Effect of Eliminating Behavioral Health Benefits for Selected Medicaid Enrollees

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Objective. To determine the extent to which the elimination of behavioral health benefits for selected beneficiaries of Oregon's Medicaid program affected general medical expenditures among enrollees using outpatient mental health and substance abuse treatment services.

Data Source/Study Setting. Twelve months of claims before and 12 months following a 2003 policy change, which included the elimination of the behavioral health benefit for selected Oregon Medicaid enrollees.

Study Design. We use a difference-in-differences approach to estimate the change in general medical expenditures following the 2003 policy change. We compare two methodological approaches: regression with propensity score weighting; and one-to-one covariate matching.

Principal Findings. Enrollees who had accessed the substance abuse treatment benefit demonstrated substantial and statistically significant increases in expenditures. Individuals who accessed the outpatient mental health benefit demonstrated a decrease or no change in expenditures, depending on model specification.

Conclusions. Elimination of the substance abuse benefit led to increased medical expenditures, although this offset was still smaller than the total cost of the benefit. In contrast, individuals who accessed the outpatient mental health benefit did not exhibit a similar increase, although these individuals did not include a portion of the Medicaid population with severe mental illnesses.

Key Words. Medicaid, substance abuse, mental health, benefit design

In response to Medicaid spending that has outpaced state tax revenues, every state in the United States has recently adopted budget-driven Medicaid cost-containment initiatives (Smith et al. 2004). A number of states are responding by instituting changes in their benefit packages and scope of coverage. Given the high prevalence and severity of behavioral health conditions in Medicaid populations, behavioral health benefits are one area that may be targeted.

While any benefit cut is expected to have some consequences for those who would use them, there is an underlying assumption that these cuts will not result in counterbalancing expenditure. However, research on behavioral health coverage does not necessarily support this assumption. A number of studies have suggested that adding behavioral health coverage reduces general medical expenditures by more than the cost of the behavioral health benefit (Holder 1998; Cartwright 2000; Parthasarathy et al. 2001; McCollister and French 2003; Ettner et al. 2006; Wickizer et al. 2006).

Less is known about the elimination of behavioral health services, the focus of this paper. We study a select group of Oregon Medicaid enrollees, who, in 2003, faced a restructuring of their benefit package, including the elimination of all outpatient behavioral health services.

SETTING

The Oregon Health Plan (OHP) was Oregon's famous rationing experiment: by limiting the number of services it would cover through the means of a prioritized list of services, the state promised to expand the number of individuals it could cover through its Medicaid program. From 1994 to 2003, the OHP program covered approximately 400,000 individuals a year, including 100,000 adults with incomes below 100 percent of the Federal Poverty Line but not otherwise eligible for traditional Medicaid (i.e., not disabled or blind, elderly, or pregnant women and children). The OHP offered coverage of behavioral health services to all enrollees. Early studies demonstrated increased access to substance abuse treatment services associated with the creation of the OHP (Carlson and Gabriel 2001; Deck and Carlson 2004, 2005; McFarland et al. 2005; Deck, Wiitala, and Laws 2006).

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Faced with substantial budget shortfalls, the OHP underwent a fundamental transformation in February 2003. The 100,000 enrollees who were not eligible for Medicaid through traditional eligibility categories were denoted as OHP "Standard" enrollees (the remaining 300,000 becoming OHP "Plus" enrollees). These 100,000 OHP Standard enrollees faced three substantial changes in their benefits.

First, OHP Standard enrollees faced higher monthly premiums and a stricter premium payment policy. Second, OHP Standard enrollees were subject to new copayments for most services, such as a \$5 copayment for outpatient or clinic visits. The third change, and the focus of the present study, was the elimination of several specific benefit categories, including outpatient mental health and substance abuse treatment services. Other benefits were also eliminated, including dental, vision, hearing, and durable medical equipment.

The immediate effect of these policy changes was a dramatic disenrollment among OHP Standard enrollees. Between February 1, 2003 and May 1, 2003, enrollment dropped from 100,000 to 50,000, largely due to the strict premium payment/lock-out rules¹ (McConnell and Wallace 2003). The rate of disenrollment slowed considerably after May 1, 2003, although the program was capped shortly thereafter (preventing new enrollees to enter the program) and gradual attrition led to enrollment of around 25,000 OHP Standard enrollees by July 1, 2004.

The central question of this study is whether the removal of outpatient behavioral health benefits led to changes in OHP/Medicaid expenditures for enrollees who had previously used these services. Beneficiaries may substitute less effective care, such as emergency department services, for the lost outpatient benefit. Deterioration in their behavioral health status may result in otherwise avoidable inpatient care. It may also disrupt maintenance or treatment of other health conditions, a consideration that is elevated by the much higher prevalence of chronic illness among Medicaid populations.

Recent research supports these hypotheses: Deck, Wiitala, and Laws (2006) found that OHP Standard enrollees who were opiate users were 60 percent less likely to access publicly funded opiate treatment services after the 2003 policy change and Fuller et al. (2006) concluded that the OHP Standard enrollees who had previously had access to methadone treatment experienced increased Addiction Severity Index scores and drug and legal problems. The present study attempts to identify how the removal of the behavioral health benefit affected medical expenditures for these enrollees.

METHODS

Overview of Study Design

The goal of this study is to identify the effect of the elimination of the behavioral health benefit on general medical expenditures. We define general medical expenditures to include all services that were covered throughout the OHP policy change. We exclude expenditures for durable medical equipment, outpatient behavioral health, vision, and dental care. We focus on two types of beneficiaries expected to be affected by this benefit change: (1) beneficiaries using outpatient substance abuse treatment services; and (2) beneficiaries using outpatient mental health services.

As described above, the 2003 OHP policy introduced premiums and copayments in addition to removing behavioral health benefits. Because we are interested in isolating the effect of the behavioral health benefit removal, we rely on a comparison group of OHP Standard enrollees who had no history of accessing the behavioral health benefit and no history of behavioral health diagnoses. Our study is based on the “difference-in-differences” approach, which is designed to use any changes in expenditures among individuals in the comparison group to isolate changes that we hypothesize were driven by the removal of the behavioral health benefit.

Because our comparison group individuals differ in important ways from individuals who accessed the behavioral health benefit, we use two distinct estimation methods in an attempt to approximate an equivalent comparison group. In one set of analyses, we combine our difference-in-differences regression approach with a propensity score weighting method, where the propensity score represents the likelihood of having used the behavioral health benefit, based on demographic variables. This method has advantages in its robustness in the use of weighting with regression. However, the estimates from this approach may be misleading if, after weighting by the propensity score, we are still left with a comparison group that is not equivalent in overall utilization and expenditures.

To explore these shortcomings, we conduct a second set of analyses where we explicitly match on all demographic variables of interest *and* expenditures before the removal of the behavioral health benefit. Because we match on initial expenditures, we define our outcome variable as the *change* in expenditures between the two time periods of interest, and estimate a simple difference in means between the behavioral health users and their matched cohort. This method lacks the precision of the first method, but may create a

more comparable comparison group by matching more closely on the initial level of expenditures.

Sources of Data

This study used OHP eligibility files, fee-for-service (FFS) claims, and managed care organization (MCO) encounter data. MCO encounter data include information on the patient, provider, diagnosis, and treatment, but do not include expenditure data, since MCOs use capitated contracts with the state Medicaid agency. In order to assign expenditures to these encounters, we used FFS data to generate average “prices” for each Diagnosis-Related Group (DRG) and Current Procedure Terminology (CPT) code. These imputed prices were then used to value each FFS and MCO claim. This approach allows for the inclusion of MCO claims in our analysis and creates a standardized set of values for each claim that is invariant to location and time.

Study Population and Time Frame

The selection of individuals for the study proceeded in two stages. In the first stage, we selected OHP Standard members 18–64 years of age (consistent with Standard enrollment limitations), enrolled for at least 6 months between November 1, 2001 and October 31, 2002 (the period preceding the February 2003 policy change) and at least 6 months between May 1, 2003 and April 30, 2004. In order to reduce the potential for changes in behavior or utilization that were driven by confusion around the time of the policy change, we excluded from our analyses a 6-month period from November 1, 2002 through April 30, 2003. We also excluded the first month of enrollment from our analyses, because we hypothesized that beneficiaries might be retrospectively enrolled following a hospital admission or emergency department visit, and thus expenses in the initial month would not be representative of typical expenditures. A further requirement for selection was the existence of complete claims or encounter data for all periods.

In the second stage, we took steps to define three groups of interest: two groups using behavioral health services (substance abuse and outpatient mental health) and our comparison group. Identification of behavioral health service categories of interest was based on a protocol developed by the state’s actuaries and used benefit elimination determinations.² Assignment into the group of substance abuse treatment users was based on the identification of at least one claim for substance abuse treatment services between November 1, 2001 and October 31, 2002, with no claims for outpatient mental health

services and no claims for durable medical equipment (an additional eliminated benefit which we hypothesized might lead to short-term changes in expenditures). Assignment into the outpatient mental health group used an analogous algorithm. The comparison group consisted of OHP Standard enrollees in the selected time period with no claims for behavioral health services or durable medical equipment between November 1, 2001 and October 31, 2002. In addition, we excluded any individuals with any primary diagnoses related to mental health or substance abuse disorders.³

Outcome Variables

Our primary outcome variable is average monthly expenditures for general medical services. We define general medical expenditures as spending on “covered” services, and remove expenditures associated with any eliminated services (including behavioral health). This provides a more accurate measure of how spending on general medical services changes in response to the removal of the behavioral health benefit.

Independent Variables

Our independent variables included gender, age, income, enrollment as a single individual or as part of a couple or family, and zip code residence within a rural area, as defined by the Oregon Office of Rural Health. We included a chronic disease indicator based on the prevalence of any primary diagnosis code that was classified by the Agency for Healthcare Research and Quality (AHRQ) as a “Chronic Condition Indicator” and *not* related to behavioral health chronic conditions.⁴ In addition, we included variables on months enrolled for each period as well as the percent of time enrolled in FFS versus managed care plans.

Estimation

Our estimation strategy is designed to elicit the average treatment effect on the treated (ATT). In other words, we estimate the effect of the elimination of behavioral health coverage on our “treated” groups of interest (behavioral health users), under the assumptions that the elimination of the behavioral health service coverage did not effect our comparison group, and that the imposition of copayments and other policy changes in 2003 had the same effect on the comparison group as the “treated” groups.

Our estimation of the ATT is based on a difference-in-differences approach. The difference in differences is the average difference (pre- and

postremoval of behavioral health benefits) in expenditures for individuals in the control group (those who did not access behavioral health benefits) subtracted from the average difference (pre- and postremoval of behavioral health benefits) for individuals who had been using these services. This approach helps to account for secular trends in outcomes, including those that might be related to the introduction of copayments. Any remaining significant differences in outcome are attributed to the removal of the behavioral health benefit.

We compare two methods for estimating the ATT. The first method uses regression in the difference-in-differences setting, using propensity score weighting to provide a closer match among individuals in the comparison group to individuals who had accessed the behavioral health benefit. A second method matches each benefit user to a single member of the comparison group, using demographic variables *and* expenditures in the period before the benefit elimination. Based on this matching, our estimates are based on differences in the *change* in expenditures before and following the benefit elimination. We describe each approach in detail below.

In our regressions with propensity score weighting, we used the two-part model (Duan et al. 1983). Part 1 of our two-part model uses a logistic regression to estimate the probability of any health expenditure. For part 2 of our model, we used the extended estimating equations (EEE) model (Basu and Rathouz 2005). The EEE model is an extension of the generalized linear model (GLM), simultaneously solving for parameters in the link and variance functions. The advantage of the EEE model is that it is unbiased in the presence of heteroskedasticity, and its flexibility leads to substantially more efficient estimation than standard GLM models. EEE models can be estimated through the *pglm* command in *Stata* (Basu 2005).

In these analyses, each individual contributed two observations: (1) average monthly expenditures for covered services for the November 1, 2001 through October 31, 2002 time period (preceding the 2003 policy change); and (2) average monthly expenditures for the May 1, 2003 through April 30, 2004 time period.

We would like to place higher weight on individuals in the comparison group who have attributes that are more like individuals who accessed the behavioral health benefit, and place lower weight on (or discard) those individuals in the comparison group who are less similar. We accomplish this through a propensity score weighting method (Robins and Rotnitzky 1995; Ichimura and Imbens 2001; Shen and Zuckerman 2005). Our propensity score is generated through a logistic regression, with an indicator of whether

the individual was a user of behavioral health services serving as the outcome variable, and the independent variables including the preperiod independent variables described above. The propensity score for each individual is the predicted value of this logistic regression. Weights for the “treated” group were defined to be unity, and weights for the “control” group were defined as $\hat{e}/(1 - \hat{e})$, where $\hat{e}$ is the estimated propensity score (Ichimura and Imbens 2001). Once these weights were assigned, we applied them to the logistic and EEE components of our two-part model. This use of matching and regression methods in combination has been called “doubly robust” (Imbens 2004).

Thus, to estimate the ATT, we proceed as follows: first, we estimate the propensity score, based on observations before the policy change. We incorporate these propensity score weights in the estimation of our two-part model. We then use these parameter estimates to generate expected expenditures, which are defined as the product of the probability of any use (based on the part-1 logistic regression) and expected expenditures, conditional on at least some use (based on the part-2 EEE regression). We estimate expenditures for four quantities of interest, among the subset of individuals who had accessed the behavioral health benefit. These four quantities of interest are: (*Q1*) estimated spending before the 2003 policy change, assuming the behavioral health benefit had never been accessed; (*Q2*) estimated spending before the 2003 policy change, assuming access to the behavioral benefit, (*Q3*) estimated spending following the 2003 policy change, assuming the behavioral health benefit had never been accessed; and (*Q4*) estimated spending following the 2003 policy change, assuming the behavioral benefit had been accessed when available. Our difference-in-differences estimate of interest is the mean of $Q4 - Q2 - (Q3 - Q1)$. This process provides a single-point estimate. We derive 95 percent bias-corrected confidence intervals of our estimates through bootstrapping with 1,000 replications. To account for the multiple observations for each individual, we use block bootstrapping, with each individual defining a single block. A more detailed algorithm and generalizable *Stata* code are available from the authors.

In secondary analyses, we calculate an alternative matching estimator suggested by Abadie et al. (2001). In contrast to the propensity score weighting method, this matching method matches on all of the demographic variables *and* initial expenditure levels, calculating a Mahalanobis distance measure between two observations.⁵ Using this distance measure, each individual who accessed the behavioral health benefit is matched to the closest individual in the comparison group. The comparison group represents a one-to-one match.

After matching, we calculate a simple difference in the means between the behavioral health users and the comparison group. The matching routine is conducted through the *nnmatch* command in *Stata*. We used *Stata*, version 9.2 (Stata Corp., College Station, TX), for all analyses.

We ran several sensitivity analyses to assess the robustness of our results, including analyses using a control group from the OHP “Plus” population, analyses for individuals accessing both the mental health and substance abuse benefit; analyses stratified by previous benefit use; analyses of expenditures by different service areas (e.g., inpatient versus outpatient); and comparisons of characteristics among individuals who disenrolled versus those who maintained enrollment. In general, we obtained similar findings to the results presented here. Details of the additional analyses are available as Supplementary Material Appendix SA1.

RESULTS

Table 1 compares the descriptive statistics characteristics for individuals who accessed the substance abuse treatment benefit and members of their comparison group. Table 2 displays similar characteristics for individuals who accessed the outpatient mental health benefit and their comparison group. Columns 2 and 3 show unadjusted characteristics. The comparison group differs substantially from individuals who accessed the behavioral health benefit. In particular, members of the comparison group have substantially higher incomes, are less likely to be white, less likely to be single, and more likely to be located in rural areas. They also exhibit lower expenditures for medical care, both before and after the 2003 policy change.

Tables 1 and 2 also display descriptive characteristics for the comparison group, after weighting by the propensity score (column 4) and matching on covariates (column 5). Relative to the unadjusted comparison group, our weighted and matched samples are much closer to the treatment groups of interest. Nonetheless, members of the treated groups and weighted comparison groups still differ in terms of their initial level of expenditures, with the comparison group having lower levels of expenditures. This holds to a lesser extent for the comparison group created by covariate matching (column 5), which used initial expenditure levels as matching variable. The discrepancy in expenditure levels is greatest among individuals who had accessed the mental health benefit, suggesting that the substance abuse treatment users may be matched to a more equivalent comparison group.

Table 1: Descriptive Characteristics for Substance Abuse Treatment Users and Comparison Group

	<i>Unmatched Comparison Group (No Use of Behavioral Health Services)</i>	<i>Substance Abuse Treatment Service Users</i>	<i>Comparison Group (Weighted by Propensity Score)</i>	<i>Comparison Group (One-to-One Matching on Covariates)</i>
Patient demographics				
Male (%)	41.2	58.8	58.6	58.8
White (%)	81.5	86.4	86.4	86.3
Single (%)*	53.5	85.5	85.4	85.3
CCI**	53.1	49.8	49.9	50.0
Rural*	51.4	31.8	32.0	31.8
Enrolled in FFS (%)*	33.0	36.1	35.9	35.9
Age* (mean)	41.9	40.9	40.7	50.0
Months enrolled* (mean)	10.4	10.6	10.5	10.6
Monthly income* (mean)	\$503	\$165	\$165	\$164
Monthly expenditures				
Expenditures before behavioral health benefit elimination (11/01–10/02)***	\$182	\$277	\$188	\$241
Expenditures following behavioral health benefit elimination (5/03–4/04)***	\$208	\$386	\$239	\$222
Sample size	9,500	594	9,286	594

*Means for these variables as displayed in this table are based on prepolicy (11/01–10/02) values.

**Chronic Condition Indicator, as defined by AHRQ algorithm, and excluding any chronic conditions related to mental disorders.

***Expenditures are for “covered” services only; i.e., they do not include Medicaid payments for benefits that were excluded, including behavioral health services.

AHRQ, Agency for Healthcare Research and Quality; FFS, fee-for-service.

Table 3 displays our difference-in-difference estimates for individuals who had accessed the substance abuse benefit and for those who had accessed the mental health benefit. Row 2 shows estimates from the regression-with-propensity score method. Row 3 shows estimates from the covariate matching method.

Both methods suggest that expenditures for covered services increased for substance abuse treatment users after the behavioral health benefit was removed. After accounting for secular trends, removal of the behavioral health benefit led to a positive and significant increase in expenditures for these individuals. Our regression method estimates the increase to be \$70

Table 2: Descriptive Characteristics for Outpatient Mental Health Service Users and Comparison Group

	<i>Unmatched Comparison Group (No Use of Behavioral Health Services)</i>	<i>Mental Health Service Users</i>	<i>Comparison Group (Weighted by Propensity Score)</i>	<i>Comparison Group (One-to-One Matching on Covariates)</i>
Patient demographics				
Male (%)	41.2	32.2	32.2	32.1
White (%)	81.5	90.4	90.4	90.4
Single (%)*	53.5	71.2	71.3	71.3
CCI**	53.1	64.4	64.5	64.8
Rural*	51.4	47.5	47.6	47.4
Enrolled in FFS (%)*	33.0	35.0	35.0	33.7
Age* (mean)	41.9	40.2	40.1	40.5
Months enrolled* (mean)	10.4	10.5	10.5	10.6
Monthly income* (mean)	\$503	\$339	\$337	\$333
Monthly expenditures				
Expenditures before behavioral health benefit elimination (11/01–10/02)***	\$182	\$403	\$218	\$320
Expenditures following behavioral health benefit elimination (5/03–4/04)***	\$208	\$372	\$247	\$294
Sample size	9,500	1,135	9,442	1,135

*Means for these variables as displayed in this table are based on prepolicy (11/01–10/02) values.

**Chronic Condition Indicator, as defined by AHRQ algorithm, and excluding any chronic conditions related to mental disorders.

***Expenditures are for “covered” services only; i.e., they do not include Medicaid payments for benefits that were excluded, including behavioral health services.

AHRQ, Agency for Healthcare Research and Quality; FFS, fee-for-service.

Table 3: Estimated Change in Expenditures for Covered Services after Behavioral Health Benefit Elimination

	<i>Benefit Group</i>	
	<i>Substance Abuse Treatment Users</i>	<i>Outpatient Mental Health Users</i>
Model specification		
Two-part model with propensity score weighting	\$70 (\$13, \$128)	– \$74 (– \$104, – \$39)
Covariate matching	\$127 (\$20, \$234)	– \$5 (– \$48, \$38)

Table 4: Estimated Savings from Elimination of Behavioral Health Benefit

	<i>Substance Abuse Treatment</i>	<i>Outpatient Mental Health</i>
Average monthly cost of behavioral health benefit	\$161	\$79
Range of offsetting expenditures	\$70 to \$127	– \$74 to – \$5
Range of savings (cost of benefit – offsetting expenditures)	\$46 to \$91	\$84 to \$153

(95 percent confidence interval [CI] \$13, \$128). Our covariate matching method estimates a similar but slightly higher increase in expenditures of \$127 (95 percent CI \$20, \$234) per month.

In contrast to individuals who accessed the substance abuse treatment benefits, individuals who accessed the outpatient mental health benefit did not exhibit increases in expenditures. Our regression method suggested a statistically significant *decrease* in expenditures of \$74 (95 percent CI –\$104, –\$39). Our covariate method suggested a small and statistically insignificant decrease in expenditures of \$5 (95 percent CI –\$48, –\$38).

Table 4 reports the average monthly cost of the substance abuse and mental health benefit, the offsetting expenditures, and estimated savings to the state from the removal of the behavioral health benefit. Expenditures for the substance abuse treatment benefit averaged \$161/month among individuals who accessed this benefit. However, because of the offsetting expenditures, removing the substance abuse benefit generated substantially less in savings to the Medicaid program. Depending on our specification, we estimate that savings were approximately in the range of \$46 to \$91/month/individual.

The cost of providing the outpatient mental health benefit was \$79, substantially less than substance abuse treatment. However, its removal was not associated with the offsetting expenditures that were observed for enrollees accessing the substance abuse benefit. Depending on our specification, we estimate that savings were in the range of \$84 to \$153/month/individual.

DISCUSSION

Our results suggest that the elimination of behavioral health benefits led to substantial increases in medical expenditures for individuals who had been using the substance abuse treatment benefit. This finding was supported by

both modeling approaches. These results are in line with other research that suggests that substance abuse treatment reduces other medical expenditures (Holder 1998; Cartwright 2000; Parthasarathy et al. 2001; McCollister, and French 2003; Ettner et al. 2006; Wickizer et al. 2006). However, unlike most of those studies, our study found that the cost of substance abuse treatment services was greater than the offsetting increase in medical expenditures that occurred when the benefit was removed. These different findings may be a result of several factors, including different effects that occur when benefits are provided versus removed, an inability to find an equivalent comparison group, or differences in Oregon's financing of substance abuse treatment services.

Our estimates of changes in expenditures for individuals who accessed outpatient mental health services differed considerably according to the modeling approach. Our regression method suggests an overall decrease in expenditures. Our covariate matching method suggests relatively little change in expenditures. Neither suggests an increase in expenditures that were observed with the substance abuse group.

There is an important caveat to our findings on individuals who accessed mental health services. Our study group consisted of individuals who were not part of the "categorically eligible" population that comprises most Medicaid programs. Most notably, this implies that our study group did not include many of the individuals with severe mental illness who would have qualified as disabled and been eligible for the OHP "Plus" benefit package. (In contrast, there is no disability category for individuals with substance abuse disorders.)

Furthermore, there may be important differences between individuals with mental illness and chemical dependencies, particularly in the persistence of the disease and emergence of conditions. Individuals with chemical dependencies who lost their treatments may have more immediate physiological and toxicological reactions. In contrast, some individuals with mental illness may have had less persistent conditions. Several studies have demonstrated the long-term benefits of quality improvement initiatives for behavioral health (Sherbourne et al. 2001; Wells et al. 2004; 2005). Thus, the full effects of eliminating the behavioral health benefit may not be observed in the 12-month follow-up of our study. Of note, legislators ultimately decided to reinstate outpatient behavioral health benefits in August 2004. Restoration of benefits was made possible through a reduction in the list of covered medical services, a shift of enrollees into managed care, and the imposition a provider tax on hospitals and Medicaid managed-care health plans.

There are other important limitations to this study. First, we note that the benefit changes that occurred in 2003 resulted in substantial disenrollment from the OHP program. Our estimation focused on a relatively small group of 1,729 behavioral health benefit users. In contrast, before the 2003 policy change, approximately 25,000 OHP Standard individuals accessed the behavioral health benefit each month. Our numbers are substantially smaller primarily because of the large disenrollment that occurred in 2003. Our requirement that individuals have at least 12 months of enrollment over a 30-month period of time also reduced our sample size. Nonetheless, these selection criteria may have led to a study group that differed in important ways from the “typical” OHP or Medicaid behavioral health benefit user.

Second, our empirical approach, estimating the ATT, is designed to isolate the effect of the removal of the behavioral health benefit. By comparing changes in expenditures among behavioral health benefit users to matched individuals with the same benefit package but no history of accessing the behavioral health benefit, we assume that observed changes can be attributed to the elimination of the behavioral health benefit. However, it is impossible to completely separate the elimination of the behavioral health benefit package from other changes in the benefit package, including, most importantly, the imposition of substantial copayments.

Third, our analysis does not assess the long-term effects of behavioral health benefit elimination. Fourth, our analysis focuses on utilization and expenditures that are recorded in claims data. However, safety net systems are available to OHP enrollees, and their use of these systems would not be detected in our analyses. Thus, decreased utilization in the OHP claims may be reflected by unrecorded increases in utilization of safety net services. (Our Supplementary Material Appendix SA1 describes some anecdotal evidence around the use of safety net systems during the study period.)

Our analysis may also be limited by the difficulty in identifying a truly comparable comparison group. Although the propensity score appears to have succeeded in matching on demographic characteristics, even after weighting, individuals who accessed the behavioral health benefit had substantially higher levels of expenditures than individuals in the comparison group. The lack of equivalence in comparison groups seems to be a particular issue in individuals who had accessed the mental health benefit, as evidenced by the contrasting estimates from our two separate methods.

Finally, it is important to note that, although we find apparent savings to the state from elimination of the behavioral health benefit, the savings are

relatively small. Before their removal, behavioral health benefits accounted for <8 percent of all expenditures for OHP Standard enrollees.

Our findings suggest that cuts for substance abuse services may not yield the intended savings. Our findings on mental health use are more difficult to interpret. Taken as a whole, our results are consistent with a large body of literature that has shown that behavioral health coverage can be achieved without substantial increases in cost. In particular, on the basis of the experience in Oregon, other state Medicaid programs would be unlikely to find substantial savings through cuts in their substance abuse coverage.

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NOTES

1. Under these new rules, a single missed monthly premium led to immediate, forced disenrollment, and a 6-month reenrollment "lock-out" in which the individual was not eligible for the OHP plan.
2. These actuarial "buckets" are based on an algorithm that uses diagnosis, revenue codes, CPT codes, and provider type to categorize claims as substance abuse treatment or outpatient mental health.
3. We excluded any individuals with primary diagnoses classified as mental health- or substance abuse-related, identified as falling within the AHRQ's Clinical Classification System categories 65–75 (Elixhauser, Steiner, and Palmer 2004).
4. The algorithm for the AHRQ's Chronic Condition Indicator is part of their Healthcare Cost and Utilization Project and is available at <http://www.hcup-us.ahrq.gov/toolssoftware/chronic/chronic.jsp>
5. Formally, the Mahalanobis distance between two observations (e.g., a vector of covariates for a treated observation iX_{iT} and a vector of covariates for a comparison observation jX_{jU}) with a covariance matrix Σ is $(X_{iT} - X_{jU})' \Sigma^{-1} (X_{iT} - X_{jU})$.

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SUPPLEMENTARY MATERIAL

The following supplementary material for this article is available online:
Appendix SA1: Author Matrix.

Table S1: Descriptive Characteristics for Behavioral Health Benefit Users: OHP Standard and OHP Plus (TANF).

Table S2: Change in Expenditures for Covered Services after Behavioral Health Benefit Elimination.

Table S3: Descriptive Characteristics for Behavioral Health Benefit Users and Comparison Group.

Table S4: Change in Expenditures for Covered Services after Behavioral Health Benefit Elimination; Savings from Elimination of Benefit.

Table S5: Comparison of Demographics for Study Group of Substance Abuse Treatment Users to Substance Abuse Treatment Users Who Disenrolled.

Table S6: Comparison of Demographics for Study Group of Mental Health Treatment Users to Mental Health Treatment Users Who Disenrolled.

Table S7: Estimated Change in Expenditures for Covered Services after Behavioral Health Benefit Elimination, Stratified by Number of Visits Prior to the Policy Change, for Individuals Who Had Accessed Substance Abuse Treatment Benefit.

Table S8: Estimated Change in Expenditures for Covered Services after Behavioral Health Benefit Elimination, Stratified by Number of Visits Prior to the Policy Change, for Individuals Who Had Accessed Mental Health Benefit.

Table S9: Estimated Change in Expenditures for Covered Services after Behavioral Health Benefit Elimination, Stratified by Number of Visits Prior to the Policy Change, for Individuals Who Had Accessed the Substance Abuse Treatment Benefit.

Table S10: Estimated Change in Expenditures for Covered Services after Behavioral Health Benefit Elimination, Stratified by Number of Visits Prior to the Policy Change, for Individuals Who Had Accessed the Mental Health Benefit.

Appendix SA2: The Effect of Eliminating Behavioral Health Benefits for Selected Medicaid Enrollees

Appendix SA3: Other Contributions.

This material is available as part of the online article from <http://www.blackwell-synergy.com/doi/abs/10.1111/j.1475-6773.2008.00844.x> (this link will take you to the article abstract).

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