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ASSOCIATION OF FEDERAL MENTAL HEALTH PARITY LEGISLATION WITH HEALTH CARE USE AND SPENDING AMONG HIGH UTILIZERS OF SERVICES

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Abstract

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Ethics Approval: This study obtained ethics approval from institutional review boards at Harvard Pilgrim Health Care Institute (#386759) and University of Michigan (#HUM00121126). Participant consent was waived for this study of secondary data.

Background: Decades-long efforts to require parity between behavioral and physical health insurance coverage culminated in the comprehensive federal Mental Health Parity and Addiction Equity Act.

Objectives: To determine the association between federal parity and changes in mental health care utilization and spending, particularly among high utilizers.

Research Design: Difference-in-differences analyses compared changes before and after exposure to federal parity vs. a comparison group

Subjects: Commercially-insured enrollees aged 18–64 with a mental health disorder drawn from 24 states where self-insured employers were newly subject to federal parity in 2010 (exposure group), but small employers were exempt before-and-after parity (comparison group). 11,226 exposure group members were propensity score matched (1:1) to comparison group members, all of whom were continuously enrolled from 1 year pre- to 1–2 years post-policy.

Measures: Mental health outpatient visits, out-of-pocket spending for these visits, emergency department visits, and hospitalizations.

Results: Relative to comparison group members, mean out-of-pocket spending per outpatient mental health visit declined among exposure enrollees by \$0.74(1.40,0.07) and \$2.03(3.17,0.89) in years 1 and 2 after the policy, respectively. Corresponding annual mental health visits increased by 0.31(0.12,0.51) and 0.59(0.37,0.81) per enrollee. Difference-in-difference changes were larger for the highest baseline quartile mental health care utilizers (Year 2: 0.76 visits per enrollee [0.14,1.38]; relative increase 10.07%) and spenders (Year 2: \$–2.28 [–3.76,–0.79]; relative reduction 5.91%) There were no significant difference-in-differences changes in emergency department visits or hospitalizations.

Conclusions: In 24 states, commercially-insured high utilizers of mental health services experienced modest increases in outpatient mental health visits 2 years post-parity.

Keywords

mental health; quasi-experimental design; health law; utilization; costs

Introduction

About 20% of the adult U.S. population experiences mental illness each year,¹ but in 2012, less than half received mental health care.² Inadequate insurance coverage contributes significantly to suboptimal access.^{2,3} Prior to 2008, a patchwork of state and federal parity policies was enacted with the goal of making behavioral health insurance coverage as generous as physical illness coverage. However, many policies were under-enforced, relatively weak, or did not apply to a large proportion of insurance plans.³

In response, the federal government enacted the Mental Health Parity and Addiction Equity Act (MHPAEA) in 2008,⁴ adopting broad parity rules for nearly all employer group health plans that provide medical care for employee participants. MHPAEA aims to improve financial protection and increase access to behavioral health services for persons with mental health conditions or substance use disorders—especially enrollees with high use and

spending.⁵ MHPAEA specifically requires parity of cost sharing and treatment limitations between physical and behavioral health benefits, when offered through private employers of 50 or more employees.⁵ The law^{5,6} was rolled out over 5 years. Group health plans were expected to be largely compliant in mid-2010 (eTable1).⁵ Building on MHPAEA, the Affordable Care Act (ACA) expanded mental health benefits to about 62 million people by classifying mental health and substance use disorder benefits as Essential Health Benefits and extending parity protections to most individual and small-group plans beginning in 2014.⁷

Previous MHPAEA studies have examined mental health and substance use disorder service utilization and spending^{8–18} but none has employed a rigorous, longitudinal controlled study design to analyze changes among high utilizers. Research on parity policies that preceded MHPAEA found modest decreases in out-of-pocket spending^{19–21} and little or modest change in utilization of mental health services or quality.^{20–23} This study investigated changes in health care utilization associated with MHPAEA among enrollees covered through “self-insured” employers (i.e., employers that retain risk for payment of claims). Self-insured plans, typically adopted by large employers, account for approximately 60% of covered workers.²⁴ These firms were exempt from all parity legislation until mid-2010,²⁵ when they became subject to MHPAEA. Enrollees from self-insured employers were compared to a cohort insured through small employers that were exempt from all parity legislation both before and after MHPAEA, until ACA requirements took effect. We hypothesized that under MHPAEA, enrollees with mental illness from self-insured employers, and particularly those with high baseline utilization, would experience lower out-of-pocket spending on outpatient mental health care and increased visits relative to the comparison cohort. The expected direction of associations between MHPAEA and emergency department (ED) visits or hospitalizations was unclear.

Methods

We assessed the relationship between MHPAEA and changes in mental health services utilization and spending in a commercially-insured population diagnosed with mental health disorders using a difference-in-differences analysis to allow estimation independent of other changes to spending and use. We also generated interrupted time series displays to depict comparative group trends in spending and utilization.

This research was approved by the institutional review boards at Harvard Pilgrim Health Care Institute and University of Michigan. We conducted analyses from January 2014 through December 2017.

Study Population

We compared spending and utilization outcomes among enrollees in large employer plans exempt from parity until MHPAEA to those in fully parity-exempt small employer plans. For the comparison group, we identified 24 states that exempted small employer group plans from state mental health parity laws throughout the study period (eSupplement, Appendix A; eTable2). Within these same states, “exposure” group members were those enrolled through self-insured employers that were newly subject to MHPAEA in mid-2010.

Our population was drawn from de-identified Optum data (Eden Prairie, MN), which includes inpatient, outpatient, and pharmacy claims from a large national health insurer with enrollees in all 50 states. Available demographic information included enrollee gender, year of birth, state of residence, and type of group health plan (fully-insured or self-insured). We classified enrollees based on their employer's size and month of plan renewal (eSupplement, Appendix A).

We analyzed enrollee claims in the year preceding MHPAEA ("baseline") and 2 years following MHPAEA implementation. Claims spanned from late 2008–2012 because we took into account differing timeframes when MHPAEA requirements were phased in on each enrollee's plan renewal date.^{4,5} We excluded from analyses a phase-in period when plan compliance was optional (eSupplement, Appendix A).^{5,26}

Adults (ages 18–64) from the 24 states of interest who were continuously enrolled from the baseline through at least 1 follow-up year were included in the sample. We excluded children because their mental health conditions and health care utilization patterns differ from those of adults. We excluded adults over age 64 because they are separately insured by Medicare, and we lacked access to those claims. The cohort consisted of adults who met the inclusion criteria for at least one of the following psychiatric diagnosis categories, which correspond to the ICD-9 diagnosis codes in eTable3: schizophrenia and other psychoses; bipolar disorder; major depression; anxiety disorders; attention deficit/hyperactivity disorder; adjustment disorders; or other mental health disorders (eSupplement, Appendix A; eTable3). To qualify for inclusion, an individual must have had, in the year *prior* to the baseline period, either (1) 2 outpatient or ED claims (on separate dates) within the same diagnosis category; (2) 1 inpatient claims within a diagnosis category; or (3) 1 outpatient or ED claims within a diagnosis category if there was no more than one other claim on a separate date within a different diagnosis category. We considered all diagnoses included in the claims in creating the cohort. The pre-matched cohorts consisted of 70,038 enrollees in self-insured plans meeting mental illness criteria (potential exposure group) and 11,226 counterparts in small employer group plans (comparison group).

We improved the comparability of the exposure and comparison group populations using enrollee-level propensity score matching.²⁷ Each small employer enrollee was matched to a self-insured plan enrollee on fixed demographic characteristics, the Johns Hopkins ACG® System comorbidity score (ACG, version 10.0.1),^{28,29} plan renewal month category, and diagnostic qualifying month (eSupplement, Appendix A). Propensity score matching improved balance among enrollees in the 2 groups along gender, comorbidity, diagnosis qualifying month, plan renewal month, race/ethnicity, neighborhood poverty and education levels, and qualifying diagnoses. Our final sample included 11,226 enrollees in self-insured plans (exposure group) and 11,226 enrollees in small employer group plans (comparison group) (Table 1; eTable4). To ensure that differing price sensitivities and utilization trends between groups were not biasing results, we also conducted a sensitivity analysis using groups matched on baseline trends in mental health visits and out-of-pocket spending (eSupplement, Appendix B; eTable5). We conducted a further sensitivity analysis after excluding enrollees with a substance use disorder diagnosis, to ensure that such inclusion was not biasing our estimates to the null (eSupplement, Appendix B).

To assess variation in our outpatient outcomes among key subgroups of interest, we stratified the exposure and comparison groups by quartiles of baseline year mental health outpatient visits, quartiles of baseline year out-of-pocket mental health outpatient spending, gender, and mental health diagnosis category (eSupplement, Appendix C).

Measures

Because detailed benefit design information was unavailable, we examined mean out-of-pocket spending per mental health outpatient visit to determine if the exposure group experienced reduced out-of-pocket expenditures. Primary outcomes were annual outpatient mental health visits per enrollee, mean out-of-pocket spending per visit, and total annual spending on all such visits (eSupplement, Appendix A; eTable6). We characterized an outpatient visit as mental-health-related if (a) the primary diagnosis associated with the claim was categorized as a mental health diagnosis or if there was an evaluation and management code specific to mental health treatment (eTable5) and (b) a mental health provider code was associated with the claim. We also examined overall inpatient admissions and ED visits.

Covariates included gender, age, neighborhood poverty and education, race/ethnicity, state of residence, ACG comorbidity score, and plan renewal month. We used validated categorical variables of 2000 U.S. Census block group poverty and educational levels, and we used a combination of 2000 U.S. Census neighborhood characteristics and surname analysis to characterize members' race/ethnicity (eSupplement, Appendix A).³⁰

Statistical Analyses

We compared baseline characteristics of our study groups using standardized differences (Table 1).³¹ Our main difference-in-differences analyses compared changes in outcomes in the exposure group to those in the comparison group from the baseline year to each of the 2 follow-up years. We used generalized estimating equations (GEEs) with a negative binomial distribution to model outpatient mental health visit rates, ED visits, hospitalizations, and out-of-pocket spending, adjusting for individual age, gender, neighborhood education and poverty, race/ethnicity, state of residence, comorbidity, and plan renewal month. We offset estimates to adjust for differential individual follow-up time in year 2.

The GEEs took the following form:

$$Y_{it} = \beta_0 + \beta_1 * T_i + \beta_2 * post_t + \beta_3 * T_i * post_t + \beta_4 X_i + e_{it}$$

in which i was an individual identifier, t was a year identifier, Y_{it} was the outcome variable, T_i was a study group indicator, $post_t$ was a pre- or post-MHPAEA indicator, and X_i was a vector of individual characteristics. The key term of interest was β_3 . All results reported are based on 2-sided tests of statistical significance defined as $p < 0.05$. We used marginal effects methods (eSupplement, Appendix A) to calculate adjusted visit rates and spending, as well as absolute and relative difference-in-differences. We adopted the same approach in sensitivity analyses.

To provide visual depictions of spending and utilization trends over time, we generated differenced outcome rates for monthly time series plots by subtracting mean exposure from comparison group estimates in each month. We used interrupted time series regression with a linear trend term to model the differenced series, adjusting standard errors for autocorrelation (eSupplement, Appendix A). We plotted the monthly rates for each group, the differenced points between the groups, a predicted trend, and separate trends fitted to the actual differenced points in each of the 2 years post-MHPAEA (Figures 1, 2). For all difference-in-differences analyses, we validated the parallel baseline trend assumption using interrupted time series regression. We performed analyses using SAS version 9.3 (SAS Institute Inc., Cary, NC) and Stata version 12 (College Station, TX).

Results

After propensity-score matching, the mean age of enrollees in both groups in the baseline year was 44 and the ACG comorbidity score was 2.3 (compared to a population mean of 1, indicating a higher-than-average morbidity in our study population); 56–58% were female (Table 1). The majority of members in both groups were from high-education, low-poverty, and predominantly white neighborhoods (65%, 51%, and 77–78%, respectively).

In the baseline year, mean out-of-pocket spending per mental health outpatient visit was \$30.98 and \$37.10 for the exposure (n=11,226) and comparison (n=11,226) groups, respectively, and corresponding total annual out-of-pocket spending for these visits was \$214.02 and \$246.99 on average (Table 2). According to difference-in-differences results, the exposure group experienced small but statistically significant declines in mean out-of-pocket spending per visit relative to comparators: \$-0.74 (-1.40, -0.07) in year 1 and \$-2.03 (-3.17, -0.89) in year 2. These corresponded to relative changes of -0.51% (-2.39, 1.36) and -3.01% (-5.80, -0.22). We observed similar patterns in the highest mental health spending quartile, which experienced declines in mean out-of-pocket spending per visit of \$-2.28 (-3.76, -0.79; relative -5.91%) in year 2 (Table 2). We observed few significant differences in mean total out-of-pocket spending.

The exposure group had somewhat greater mean outpatient mental health visit rates in the baseline year than the comparison cohort (7.31 versus 6.71 visits per enrollee, Table 3). The baseline year ED visit and hospitalization rates (0.27–0.29 and 0.08 per enrollee, respectively) did not differ significantly between groups. Relative to comparison group enrollees, exposure group enrollees experienced statistically significant increases in outpatient mental health visits of 0.31 visits (0.12, 0.51) in year 1 and 0.59 visits (0.37, 0.81) in year 2, with corresponding relative changes of 4.40% (1.55, 7.25) and 8.58% (5.26, 11.90). We did not detect significant differences in ED visits (mean difference between groups of 0.00 [-0.02, 0.03] in year 1 and 0.01 [-0.02, 0.04] in year 2) or hospitalizations (mean difference between groups of 0.01 [-0.01, 0.02] in year 1 and 0.00 [-0.01, 0.02] in year 2).

In analyses stratified by baseline year mental health outpatient use, the higher users in the exposure group experienced the most pronounced increases in utilization post-MHPAEA. Specifically, in the third quartile (50–75th percentile in baseline utilization, or 6.71 and 6.38

visits in exposure and comparison group enrollees, respectively), compared to comparison group enrollees, exposure group enrollees experienced statistically significant increases of 0.42 visits (0.14, 0.71; relative 6.82%) in year 1 and 0.83 visits (0.51, 1.14; relative 13.02%) in year 2 (Table 3). In the fourth quartile (75–100th percentile in baseline utilization, or 17.89 and 16.40 visits in exposure and comparison group enrollees, respectively) exposure group enrollees experienced borderline significant increases of 0.54 visits (–0.03, 1.11; relative 6.78%) in year 1 and significant increases of 0.76 visits (0.14, 1.38; relative 10.07%) in year 2, as compared to comparison group enrollees (Table 3). When we stratified by mental health diagnosis, we found significant increases in mental health outpatient visits and decreases in mean spending per visit in year 2 among the major depression cohort, although many severe diagnostic cohorts are not reported due to small sample sizes (eSupplement, Appendix C; eTable7; eTable8). Both genders experienced significant increases in visits (eSupplement, Appendix C; eTable9; eTable10).

Figures 1 and 2 demonstrate comparable baseline trends that do not statistically significantly differ (eSupplement, Appendix A) across study groups in monthly mean out-of-pocket spending per visit and visit rate. Fitted trends in the 2 years post-MHPAEA implementation were consistent with difference-in-differences estimates.

Our basic findings were robust to sensitivity analyses. After matching on baseline out-of-pocket spending and visit rate trends, difference-in-differences effect estimates for mean out-of-pocket spending per visit, total out-of-pocket spending, and outpatient visits per enrollee were consistent in terms of significance to main analysis estimates, if somewhat higher in magnitude for spending (eSupplement, Appendix B; eTable11; eTable12; eFigure1; eFigure2). Outpatient visit and out-of-pocket-spending findings were supported by a test for regression to the mean in sensitivity results (eSupplement, Appendix B; eTable13; eTable14). Moreover, the main analysis mental health spending and utilization estimates were consistent with those generated in a sensitivity analysis that excluded enrollees with a substance use disorder diagnosis (eSupplement, Appendix B; eTable15; eTable16).

Discussion

This study, one of the most robust and comprehensive conducted to examine changes in mental health care use and spending after MHPAEA, found that federal mental health parity legislation was associated with statistically significant but small decreases in mean out-of-pocket spending per mental health outpatient visit and increases in the number of such visits for adults with mental health diagnoses. The spending result is consistent with a government compliance report which found that between 2009 and 2011, large employers decreased the use of higher cost-sharing (copays and coinsurance) for mental health and substance use disorder care: noncompliance with MHPAEA ranged from 10–30% in 2009 and dropped to 0–20% in 2011.³² Small increases in financial protection—likely in combination with removal of annual caps on mental health outpatient visits—were associated with increased use of outpatient mental health services, including among high utilizers and those with serious mental illness (major depression). This result is consistent with one of parity’s major goals: to **increase** financial protection and access for those with high mental health care use and need on the theory that these patients were underserved for mental health specialty care.

⁵ These changes were more pronounced in the second year after MHPAEA than the first, suggesting that enrollees may not have immediately understood coverage changes. MHPAEA generally was not associated with changes in total out-of-pocket spending on these visits likely because, although spending per visit declined, the number of visits increased. We did not detect changes in **overall medical care** (ED or inpatient) **utilization** perhaps because increases in **mental health** outpatient services were too modest to generate offsets.

Our analysis leverages data from almost half the states and uses a rigorous design to evaluate MHPAEA, a parity policy of unprecedented scope, to find modest increases in mental health care use among high utilizers. Our results differ somewhat from analyses of earlier parity policies but are quite consistent with emerging MHPAEA evaluations. Most studies of earlier parity policies (i.e., state and federal employee) found that parity was associated with no difference in or reduced use of mental health and substance use disorder services, and many identified modest decreases (\$14 to \$87 annually) in total out-of-pocket spending for those services.^{20,21,23} In other studies, federal employee parity and Oregon's 2007 state parity law (which had MHPAEA-like nonquantitative treatment protections) was associated with greater mental health service **use** among moderate spenders and those with moderate outpatient need, respectively.^{22,33,34} Studies that used survey data found associations between state parity laws and increased mental health service use.^{19,25,35,36} Consistent with our findings, recent studies of adult populations that use less rigorous designs associate MHPAEA with statistically significant increases in high utilizer use of mental health outpatient services,¹⁸ probability of mental health treatment,¹³ and monthly mental health visits per person.¹⁵ Unlike this study, however, no other evaluation has used a longitudinal controlled design with precise policy implementation timing to evaluate utilization and spending among those targeted by MHPAEA.

One potential explanation for the differences between our findings and several early studies is that under prior parity policies, health plans increased supply-side managed behavioral care techniques (e.g., medical necessity determinations) to counteract the potential moral hazard introduced by expanded mental health benefit coverage.^{37–41} Most early parity policies (except Oregon's) allowed or encouraged the use of such techniques. MHPAEA, however, required nonquantitative treatment limitation parity as of the interim final rule effective date, although compliance is difficult to monitor.⁴² Additionally, previous parity policies reportedly suffered from under-enforcement and noncompliance.^{3,43} Consistent enforcement of MHPAEA is also a concern, given decentralized accountability among federal agencies and state governments.^{44,45} However, the sweeping and highly publicized nature of MHPAEA, along with early federal oversight, appears to have encouraged plans to comply with many benefit design requirements.^{26,32} Methodological differences may also account for differences between our findings and those of other parity studies. We isolated outpatient mental health visits rather than combining them with mental health inpatient services and drug utilization,^{19,20,22,35} on the theory that unmet outpatient need would be most affected by parity. We also examined outcomes at 1 and 2 years after MHPAEA implementation to account for any lag time in plan compliance, whereas most other studies examined only one year or pooled data across 2 years post-parity.^{19,20,22,36}

Our analysis has several limitations. Claims data do not provide diagnoses based on structured, standardized clinical interviews. Although it is unlikely that there were systematic changes in the data over time that differed across study groups, any such differences could introduce bias. A further limitation is that 2 years may not be long enough to capture the full extent of changes post-MHPAEA, and differential follow-up in year 2 across groups (although adjusted for) could have biased results. The Optum data are drawn from a single, national insurer that may not be representative of all insurers in terms of their plans' MHPAEA compliance. However, this insurer covers a sizeable percentage of the U.S. commercially insured population. Each employer's actual compliance with MHPAEA is uncertain given our lack of detailed benefit design information. We examined the "real-world" implementation window when employers were expected to comply,^{5,6,32,42} so any lack of association between parity and changes in spending and utilization would reflect a policy-relevant failure of compliance and enforcement.

Also, by propensity score matching, we selected a subset of self-insured enrollees who may not have been representative of the entire group. Some self-insured plans may have offered generous mental health benefits prior to MHPAEA. The self-insured enrollees ultimately selected by our matching techniques were more similar to small firm employees not impacted by parity. Therefore, MHPAEA-associated changes detected relative to small employer enrollees in the matched self-insured enrollees are arguably more policy relevant than those in the overall self-insured group. Furthermore, using small employer plan enrollees as the comparator could introduce bias if persons with unmet mental health care need are more likely to be employed by large employers and we failed to adjust for these differences. Also, small employer plans may have changed their benefit designs to align with MHPAEA, which could bias results to the null.

MHPAEA represents the most sweeping mental health parity legislation adopted in the U.S. prior to the ACA. We found comprehensive parity was associated with modest increases in covered outpatient mental health visits, although larger increases for those with the highest baseline outpatient mental health care use. As a result of increased access to care, mental health specialists and generalist clinicians may see a small or gradual increase in patients presenting for mental health care. Nevertheless, other persistent barriers, such as stigma,^{46,47} and clinician undersupply^{38,47} may limit opportunities for increased access to care offered by MHPAEA and the ACA.^{38,48} While further research is needed to assess MHPAEA effects, including on clinical outcomes, our results suggest that comprehensive parity in insurance coverage modestly increases service use but is unlikely alone to solve mental health care treatment deficits in the U.S.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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References

1. Center for Behavioral Health Statistics and Quality, Substance Abuse and Mental Health Services Administration. The NSDUH report: state estimates of adult mental illness. <http://www.samhsa.gov/data/2k12/NSDUH110/sr110-adult-mental-illness.htm>. Published May 31, 2012. Accessed January 21, 2018.
2. Substance Abuse and Mental Health Services Administration. Results from the 2012 National Survey on Drug Use and Health: mental health findings, NSDUH Series H-47. DHHS publication no. (SMA) 13-4805. Rockville, Md.: Substance Abuse and Mental Health Services Administration <http://www.samhsa.gov/data/sites/default/files/NSDUHmhfr2012/NSDUHmhfr2012.pdf/>.
3. Barry CL, Gabel JR, Frank RG, Hawkins S, Whitmore HH, Pickering JD. Design of mental health benefits: still unequal after all these years. *Health Aff.* 2003;22(5):127-37.
4. Mental Health Parity and Addiction Equity Act of 2008. Pub. L 110-343.
5. Interim Final Rules Under the Paul Wellstone and Pete Domenici Mental Health Parity and Addiction Equity Act of 2008, 75 *Federal Register* 5410 (22, 2010).
6. Final Rules Under the Paul Wellstone and Pete Domenici Mental Health Parity and Addiction Equity Act of 2008. 78 *Federal Register* 68240 (11/13, 2013).
7. Beronio K, Po R, Skopec L, Glied S. ASPE issue brief: Affordable Care Act expands mental health and substance use disorder benefits and federal parity protections for 62 million americans. Washington, D.C.: Office of the Assistant Secretary of Planning and Evaluation http://aspe.hhs.gov/health/reports/2013/mental/rb_mental.cfm.
8. Busch S, Epstein A, Harhay M, Fiellin D, Un H, Leader D, Barry C. The effects of federal parity on substance use disorder treatment. *Am J Man Care.* 2014;20(1):76-82.
9. McGinty EA, Busch SH, Stuart EA, Huskamp HA, Gibson TB, Goldman HH, Barry CL. Federal parity law associated with increased probability of using out-of-network substance use disorder treatment services. *Health Aff.* 2015;34(8):1331-39.
10. Friedman S, Xu H, Harwood JM, Azocar F, Hurley B, Ettner SL. The Mental Health Parity and Addiction Equity Act evaluation study: Impact on specialty behavioral healthcare utilization and spending among enrollees with substance use disorders. *J Subst Abuse Treatment* 2017;80:67-78.
11. Stuart EA, McGinty EE, Kalb L, Huskamp HA, Busch SH, Gibson TB, Goldman H, Barry CL. Increased service use among children with autism spectrum disorder associated with mental health parity law. *H Aff.* 2017;36(2):337-345.
12. Huskamp HA, Samples H, Hadland SE, McGinty EE, Gibson TB, Goldman HH, Busch SH, Stuart EA, Barry CL. Mental health spending and intensity of service use among individuals with diagnoses of eating disorders following federal parity. *Psych Serv.* Nov. 15, 2017.
13. Goldberg DM, Lin H. Effects of the mental health parity and addictions equality act on depression treatment choice in primary care facilities. *Int'l J Psych Med.* 2017;52(1):34-47.
14. Walter AW, Yuan Y, Cabral HJ. Mental health service utilization and expenditures among children enrolled in employer-sponsored health plans. *Pediatrics* 2017;139(s2):s127-s135. [PubMed: 28562310]

15. Harwood JM, Azocar F, Thalmayer A, Xu H, Ong MK, Tseng C, Wells KB, Friedman S, Ettner SL. The Mental Health Parity and Addiction Equity Act Evaluation Study: Impact on specialty behavioral care utilization and spending among carve-in enrollees. *Med Care*. 2017;55(2):164–172. [PubMed: 27632769]
16. Busch SH, McGinty EE, Stuart EA, Huskamp HA, Gibson TB, Goldman HH, Barry CL. Was federal parity associated with changes in out-of-network mental health care use and spending? *BMC Health Serv Res*. 2017;17:315. [PubMed: 28464814]
17. Friedman S, Thalmayer AG, Azocar F, Xu H, Harwood JM, Ong MK, Johnson LL, Ettner SL. The Mental Health Parity and Addiction Equity Act evaluation study: Impact on mental health financial requirements among commercial “carve-in” plans. *Health Serv Res*. 12 12, 2016. doi: 10.1111/1475-6773.12614.
18. Grazier KL, Eisenberg D, Jedele JM, Smiley ML. Effects of mental health parity on high utilizers of services: pre-post evidence from a large self-insured employer. *Psych Serv*. 2016;67(4):448–51.
19. Sipe TA, Finnie RKC, Knopf JA, et al. Effects of mental health benefits legislation: a community guide systematic review. *Am J Prev Med*. 2015;48(6):755–766. [PubMed: 25998926]
20. Goldman HH, Frank RG, Burnam MA, et al. Behavioral health insurance parity for federal employees. *N Eng J Med*. 2006;354(13):1378–86.
21. Busch AB, Yoon F, Barry CL, et al. The effects of mental health parity on spending and utilization for bipolar, major depression and adjustment disorders. *Am J Psychiatry*. 2013;170(2):180–7. [PubMed: 23377639]
22. McConnell KJ, Gast SH, Ridgely MS, et al. Behavioral health insurance parity: does Oregon’s experience presage the national experience with the Mental Health Parity and Addiction Equity Act? *Am J Psychiatry*. 2012;169:31–38. [PubMed: 21890792]
23. Busch AB, Huskamp HA, Normand SLT, Young AS, Goldman H, Frank RG. The impact of parity on major depression treatment quality in the federal employees’ health benefits program after parity implementation. *Med Care*. 2006;44(6):506–512. [PubMed: 16707998]
24. Employer health benefits: 2017 annual survey. Menlo Park, CA: The Henry J. Kaiser Family Foundation and Health Research & Educational Trust, 2017.
25. Busch SH, Barry CL. New evidence on the effects of state mental health mandates. *Inquiry*. 2008; 45:308–22. [PubMed: 19069012]
26. U.S. General Accountability Office. Employers’ insurance coverage maintained or enhanced since parity act, but effect of coverage on enrollees varied. Washington, D.C.: U.S. General Accountability Office GAO publication no. 12–63. <http://www.gao.gov/assets/590/586550.pdf>.
27. Coca-Perraillon M. Local and global optimal propensity score matching. SAS Global Forum 2007 Paper 185–2007. <http://www2.sas.com/proceedings/forum2007/185-2007.pdf>.
28. The Johns Hopkins ACG Case-Mix System Reference Manual, Version 10.1. Baltimore, MD: The Johns Hopkins University; 2015.
29. Reid RJ, Roos NP, MacWilliam L, Frohlich N, Black C. Assessing population health care need using a claims-based ACG morbidity measure: a validation analysis in the Province of Manitoba. *Health Serv Res*. 2002;37:1345–64. [PubMed: 12479500]
30. Census 2000 Summary File 1: United States. Washington, D.C.: U.S. Census Bureau, 2001.
31. Yang D, Dalton JE. A unified approach to measuring the effect size between two groups using SAS®. SAS Global Forum 2012 Paper 335–2012. <https://www.lerner.ccf.org/qhs/software/lib/stdiff.pdf>.
32. Goplerud E Consistency of Large Employer and Group Health Plan Benefits with Requirements of the Paul Wellstone and Pete Domenici Mental Health Parity and Addiction Equity Act of 2008. Washington, D.C.: Assistant Secretary for Planning and Evaluation, Office of Disability, Aging and Long-Term Care Policy <http://aspe.hhs.gov/daltcp/reports/2013/mhpaeAct.shtml>.
33. Neelon B, O’Malley AJ, Normand ST. A bayesian two-part latent class model for longitudinal medical expenditure data: assessing the impact of mental health and substance abuse parity. *Biometrics*. 2011;67:280–89. [PubMed: 20528856]
34. McConnell KJ. The effect of parity on expenditures for individuals with severe mental illness. *Health Serv Res*. 2013;48(5):1634–52. [PubMed: 23557191]

35. Harris KM, Carpenter C, Bao Y. The effects of state parity laws on the use of mental health care. *Med Care*. 2006; 44(6):499–505. [PubMed: 16707997]
36. Bao Y, Sturm R. Effects of state mental health parity legislation on perceived insurance coverage, access to care, and mental health specialty care. *Health Serv Res*. 2004; 39(5):1361–77. [PubMed: 15333113]
37. National Alliance on Mental Illness. A long road ahead: achieving true parity in mental health and substance use care. <https://www.nami.org/About-NAMI/Publications-Reports/Public-Policy-Reports/A-Long-Road-Ahead/2015-ALongRoadAhead.pdf>. Published April 2015. Accessed January 21, 2018.
38. Newhouse JP. *Free for All? Lessons from the RAND Health Insurance Experiment*. Cambridge, Ma.: Harvard University Press, 1993.
39. Frank RG, McGuire TG. Economics and mental health In: Culyer AJ, Newhouse JP, eds. *Handbook of health economics*. New York, Ny.: Elsevier, 2000:893–954.
40. Barry CL, Frank RG, McGuire TG. The costs of mental health parity: still an impediment? *Health Aff*. 2006;25(3):623–34.
41. Frank RG, Koyanagi C, McGuire TG. The politics and economics of mental health ‘parity’ laws. *Health Aff*. 1997;16(4):108–19.
42. Ridgely MS, Pacula RL, Burnam MA. Short-term analysis to support mental health and substance use disorder parity implementation. Washington, D.C.: Office of the Assistant Secretary of Planning and Evaluation <http://aspe.hhs.gov/basic-report/short-term-analysis-support-mental-health-and-substance-use-disorder-parity-implementation>.
43. Morton JD, Aleman P. Trends in employer-provided mental health and substance abuse benefits. *Monthly Lab Rev*. 2005; 128(4):25–35.
44. Bendat M In name only? Mental health parity or illusory reform. *Psychodynamic Psychiatry*. 2014;42(3):353–75. [PubMed: 25211430]
45. Graham J. Since 2008, insurers have been required by law to cover mental health—why many still don’t. *The Atlantic*. 3 11, 2013 <http://www.theatlantic.com/health/archive/2013/03/since-2008-insurers-have-been-required-by-law-to-cover-mental-health-why-many-still-dont/273562/>.
46. Corrigan PW, Druss BG, Perlick DA. The impact of mental illness stigma on seeking and participating in mental health care. *Psych Sci Pub Interest*. 2014;15(2):37–70.
47. Cunningham PJ. Beyond parity: primary care physicians’ perspectives on access to mental health care. *Health Aff*. 2009;28(3):w490–w501.
48. Final Rule on the Application of Mental Health Parity Requirements to Coverage Offered by Medicaid Managed Care Organizations, the Children’s Health Insurance Program (CHIP), and Alternative Benefit Plans. 81 *Federal Register* 18390 (3 30, 2016).
49. U.S. Census Bureau. Geography: Regions. July 28, 2015 <https://www.census.gov/geo/reference/webatlas/regions.html>

Figure 1.

Unadjusted Out-of-Pocket Spending per Mental Health Outpatient Visit among Self-Insured Enrollees (Exposure Group) and Small Employer Enrollees (Comparison Group) in the Propensity Matched Cohort^a

Abbreviations: MHPAEA, Mental Health Parity and Addiction Equity Act.

^aFor this main analysis, exposure and comparison groups were enrollee-level 1:1 caliper matched in the pre-baseline and baseline years (i.e., the two years before MHPAEA) on fixed demographic characteristics (i.e., age, sex, race/ethnicity, neighborhood poverty and

education, ACG comorbidity score, diagnostic qualifying month, and plan renewal month category).

A fitted regression line shows the difference between exposure and comparison groups in the baseline period and continues as a predicted regression line in the follow-up period. Separate regression lines were fitted for years 1 and 2 of the follow-up period. Regression lines were calculated using unadjusted population-level interrupted time series linear models for the outcomes of interest.

Figure 2.

Unadjusted Mental Health Outpatient Visit Rates among Self-Insured Enrollees (Exposure Group) and Small Employer Enrollees (Comparison Group) in the Propensity Matched Cohort^a

Abbreviations: MHPAEA, Mental Health Parity and Addiction Equity Act.

^aFor this main analysis, exposure and comparison groups were enrollee-level 1:1 caliper matched in the pre-baseline and baseline years (i.e., the two years before MHPAEA) on fixed demographic characteristics (i.e., age, sex, race/ethnicity, neighborhood poverty and

education, ACG comorbidity score, diagnostic qualifying month, and plan renewal month category).

A fitted regression line shows the difference between exposure and comparison groups in the baseline period and continues as a predicted regression line in the follow-up period. Separate regression lines were fitted for years 1 and 2 of the follow-up period. Regression lines were calculated using unadjusted population-level interrupted time series linear models for the outcomes of interest.

Table 1.

Unadjusted Baseline Characteristics of Study Population*

Factor	Before Propensity Score Matching			After Propensity Score Matching			Standardized Difference ^e
	Self-Insured Plans: (n=70,038)	Small Employer Plans: (n=11,226)		Self-Insured Plans: (n=11,226)	Small Employer Plans: (n=11,226)		
<i>Age (year) in index month</i>	43.8 ± 11.3	43.9 ± 11.8		44.1 ± 11.5	43.9 ± 11.8		-0.02
<i>Female</i>	60.6	56.2		57.6	56.2		0.02
<i>ACG comorbidity score in index month (population mean=1)</i>	2.5 ± 3.3	2.3 ± 3.2		2.3 ± 3.1	2.3 ± 3.2		-0.01
<i>Diagnosis qualifying month (1-12)</i>	6.3 ± 3.5	6.4 ± 3.4		6.4 ± 3.4	6.4 ± 3.4		0.04
<i>Plan renewal month (1-12)</i>	2.9 ± 3.1	6.4 ± 3.3		5.8 ± 3.5	6.4 ± 3.3		0.94
<i>Race/ethnicity^a</i>							0.03
Hispanic	10.4	7.2		7.8	7.2		
Asian	2.1	1.7		1.6	1.7		
White neighborhood	73.4	77.2		77.6	77.2		
Black neighborhood	1.2	0.9		0.8	0.9		
Mixed neighborhood	13.0	13.0		12.3	13.0		
<i>Neighborhood education^b</i>							0.01
High	64.6	65.0		65.3	65.0		
High-middle	20.4	19.9		19.8	19.9		
Low-middle	11.2	11.3		11.4	11.3		
Low	3.9	3.8		3.6	3.8		
<i>Neighborhood poverty^c</i>							0.01
Low	50.1	50.6		51.0	50.6		
Low-middle	25.1	24.1		24.0	24.1		
High-middle	17.5	17.5		17.5	17.5		
High	7.4	7.8		7.4	7.8		

Factor	Before Propensity Score Matching			After Propensity Score Matching			Standardized Difference ^e
	Self-Insured Plans: (n=70,038)	Small Employer Plans: (n=11,226)	Self-Insured Plans: (n=11,226)	Small Employer Plans: (n=11,226)	Small Employer Plans: (n=11,226)		
<i>Qualifying diagnoses</i>							
Schizophrenia & other psychoses	0.8	0.8	0.7	0.8	0.8	0.08	
Bipolar disorder	2.4	2.5	2.2	2.5	2.5		
Major depression	11.4	9.9	10.1	9.9	9.9		
Anxiety disorders	28.0	27.4	27.8	27.4	27.4		
Attention deficit/hyperactivity disorder	5.6	7.6	5.6	7.6	7.6		
Adjustment disorders	13.3	11.7	12.7	11.7	11.7		
Other mental & substance use disorders	56.8	57.1	57.5	57.1	57.1		
<i>Region of residence^d</i>							
Northeast	15.7	4.9	11.1	4.9	4.9	0.28	
Midwest	25.5	31.4	26.4	31.4	31.4		
South	46.0	51.3	45.6	51.3	51.3		
West	12.8	12.4	16.9	12.4	12.4		

Abbreviations: MHPAEA, Mental Health Parity and Addiction Equity Act.

* Data are presented as mean $\pm$ SD or %.

^a Race/ethnicity was derived from a combination of geocoded census-block group level race from the 2000 US Census and surname analysis to identify Asian and Hispanic individuals. Mixed neighborhoods are those that do not meet a 75% threshold for white, black or Hispanic.

^b Neighborhood education based on geocoded census-block group level data from the 2000 US Census. High denotes neighborhoods with <15% of the population with less than a high school education, high-middle 15%–24.9%, low-middle 25%–39.9%, and low 40%.

^c Neighborhood poverty based on geocoded census-block group level data from 2000 US Census. Low denotes neighborhoods with <5% living below poverty level, high-middle 5%–9.9%, low-middle 10%–19.9%, and high 20%.

^d Regions based on US Census Bureau regions: Northeast, Midwest, South, West.⁴⁹

^e Standardized difference = difference in means or proportions divided by standard error: a single standardized difference is calculated for binary and categorical variables; imbalance defined as absolute value greater than 0.20 (small effect size).

Out-of-Pocket Spending on Outpatient Mental Health Visits among Self-Insured Enrollees (Exposure Group) and Small Employer Enrollees (Comparison Group) in the Propensity Matched Cohort^a

Mean Change From Baseline to Follow-Up, Exposure Group vs Comparison Group									
Mean Spending (\$)					Relative, %				
Exposure Group (n=11,226)			Comparison Group (n=11,226)		Absolute Spending (\$)		Est. (95% CI)		p-value
Pre (95%CI)	Post (95%CI)		Pre (95%CI)	Post (95%CI)	Est. (95% CI)	p-value	Est. (95% CI)		p-value
OVERALL COHORT									
MHPAEA, Year 1									
OOP Spending per Visit	30.98 (30.57,31.39)	33.67 (33.21,34.13)	37.10 (36.65,37.54)	40.52 (40.05,40.99)	-0.74 (-1.40,-0.07)	0.03 *	-0.51 (-2.39,1.36)		0.59
Total OOP Spending per Enrollee	214.02 (208.73,219.30)	232.99 (227.08,238.89)	246.99 (240.45,253.54)	265.52 (258.20,272.85)	0.44 (-8.11,8.99)	0.92	1.27 (-2.30,4.84)		0.49
MHPAEA, Year 2									
OOP Spending per Visit	30.98 (30.57,31.39)	34.73 (34.25,35.22)	37.10 (36.65,37.54)	42.88 (41.90,43.85)	-2.03 (-3.17,-0.89)	<0.001 *	-3.01 (-5.80,-0.22)		0.04 *
Total OOP Spending per Enrollee	214.02 (208.73,219.30)	238.39 (232.47,244.32)	246.99 (240.45,253.54)	264.52 (257.70,271.34)	6.85 (-2.28,15.98)	0.14	4.01 (0.01,7.92)		0.05
SPENDING QUARTILE 1: LOWEST BASELINE SPENDERS ON MENTAL HEALTH OUTPATIENT VISITS									
MHPAEA, Year 1									
OOP Spending per Visit	18.69 (18.13,19.24)	30.82 (29.70,31.93)	23.38 (22.72,24.03)	36.09 (35.08,37.09)	-0.58 (-2.15,0.99)	0.47	6.82 (0.97,12.67)		0.02 *
Total OOP Spending per Enrollee	25.07 (22.92,27.22)	111.12 (102.88,119.37)	30.31 (28.17,32.46)	118.56 (110.11,127.02)	-2.20 (-12.14,7.75)	0.67	13.32 (0.00,26.53)		0.05
MHPAEA, Year 2									
OOP Spending per Visit	18.69 (18.13,19.24)	32.45 (31.28,33.62)	23.38 (22.72,24.03)	40.47 (36.18,44.76)	-3.33 (-7.94,1.27)	0.16	0.29 (-12.03,12.61)		0.96
Total OOP Spending per Enrollee	25.07 (22.92,27.22)	121.67 (112.91,130.43)	30.31 (28.17,32.46)	132.85 (123.59,142.11)	-5.94 (-17.19,5.32)	0.30	10.73 (-2.57,24.04)		0.11
SPENDING QUARTILE 2: LOW-MEDIUM BASELINE SPENDERS ON MENTAL HEALTH OUTPATIENT VISITS									

	Mean Spending (\$)				Mean Change From Baseline to Follow-Up, Exposure Group vs Comparison Group			
	Exposure Group (n=11,226)		Comparison Group (n=11,226)		Absolute Spending (\$)		Relative, %	
	Pre (95%CI)	Post (95%CI)	Pre (95%CI)	Post (95%CI)	Est. (95%CI)	p-value	Est. (95%CI)	p-value
MHPAEA, Year 1								
OOP Spending per Visit	26.35 (25.79,26.90)	31.41 (30.58,32.24)	30.96 (30.36,31.57)	36.26 (35.40,37.11)	-0.23 (-1.37,0.91)	0.69	1.81 (-1.80,5.42)	0.33
Total OOP Spending per Enrollee	85.45 (83.98,86.91)	140.16 (134.29,146.03)	95.42 (93.91,96.92)	162.53 (155.21,169.85)	-12.40 (-21.80,-3.09)	0.009 *	-3.70 (-9.73,2.33)	0.23
MHPAEA, Year 2								
OOP Spending per Visit	26.35 (25.79,26.90)	33.29 (32.39,34.18)	30.96 (30.36,31.57)	39.18 (38.20,40.16)	-1.27 (-2.60,-0.05)	0.06	-0.14 (-4.01,3.72)	0.94
Total OOP Spending per Enrollee	85.45 (83.98,86.91)	159.11 (152.04,166.18)	95.42 (93.91,96.92)	174.90 (167.07,182.73)	-5.82 (-16.31,4.68)	0.28	1.59 (-4.96,8.13)	0.63
SPENDING QUARTILE 3: MEDIUM-HIGH BASELINE SPENDERS ON MENTAL HEALTH OUTPATIENT VISITS								
MHPAEA, Year 1								
OOP Spending per Visit	32.25 (31.55,32.95)	34.02 (33.20,34.83)	38.54 (37.75,39.34)	40.91 (40.05,41.76)	-0.60 (-1.78,0.59)	0.33	-0.61 (-3.87,2.64)	0.71
Total OOP Spending per Enrollee	186.81 (184.26,189.37)	212.33 (204.95,219.72)	200.77 (198.15,203.39)	233.01 (223.62,242.40)	-6.72 (-18.70,5.26)	0.27	-2.07 (-7.35,3.22)	0.44
MHPAEA, Year 2								
OOP Spending per Visit	32.25 (31.55,32.95)	34.86 (33.98,35.73)	38.54 (37.75,39.34)	42.53 (41.60,43.47)	-1.38 (-2.68,-0.09)	0.04 *	-2.06 (-5.49,1.38)	0.24
Total OOP Spending per Enrollee	186.81 (184.26,189.37)	224.02 (215.83,232.22)	200.77 (198.15,203.39)	239.80 (230.25,249.34)	-1.82 (-14.42,10.79)	0.78	-0.40 (-5.10,5.90)	0.89
SPENDING QUARTILE 4: HIGHEST BASELINE SPENDERS ON MENTAL HEALTH OUTPATIENT VISITS								
MHPAEA, Year 1								
OOP Spending per Visit	42.15 (41.20,43.09)	38.73 (37.80,39.67)	50.01 (49.11,50.92)	47.72 (46.75,48.69)	-1.12 (-2.49,0.25)	0.11	-3.67 (-6.68,-0.67)	0.02 *
Total OOP Spending per Enrollee	558.96 (545.24,572.68)	434.38 (418.04,450.72)	642.52 (624.12,660.91)	489.42 (468.89,509.94)	28.52 (3.90,53.14)	0.02 *	2.02 (-3.04,7.08)	0.43

	Mean Spending (\$)				Mean Change From Baseline to Follow-Up, Exposure Group vs Comparison Group			
	Exposure Group (n=11,226)		Comparison Group (n=11,226)		Absolute Spending (\$)		Relative, %	
	Pre (95%CI)	Post (95%CI)	Pre (95%CI)	Post (95%CI)	Est. (95%CI)	p-value	Est. (95%CI)	p-value
MHPAEA, Year 2								
OOP Spending per Visit	42.15 (41.20,43.09)	38.82 (37.83,39.81)	50.01 (49.11,50.92)	48.96 (47.89,50.02)	-2.28 (-3.76,-0.79)	0.003 *	-5.91 (-9.07,-2.75)	<0.001 *
Total OOP Spending per Enrollee	558.96 (545.24,572.68)	401.69 (386.28,417.10)	642.52 (624.12,660.91)	446.45 (428.31,464.59)	34.80 (13.35,64.24)	0.003 *	3.42 (-2.09,8.94)	0.22

Abbreviations: MHPAEA, Mental Health Parity and Addiction Equity Act; OOP, out-of-pocket.

* p<0.05

^a All rates and changes estimated using the Stata margins and/or nlcom commands and adjusted for age, gender, race/ethnicity, education level, poverty level, ACG score, state of residence, and plan renewal month.

Table 3.

Health Care Utilization among Self-Insured Enrollees (Exposure Group) and Small Employer Enrollees (Comparison Group) in the Propensity Matched Cohort^a

	Mean Visits per Enrollee				Mean Change From Baseline to Follow-Up, Exposure Group vs Comparison Group			
	Exposure Group (n=11,226)		Comparison Group (n=11,226)		Absolute, per Enrollee		Relative, %	
	Pre (95%CI)	Post (95%CI)	Pre (95%CI)	Post (95%CI)	Est. (95%CI)	p-value	Est. (95%CI)	p-value
OVERALL COHORT								
MHPAEA, Year 1								
Outpatient Mental Health	7.31 (7.17,7.46)	7.56 (7.40,7.73)	6.71 (6.57,6.86)	6.65 (6.50,6.80)	0.31 (0.12,0.51)	0.002*	4.40 (1.55,7.25)	0.002*
Emergency Department	0.29 (0.27,0.30)	0.32 (0.30,0.34)	0.27 (0.25,0.29)	0.30 (0.28,0.32)	0.00 (-0.02,0.03)	0.75	0.85 (-8.42,10.12)	0.86
Inpatient	0.08 (0.07,0.09)	0.09 (0.09,0.10)	0.08 (0.07,0.08)	0.08 (0.08,0.09)	0.01 (-0.01,0.02)	0.40	5.11 (-9.87,20.09)	0.50
MHPAEA, Year 2								
Outpatient Mental Health	7.31 (7.17,7.46)	7.71 (7.54,7.88)	6.71 (6.57,6.86)	6.52 (6.37,6.67)	0.59 (0.37,0.81)	<0.001*	8.58 (5.26,11.90)	<0.001*
Emergency Department	0.29 (0.27,0.30)	0.33 (0.31,0.35)	0.27 (0.25,0.29)	0.30 (0.28,0.32)	0.01 (-0.02,0.04)	0.39	3.22 (-6.33,12.77)	0.51
Inpatient	0.08 (0.07,0.09)	0.10 (0.09,0.10)	0.08 (0.07,0.08)	0.09 (0.08,0.10)	0.00 (-0.01,0.02)	0.63	2.39 (-12.59,17.37)	0.76
USE QUARTILE 1: LOWEST BASELINE MENTAL HEALTH OUTPATIENT VISITS USERS								
MHPAEA, Year 1								
Outpatient Mental Health	1.28 (1.22,1.33)	3.20 (3.05,3.35)	0.83 (0.77,0.89)	2.66 (2.49,2.84)	0.08 (-0.12,0.29)	0.43	-22.34 (-29.57,-15.11)	<0.001*
MHPAEA, Year 2								
Outpatient Mental Health	1.28 (1.22,1.33)	3.52 (3.33,3.71)	0.83 (0.77,0.89)	2.90 (2.69,3.10)	0.18 (-0.08,0.44)	0.19	-21.34 (-29.39,-13.29)	<0.001*
USE QUARTILE 2: LOW-MEDIUM BASELINE MENTAL HEALTH OUTPATIENT VISITS USERS								
MHPAEA, Year 1								
Outpatient Mental Health	3.56 (3.50,3.62)	4.79 (4.58,5.00)	3.04 (3.00,3.09)	4.11 (3.98,4.24)	0.16 (-0.09,0.40)	0.22	-0.61 (-6.06,4.83)	0.83

	Mean Visits per Enrollee				Mean Change From Baseline to Follow-Up, Exposure Group vs Comparison Group			
	Exposure Group (n=11,226)		Comparison Group (n=11,226)		Absolute, per Enrollee		Relative, %	
	Pre (95%CI)	Post (95%CI)	Pre (95%CI)	Post (95%CI)	Est. (95%CI)	p-value	Est. (95%CI)	p-value
MHPAEA, Year 2								
Outpatient Mental Health	3.56 (3.50,3.62)	5.12 (4.89,5.35)	3.04 (3.00,3.09)	4.25 (4.10,4.40)	0.35 (0.08,0.62)	0.01	2.88 (-2.99,8.74)	0.34
USE QUARTILE 3: MEDIUM-HIGH BASELINE MENTAL HEALTH OUTPATIENT VISITS USERS								
MHPAEA, Year 1								
Outpatient Mental Health	6.71 (6.64,6.78)	6.83 (6.62,7.04)	6.38 (6.31,6.46)	6.08 (5.89,6.27)	0.42 (0.14,0.71)	0.004 *	6.82 (2.11,11.54)	0.005 *
MHPAEA, Year 2								
Outpatient Mental Health	6.71 (6.64,6.78)	7.29 (7.05,7.53)	6.38 (6.31,6.46)	6.14 (5.93,6.34)	0.83 (0.51,1.14)	<0.001 *	13.02 (7.71,18.32)	<0.001 *
USE QUARTILE 4: HIGHEST BASELINE MENTAL HEALTH OUTPATIENT VISITS USERS								
MHPAEA, Year 1								
Outpatient Mental Health	17.89 (17.54,18.24)	14.34 (13.90,14.79)	16.40 (15.96,16.83)	12.31 (11.87,12.75)	0.54 (-0.03,1.11)	0.06	6.78 (2.51,11.06)	0.002 *
MHPAEA, Year 2								
Outpatient Mental Health	17.89 (17.54,18.24)	13.44 (13.00,13.88)	16.40 (15.96,16.83)	11.20 (10.79,11.60)	0.76 (0.14,1.38)	0.02 *	10.07 (5.04,15.10)	<0.001 *

Abbreviations: MHPAEA, Mental Health Parity and Addiction Equity Act; Est., Estimate.

* p<0.05

^a All rates and changes estimated using the Stata margins and/or nlcom commands and adjusted for age, gender, race/ethnicity, education level, poverty level, ACG score, state of residence, and plan renewal month.