 70% of the cost of reducing black-white disparities in psychotropic drug use would be offset by savings in emergency department treatment of general medical conditions. This finding complements the findings of prior studies, in which timely mental health treatment reduced

TABLE 2. Racial-ethnic disparities in “appropriate care” of 6,206 MEPS respondents with probable mental illness^a

Measure	Any outpatient medical expenditure		Any psychotropic medication expenditure	
	M	SD	M	SD
Whites	28.4	.9	42.5	1.2
Blacks	20.8	1.2	25.0	1.5
Latinos	22.2	1.5	27.6	1.3
Disparity				
Between whites and blacks*	7.7	1.6	17.5	2.0
Between whites and Latinos*	6.3	1.7	14.9	1.6

^aSource: 2004–2010 Medical Expenditure Panel Survey. Appropriate care was defined as any outpatient mental health care and any psychotropic drug use. Disparities were calculated by applying the Institute of Medicine definition of racial-ethnic disparities with the use of a rank-and-replace method that adjusts for need variables.

* $p < .05$

use of general medical services, particularly for patients with chronic conditions such as heart disease and diabetes (10,57), and chronic general medical illnesses improved with appropriate treatment of comorbid mental illness (43,45,58).

Our finding that offsets were most pronounced for individuals insured by Medicare or Medicaid reinforces prior research finding cost offsets among enrollees in these programs (59,60). This is especially relevant given that Medicaid expansions under the Affordable Care Act are likely to disproportionately improve coverage for Latinos and blacks. Pairing coverage expansion with increased policy attention to reducing mental health care disparities will likely lead to short-run reductions in acute general medical care expenditure.

The lack of offset identified in acute mental health care services may be due to the inadequate or disjointed episodes of mental health care experienced by members of racial-ethnic minority groups (8), and insufficient integration of

TABLE 3. Disparities predicted between blacks and whites, cost offset, and savings for outpatient mental health care and psychotropic drug use^a

Expenditure	Step 1: disparity estimation			Step 2: offset estimation per capita (\$)	Step 3: savings estimation (disparity × offset)	
	Disparity (%)	Disparity per population	Cost per capita (\$)		Savings per capita (\$)	Total savings (\$)
Any outpatient mental health expenditure						
ER total expenditure	7.7	1,285,003	113.74	136.95**	23.21	29,825,633
Mental health	7.7	1,285,003	113.74	6.10	—	—
General medical	7.7	1,285,003	113.74	135.25**	21.51	27,641,784
Inpatient total expenditure	7.7	1,285,003	113.74	762.28**	648.54	833,372,482*
Mental health	7.7	1,285,003	113.74	—	—	—
General medical	7.7	1,285,003	113.74	540.83**	427.09	548,810,761*
Any psychotropic drug expenditure						
ER total expenditure	17.5	2,924,153	99.20	70.75	—	—
Mental health	17.5	2,924,153	99.20	3.49	—	—
General medical	17.5	2,924,153	99.20	72.78	—	—
Inpatient total expenditure	17.5	2,924,153	99.20	—	—	—
Mental health	17.5	2,924,153	99.20	—	—	—
General medical	17.5	2,924,153	99.20	—	—	—

^aDashes indicate no positive offset value or no significant positive offset value for 500 × bootstrap.

* $p < .05$, ** $p < .01$

TABLE 4. Disparities predicted between Latinos and whites, offset and savings for outpatient mental health care and psychotropic drug use^a

Expenditure	Step 1: disparity estimation			Step 2: offset estimation per capita (\$)	Step 3: savings estimation (disparity × offset)	
	Disparity (%)	Disparity per population	Cost per capita (\$)		Savings per capita (\$)	Total savings (\$)
Any outpatient mental health expenditure						
ER total expenditure	6.3	1,104,244	113.74	—	—	—
Mental health	6.3	1,104,244	113.74	—	—	—
General medical	6.3	1,104,244	113.74	—	—	—
Inpatient total expenditure	6.3	1,104,244	113.74	642.33*	528.59	583,690,028*
Mental health	6.3	1,104,244	113.74	26.99	—	—
General medical	6.3	1,104,244	113.74	596.69*	482.95	533,295,096*
Any psychotropic drug expenditure						
ER total expenditure	14.9	2,625,496	99.20	—	—	—
Mental health	14.9	2,626,052	99.20	—	—	—
General medical	14.9	2,626,052	99.20	—	—	—
Inpatient total expenditure	14.9	2,626,052	99.20	697.77*	598.57	1,571,866,592*
Mental health	14.9	2,626,052	99.20	34.62	—	—
General medical	14.9	2,626,052	99.20	662.89*	563.69	1,480,273,153*

^a Dashes indicate no positive offset value or no significant positive offset value for 500 × bootstrap.

* $p < .05$

mental and general medical care and coordination between acute and outpatient mental health care services (61–63). Another possibility is that offsets may not be realized until after year 2. Organizations seeking to reduce mental health care disparities are unlikely to realize mental health cost offsets in the short run without a concerted effort at integration of care across general medical and mental health settings and outpatient and acute care settings.

This simulation study had limitations. We assumed that the per capita cost of increasing mental health care access is equal to the average cost of a mental health care visit and did not factor in indirect treatment costs (such as campaigns to improve outreach and reduce stigma of these services). Other scenarios can be developed by using offset estimates. For example, from Table 3, if \$762.28 were spent per capita on reducing black-white outpatient mental health care disparities, there would be no savings in inpatient expenditure. Second, compared with diagnostic instruments used in psychiatric epidemiology studies, using the PHQ-2 and K-6 to identify the population with probable mental illness likely underestimated the actual number of U.S. residents in need (64). Approximately 11% of respondents in the MEPS were identified as having probable mental illness, compared with a 26.2% estimated prevalence of past-year mental illness in the National Comorbidity Survey–Replication. Third, the scope of this analysis was limited to measuring the cost offsets of eliminating disparities in any mental health care because of the large disparities in access to care, the large number of people who would be affected, and the current clinical and policy emphasis placed on encouraging individuals to initiate mental health care. However, greater cost offsets may be realized if disparities in adequate care were eliminated. Future studies should address this possibility.

CONCLUSIONS

Despite these limitations, we provide the first estimates of the potential cost savings from reducing disparities in mental health care. For blacks and Latinos, the potential savings in inpatient general medical expenditure are substantial (as much as \$1 billion), providing preliminary evidence of a “business case” (35) for reducing disparities in mental health care access. In concert with equity arguments, these data can be used to encourage policy makers and administrators in organizations bearing increased financial risk under global payment mechanisms (65,66) to improve mental health care access and treatment for individuals from racial-ethnic minority groups.

AUTHOR AND ARTICLE INFORMATION

Dr. Cook, Mr. Liu, Ms. Lessios, and Mr. Loder are with the Center for Multicultural Mental Health Research, Cambridge Health Alliance, Somerville, Massachusetts (e-mail: bcook@cha.harvard.edu). Dr. Cook is also with the Department of Psychiatry, Harvard Medical School, Cambridge, Massachusetts. Dr. McGuire is with the Department of Health Care Policy, Harvard Medical School, Boston. This work was presented in part at the following meetings: AcademyHealth, June 24–26, 2012, Orlando, Florida; National Hispanic Science Network, September 26–29, 2012, San Diego; Eleventh Workshop on Costs and Assessment in Psychiatry, International Center of Mental Health Policy and Economics, March 22–24, 2013, Venice, Italy.

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REFERENCES

1. Blanco C, Patel SR, Liu L, et al: National trends in ethnic disparities in mental health care. *Medical Care* 45:1012–1019, 2007

2. Cook BL, McGuire TG, Lock K, et al: Comparing methods of racial and ethnic disparities measurement across different settings of mental health care. *Health Services Research* 45:825–847, 2010
3. Cook BL, McGuire T, Miranda J: Measuring trends in mental health care disparities, 2000–2004. *Psychiatric Services* 58:1533–1540, 2007
4. McGuire TG, Alegria M, Cook BL, et al: Implementing the Institute of Medicine definition of disparities: an application to mental health care. *Health Services Research* 41:1979–2005, 2006
5. Cook BL, Manning W, Alegria M: Measuring disparities across the distribution of mental health care expenditures. *Journal of Mental Health Policy and Economics* 16:3–12, 2013
6. Institute of Medicine: *Unequal Treatment: Confronting Racial and Ethnic Disparities in Health Care*. Washington, DC, National Academies Press, 2003
7. Dinwiddie GY, Gaskin DJ, Chan KS, et al: Residential segregation, geographic proximity and type of services used: evidence for racial/ethnic disparities in mental health. *Social Science and Medicine* 80: 67–75, 2013
8. Cook BL, Zuvekas SH, Carson N, et al: Assessing racial/ethnic disparities in treatment across episodes of mental health care. *Health Services Research* 49:206–229, 2014
9. Cepoiu M, McCusker J, Cole MG, et al: Recognition of depression by non-psychiatric physicians: a systematic literature review and meta-analysis. *Journal of General Internal Medicine* 23:25–36, 2008
10. Cummings NA, Dorken H, Pallak MS, et al: *The Impact of Psychological Intervention on Healthcare Utilization and Costs*. San Francisco, Biodyne Institute, 1990
11. François C, Despiéglé N, Maman K, et al: Anxiety disorders, major depressive disorder and the dynamic relationship between these conditions: treatment patterns and cost analysis. *Journal of Medical Economics* 13:99–109, 2010
12. Koopmans GT, Donker MC, Rutten FH: Common mental disorders and use of general health services: a review of the literature on population-based studies. *Acta Psychiatrica Scandinavica* 111:341–350, 2005
13. Luber MP, Hollenberg JP, Williams-Russo P, et al: Diagnosis, treatment, comorbidity, and resource utilization of depressed patients in a general medical practice. *International Journal of Psychiatry in Medicine* 30:1–13, 2000
14. Luppá M, Heinrich S, Angermeyer MC, et al: Cost-of-illness studies of depression: a systematic review. *Journal of Affective Disorders* 98:29–43, 2007
15. Wang PS, Lane M, Olfson M, et al: Twelve-month use of mental health services in the United States: results from the National Comorbidity Survey Replication. *Archives of General Psychiatry* 62:629–640, 2005
16. Hunsley J: Cost-effectiveness and medical cost-offset considerations in psychological service provision. *Canadian Psychology* 44:61–73, 2003
17. Chiles JA, Lambert MJ, Hatch AL: The impact of psychological interventions on medical cost offset: a meta-analytic review. *Clinical Psychology: Science and Practice* 6:204–220, 1999
18. Katon WJ, Russo JE, Von Korff M, et al: Long-term effects on medical costs of improving depression outcomes in patients with depression and diabetes. *Diabetes Care* 31:1155–1159, 2008
19. Mumford E, Schlesinger HJ, Glass GV, et al: A new look at evidence about reduced cost of medical utilization following mental health treatment. *American Journal of Psychiatry* 141:1145–1158, 1984
20. Gilbody S, Bower P, Whitty P: Costs and consequences of enhanced primary care for depression: systematic review of randomised economic evaluations. *British Journal of Psychiatry* 189:297–308, 2006
21. Katon W, Russo J, Von Korff M, et al: Long-term effects of a collaborative care intervention in persistently depressed primary care patients. *Journal of General Internal Medicine* 17:741–748, 2002
22. Wells K, Sherbourne C, Schoenbaum M, et al: Five-year impact of quality improvement for depression: results of a group-level randomized controlled trial. *Archives of General Psychiatry* 61:378–386, 2004
23. Katon W, Russo J, Sherbourne C, et al: Incremental cost-effectiveness of a collaborative care intervention for panic disorder. *Psychological Medicine* 36:353–363, 2006
24. Chandra A, Gruber J, McKnight R: Patient cost-sharing and hospitalization offsets in the elderly. *American Economic Review* 100: 193–213, 2010
25. Gaynor M, Li J, Vogt WB: Substitution, spending offsets, and prescription drug benefit design. *Forum for Health Economics and Policy* 10:1–31, 2007
26. Hsu J, Price M, Huang J, et al: Unintended consequences of caps on Medicare drug benefits. *New England Journal of Medicine* 354: 2349–2359, 2006
27. Shang B, Goldman DP: *Prescription Drug Coverage and Elderly Medicare Spending*. Washington, DC, National Bureau of Economic Research, 2007
28. Thompson D, Hylan TR, McMullen W, et al: Predictors of a medical-offset effect among patients receiving antidepressant therapy. *American Journal of Psychiatry* 155:824–827, 1998
29. Stein MB, Cantrell CR, Sokol MC, et al: Antidepressant adherence and medical resource use among managed care patients with anxiety disorders. *Psychiatric Services* 57:673–680, 2006
30. Cook BL, McGuire TG, Alegria M, et al: Crowd-out and exposure effects of physical comorbidities on mental health care use: implications for racial-ethnic disparities in access. *Health Services Research* 46:1259–1280, 2011
31. McGee D, Cooper R, Liao Y, et al: Patterns of comorbidity and mortality risk in blacks and whites. *Annals of Epidemiology* 6:381–385, 1996
32. Cook BL, McGuire TG, Zaslavsky AM: Measuring racial/ethnic disparities in health care: methods and practical issues. *Health Services Research* 47:1232–1254, 2012
33. Alegria M, Mulvaney-Day N, Woo M, et al: Correlates of past-year mental health service use among Latinos: results from the National Latino and Asian American Study. *American Journal of Public Health* 97:76–83, 2007
34. Cook BL, Zuvekas SH, Carson N, et al: Assessing racial/ethnic disparities in treatment across episodes of mental health care. *Health Services Research* 49:206–229, 2014
35. Lurie N, Somers SA, Fremont A, et al: Challenges to using a business case for addressing health disparities. *Health Affairs* 27: 334–338, 2008
36. Cummings NA: Medical cost offset, meta-analysis, and implications for future research and practice. *Clinical Psychology: Science and Practice* 6:221–224, 1999
37. Goldman HH: Justifying mental health care costs. *Health Affairs* 18(2):94–95, 1999
38. Kessler RC, Barker PR, Colpe LJ, et al: Screening for serious mental illness in the general population. *Archives of General Psychiatry* 60:184–189, 2003
39. Kroenke K, Spitzer RL, Williams JBW: The Patient Health Questionnaire–2: validity of a two-item depression screener. *Medical Care* 41:1284–1292, 2003
40. Zuvekas SH: Trends in mental health services use and spending, 1987–1996. *Health Affairs* 20(2):214–224, 2001
41. Machlin S, Cohen J, Elixhauser A, et al: Sensitivity of household reported medical conditions in the Medical Expenditure Panel Survey. *Medical Care* 47:618–625, 2009
42. Ware J Jr, Kosinski M, Keller SD: A 12-Item Short-Form Health Survey: construction of scales and preliminary tests of reliability and validity. *Medical Care* 34:220–233, 1996
43. Simon GE, Ludman EJ, Tutty S, et al: Telephone psychotherapy and telephone care management for primary care patients starting antidepressant treatment: a randomized controlled trial. *JAMA* 292:935–942, 2004

44. Ciechanowski PS, Katon WJ, Russo JE: Depression and diabetes: impact of depressive symptoms on adherence, function, and costs. *Archives of Internal Medicine* 160:3278–3285, 2000
45. Ciechanowski PS, Katon WJ, Russo JE, et al: The relationship of depressive symptoms to symptom reporting, self-care and glucose control in diabetes. *General Hospital Psychiatry* 25:246–252, 2003
46. Manning WG, Mullahy J: Estimating log models: to transform or not to transform? *Journal of Health Economics* 20:461–494, 2001
47. Buntin MB, Zaslavsky AM: Too much ado about two-part models and transformation? Comparing methods of modeling Medicare expenditures. *Journal of Health Economics* 23:525–542, 2004
48. Basu A, Rathouz PJ: Estimating marginal and incremental effects on health outcomes using flexible link and variance function models. *Biostatistics* 6:93–109, 2005
49. Rubin DB, Schenker N: Multiple imputation in health-care databases: an overview and some applications. *Statistics in Medicine* 10:585–598, 1991
50. Efron B: Bootstrap methods: another look at the jackknife. *Annals of Statistics* 7:1–26, 1979
51. Rubin DB: *Multiple Imputation of Nonresponse in Surveys*. New York, Wiley, 1998
52. Little RJA, Rubin DB: *Statistical Analysis With Missing Data*. Hoboken, NJ, Wiley, 2002
53. Alegria M, Chatterji P, Wells K, et al: Disparity in depression treatment among racial and ethnic minority populations in the United States. *Psychiatric Services* 59:1264–1272, 2008
54. Stockdale SE, Lagomasino IT, Siddique J, et al: Racial and ethnic disparities in detection and treatment of depression and anxiety among psychiatric and primary health care visits, 1995–2005. *Medical Care* 46:668–677, 2008
55. Ojeda VD, McGuire TG: Gender and racial/ethnic differences in use of outpatient mental health and substance use services by depressed adults. *Psychiatric Quarterly* 77:211–222, 2006
56. Leong FT, Lau AS: Barriers to providing effective mental health services to Asian Americans. *Mental Health Services Research* 3: 201–214, 2001
57. Katon W, Russo J, Lin EHB, et al: Cost-effectiveness of a multi-condition collaborative care intervention: a randomized controlled trial. *Archives of General Psychiatry* 69:506–514, 2012
58. Ciechanowski PS, Katon WJ, Russo JE: Depression and diabetes impact of depressive symptoms on adherence, function, and costs. *Archives of Internal Medicine* 160:3278–3285, 2000
59. Campbell TL, Franks P, Fiscella K, et al: Do physicians who diagnose more mental health disorders generate lower health care costs? *Journal of Family Practice* 49:305–310, 2000
60. Crane DR, Christenson JD: The medical offset effect: patterns in outpatient services reduction for high utilizers of health care. *Contemporary Family Therapy* 30:127–138, 2008
61. Kim HM, Pfeiffer P, Ganoczy D, et al: Intensity of outpatient monitoring after discharge and psychiatric rehospitalization of veterans with depression. *Psychiatric Services* 62:1346–1352, 2011
62. Boyer CA, McAlpine DD, Pottick KJ, et al: Identifying risk factors and key strategies in linkage to outpatient psychiatric care. *American Journal of Psychiatry* 157:1592–1598, 2000
63. Carson NJ, Vesper A, Chen CN, et al: Quality of follow-up after hospitalization for mental illness among patients from racial-ethnic minority groups. *Psychiatric Services* 65:888–896, 2014
64. Kessler RC, Chiu WT, Demler O, et al: Prevalence, severity, and comorbidity of 12-month DSM-IV disorders in the National Comorbidity Survey Replication. *Archives of General Psychiatry* 62:617–627, 2005
65. Chernew ME, Mechanic RE, Landon BE, et al: Private-payer innovation in Massachusetts: the “alternative quality contract.” *Health Affairs* 30:51–61, 2011
66. Song Z, Safran DG, Landon BE, et al: Health care spending and quality in year 1 of the alternative quality contract. *New England Journal of Medicine* 365:909–918, 2011