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Abstract

Objective: Assess the determinants of medical costs for depressed individuals.

Method: Using medical insurance claims for a population of depressed individuals with employer provided insurance, we estimated multivariate models of the costs for general medical care, exclusive of costs for mental health services, following diagnosis. Explanatory variables included provider choice (psychiatrist or non-physician mental health specialist), treatment choice (medication, psychotherapy, or combination treatment); treatment adequacy as defined by APA guidelines; characteristics of depression symptoms and severity; and other demographic characteristics.

Results: On average, there were increases in the costs for general medical services in the year following diagnosis of a depressive disorder. The increases in general medical costs were slightly higher when depressed persons received a treatment for depression when compared to those who did not receive a treatment for depression. Among those treated, there was no significant difference between those who received an adequate course of treatment when compared with those who did not. Significant predictors of high medical costs following diagnosis included choice of a non-psychiatrist as the initial provider, high pre-period medical costs, and several measures of severity.

Conclusions: Our findings suggest that a diagnosis of depression is associated with increases in costs for general medical care. These increases are more modest when care is initially provided by a psychiatrist.

Introduction

Provision of mental health services is sometimes associated with reduction in the need for general medical services, a phenomenon known as the medical cost-offset effect (Olfson, Sing and Schlesinger 1999; Hankin et al. 1983; Friedman et al. 1995; Holder and Blose 1987; Mumford et al. 1984; Borus et al. 1985; Pallack et al. 1993; Fiedler and Wright 1989). Several hypotheses have been advanced to explain its existence. First, many mental disorders appear to cause physical distress that may be most effectively addressed by mental health treatments. Second, specialized mental health care can affect the perception and expression of physical illness, reducing the perceived need for non-mental health care. Third, specialized psychiatric care can directly substitute for non-psychiatric medical care by providing comfort, support, triage, and direct medical services that might otherwise be offered by general medical care providers. Fourth, specialized mental health care can discourage patients from using unnecessary or inappropriate medical services. Finally, mental health services might encourage or facilitate better self-care and fewer risky behaviors, with resulting improvement in health status and reduced need for medical services.

In spite of the intuitive appeal of the hypotheses in favor of the medical cost-offset, evidence for extensive offsets has been neither consistent nor conclusive, with several explanations offered. In some cases, the nature of the illness may limit any potential offset. For example, many physical illnesses are associated with high rates of mental disorders. In these cases, treatment of the mental disorder would not be expected to have an extensive effect of use of medical services for the underlying physical illness (Holder and Blose 1987; Callahan, Kesterson, and Tierney 1997). In addition, use of general medical services could be stimulated if

use of mental health services represents the first contact with medical care. In other cases, the data and methods used may have served to limit the observation of an offset, even when one might exist. For example, many studies examine the effects of mental health treatment generally and not the effect of treatment on specific mental disorders. Mental disorders and their treatments are heterogeneous, and cost patterns of patients with different mental disorders vary substantially. Aggregating all conditions and treatments into a single study is likely to result in a loss of significant information.

More recent analyses of the medical cost-offset have examined the specific case of the treatment of depressive disorders (Simon and Katzelnick 1997; Thompson et al. 1998; Katzelnick et al. 1997; Zhang, Rost, and Fortney 1999). Depressive disorders are common and associated with high costs of treatment and social burden (Kessler et al. 1994; Greenberg et al. 1993), and they are frequently associated with costly co-occurring physical illness (Croghan, Crown, and Obenchain 1998; Kathol and Petty 1981). In addition, treatment of depression has significantly changed over the past 12 years, with new pharmacological and psychotherapeutic options becoming widely available. The effectiveness of these new treatments could increase the likelihood of a medical cost-offset effect. Consistent with these observations, studies have shown a small offset for high utilizers of general medical services (Katzelnick et al. 1997; Zhang, Rost, and Fortney 1999) and for those who receive high quality pharmaceutical care (Thompson et al. 1998).

The purpose of this paper is to extend prior work on medical cost-offset associated with treatment of depressive disorders in several important ways. First, because treatments and providers may vary, we examine the relationship of provider type and the adequacy of treatment on any potential offset. Second, because behavior change with regard to use of general medical services may lag behind initiation of treatment for depression, we study medical costs and offsets in the six-month period

immediately following the initial diagnosis of depression and again six months later (Simon and Katzelnick 1997)). Although we are unable to document an offset effect, we find significant differences in the increases in costs. Specifically, our results suggest that receiving depression care from non-psychiatrists is strongly associated with higher use of general medical services and costs.

Methods

The objective of this study is to determine the characteristics of mental health care that predict changes in the cost of general medical services following a diagnosis of a depressive disorder.

Data and Episode Construction

Study subjects were identified from a subset of the MarketScan® database (The MedStat Group, Ann Arbor, MI), a system of standardized medical and pharmacy insurance claims for about 6 percent of Americans with employer provider insurance benefits, most under fee-for service or discounted fee-for-service/Preferred Provider arrangements. Only a small number of individuals with fully capitated insurance arrangements are missing in the data. To be included in the study, subjects aged 18 to 65 had to have at least one claim with a primary diagnosis of a depressive disorder from a mental health specialty provider during the years 1990-1994. The diagnosis of a depressive disorder was identified using the International Classification of Diseases—9th Edition—Clinical Modification (ICD-9-CM) codes 296.2x, 296.3x, 300.4, 309.0, 309.1, or 311.x. A mental health specialty provider was defined by provider codes for psychiatrists, psychologists, and counselors—e.g., psychiatric social workers, or a facility code indicating a mental health clinic on at least one claim for which a depressive disorder was listed. We excluded subjects whose diagnosis was made in primary care because of our greater confidence in claims-based diagnosis made provided from the mental health

sector (Rost et al. 1994; Badger et al. 1994). In keeping with our objective to study cost-offsets associated with depressive disorders, we also excluded subjects with any claims history suggesting bipolar affective disorder, schizophrenia or other psychosis, and substance abuse.

In order to study new episodes of treatment, we created 18-month episodes of care for each individual included in the final analytic sample. The index date for each episode was identified by the date of the claim with the first diagnostic indicator of depression. Episodes of care were defined as the period beginning six months prior to the index date until 12 months after the index date. All subjects had to be eligible for insurance benefits throughout the entire 18-month episode. Subjects with evidence of mental health care, either psychotherapy or medication treatment (except use of minor tranquilizers) during the six months prior to the index date were excluded from further analysis. We included persons who used anxiolytics during this pretreatment period for a number of reasons. First, anxiolytic use is common but sporadic in the population we study. Second, their use is informative regarding complicating psychiatric illness or symptoms that may indicate severity and/or chronicity. Third, our prior research has shown that use is associated with costs, so that while the interpretation of the any results may be complex, including these individuals is important to the overall results of our study. These inclusion and exclusion criteria result in a final analytic sample of 5,842 subjects.

Cost Measures

For each subject, costs for paid-claims were tabulated for all general medical services, including ambulatory care, pharmacy, and hospital services, for each six month period beginning with the pre-treatment period. We excluded costs associated with claims for which the primary diagnosis listed indicated a mental health problem (ICD-9-CM codes 290-319) and those indicating a mental health specialty provider or clinic.

After empirically examining several ways to assess cost-offset, we chose the change between pre-treatment costs and post-treatment costs because it appeared most responsive and informative, and because it has empirical justification in the literature (Pallack et al. 1993; Katzelnick et al. 1997). Specifically, we calculate (1) the difference in costs between the six months prior to the index date and the immediate six months after the index date, hereafter called the immediate cost differential, and (2) the difference between the six months before the index date and the second six-month period following the index date, hereafter called the lagged cost differential. All costs were adjusted for inflation using the medical portion of the consumer price index.

Independent Variables

In assessing the determinants of changes in costs associated with treatment of depressive disorders, we first looked for variables that might be under some degree of control by the patient, provider, or system of care, and then controlled for socio-demographic and health status variables. Using this framework, the determinants of primary interest measured processes of care and included choice of provider, choice of treatment, and the adequacy of treatment. Providers were classified according to whether care was initiated by a psychiatrist or by a non-psychiatrist mental health professional (all others). Treatment choices were medication only, psychotherapy only, or combination treatment. Medication treatment was identified by the presence of one or more pharmacy claims for an antidepressant at any time during the post-index period. Psychotherapy was determined by the occurrence of one or more therapeutic procedure codes 90841-90857. Medication only and psychotherapy only treatment were determined by the occurrence of one treatment only. Combination treatment was determined by the occurrence of both an antidepressant prescription and a therapeutic

procedure code for psychotherapy at any time during the post-index period. For combination treatment to occur, medication and psychotherapy did not need to occur simultaneously.

Adequacy of medication and psychotherapy treatments was determined by adherence to the recommendations for treatment of major depression by expert panels of the Agency for Health Care Policy and Research (AHCPR) and the American Psychiatric Association (APA) (Depression Guideline Panel 1993; "Practice Guideline for Major Depressive Disorder in Adults 1993). In general, these guidelines recommend specific lengths of treatment that can be assessed in claims data. In spite of expert recommendations, however, measuring the adequacy of psychotherapy treatment proved challenging. Both the AHCPR and APA guidelines recognize that many episodes of major depression may spontaneously remit and therefore recommend a period of "watchful waiting." In this circumstance, the expert panels suggest that as few as two follow-up sessions are appropriate. In most cases, however, a minimum of six sessions is considered consistent with the expert recommendations. During preliminary sensitivity analysis, we examined both the two- and six-session standard and found no significant differences associated with changes in medical costs. For the final models, we therefore used two follow-up visits as our measure of adequate care.

Adherence to medication guidelines was determined by filling four prescriptions for any antidepressant during the first six months following the index date. This measure of the adequacy of antidepressant treatment has been used successfully in prior research and shown to be a clinically relevant marker (Sood et al. 2000; Melfi et al. 1998). We considered subjects who received combination treatment to have received adequate care if the process of care was consistent with either the medication or the psychotherapy measures of adequacy. These measures resulted in seven mutually exclusive categories: (1) adequate antidepressant treatment, (2) adequate psychotherapy, (3) adequate

combination therapy, (4) inadequate antidepressant treatment, (5) inadequate psychotherapy, (6) inadequate combination therapy, and (7) no treatment, which was always considered inadequate.

Statistical Analysis

We used ordinary least squares (OLS) regression to predict the difference between prior period and the immediate and lagged post-period costs of general medical services. In addition to the primary variables of interest—i.e., provider choice and adequacy of care—we adjusted the models for age and sex, measures of general health status, and type of depression. General health status was assessed by the total of major diagnostic categories that appeared in the claims history except those associated with mental illness (MDC count). Severity measures included the specific depression diagnosis identified by the ICD-9-CM indicator at the index date and use of anxiolytics at any time during the episode. We also included an indicator for the year of the index date to account for systematic changes in the way depressive disorders were treated during the years of the study.

We used sample selection techniques to account for the possibility of systematic differences between subjects who selected a psychiatrist and those who selected a non-psychiatrist for their initial mental health care. The explanatory variables used in the first stage probit model of provider choice included age, gender, MDC count, a semi-annual time index, use of non-psychiatric in-patient services in the pre-index period, number of physician office visits in the pre-index period, total non-psychiatric care costs in the pre-index period, and geographic and occupational variables. An Inverse Mills Ratio generated from this model was used to control for sample selection bias in the cost-offset models (Crown et al. 1998).

Results

Of the 5,842 subjects included in the study, 2,873 received the initial diagnosis of a depressive disorder by a non-psychiatrist and 2,969 received the initial diagnosis from a psychiatrist. Table 1 stratifies the observations by treatment type, treatment adequacy, and initial provider type. Of the 2,873 initially treated by non-psychiatrists, 2,108 (73.4 percent) had no indication of follow-up care for a depressive disorder. Of those treated, 600 (78.4 percent) received adequate care, and 165 (21.6 percent) received inadequate care. Of the 2,969 persons initially evaluated by psychiatrists, only 194 (6.5 percent) had no indication of follow up care. The majority of treated patients received psychotherapy (1,859, 67.0 percent) or combination treatment (872, 31.4 percent). In contrast to subjects initially evaluated by non-psychiatrists, the overwhelming majority of subjects diagnosed by psychiatrists (2,551, 85.9 percenbt) received care that met our criteria for adequacy; this difference in adequacy of treatment based on diagnosing provider type is strongly significant (χ^2= 2486, $p<0.001$).

The adequacy of treatment differs with provider type among those subjects that received a course of treatment. For patients diagnosed by psychiatrists and subsequently treated, 92 percent received adequate treatment, while 78 percent of patients diagnosed by non-psychiatrists and subsequently treated received adequate treatment (χ^2= 112, $p<0.001$). It is interesting to note that some persons whose diagnosis appears to have been made by a non-physician mental health specialist nevertheless received "medication-only" treatment. The adequacy of this treatment was not significantly different from others whose diagnosis of a depressive disorder first appears on a claim from a non-physician mental health specialist. We cannot tell the characteristics of the prescriber—i.e., physician, nurse practitioner, etc.—from our data.

Table 2 shows the magnitude of the immediate and lagged differences in general medical costs according to initial provider, treatment type, and treatment adequacy. Overall, in the immediate period, the difference in medical costs increases between treated subjects and untreated subjects is not statistically significant. In the lagged period, however, the cost increase for treated subjects is $483 ± 158 higher than the cost increase for untreated subjects, a statistically significant difference [$t = 3.06$, $p < 0.01$] (data not shown).

The univariate analysis suggests that adequacy of treatment alone does not seem to have a substantial effect on cost changes. General medical costs in the immediate period tended to increase for those receiving adequate care were higher than for those receiving inadequate care, a statistically significant difference [$t = 2.16$, $p<0.05$]. In the lagged period, general medical costs were not, however, significantly different from those in the pre-index period for those receiving adequate care [$t = 0.76$, $p= 0.45$].

The differences in cost differentials shown in Table 2 may be partially explained by cost differences between treated and untreated subjects. Within the treated subsample, adequacy of treatment does not appear to affect changes in medical costs. Although medical costs increased on average following the diagnosis, in both the immediate and lagged periods there is no statistically significant difference in the cost increase between subjects whose care was adequate and subjects who received care but whose care was inadequate ($t = 1.07$, $p= 0.28$, and $t = 0.88$, $p=0.38$, respectively).

In Table 3, we further stratify the sample according to whether or not subjects are observed to have an increase or decrease in expenditures for general medical disorders according to provider type and treatment adequacy. There are no systematic differences observed for those receiving adequate

treatment compared to those who received inadequate treatment, and we do not observe differences in the magnitude of increases in medical costs according to provider type.

Although these univariate statistical tests are useful for investigating differences among various types of subjects in our subsamples, the large standard deviations limit the usefulness of the point estimates. We therefore use ordinary least squares regression to further investigate the factors that influence changes in medical costs and present the results in Table 4. For both time periods, receiving the initial diagnosis of depression from a non-psychiatrist is associated with a large and significant increase in general medical costs. After adjusting for the initial provider choice, type and adequacy of treatment are not associated with significant increases or decreases in general medical costs. Correlates of significant reductions in costs of general medical services, including gender and high use of various medical services in the pre-diagnosis period, predict cost differentials in both the immediate and lagged time periods. Factors associated with increases in general medical costs include age, recurrent major depression (lagged period only), use of anxiolytics, and the number of comorbid medical conditions.

Discussion

The purpose of this study is to extend prior work on medical cost-offset by examining the effects of choice of initial mental health provider, treatment choice, and the adequacy of treatment, on changes in the costs of subsequent general medical services. Overall, we are unable to document a medical cost-offset for the population studied here. Indeed, the costs of general medical services increased slightly for most of those who received a treatment for a depressive disorder. Among those treated, there was no significant difference between those who received adequate treatment and those who did not. With regard to patient characteristics, subjects who appeared to be high utilizers of

general medical services in the pre-diagnosis period had a significant medical cost-offset. These results are consistent with recent studies of medical cost-offset in depressed individuals (Katzelnick et al. 1997; Zhang, Rost, and Fortney 1999).

In spite of the absence of a medical cost-offset effect in this study, there are several significant findings that suggest choice of provider and treatment play significant roles in the costs of general medical services and the adequacy of treatment. Most importantly, choice of a non-psychiatrist as the initial provider was associated with a significant increase in general medical costs for both the immediate and lagged periods when compared to the choice of a psychiatrist. This finding was most consistent for those who received inadequate care in the immediate period following diagnosis. The finding that many individuals who received adequate care had increases in general medical costs during the lagged periods may be consistent with the return of those patients to the general medical sector following completion of psychiatric care.

The most dramatic finding of this study is the significant difference in the adequacy of treatment when initial evaluation and treatment were received from psychiatrists as opposed to non-psychiatrist mental health specialists. Patients receiving initial care from psychiatrists are four times more likely to receive an adequate course of treatment, with most of the difference associated with the likelihood of receiving any treatment beyond the initial evaluation. Further study of the reasons for this difference in the adequacy of care will be important if we are to understand whether the difference is appropriate or whether it is associated with poor clinical outcome. Many factors, including pathways to care, perceptions and expectations of outcome or side effects of medications, the availability and accessibility of services, and insurance benefits are all likely to affect the likelihood of receiving treatment and its subsequent adequacy.

As in any quasi-experimental approach, there are several limitations to this study that must be mentioned. We know, for example, that there are systematic associations between provider choice, treatment choice, and adequacy of treatment. While we are able to adjust for these differences in the statistical analysis, other factors that we could not observe in the data may also have had an influence on the measurement of medical costs. Our use of sample selection models should have mitigated any bias that such unobserved factors may have introduced, but we cannot be certain of residual effects. Only well-controlled, randomized trials will provide an adequate assessment of these factors. Second, our study is limited to those who received initial diagnosis from a mental health specialist, limiting the generalizability of the study. Although we made this decision in order to have more confidence in the diagnosis listed on the insurance claim represented a depressive disorder, most medical care for depression is initiated in primary care settings. Further studies of medical cost-offsets in primary care settings will be necessary. Finally, it is important to note that we applied guidelines for treatment of major depression to all forms depressive disorder. We do not yet know, however, the appropriateness of these guidelines in treatment of these disorders, further study is needed to determine their effect on outcomes and costs of care.

Although any medical cost-offset is secondary to the goal of providing high quality treatment to those who need it, determination of the existence of an offset and the determinants of changes in medical costs that are associated with receipt of mental health treatment are of more than academic interest. More than 60 percent of Americans receive employer provided health insurance, many of which segregate or "carve-out" the mental health benefit from the benefit for general medical services. The purchasers of this care must understand the economic impact of its contracting and allocation decisions between medical and mental health services. In this regard, it appears that managed mental health care

companies that encourage integrated psychiatric services may provide the best value by limiting the costs of general medical services. Whether this choice is also associated with improvements in the adequacy of care remains to be determined.

There are also important policy implications from our study. Access to mental health treatment has improved with the introduction of new treatments, including newer psychiatric medications and psychotherapy techniques (Foote and Etheridge 2000). Our finding that general medical costs increase when persons access mental health treatment in the "SSRI era" suggests that, on balance, many recipients are now low-utilizers of medical care whose first interaction with the medical care is through the mental health system. The study presented here can not answer questions regarding the appropriateness or outcome of that care, but it is important to remember that rising costs for general medical care may represent fulfillment of previous unmet medical need (Croghan 2001). It may also mean that the promise of a medical cost-offset, apparently not yet fulfilled, will only be kept by treatments that span the domains of physical and mental disorders.

Table 1. Adequacy of Care

	Provider		
	Psychiatrist	**Non-Psychiatrist**	**Total**
Medication Only			
Adequate	28	146	174
Inadequate	16	76	92
Psychotherapy Only			
Adequate	1,673	289	1,962
Inadequate	186	78	264
Combination			
Adequate	850	165	1,015
Inadequate	22	11	33
No Treatment			
Inadequate	194	2,108	2,302

Table 2. Immediate and Lagged Differences in Costs of General Medical Services[a]

	Provider			
	Psychiatrist		Non-Psychiatrist	
	Immediate	Lagged	Immediate	Lagged
Medication Only				
Adequate	2,566	1,094	1,737	1,241
	(3,812)	(3,353)	(7,137)	(3,914)
Inadequate	-172	968	2,036	1,261
	(1,911)	(2,069)	(7,343)	(3,631)
Psychotherapy Only				
Adequate	889	1,348	498	912
	(4,483)	(7,702)	(2,656)	(3,737)
Inadequate	94	1,663	859	1,893
	(5,890)	(11,039)	(2,604)	(7,194)
Combination				
Adequate	1,002	1,043	869	918
	(6,255)	(6,461)	(8,649)	(5,460)
Inadequate	-136	1,018	724	2,645
	(4,701)	(5,326)	(4,209)	(6,853)
No Treatment				
Inadequate	138	-3	700	826
	(6,365)	(6,602)	(4,622)	(4,926)

[a]Standard deviations are shown in parentheses.

Table 3. Effect of Provider Choice and Treatment Adequacy On Medical Cost Offset[a]

	Provider			
	Psychiatrist		Non-Psychiatrist	
	Immediate	Lagged	Immediate	Lagged
	Patients with Offset			
All	-2,195.24 [5,620.42] (n=763)	-2,327.91 [6,084.16] (n=728)	-1,519.61 [4,458.54] (n=813)	-1,584.52 [4,737.82] (n=765)
Adequate Treatment	-2,046.62 [4,901.64] (n=619)	-2,097.73 [5,009.62] (n=616)	-1,649.00 [3,489.04] (n=157)	-1,547.30 [3,406.06] (n=158)
Inadequate Treatment	-2,834.10 [7,999.30] (n=144)	-3,593.87 [10,074.05] (n=112)	-1,488.64 [4,662.52] (n=656)	-1,594.21 [5,029.25] (n=607)
	Patients without Offset			
All	1,998.49 [4,841.09] (n=2,064)	2,428.20 [7,720.19] (n=2,147)	1,832.13 [5,084.16] (n=1,900)	1,919.35 [4,691.71] (n=1,992)
Adequate Treatment	2,038.84 [4,975.66] (n=1,804)	2,422.24 [7,726.29] (n=1,843)	2,004.94 [6,798.22] (n=399)	2,055.76 [4,374.59] (n=409)
Inadequate Treatment	1,718.56 [3,773.73] (n=260)	2,464.35 [7,624.37] (n=304)	1,786.19 [4,522.36] (n=1,501)	1,884.10 [4,770.91] (n=1,583)

[a]This table excludes individuals who experience no change in cost for the applicable period. Standard deviations are shown in brackets.

Table 4. Determinants of Medical Cost-Offset in the Immediate and Lagged Periods

	Immediate			Lagged		
	Coefficient	**T-Ratio**	**P-Value**	**Coefficient**	**T-Ratio**	**P-Value**
Constant	-2147.31	-3.64	<0.01	-3197.41	-4.51	<0.01
Treatment Characteristics						
Non-Physician Provider	2721.50	4.64	<0.01	3012.85	4.19	<0.01
Adequate Antidepressant Therapy	830.42	1.66	0.10	23.78	0.08	0.94
Adequate Psychotherapy	51.98	0.25	0.80	410.42	1.78	0.07
Adequate Combination Therapy	-197.35	-0.63	0.53	-382.30	-1.26	0.21
Inadequate Antidepressant Therapy	696.39	0.97	0.33	36.04	0.10	0.92
Inadequate Psychotherapy	-309.58	-0.92	0.36	946.87	1.59	0.11
Inadequate Combination Therapy	-859.80	-1.26	0.21	353.51	0.40	0.69
Covariates						
Age	9.75	1.33	0.18	15.96	1.91	0.06
Female Gender	-440.51	-2.71	<0.01	-491.18	-1.40	0.02
Single Episode Major Depression	38.64	0.09	0.92	823.74	1.37	0.17
Recurrent Episode Major Depression	454.98	1.26	0.21	1212.41	2.44	0.01
Dysthymia (Neurotic Depression)	286.79	0.93	0.36	576.21	1.54	0.12
Brief Reactive Depression	123.66	0.37	0.71	347.81	0.86	0.39
Prolonged Reactive Depression	-10.87	-0.03	0.98	322.33	0.71	0.48
High Pre-Period Prescription Costs	-829.91	-4.33	<0.01	-641.50	-2.73	<0.01
High Pre-Period Emergency Visits	-1500.57	-3.65	<0.00	-1622.35	-3.54	<0.01
High Pre-Period Physician Visits	-1263.55	-7.33	<0.01	-1503.66	-6.71	<0.01
Number of Anxiolytic Prescriptions	275.13	2.20	0.03	-32.74	-0.37	0.71
MDC Count	446.62	12.08	<0.01	536.24	11.02	<0.01
Time	-27.55	-0.89	0.37	21.86	0.57	0.57
Sample Selection Correction	-1748.04	-4.90	<0.01	-1907.78	-4.01	<0.01

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