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The Mental Health Parity and Addiction Equity Act evaluation study: Impact on specialty behavioral healthcare utilization and spending among enrollees with substance use disorders

Sarah Friedman^{a,b,c,*}, Haiyong Xu^b, Jessica M. Harwood^d, Francisca Azocar^e, Brian Hurley^f, and Susan L. Ettner^{a,b}

^aDepartment of Health Policy and Management, Fielding School of Public Health, University of California, Los Angeles, 911 Broxton Avenue, Los Angeles, CA 90024, United States

^bDivision of General Internal Medicine and Health Services Research, Department of Medicine, David Geffen School of Medicine, UCLA, 911 Broxton Avenue, Los Angeles, CA 90024, United States

^cSchool of Community Health Sciences, Division of Health Sciences, University of Nevada, 1664 N. Virginia Street, Reno, NV 89557, United States

^dDivision of General Internal Medicine and Health Services Research, Department of Medicine, David Geffen School of Medicine, UCLA, 10940 Wilshire Boulevard, Suite 700, Los Angeles, CA 90024, United States

^eOptum®, United Health Group, 425 Market Street, 14th Floor, San Francisco, CA 94105, United States

^fDepartment of Family Medicine, David Geffen School of Medicine, University of California, Los Angeles, 50-078 Center for Health Sciences, Box 951683, Los Angeles, CA 90095, United States

Abstract

Background: The federal Mental Health Parity and Addiction Equity Act (MHPAEA) sought to eliminate historical disparities between behavioral health and medical health insurance benefits among the commercially insured. This study determines whether MHPAEA was associated with increased BH expenditures and utilization among a population with substance use disorder (SUD) diagnoses.

Methods: Claims and eligibility data from 5,987,776 enrollees, 2008–2013, were obtained from a national, commercial, managed behavioral health organization. An interrupted time series study design with segmented regression analysis estimated time trends of per-member-per-month (PMPM) spending and use before (2008–2009), during (2010), and after (2011 — 2013) MHPAEA compliance. The study sample contained individuals with drug or alcohol use disorder diagnosis during study period (N = 2,716,473 member-month observations). Outcomes included:

*Corresponding author at: School of Community Health Sciences, Division of Health Sciences, University of Nevada, 1664 N. Virginia Street, Reno, NV 89557, United States.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <http://dx.doi.org/10.1016/j.jsat.2017.06.006>.

total, plan, patient out-of-pocket spending; outpatient utilization (assessment/diagnostic evaluation visits; medication management; individual, group and family psychotherapy, and structured outpatient care); intermediate care utilization (day treatment; recovery home and residential); and inpatient utilization.

Results: Starting at the beginning of the post-parity period, MHPAEA was associated with increased levels of PMPM total and plan spending (\$25.80 [p = 0.01]; \$28.33 [p = 0.00], respectively), as well as the number of PMPM assessment/evaluation, individual psychotherapy, and group psychotherapy visits, and inpatient days (0.01 visits [p = 0.01]; 0.02 visits [p = 0.01]; 0.01 visits [p = 0.03]; 0.01 days [p = 0.01], respectively). Following these initial level changes, MHPAEA was also associated with monthly increases in PMPM total, plan, and patient out-of-pocket spending (\$2.56/month [p = 0.00]; \$2.25/month [p = 0.00]; \$0.27 [p = 0.03], respectively), as well as structured outpatient visits and inpatient days (0.0012 visits/month [p = 0.01]; 0.0012 days/month [p = 0.00]).

Conclusion: MHPAEA was associated with modest increases in total, plan, and patient out-of-pocket spending and outpatient and inpatient utilization. These increases, while modest in magnitude, are larger in magnitude than increases detected among a sample of all enrollees (i.e. not only those with SUD diagnoses).

Keywords

Behavioral health care; Policy evaluation; Commercial health insurance; Claims data; Substance use disorder

1. Introduction

High proportions of Americans have substance use disorders (SUD). The Substance Abuse and Mental Health Services Administration's National Survey on Drug Use and Health found that, in 2013, 21.5 million people had at least one SUD; of these, 7.9 million also had one or more comorbid mental health (MH) condition (Center for Behavioral Health Statistics and Quality, 2015). A study using National Comorbidity Survey Replication data reports that drug and alcohol use are highly comorbid (Kessler et al., 2005). Without insurance, behavioral health treatment for SUD patients, which may involve treatment for drugs and/or alcohol addiction, and any comorbid mental health conditions, can be costly.¹ Despite the fact that health insurance is supposed to protect individuals from financial shocks associated with healthcare expenses, behavioral health (BH) insurance benefits, which cover MH and SUD services, have historically been less generous than insurance benefits for medical and surgical care in the employer-sponsored insurance market (Barry et al., 2003; Hodgkin, Horgan, Garnick, & Merrick, 2003; Merrick, Horgan, Garnick, & Hodgkin, 2006; Peele, Lave, & Xu, 1999).

¹For example, one year of methadone maintenance treatment, used to treat addiction to opioids (such as heroin and alcohol), can cost as much as \$4700 per person, according to the National Institute on Drug Abuse (2012). Health economists estimate that the resource cost of providing an episode of methadone maintenance can range from \$1500 to \$8000, depending on the length of the episode, while the cost of providing an episode of non-methadone substance use disorder treatment can range from \$1000–\$5000 (French, Popovici, & Tapsell, 2008). The out-of-pocket cost to patients depends largely on insurance coverage.

“Parity” laws were designed to remedy these inequities, requiring plans to cover BH services at benefit levels matching corresponding medical and surgical benefits. When the landmark federal Mental Health Parity and Addiction Equity Act (MHPAEA) passed in 2008, it was the first national mandate to require parity for a comprehensive set of benefit design features. The law, along with subsequent regulation contained in the 2010 Interim Final Rule (IFR), required parity for financial requirements (e.g. copayments, coinsurance, etc.), quantitative treatment limits (e.g. annual outpatient visits, etc.) and non-quantitative treatment limits (e.g. prior authorization requirements, provider networks, etc.). With a few exceptions, MHPAEA applied to employer-sponsored plans for large employers (i.e. >50 employees) renewing on or after January 1, 2010² (110th Congress, 2008).

Before MHPAEA, state and federal attempts to improve equity of employer-sponsored BH coverage did not match MHPAEA's inclusivity of SUD benefits. Forty-five states enacted some form of parity law, although different conditions, benefits, and employer groups were included in each of the mandates (Sturm & Pacula, 1999). Notably, only five states included SUD benefits in their parity laws (Barry, Huskamp, & Goldman, 2010). The federal Mental Health Parity Act (MHPA), passed in 1996, required parity for annual and lifetime dollar limits for MH benefits, but did not apply to SUD benefits (U.S. Government Accountability Office, 2000). It is thus of interest to understand whether MHPAEA's inclusion of SUD benefits contributed to improved access to BH care for individuals with SUDs.

Prior research on the impact of MHPAEA on BH service use is sparse. Among the general population, there is some evidence of modest utilization increases associated with MHPAEA. Examining the effects of MHPAEA among high-utilizers at one employer group, Grazier et al. found an association between MHPAEA and increases in outpatient mental health service use (Grazier, Eisenberg, Jeedele, & Smiley, 2015). Two additional studies documented modest increases in expenditures and utilization among all patients enrolled in carve-in plans, which administer both BH and medical benefits (Harwood et al., 2017) and carve-out plans, those that administer only BH benefits (Ettner et al., 2016).

It is of particular interest, however, to see how changes in BH service use associated with MHPAEA among individuals with SUDs compares to changes in a general sample of commercially insured individuals (including all enrollees regardless of their diagnoses). It may be that the effects are greater among commercially insured individuals with SUDs because SUDs are associated with elevated morbidity and associated service needs. Alternatively, the effects could be smaller among individuals with SUDs because these patients can be more difficult to engage in treatment, potentially due to enrollees' concerns about stigma (Mojtabai, Chen, Kaufmann, & Crum, 2014).

Thus far, two peer-reviewed studies have examined associations between MHPAEA and SUD utilization and expenditures. Busch et al. (2014) found modest increases in total spending for SUD treatment between 2009 and 2010 among enrollees of carve-in plans (including those who do not have SUD diagnoses). However, that study did not examine

²Other exemptions include disability plans, long-term care plans, government-sponsored plans opting out, hospital or other fixed indemnity insurance, and plans showing that their costs increased by a certain amount as a result of compliance.

utilization or spending changes after non-quantitative treatment limits were required to be at parity (starting in 2011), and thus may not have documented the full extent of MHPAEA's effects. Also, that study's main outcomes focused on SUD treatment, rather than all BH treatment. McGinty et al. (2015) found that MHPAEA was associated with increased access to, use of, and total spending on out-of-network SUD services between 2007 and 2012. Although this study highlights a notable effect of MHPAEA, its focus on out-of-network care overlooks in-network care, which likely accounts for the majority of MH and SUD treatment. For example, a recent study found that among privately insured U.S. adults using mental health care, 82% used only in-network providers for their mental health care (Kyanko, Curry, & Busch, 2013).

The present study estimates the effects of MHPAEA on MH and SUD utilization and expenditures for a commercially insured population with a SUD diagnosis. This analysis is conducted using administrative claims and enrollment data provided by Optum®, a subsidiary of UnitedHealth Group. Optum was one of the largest managed behavioral health organizations (MBHO) in the country during the study period. The study asks: Post-MHPAEA, 1. Among enrollees with SUD diagnoses, did expenditures and inpatient, intermediate, and/or outpatient utilization increase? 2. Were these increases driven by changes in the penetration rate (i.e. the probability of any use) among all enrollees with SUD and/or by increases in utilization level among the subsample of enrollees who used services?

This study expands on the published literature in several ways. Its study period (2008–2013) includes three years following MHPAEA's IFR implementation, so findings incorporate changes associated with parity with respect to non-quantitative treatment limits. Additionally, this study examines all BH care obtained by a population with SUD diagnoses, rather than treatment for SUD diagnoses obtained by a general population of enrollees. MH comorbidities occur frequently among those with SUD diagnoses (Kessler et al., 2005), and MHPAEA affected insurance for both MH and SUD care, so its impact on the total BH received by patients with SUD is likely to be greater than its impact on SUD treatment alone. Our study examines total use, across both in-network and out-of-network providers. Finally, our findings should generalize more broadly by using data from enrollees in carve-out plans (about 25% of the sample) in addition to carve-in plan enrollees.

2. Material and methods

2.1. Data and study design

The Optum study data spanned 2008 to 2013 with information on (1) specialty BH insurance claims providing utilization, expenditure and diagnosis, (2) enrollment eligibility and demographics, and (3) employer and plan characteristics from Optum's Book of Business. Individual-level interrupted time series (ITS) study design and segmented regression models were applied to estimate the impact of MHPAEA on BH utilization and expenditures for adults with alcohol or drug use disorders during the study period. Specifically, this study compares utilization and expenditures across three time periods (1) “pre-parity”: 2008–2009, (2) “transition”: 2010, when good-faith efforts at compliance with respect to coinsurance, copayments, combined medical-behavioral health deductibles, and quantitative treatment limits went into effect for plans renewing on a calendar-year basis, and (3) “post-parity”:

2011–2013, when publication of MHPAEA's IFR required legal compliance with MHPAEA provisions as well as parity for non-quantitative treatment limits.³ The ITS method not only allows examination of how parity-period affects the level of the outcome (i.e. changes in the intercept made at the start of the parity-period and sustained throughout the period), but also allows examination of how it affects the outcome's slope (i.e. additional changes dependent on the number of months since the start of the parity-period).

2.2. Sample

The analysis data included adults, aged 27 to 64 residing in the 50 U.S. states, who were diagnosed with alcohol or drug use disorders at least once during 2008–2013 (see Web Appendix 1 for list of diagnosis codes used for identification). In order to ensure that plans were subject to parity compliance on a standard timeline, subjects had to have been enrolled in a plan that: (1) included BH benefits (excluding employee assistance program and work/life-only plans); (2) was not a retiree, supplemental or indemnity plan; (3) was not collectively bargained; (4) was renewed on a calendar-year cycle; (5) was associated with a large employer (i.e. >50 employees); and (6) was self-insured (excluding the minority of plans that are fully-insured plans in the data from Optum). See Web Appendix 2 for the number of enrollees excluded at each step. Study sample individuals could have been in either a “carve-in” plan (i.e. a plan that administers both BH and medical benefits together) or a “carve-out” plan (i.e. a plan that administers BH benefits but contracts out for administration of medical benefits separately). The final sample included 2,716,473 person-months (the unit of analysis), consisting of 69,281 people, 7816 plans and 440 employers.

2.3. Outcomes

Outcome variables were per-member-per-month (PMPM) utilization and expenditures of in-network and out-of-network services. Outpatient utilization measures separately counted assessment/diagnostic evaluation, medication management, structured outpatient care, individual psychotherapy, group psychotherapy and family psychotherapy visits. Intermediate care is a setting of care commonly used to treat behavioral health conditions. Its utilization measures separately counted days of day treatment, residential care, and care in a recovery home. Acute inpatient care utilization was measured by the number of days spent in the hospital. With the exception of group therapy and recovery home, two services used almost exclusively to treat SUD conditions, the utilization measures capture treatment for both MH and SUD conditions. Given the high rates of MH comorbidity among our sample of patients with SUD diagnoses (annual MH prevalence 38% among carve-in patients and 44% among carve-out patients) and the likelihood of spillover effects (e.g., that services for MH diagnoses affect SUD and services for SUD affect MH), it is of interest to understand how MHPAEA affected use of all specialty behavioral healthcare, not just services where SUD is listed as the primary diagnosis.

Plan expenditures were the sum of payments made by Optum and “coordination of benefits” payments by other insurers. Patient out-of-pocket expenditures consisted of copayment,

³It is worthwhile to note that although the Final Rule (FR) took effect after the study period, the FR confirmed the IFR provisions and clarified interactions with the ACA.

coinsurance, and deductibles. Total expenditures were the sum of plan and patient out-of-pocket expenditures. All expenditure variables combined dollars spent on all outpatient, intermediate, and inpatient services. All expenditure variables were adjusted for geography (to a national mean) using state-level adjustment factors as well as for inflation (to 2013 dollars) using the Consumer Price Index (CPI). The inpatient CPI was used to adjust inpatient expenditures and the “other medical professionals” CPI was used to adjust outpatient expenditures.

2.4. Covariates

Our covariates of primary interest were indicators and spline variables that measured the impact of MHPAEA and the IFR on the changes in an outcome in the transition and post-parity periods, relative to the pre-parity period. A continuous variable counting the order of the month (= 1 for Jan 2008 and = 72 for Dec 2013) was used to control for the baseline time trend. Indicators of MHPAEA (= 1 for months in 2010, 0 otherwise), and the IFR (= 1 for months in 2011–2013, 0 otherwise), measured immediate and sustained changes in the *level* of the outcome (i.e. the intercept shift associated with the entire parity-period) introduced by MHPAEA and the IFR respectively. Spline variables for the transition period (order of the month during “transition” period, i.e. = 1 for Jan 2010 and = 12 for Dec 2010) and post-parity period (order of the month during “post-parity” period, i.e. = 1 for Jan 2011 and = 36 for Dec 2013) measured more gradual changes, manifested in changes in the *slope* (monthly rate of change) of the outcomes introduced by MHPAEA and IFR respectively. For example, if the coefficient on the post-parity spline variable is 0.05 when individual psychotherapy visits are the outcome, this means that in addition to any constant level (intercept) changes, on average, in the second month of the post-parity period, PMPM visits increased by 0.1 ($2 * 0.05$), while in the third month of the post-parity period, PMPM visits increased by 0.15 ($3 * 0.05$). To emphasize the dependence of the slope change results on the number of months elapsed, the results report the change in slope as PMPM \$/month or visits/month.

Other covariates included enrollee sex, age group, primary insured vs. dependent status, employer size category, whether or not the plan was more or less managed, state, month, whether plans were “carve-in” or “carve-out”, provider supply rates per 1000 people in the enrollee's state, and whether the patient was diagnosed with alcohol disorders only, drug disorders only or both.

2.5. Statistical analyses

Segmented regression models were used to estimate the changes in an outcome's time trend between the “pre-parity,” “transition,” and “post-parity” periods, controlling for the aforementioned covariates. To account for correlation of people within employers, standard errors were adjusted using Generalized Estimating Equations. We used $p = 0.05$ as our cutoff for statistical significance. For each outcome, we modeled changes in the monthly (1) penetration rate (probability an enrollee had any use/expenditure) using logistic regression; (2) conditional mean (mean among “users,” the subset of enrollees with any service use in each category) using gamma regression, and (3) unconditional mean (mean among all enrollees) based on a “two-part model” method of recombining the estimates calculated in

(1) and (2) (Duan, Manning, Morris, & Newhouse, 1984). This method is a common approach to analyzing rare outcomes, such as behavioral health use among a commercially insured population. Also, this method allows us to answer the second research question by indicating whether changes observed among all enrollees were caused by changes in the proportion of enrollees who had any use (i.e. penetration rates), or, alternatively whether they were caused by changes in the level of use among people with use (i.e. intensity of use). To determine whether the effects of MHPAEA were the same among “carve-in” and “carve-out” plans, a sensitivity analysis repeated the two-part model on the probability of use, conditional mean, and unconditional mean, stratified by “carve-in” and “carve-out” status.

To more concretely illustrate the associations of MHPAEA with changes in BH utilization and expenditures, we also report the predicted values of the outcomes at the midpoint of the post-parity period under two scenarios: if MHPAEA had *not* been enacted, and MHPAEA as it was enacted. This analysis incorporates both the slope and level changes from the segmented regression models to give a summary estimate of how expected outcomes compare under the two scenarios. Standard errors were not produced for these estimates, so this analysis is intended to be illustrative of the effect sizes rather than allow for statistical inference about which changes in expenditure and utilization were associated with MHPAEA.

This study was approved by University of California, Los Angeles Institutional Review Board #12-000006.

3. Results

3.1. Sample characteristics

Fig. 1a presents member-month summary statistics on enrollee demographics, plan and employer characteristics, and provider supply across the sample. It shows that the sample was primarily concentrated in the 35–44 and 45–54 year old age groups, 60% male, and geographically diverse. Over half of the member-month observations are for primary insured persons (rather than dependents). The sample enrollees work for firms of varied size, including about a third who work for employers with >40,000 employees. The preponderance of sample enrollees is insured by HMOs and other similar plans. Among the 69,281 enrollees in the study sample, 55% had alcohol disorder only, 28% had drug use only, and 17% had both alcohol and drug use disorder (data not in figure).

Fig. 1b and c respectively contains member-month summary statistics for comorbid mental health diagnoses among member-months with BH service use, and service usage and expenditures. Among treated members, the most common mental health comorbidity is depressive disorder. Outpatient medication management and outpatient individual psychotherapy are the most commonly used service types, while, among users, residential, recovery home, and day treatment are used the most intensively (about 7–9 days per month, respectively). Monthly average total expenditures were \$1137 and plan expenditures were \$1078 among those who used mental health and/or substance use disorder services during the month.

3.2. Changes among all enrollees

Fig. 2 displays the trend of total, plan and patient out-of-pocket PMPM expenditures over time, graphically, via solid black lines. Dotted lines project the pre-parity (baseline) trend into 2010–2013, representing what would have been expected in the absence of MHPAEA. For example, in the top panel, which is about total PMPM expenditures, the difference in the level (measured on the y-axis) between the solid line and the dotted line at the beginning of the transition period (January 2010) is \$27.12 ($p = 0.01$), an increase which is sustained throughout the transition period. In the post-parity period, when legal (rather than “good faith”) compliance was required of plans, the intercept change is \$25.80 PMPM ($p = 0.02$). A significant change is also observed between the slope of the solid line and the slope of the dotted line in the post-parity period. This difference indicates that, each month, total PMPM expenditures increase an additional \$2.56 ($p = 0.00$) more than they would have in the absence of MHPAEA. The total PMPM expenditures would increase \$30.92 two months after parity ($2 \text{ months} * 2.56 + \25.80), compared to what it would have been in the absence of parity.

Compared to pre-parity, there are also statistically significant sustained increases in the levels of PMPM plan paid expenditures starting at the beginning of the transition period (\$30.47 [$p = 0.00$]), and starting at the beginning of the post-parity period (\$28.33 [$p = 0.01$]). There are also significant increases that depend on the number of months post-parity for PMPM plan and patient expenditures (plan: \$2.25/month [$p = 0.00$], and patient: \$0.27/month [$p = 0.03$]).

Figs. 3 and 4 show changes in utilization associated with MHPAEA for services that changed significantly in the post-parity period among all enrollees. MHPAEA has a mixed association with PMPM assessment/diagnostic evaluation visits during the transition and post-parity periods (decreasing 0.0003 visits/month [$p = 0.02$] during the transition period, but increasing in level by approximately 0.01 visits [$p = 0.00$] starting at the beginning of both the transition and post-parity periods) (Fig. 3). MHPAEA is associated with significant increases in the number of PMPM individual psychotherapy visits (0.002 visits/month [$p = 0.01$] during the transition period, and an increase of 0.02 visits [$p = 0.01$] starting at the beginning of the post-parity period) (Fig. 3), PMPM group psychotherapy visits (0.0009 visits/month [$p = 0.00$] during the transition period, and an increase of 0.01 visits PMPM [$p = 0.04$] starting at the beginning of the post-parity period) (Fig. 3), and PMPM structured outpatient visits (an increase of 0.02 visits [$p = 0.02$] starting at the beginning of transition period and 0.001 visits/month [$p = 0.01$] increase during the post-parity period) (Fig. 4). MHPAEA is also associated with a significant increase in intermediate care, although only in the transition period (results not shown in a figure): The number of PMPM day treatment days increased (0.012 days [$p = 0.02$] starting at the beginning of the transition period). Finally, MHPAEA is associated with increases in PMPM inpatient days (0.01 days [$p = 0.03$] starting at the beginning of transition period, and 0.001 days/month [$p = 0.00$] during the post-parity period) (Fig. 4). Outcomes that did not change significantly following MHPAEA, among the full sample, include medication management, family psychotherapy, recovery home and residential care. A comprehensive set of estimates may be found in Web Appendix Table 3.

3.3. Changes in penetration rates and changes among users

The effect of MHPAEA on penetration rates and per-user amounts is examined separately as well. Fig. 5 illustrates that MHPAEA is associated with increases in both penetration rates and per-user amounts of plan expenditures, and utilization of assessment/evaluation visits, and inpatient days. However, MHPAEA has a mixed association with structured outpatient and day treatment days; for these types of care, penetration rates significantly increase while per-user amounts significantly decrease.

3.4. Predicted spending and use, with and without MHPAEA

Fig. 6 illustrates the predicted penetration rate, per-user amounts of utilization, and per-enrollee amounts of utilization in July 2012 under the assumptions of MHPAEA versus no MHPAEA in effect. For example, when MHPAEA is in effect, the penetration rate for plan expenditures (i.e., the probability of any plan expenditures) is 18.57%, versus 15.81% when it is not. Similarly, the monthly per-user amount of plan expenditures is \$882.76 without MHPAEA, and \$1093.23 with it. Among the entire member population, including both treated and untreated members, the projected monthly plan expenditure per member without MHPAEA in effect is \$139.54 compared to \$203.05 when MHPAEA is in effect. Fig. 6 reports, that under MHPAEA, penetration rates and/or per-user use levels are higher for most types of outpatient visits and inpatient days, compared to the scenario without MHPAEA. Also, under MHPAEA, penetration rates were higher but per-user use levels were lower for structured outpatient care and day treatments, compared to the scenario without MHPAEA.

3.5. Differences between “carve-in” and “carve-out” plans among all enrollees

Among the unconditional sample, PMPM total and plan expenditures for both “carve-in” and “carve-out” plans increased post-parity, however increases were due to increases in the level starting at the beginning of the post-parity period among “carve-out” plans (total expenditures: \$67.7 [p = 0.00]; plan expenditures: \$79.4 [p = 0.00]), while they were due to monthly increases among “carve-in” plans (total expenditures: \$2.77/month [p = 0.00]; plan expenditures: \$2.26 [p = 0.00]). PMPM patient expenditures also increased each month among “carve-in” plans (\$0.44/month [p = 0.00]); however, they did not significantly change among “carve-out” plans (Web Appendix 4).

Among all “carve-in” enrollees, MHPAEA is associated with increases in the level of PMPM assessment/evaluation visits (0.009 visits [p = 0.00]), individual psychotherapy (0.025 visits [p = 0.01]), and group psychotherapy visits (0.01 visits [p = 0.02]) starting at the beginning of the post-parity period, as well as monthly increases during the post-parity period in the number of PMPM structured outpatient days (0.001 days/month [p = 0.046]), and the number of PMPM inpatient days (0.001 days/month [p = 0.00]). As with “carve-in” enrollees, among all “carve-out” enrollees, MHPAEA is associated with increases in level of PMPM assessment/evaluation visits (0.008 visits [p = 0.01]) and individual psychotherapy (0.034 visits [p = 0.048]) starting at the beginning of the post-parity period. However, unlike “carve-in” enrollees, among “carve-out” enrollees, MHPAEA was also associated with increases in PMPM structured outpatient days (0.045 days [p = 0.04]), the number of PMPM day treatment days (0.022 days [p = 0.03]), and the number of PMPM inpatient days (0.020 days [p = 0.02]) (Web Appendix 4).

4. Discussion

Following MHPAEA's historically comprehensive reforms to BH benefits for commercially-sponsored insurance plans, earlier analyses have shown that the resulting increases in specialty BH utilization and expenditures among a population of adult enrollees were modest (Harwood et al., 2017). However, whether these reforms would be associated with utilization and expenditure increases among a population with SUD remained an open question. This analysis uses an ITS study design applied to claims and eligibility data from a large MBHO. We found that, in a sample of adults with SUD diagnoses, MHPAEA was associated with increases in utilization and expenditure penetration rates, and increases in levels of utilization and expenditures among users and among all enrollees. Specifically, during the three years following publication of MHPAEA's IFR (when compliance was required for all components of the law), total, plan, and patient out-of-pocket spending, individual psychotherapy visits, assessment/evaluation visits, structured outpatient days, and hospital days increased among all enrollees in the study sample.

These findings carry several caveats. Although ITS is considered a strong study design, it makes the assumption that trends in utilization and expenditures pre-MHPAEA would have continued in the absence of the law. To investigate whether increases in opioid addiction during our study period might have led to a violation of this assumption, we re-ran our analyses among the sub-set of the study sample that had alcohol use disorder but not drug use disorder (and thus excluded opioid-addicted individuals). Although the effects were lower in magnitude in the alcohol-only population (which is consistent with the lower baseline expenditures among the alcohol-only subsample), the trends reflected those observed in the main study sample. This suggests that secular trends associated with growing opioid addiction do not explain our findings. Without a comparison group similar enough to individuals impacted by the law to allow a meaningful control, it is not possible to rule out other possible secular trends. We considered using enrollees from small employer group plans or from fully-insured plans in states with strong parity laws pre-MHPAEA, but rejected both options due to inadequate sample size and comparability.

Also, external validity may be affected by identification of SUD using diagnoses in the claims data. This method is likely to be highly specific (i.e. few false positives) but potentially less sensitive (i.e. some true positives not included). It may miss enrollees with an undiagnosed or undocumented SUD, particularly among enrollees without any utilization and thus claims records. Enrollees with an undiagnosed or undocumented SUD may have different utilization patterns post-MHPAEA than the studied sample. Also, although self-insured plans are increasingly prevalent among large employer groups (Fronstin, 2012), our findings may not be generalizable to enrollees in fully-insured plans.

Finally, although this study finds that both expenditures and some types of utilization increase over the study period, the relatively larger magnitude of changes in expenditure suggest that the utilization measures analyzed here do not capture all of the mental health and substance use disorder service use captured by the expenditure variables. This is likely because while the expenditure variables are comprehensive (i.e. all dollars spent on specialty behavioral health care are included in the measure), the utilization variables are not (i.e. they

categorize common service codes, but do not include every service code that occurs in the claims data for the study sample). Utilization changes reported therefore are not an exhaustive description of all utilization changes associated with MHPAEA.

It appears that although MHPAEA was associated with significant increases in total and plan spending, it was also associated with increased patient out-of-pocket spending, though only among “carve-in” plans. If benefits became more generous following MHPAEA, utilization and thus expenditures might be expected to increase overall, but for enrollees, the decrease in cost-sharing could have cancelled out the higher out-of-pocket expenditures due to utilization increases, resulting in decreased patient out-of-pocket spending. However, it appears that, among “carve-in” plans, the net increases in utilization more than offset any reductions in cost-sharing proportions resulting from MHPAEA.

Modest increases in behavioral health utilization may reflect greater access to needed MH and SUD services, the desired outcome of MHPAEA. The study population is a vulnerable, high-risk, and often difficult-to-reach population. Left untreated, SUD and MH conditions are associated with poorer overall health outcomes (Druss & Walker, 2011; Harris & Barraclough, 1998; Lawrence & Kisely, 2010). Thus, improvements in access to BH care for this population may improve their overall medical health status. Also, although MHPAEA was not intended as a strategy for reducing overall healthcare expenditures, given the observations stated above, future work investigating whether MHPAEA affected changes in medical expenditures maybe of interest. In the short-term, medical expenditures could increase if, for example, patients have medical conditions newly diagnosed and treated during a SUD treatment; in the long run, however, medical expenditures could decline if better outpatient medical care prevents costly emergency room visits and hospitalizations.

The per-member per-month changes in BH utilization and expenditure are small. However, the models predict that in a sample month 2½ years following MHPAEA, the study population of 38,051 would have had about 1141 more outpatient psychotherapy visits and inpatient days, and 380 more structured outpatient days than if MHPAEA had not been enacted.⁴ These increases correspond to increases of 16% for individual psychotherapy visits, 60% for inpatient days, and 8% for structured outpatient days, among the full sample. Additionally, significant utilization increases were observed for four types of outpatient utilization (including one service that is primarily used for SUD treatment) as well as inpatient care. This suggests increased access to a variety of MH and SUD therapies.

As documented elsewhere, MHPAEA ended use of treatment limits (typically 30 inpatient/intermediate days or 20 outpatient visits) for mental health and SUD treatment (Horgan et al., 2015). Members of the study population needing regular and ongoing treatment for addiction or comorbid mental health conditions may have required service levels that exceeded imposed treatment limits. In 2013, >6% of continuously enrolled individuals with SUD diagnoses used >20 outpatient visits and about half as many exceeded 30 inpatient/intermediate days. Even though changes in cost-sharing benefit design features such as

⁴This calculation was made by multiplying the total number of sample individuals in July 2012 (mid-way through the post-parity period), 38,051, by the difference between the expected level of use (individual psychotherapy and inpatient: 0.03, structured outpatient: 0.01) in the no-MHPAEA scenario and the MHPAEA scenario.

copayments and coinsurance appear to have been very modest, plans' reduced use of limits may have spurred higher utilization levels post-MHPAEA among the study population (Friedman et al., 2016; Thalmayer, Friedman, Azocar, Harwood, & Ettner, 2017).

For assessment/evaluation and inpatient days, the increases in utilization post-MHPAEA were driven by both increases in penetration rates and in the level of use among those already using services. This indicates that there were small increases in people getting any care as well as small increases in the volume of care received among those getting care. For individual and group psychotherapy, the rate of any use did not change, but the use level among users increased. The significant increase in treatment intensity among users may suggest that for many of the individuals who were already getting care, use levels were suppressed, potentially due to cost-sharing levels. For structured outpatient days, the overall increases in the level of use were driven completely by increased prevalence of any use, since the use level among users significantly decreased. This suggests that as more patients sought structured outpatient care for MH or SUD conditions, new individuals in the “user” group may have been less severely ill or had lower propensities to use care than individuals already in the “user” group. If so, this new case-mix among users would result in lower use levels among their ranks, as the lower use among the newly treated would bring down the average.

The direction of this study's findings resembles results from similar analyses using the same source data, but conducted in a sample of all adults in carve-in plans (i.e. the general population) (Harwood et al., 2017) and all adults in carve-out plans (Ettner et al., 2016). An informative difference stands out from comparing the results of these complementary analyses: The level changes in total and plan expenditures are higher in this study (approximately \$30 among adults with SUD in both carve-in and carve-out plans versus approximately \$1 among all adults in carve-in plans and among all adults in carve-out plans). The expenditure changes observed among the SUD diagnosed sample are all the more notable given that among users of BH specialty services, the subset with SUD diagnoses has much higher pre-parity average per-member per-month total expenditures (\$1035) compared to all carve-in users (\$331) and all carve-out users (\$302) (Ettner et al., 2016; Harwood et al., 2017). At first glance, the greater change in expenditures among the SUD population is not surprising, since 100% of the sample in this paper has a SUD diagnosis, and thus might be expected to increase utilization and expenditures to a greater degree than the other studies' samples which include those with and without SUD diagnoses. On the other hand, perceived and real stigmas associated with having a SUD (Barry, McGinty, Pescosolido, & Goldman, 2014), as well as functional impairment caused by the SUD and any comorbid MH conditions (Compton, Thomas, Stinson, & Grant, 2007), may intensify the challenge of using insurance policy regulations to increase access to care among this population. From that perspective, the changes observed in this paper, while somewhat modest in magnitude (about a 10% increase compared with baseline spending among the full sample), are encouraging.

Both this study and the Busch et al. (2014) study report relatively modest changes in utilization and expenditure associated with MHPAEA. Differences in the two studies' findings are explained by differences in their research questions and outcomes measured. We

examine changes in total combined SUD and MH expenditures as well as inpatient, intermediate, and outpatient combined SUD and MH utilization among a population of individuals with SUD diagnoses, whereas Busch examines changes in any SUD utilization and expenditure among a population not restricted to those with SUD diagnoses, and then total and patient SUD expenditures among those with SUD use. For example, we observed significant increases in total expenditures during 2010 (the year that Busch et al. examined), but Busch et al. did not see significant increases in total expenditures by those with SUD use. The increase we detected may have been driven by increases in MH utilization, which Busch et al. did not examine.

5. Conclusion

This study contributes to the existing body of literature documenting the effects of the comprehensive national parity law, MHPAEA, on BH expenditures and utilization among a national sample of enrollees with SUDs in employer-sponsored self-insured plans. It complements the existing literature by expanding the study period to a time when all elements of the law were enforced, by looking at in-and-out of network utilization for both “carve-in” and “carve-out” plan enrollees, and by including both mental health and substance use services used by individuals with SUD diagnoses.

This study finds that MHPAEA was associated with modest increases in BH expenditure and utilization in the SUD-diagnosed population studied. Although the increases were mostly small in magnitude, they were observed for a variety of types of care, potentially indicating small improvements in access to a spectrum of SUD and other BH treatments. It is heartening that some of MHPAEA's most discernable effects occurred in a population with high health care needs. However, the still somewhat weak utilization effects may be explained by non-financial barriers to care (e.g., stigma, provider availability). Future evaluations of MHPAEA's impact on expenditures and utilization among individuals purchasing insurance on the exchanges and Medicaid Managed Care enrollees, two populations to which the Affordable Care Act extended MHPAEA's reach starting in 2014, will be of great interest.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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<i>a: Demographics and employer, plan, and provider information</i>		
Total number of employers	440	
Total number of plans	7,816	
Total number of members	69,281	
Total number of member-months	2,716,473	
	n	%
Age group, years		
27-34	549,522	20.2
35-44	814,541	30.0
45-54	876,979	32.3
55-64	475,431	17.5
Male (vs. female)	1,639,428	60.4
Census Division		
Northeast: New England	175,511	6.5
Northeast: Middle Atlantic	298,775	11.0
Midwest: East North Central	462,381	17.0
Midwest: West North Central	314,799	11.6
South: South Atlantic	489,604	18.0
South: East South Central	122,314	4.5
South: West South Central	309,938	11.4
West: Mountain	262,496	9.7
West: Pacific	280,655	10.3
Primary insured person (vs. dependent)	1,779,835	65.5
Employer group size		
>40K enrolled employees	937,650	34.5
>10K & ≤ 40K	1,096,166	40.4
5,000-10,000	353,848	13.0
<5,000	328,809	12.1
Plan type is EPO, POS, or HMO (vs. PPO, MIN, HDHP) ¹	2,125,672	78.3
Number of providers per 1000 members, for a given state & year, by provider type:	Mean	SD
MD (doctor of medicine)	0.90	0.73
MSW (master of social work)	3.49	4.17
PHD (doctor of philosophy)	1.26	1.18
RN (registered nurse)	0.25	0.38
Non-independent licensed	0.19	2.33

<i>b: Diagnoses among member-months with any spending/service use</i>		
	n	%
Any adjustment disorder	56,746	10.42
Any post-traumatic stress disorder	24,731	4.54
Any generalized anxiety	84,195	15.46
Any obsessive-compulsive disorder	7,206	1.32
Any panic disorder	21,301	3.91
Any phobia	4,095	0.75
Any cognitive disorder	2,630	0.48
Any bipolar disorder	83,371	15.31
Any depressive disorder	234,875	43.12
Any personality disorder	7,164	1.32
Any psychotic disorder	10,756	1.97
Any other psychiatric disorder	38,923	7.15
<i>c: Member-months with spending/service use</i>		
	n	%
Any spending/service use		
Total Expenditures	544,723	20.05
Plan Expenditures	489,425	18.02
Patient Out-Of-Pocket Expenditures	472,456	17.39
Outpatient Assessment/Diagnostic Evaluation	72,413	2.67
Outpatient Medication Management	229,814	8.46
Outpatient Individual Psychotherapy	240,863	8.87
Outpatient Group Psychotherapy	26,357	0.97
Outpatient Family Psychotherapy	14,611	0.54
Structured Outpatient Care	52,688	1.94
Day Treatment Care	18,927	0.7
Residential Care	15,467	0.57
Recovery Home	879	0.03
Inpatient Care	37,605	1.38
Level of spending/service use, among users	Mean	SD
Total Expenditures (\$)	1137.15	3536.02
Plan Expenditures (\$)	1078.10	3396.54
Patient Out-Of-Pocket Expenditures (\$)	194.54	640.92
Outpatient Assessment/Diagnostic Evaluation (visits)	1.24	0.92
Outpatient Medication Management (visits)	1.34	1.08
Outpatient Individual Psychotherapy (visits)	2.35	1.67
Outpatient Group Psychotherapy (visits)	3.78	3.40
Outpatient Family Psychotherapy (visits)	1.76	1.16
Structured Outpatient (days)	6.49	5.34
Day Treatment (days)	7.05	6.03
Residential (days)	9.19	8.10
Recovery Home (days)	7.32	7.18
Inpatient (days)	5.48	4.59

Fig. 1.
Demographics and spending/service use at the member-month level, 2008–2013.

Fig. 2.

Significant changes in the slope and levels of average monthly BH spending associated with MHPAEA, among all enrollees. Notes: Spending levels are adjusted to 2013 values. Sample is member-months from 2008 to 2013 (N = 2,716,473). Estimates from linear regression; significance defined at $p = 0.05$. Interrupted time series segmented regression analysis controlled for a linear monthly time trend, indicators and splines (measuring respective changes in level and slope) for the transition and post periods, sex, age group, primary insured vs. dependent, employer size, whether plan was more vs. less managed, whether plan was "carve-in" or "carve-out", state fixed effects, provider supply, month, and type of SUD diagnosis.

Fig. 3.

Significant changes in the slope and levels of average monthly outpatient utilization associated with MHPAEA, among all enrollees. Notes: Sample is member-months from 2008 to 2013 (N = 2,716,473). Estimates from linear regression; significance defined at p 0.05. Interrupted time series segmented regression analysis controlled for a linear monthly time trend, indicators and splines (measuring respective changes in level and slope) for the transition and post periods, sex, age group, primary insured vs. dependent, employer size, whether plan was more vs. less managed, whether plan was "carve-in" or "carve-out", state fixed effects, provider supply, month, and type of SUD diagnosis.

Fig. 4.

Significant changes in the slope and levels of average monthly structured outpatient and inpatient utilization associated with MHPAEA, among all enrollees. Notes: Results for patient out-of-pocket spending not shown in figure due to lack of significance. Sample is member-months from 2008 to 2013 ($N = 2,716,473$). Estimates from linear regression; significance defined at $p = 0.05$. Interrupted time series segmented regression analysis controlled for a linear monthly time trend, indicators and splines (measuring respective changes in level and slope) for the transition and post periods, sex, age group, primary insured vs. dependent, employer size, whether plan was more vs. less managed, whether plan was “carve-in” or “carve-out”, state fixed.

Outcome	Change in penetration rate‡		Change in amount of spending or utilization among users‡	
	Change in level	Change in slope	Change in level	Change in slope
Expenditures				
Total	0.0092	0.0005	\$83.13	\$9.5898*
Plan	0.0168*	0.0006*	\$67.15	\$8.4895*
Patient Out-Of-Pocket	0.0002	-0.0002	-\$13.62	\$1.8110*
Utilization				
Assessment/Evaluation, visits	0.0058*	-0.0001	0.0525*	0.0006
Medication Management, visits	-0.0020	0.0001	0.0697*	0.0021
Individual Psychotherapy, visits	0.0066	0.0002	0.1062*	0.0003
Group Psychotherapy, visits	0.0013	0.0001	0.4548*	0.0001
Family Psychotherapy, visits	0.0008	0.0000	0.1132	0.0003
Structured Outpatient, days	0.0005	0.0001*	-1.0728*	0.0205
Day Treatment, days	0.0016*	0.0001*	-1.6081*	-0.0418*
Residential Care, days	0.0002	0.0000	-5.0096*	-0.0212
Recovery Home, days	0.0002	0.0000	-7.6850	-0.0355
Inpatient Care, days	0.0005	0.0002*	0.6893*	0.0053

*Indicates $p \leq 0.05$

†Pre-parity includes years 2008-2009, and post-parity includes years 2011-2013.

‡Change in penetration rates estimated using logistic regression. Change in per-user amount estimated using gamma regressions. Both regressions use interrupted time series segmented regression analysis controlled for a linear monthly time trend, indicators and splines (measuring respective changes in level and slope) for the transition and post periods, sex, age group, primary insured vs. dependent, employer size, whether plan was more vs. less managed, whether plan was “carve-in” or “carve-out”, state, provider supply, month, and type of SUD diagnosis.

Fig. 5.

Change in penetration rate among all enrollees and in level of expenditures and utilization among users post-parity compared to pre-parity†.

Outcome	Penetration rate‡		Level of outcome among users‡		Level of outcome among all enrollees‡	
	No MHPAEA	MHPAEA	No MHPAEA	MHPAEA	No MHPAEA	MHPAEA
Expenditures						
Total	19.11%	21.04%	\$897.26	\$1135.03§	\$171.47	\$238.90§
Plan	15.81%	18.57%§	\$882.76	\$1093.23§	\$139.54	\$203.05§
Patient Out-Of-Pocket	18.34%	17.88%	\$179.41	\$199.62§	\$32.92	\$35.70§
Utilization						
Assessment/Evaluation, visits	2.17%	2.60%§	1.18	1.24§	0.03	0.03§
Medication Management, visits	9.16%	9.10%	1.22	1.33§	0.11	0.12
Individual Psychotherapy, visits	8.34%	9.37%	2.24	2.35§	0.19	0.22§
Group Psychotherapy, visits	0.84%	1.09%	3.36	3.80§	0.03	0.042§
Family Psychotherapy, visits	0.51%	0.57%	1.63	1.740	0.01	0.010
Structured Outpatient, days	1.73%	2.04%§	7.22	6.50	0.12	0.13§
Day Treatment, days	0.46%	0.70%§	8.31	5.89	0.04	0.040
Residential Care, days	0.53%	0.63%	12.65	7.13	0.07	0.050
Recovery Home, days	0.01%	0.06%	19.29	6.732	0.00	0.004
Inpatient Care, days	1.04%	1.41%§	4.80	5.60§	0.05	0.08§

*The post-parity includes years 2011-2013. The midpoint of this period was July 2012.

†The “No MHPAEA” scenario assumes that the time trend from the pre-parity period continued, and the “MHPAEA” scenario uses the observed post-parity data.

‡Penetration rates estimated using logistic regression. The level of outcome among users is estimated using gamma regressions. The level of outcome among all enrollees is estimated using a “two-part” model. All regressions use interrupted time series segmented regression analysis controlled for a linear monthly time trend, indicators and splines (measuring respective changes in level and slope) for the transition and post periods, sex, age group, primary insured vs. dependent, employer size, whether plan was more vs. less managed, whether plan was “carve-in” or “carve-out”, state, provider supply, month, and type of SUD diagnosis.

§Model predicts significant positive changes in level and / or slope for the given outcome.

|| Model predicts significant negative changes in level and / or slope for the given outcome.

Fig. 6.

Predicted expenditure and utilization penetration rates, mean level among users, and mean level among all enrollees, at midpoint of post-parity period*, for “No MHPAEA” and “MHPAEA” scenarios†.