



ASPE
ASSISTANT SECRETARY FOR
PLANNING AND EVALUATION

**OFFICE OF BEHAVIORAL HEALTH,
DISABILITY, AND AGING POLICY**

Impact of the Medicare Improvements for Patients and Providers Act on Mental Health Service Utilization and Spending among Older Adults: Final Report

Prepared for
the Office of the Assistant Secretary for Planning and Evaluation (ASPE)
at the U.S. Department of Health & Human Services

by
RTI International

January 2025

Office of the Assistant Secretary for Planning and Evaluation

The Assistant Secretary for Planning and Evaluation (ASPE) advises the Secretary of the U.S. Department of Health and Human Services (HHS) on policy development in health, disability, human services, data, and science; and provides advice and analysis on economic policy. ASPE leads special initiatives; coordinates the Department's evaluation, research, and demonstration activities; and manages cross-Department planning activities such as strategic planning, legislative planning, and review of regulations. Integral to this role, ASPE conducts research and evaluation studies; develops policy analyses; and estimates the cost and benefits of policy alternatives under consideration by the Department or Congress.

Office of Behavioral Health, Disability, and Aging Policy

The Office of Behavioral Health, Disability, and Aging Policy (BHDAP) focuses on policies and programs that support the independence, productivity, health and well-being, and long-term care needs of people with disabilities, older adults, and people with mental and substance use disorders. Visit BHDAP at <https://aspe.hhs.gov/about/offices/bhdap> for all their research activity.

NOTE: BHDAP was previously known as the Office of Disability, Aging, and Long-Term Care Policy (DALTCP). Only our office name has changed, not our mission, portfolio, or policy focus.

This research was funded by the U.S. Department of Health and Human Services Office of the Assistant Secretary for Planning and Evaluation under contract and carried out by Research Triangle Institute. Please visit <https://aspe.hhs.gov/topics/aging-disability> for more information about ASPE research on aging and disability, or <https://aspe.hhs.gov/topics/behavioral-health> for more information on behavioral health.

IMPACT OF THE MEDICARE IMPROVEMENTS FOR PATIENTS AND PROVIDERS ACT ON MENTAL HEALTH SERVICE UTILIZATION AND SPENDING AMONG OLDER ADULTS: FINAL REPORT

Authors

Matt Toth, MSW PhD
Brent Gibbons, PhD
Abbie Levinson, MA
Molly Frommer, BA
Vince Keyes, MA
RTI International

January 15, 2025

Prepared for

Office of Behavioral Health, Disability, and Aging Policy
Office of the Assistant Secretary for Planning and Evaluation
U.S. Department of Health and Human Services

The opinions and views expressed in this report are those of the authors. They do not reflect the views of the Department of Health and Human Services, the contractor or any other funding organization. This report was completed and submitted on September 2022.

TABLE OF CONTENTS

ACRONYMS	v
EXECUTIVE SUMMARY	1
1. BACKGROUND	3
2. DATA AND METHODS	5
2.1. Study Design.....	5
2.2. Data Source.....	5
2.3. Study Sample.....	6
3. RESULTS	11
3.1. What are the trends in mental health service utilization before, during, and after the implementation of MIPPA?	11
3.2. Are there differences in trends based on beneficiary characteristics such as age, race, dual eligibility, co-occurring SUD, rurality, or comorbidity status?.....	13
3.3. Has there been a change in mental health services among Medicare beneficiaries with a MH diagnosis or MH-related service use after the implementation of MIPPA: ITS Analysis?	14
4. CONCLUSION	19
END NOTES	22
APPENDICES	
APPENDIX A. Measure and Subgroup Definitions	A-1
APPENDIX B. Unadjusted Monthly Trend Graphs	A-3
APPENDIX C. Descriptive Tables and Supplemental Results	A-20

LIST OF EXHIBITS

EXHIBIT 1.	Frequency and Percent of Medicare Beneficiaries Identified as having a MH Diagnosis or MH-Related Service Use through Diagnoses, Procedures, or Prescription Fills, 2008-2017	7
EXHIBIT 2.	Monthly Percentage of Medicare Beneficiaries with a MH Diagnosis or MH-Related Service Use Who had Any MH Outpatient Visits, 2008-2017	11
EXHIBIT 3.	Monthly Average Rate of MH Outpatient Visits per 1,000 Medicare Beneficiaries with a MH Diagnosis or MH-Related Service Use, 2008-2017	12
EXHIBIT 4.	Monthly Average MH Part B OOP Payments per User of MH Part B Outpatient Services among Medicare Beneficiaries with a MH Diagnosis or MH-Related Service Use, 2008-2017	13
EXHIBIT 5.	Key Takeaways from ITS Analysis	14
EXHIBIT 6.	Overall Impact of MIPPA on MH OOP Payments, Utilization, and Spending, 2008-2017	15
EXHIBIT 7.	Difference in Phase-Specific Trend on MH OOP Payments, Utilization, and Spending Relative to Pre-MIPPA, 2008-2017	16
EXHIBIT 8.	Change in Trend During Phase 4 Relative to the Baseline Period, by Dual Eligible Status, 2014-2017	17
EXHIBIT A-1.	Definition of MH-Specific Service Utilization and Spending Measures	A-1
EXHIBIT A-2.	Subgroup Definitions	A-2
EXHIBIT B-1.	Monthly Percent of Medicare Beneficiaries with Any MH Prescription Drug Fill, 2008-2017	A-3
EXHIBIT B-2.	Monthly Percent of Medicare Beneficiaries with Any MH Hospitalization, 2008-2017	A-4
EXHIBIT B-3.	Monthly Percent of Medicare Beneficiaries with Any MH ED Visit, 2008-2017	A-4
EXHIBIT B-4.	Monthly Average MH Inpatient Spending among Medicare Beneficiaries with a MH Diagnosis or MH-Related Service Use, 2008-2017	A-5
EXHIBIT B-5.	Monthly Average Total MH FFS Spending among Medicare Beneficiaries with a MH Diagnosis or MH-Related Service Use, 2008-2017	A-5

EXHIBIT B-6.	Monthly Average Part B OOP Payments for Non-MH Services among Medicare Beneficiaries with a MH Diagnosis or MH-Related Service Use, 2008-2017.....	A-6
EXHIBIT B-7.	Monthly Rate of Non-MH E&M Visits among Medicare Beneficiaries with a MH Diagnosis or MH-Related Service Use, 2008-2017	A-6
EXHIBIT B-8.	Monthly MH Part B OOP Payments per User of MH Part B Outpatient Services among Medicare Beneficiaries with a MH Diagnosis or MH-Related Service Use, by Age Group, 2008-2017.....	A-7
EXHIBIT B-9.	Monthly Percent of Medicare Beneficiaries with a MH Diagnosis or MH-Related Service Use Who had Any MH Outpatient Visit, by Age Group, 2008-2017.....	A-7
EXHIBIT B-10.	Monthly Rate MH Outpatient Visits per 1,000 Medicare Beneficiaries with a MH Diagnosis or MH-Related Service Use, by Age Group, 2008-2017	A-8
EXHIBIT B-11.	Monthly MH Part B OOP Payments per User of MH Part B Outpatient Services among Medicare Beneficiaries with a MH Diagnosis or MH-Related Service Use, by Race, 2008-2017.....	A-9
EXHIBIT B-12.	Monthly Percent of Medicare Beneficiaries with a MH Diagnosis or MH-Related Service Use Who had Any MH Outpatient Visit, by Race, 2008-2017	A-10
EXHIBIT B-13.	Monthly Rate MH Outpatient Visits per 1,000 Medicare Beneficiaries with a MH Diagnosis or MH-Related Service Use, by Race, 2008-2017	A-11
EXHIBIT B-14.	Monthly MH Part B OOP Payments per User of MH Part B Outpatient Services among Medicare Beneficiaries with a MH Diagnosis or MH-Related Service Use, by Dual Eligibility Status, 2008-2017	A-12
EXHIBIT B-15.	Monthly Percent of Medicare Beneficiaries with a MH Diagnosis or MH-Related Service Use Who had Any MH Outpatient Visit, by Dual Eligibility Status, 2008-2017	A-12
EXHIBIT B-16.	Monthly Rate MH Outpatient Visits per 1,000 Medicare Beneficiaries with a MH Diagnosis or MH-Related Service Use, by Dual Eligibility Status, 2008-2017	A-13
EXHIBIT B-17.	Monthly MH Part B OOP Payments per User of MH Part B Outpatient Services among Medicare Beneficiaries with a MH Diagnosis or MH-Related Service Use, by SUD, 2008-2017.....	A-13
EXHIBIT B-18.	Monthly Percent of Medicare Beneficiaries with a MH Diagnosis or MH-Related Service Use Who had Any MH Outpatient Visit, by SUD, 2008-2017.....	A-14

EXHIBIT B-19.	Monthly Rate MH Outpatient Visits per 1,000 Medicare Beneficiaries with a MH Diagnosis or MH-Related Service Use, by SUD, 2008-2017	A-14
EXHIBIT B-20.	Monthly MH Part B OOP Payments per User of MH Part B Outpatient Services among Medicare Beneficiaries with a MH Diagnosis or MH-Related Service Use, by Rural Status, 2008-2017	A-15
EXHIBIT B-21.	Monthly Percent of Medicare Beneficiaries with a MH Diagnosis or MH-Related Service Use Who had Any MH Outpatient Visit, by Rural Status, 2008-2017	A-16
EXHIBIT B-22.	Monthly Rate MH Outpatient Visits per 1,000 Medicare Beneficiaries with a MH Diagnosis or MH-Related Service Use, by Rural Status, 2008-2017	A-17
EXHIBIT B-23.	Monthly Average MH Part B OOP Payments per User among Medicare Beneficiaries with a MH Diagnosis or MH-Related Service Use, by Charlson Comorbidity Categories, 2008-2017	A-18
EXHIBIT B-24.	Monthly Percent of Medicare Beneficiaries with a MH Diagnosis or MH-Related Service Use Who had Any MH Outpatient Visit, by Charlson Comorbidity Category, 2008-2017	A-18
EXHIBIT B-25.	Monthly Rate MH Outpatient Visits per 1,000 Medicare Beneficiaries with a MH Diagnosis or MH-Related Service Use, by Charlson Comorbidity Categories, 2008-2017	A-19
EXHIBIT C-1.	Demographic Characteristics of Medicare Beneficiaries with a MH Diagnosis or MH-Related Service Use during Pre-MIPPA Years, 2008-2009	A-20
EXHIBIT C-2.	Demographic Characteristics of Medicare Beneficiaries with a MH Diagnosis or MH-Related Service Use during MIPPA Implementation Phase 1-Phase 3, 2010-2013	A-21
EXHIBIT C-3.	Demographic Characteristics of Medicare Beneficiaries with a MH Diagnosis or MH-Related Service Use during MIPPA Implementation Phase 4 and Later Years, 2014-2017	A-22
EXHIBIT C-4.	Phase-Specific Impact of MIPPA on MH OOP Payments, Utilization, and Spending, 2008-2017	A-23
EXHIBIT C-5.	Difference in Overall and Phase-Specific Trend on MH OOP Spending per Visit, Relative to the Pre-MIPPA Trend, 2008-2017	A-24
EXHIBIT C-6.	Difference in Phase-Specific Trend on MH OOP Payments, Utilization, and Spending Relative to Pre-MIPPA, Non-Full Dual Eligible Beneficiaries, 2008-2017	A-25

ACRONYMS

The following acronyms are mentioned in this report and/or appendices.

ADHD	Attention-Deficit/Hyperactivity Disorder
BH	Behavioral Health
CCW	Chronic Conditions Warehouse
DME	Durable Medical Equipment
E&M	Evaluation and Management
ED	Emergency Department
FFS	Fee-For-Service
HCPCS	Healthcare Common Procedure Coding System
ICD	International Classification of Diseases
ITS	Interrupted Time Series
MBSF	Master Beneficiary Summary File
MH	Mental Health
MIPPA	Medicare Improvements for Patients and Providers Act
NDC	National Drug Code
OOP	Out-Of-Pocket
RUCA	Rural Urban Commuting Area
SMI	Serious Mental Illness
SUD	Substance Use Disorder

EXECUTIVE SUMMARY

Mental health conditions are common among older adult Medicare beneficiaries (those aged 65 and older). In 2019, 34.3 percent of older adult Medicare fee-for-service (FFS) beneficiaries had a diagnosis of a mental health condition or used mental health services.¹ Among adults with a serious mental illness, older adults have a higher risk for untreated illness or later treatment than their younger counterparts.² Lack of access to behavioral health services may contribute to poorer self-management of other chronic diseases leading more emergency service use and hospitalizations.³ Access to mental health services for this population is a major concern for patients, providers, and policy makers.^{1,2,4,5} Researchers report that limited knowledge of MH conditions, workforce issues, fragmented care delivery, and out-of-pocket (OOP) costs can act as barriers to accessing MH care for older adults; real and perceived stigma on behalf of the individual or others can also play a role.³ Among adults with a serious mental illness (SMI), older adults have a lower rate of accessing MH care compared to younger adults.² In 2008, Congress passed the Medicare Improvements for Patients and Providers Act (MIPPA), in part to help improve access to outpatient mental health services. The legislation reduced Part B coinsurance rates for mental health outpatient services to be the same as the coinsurance rates for physical health rates. MIPPA gradually reduced cost-sharing rates over a 5-year period, in four phases, from 50 percent to 20 percent: Phase 1: 50 percent to 45 percent (2010-2011); Phase 2: 45 percent to 40 percent (2012); Phase 3: 40 percent to 35 percent (2013); and Phase 4: 35 percent to 20 percent in 2014 and beyond.

Recent work examining the impact of MIPPA on cost-sharing and utilization outcomes for Medicare beneficiaries with mental health conditions has produced mixed results.^{6,7} These studies focused on beneficiaries under 65, or the analyses were survey-based; no study has examined the impact of MIPPA specifically for the older adult population using Medicare claims data. In this study, we used a quasi-experimental regression analysis to estimate the associated impact of MIPPA on utilization and spending outcomes for older adult Medicare FFS beneficiaries who with a MH diagnosis or MH-related service use. Our key findings include the following:

- We found mixed evidence on the association of MIPPA on mental health utilizations. The final phased reduction of coinsurance (Phase 4) was associated with a small (0.02 percentage point) increase in the monthly trend of beneficiaries with any mental health outpatient visits, relative to the pre-MIPPA period. Over 4 years (2014-2017), this amounts to almost a percentage point increase in the proportion of beneficiaries with any mental health outpatient visit.
- There was no evidence that mental health outpatient utilization increased during earlier years (2010-2013) of MIPPA coinsurance reductions, relative to the pre-MIPPA period.

- Between 2014 and 2017, we did not find that MIPPA was associated with a monthly decrease in mental health out-of-pocket (OOP) trends relative to the pre-MIPPA period. However, we did find a small monthly decrease of \$0.27 in the trend of mental health OOP payments between 2010 and 2011, totaling \$6.55 over these 2 years, relative to the pre-MIPPA period.

SECTION 1. BACKGROUND

Mental health conditions are common among older adult Medicare beneficiaries. In 2019, 34.3 percent of Medicare fee-for-service (FFS) beneficiaries aged 65 and older had a diagnosis of a mental health condition or used mental health services.¹ Access to mental health services for this population is a major concern for patients, providers, and policy makers.^{4,5} Researchers report that limited knowledge of mental health conditions, workforce issues, fragmented care delivery, and out-of-pocket (OOP) costs can act as barriers to accessing mental health care for older adults; real and perceived stigma on behalf of the individual or others can also play a role.⁸ Among adults with a serious mental illness (SMI), older adults have a lower rate of accessing mental health care compared to younger adults;² only 37.7 percent of older adults with a SMI received mental health services in a year.³ Furthermore, these challenges to accessing mental health care may contribute to poorer self-management of chronic diseases and adverse health events. This can contribute to increased utilization emergency services and hospitalizations, leading to greater Medicare spending and potentially OOP payments.^{3,9,10} Medicare FFS beneficiaries of any age diagnosed with either a SMI or other common mental health condition incurred higher mean annual Medicare spending (increase of \$4,768 for SMI; increase of \$2,370 for other common mental health conditions) than those with no mental health condition.¹¹

Some efforts to increase access to mental health services among Medicare beneficiaries include the expansion of telehealth services,¹² integration of behavioral health (BH) services under shared savings models,¹³ and efforts to improve the training and availability of the behavioral health workforce.¹⁴ The difference between OOP payments for mental health services and medical services is thought to be a barrier to accessing behavioral health services,^{8,15} and reducing the coinsurance rates to equal to medical coinsurance rates may help improve access to behavioral health services.

In 2008, Congress passed the Medicare Improvements for Patients and Providers Act (MIPPA), in part to help improve access to mental health outpatient services. The legislation reduced Part B coinsurance requirements for mental health outpatient services to be the same as coinsurance rates for medical services. Prior to 2010, Medicare set limitations on coverage for mental health outpatient treatment, with a coinsurance rate of 50 percent for mental health visits compared to a 20 percent rate for most other medical services. MIPPA gradually reduced cost-sharing requirements over a 5-year period to 20 percent from 2014 onward. These periods are distinguished by coinsurance reductions from 50 percent to 45 percent (2010-2011), 45 percent to 40 percent (2012), 40 percent to 35 percent (2013), and 35 percent to 20 percent in 2014 and going forward. As high cost-sharing reduces access to mental health service utilization,^{16,17} the passing of MIPPA was expected to facilitate increased access to treatment for Medicare beneficiaries with mental health conditions.

Recent work examining the impact of MIPPA on cost-sharing and utilization outcomes for Medicare beneficiaries with mental health conditions has produced mixed results. One study

found that the MIPPA coinsurance reductions increased the use of psychotropic medications among Medicare beneficiaries relative to adults in commercial plans, though it did not find evidence of increased mental health outpatient visits.⁷ Fung et al. (2020) found that among Medicare beneficiaries under 65, MIPPA was associated with a reduction in OOP payments for mental health services, but no increase in the use of mental health outpatient services relative to a comparison group.⁶ Neither of these studies examined the impact of MIPPA specifically for the older adult population.

MIPPA-related coinsurance reductions for mental health outpatient services should theoretically increase access to such services among Medicare beneficiaries. Further, having better access to mental health outpatient services may have indirect consequences for higher intensity mental health services use, such as reductions in emergency department (ED) visits and hospitalizations. However, there is limited information on how or whether the MIPPA coinsurance reductions improved access to mental health care among older Medicare beneficiaries. The Office of the Assistant Secretary for Planning and Evaluation in the U.S. Department of Health and Human Services contracted with RTI to better understand the impact of mental health outpatient service coinsurance reductions made following enactment of MIPPA on utilization and spending outcomes for Medicare beneficiaries 65 years and older.

In this study, we used a quasi-experimental approach to estimate the impact of MIPPA on utilization and spending outcomes for older adult Medicare FFS beneficiaries with a MH diagnosis or MH-related service use. We identified beneficiaries for inclusion in the analyses if they had at least one claim in the previous 12 months with a MH diagnosis code or a MH-related prescription drug or procedure code. We addressed the following research questions:

- What are the trends in mental health utilization and costs for older Medicare beneficiaries with a MH diagnosis or MH-related service use before, during, and after the implementation of coinsurance rate reduction through MIPPA (2008-2017)?
- Are there differences in trends based on beneficiary characteristics such as age, race, dual eligibility, co-occurring substance use disorder (SUD), rurality, or comorbidity status?
- Has there been a change in the types of mental health services used by individuals with a MH diagnosis or MH-related service use following the passage of MIPPA?

SECTION 2. DATA AND METHODS

2.1. Study Design

We conducted a quasi-experimental observational study using an interrupted time series (ITS) analysis of Medicare FFS beneficiaries with a MH diagnosis or MH-related service use from 2008 to 2017. An ITS design is appropriate to evaluate the impact of a population-level health policy intervention, such as coinsurance reductions for outpatient mental health services, is robust to selection bias, and has strong external validity.¹⁸ The main limitations of an ITS design include autocorrelation and time-varying external effects, such as other payment policy changes.¹⁹ Other work has employed this design to evaluate parity impacts on utilization and spending.²⁰ The years 2008 through 2009 were used as a pre-implementation period. The post-implementation period was separated into multiple periods of phased-in reductions in coinsurance and examined relative to the pre-implementation group for differences in outcomes (further described in *Section 2.3*). These post-implementation periods were distinguished by coinsurance reductions from 50 percent to 45 percent (2010-2011), 45 percent to 40 percent (2012), 40 percent to 35 percent (2013), and 35 percent to 20 percent in 2014 and going forward.

2.2. Data Source

We used 100 percent of Medicare FFS claims and administrative data from 2008 to 2017 to estimate the impact of MIPPA on mental health OOP payments, outpatient visits, emergency department use, hospitalizations, and FFS spending. We accessed this data through the Chronic Conditions Warehouse's (CCW's) Virtual Research Data Center. Specifically, we used the following files:

Medicare Master Beneficiary Summary Files (MBSF). Eligibility information was captured through the Medicare MBSF. The MBSF contains the enrollment and eligibility information of all Medicare beneficiaries ever enrolled in Medicare during the calendar year. It contains Part A and B enrollment, Medicare Advantage enrollment, whether the beneficiary is alive, reason for entitlement, and other demographic and eligibility information that were used in this analysis. The Chronic Conditions segment and the Other Chronic and Potentially Disabling Conditions segment was used in one strategy to identify individuals with a behavioral health condition; it was also used to identify other comorbid disorders.

Medicare Claims. Medicare institutional and non-institutional claims were used to create the outcomes of interest. Institutional claims include inpatient, outpatient, and skilled nursing facility claims files. Non-institutional claims include carrier, home health, and durable medical equipment (DME) claims.

Medicare Part D Event and Summary File. This file was used to create outcomes related to prescription fills. The Part D event file contains the National Drug Code (NDC), days of supply, subsidy amount, and prescription fill date.

Rural-Urban Commuting Area Codes. These codes are 2010 census-based identifiers for population density, urbanization, and daily commuting. They were used to classify Medicare beneficiaries into rural categories of residence.

2.3. Study Sample

The overall sample includes Medicare beneficiaries who met the following eligibility criteria: (1) 65 years and older; (2) enrolled in both Medicare Part A and Part B; (3) alive during the calendar year; (4) not enrolled in Medicare Advantage plan; and (5) residing in one of 50 states or Washington, D.C. We required the beneficiary to meet these eligibility criteria for all 12 months to ensure comparability over time. However, we did not require that beneficiaries have 12 months of enrollment in Medicare Part D unless indicated otherwise. Beneficiaries dually eligible for Medicaid and Medicare, while not expected to be affected by coinsurance reductions, were included to fully capture utilization trends pre-MIPPA and post-MIPPA among Medicare beneficiaries with a MH diagnosis or MH-related service use.

Identifying MH Diagnoses And MH-Related Service Use. Among the Medicare FFS population who are 65 and older, we identified beneficiaries with any MH diagnosis or MH-related service use during the calendar year. The primary identification approach included anyone with at least one claim in either the inpatient or outpatient files in the previous 12 months with any ICD-9 (pre-October 2015) or ICD-10 code indicating the following conditions OR at least one prescription drug claim for select psychotherapeutics in the previous year OR at least one procedure code for any selected outpatient psycho-social service use:

- Anxiety disorder.
- Bipolar disorder.
- Depressive disorders.
- Attention-Deficit/Hyperactivity Disorder (ADHD).
- Eating disorder.
- Personality disorders.
- Post-traumatic stress disorder.
- Schizophrenia and related psychotic disorders.

The diagnosis codes used were derived from the CCW condition algorithms.²¹ The psychotherapeutic class of drugs included benzodiazepines, anxiolytics, sedatives, and hypnotics; antipsychotics and antimanics; antidepressants; analeptics (ADHD medications); and some anticonvulsants. These psychotherapeutic drug classes are listed in Substance Abuse and Mental Health Services Administration's 2019 report.²² Procedure codes for specialty outpatient mental health service use included any social work or psychiatric services with the exception of psychiatric diagnostic evaluation codes, mental health assessment and screening codes, family therapy codes, and unlisted psychiatric procedures, due to concerns of misspecification (see *Appendix A-2* and *Appendix A-3* for more detail).

This three-pronged approach for identifying beneficiaries to include in analyses is more inclusive than other potential methods, but it is still consistent with approaches utilized in previous studies.^{22,23} Using drug claims means that the study population also likely includes a significant number of adults without MH conditions, because a number of psychotropic medications have other indications and medical uses (e.g. SSRIs and SNRIs can be used to treat chronic pain, diazepam for muscle spasms, other benzodiazepines for periprocedural anxiety, etc.). We chose to include these individuals for two main reasons. First, a number of individuals who do have mental health conditions may receive mental health-related treatment without necessarily having a diagnosis on their claim; therefore, relying on diagnosis alone omits certain beneficiaries who should be included.²⁴ Secondly, existing research shows that a high majority of the medications included in this analysis are primarily used to treat relevant mental health conditions. We acknowledge that by choosing to use broader inclusion criteria through use of prescriptions and services, we will capture some individuals who use these medications for non-mental health indications. Therefore, the study population should not be interpreted as being strictly limited to beneficiaries with mental health conditions. *Exhibit 1* illustrates the percent of beneficiaries with any mental health diagnoses, procedures, or prescription drug use among our sample of the Medicare FFS population during the study period. As can be seen in the exhibit, the vast majority of beneficiaries were identified through diagnosis and prescription drug use. *Appendix C, Exhibit C-1* displays the number and characteristics of beneficiaries with a MH diagnosis or MH-related service use during each year of the study period.

Exhibit 1. Frequency and Percent of Medicare Beneficiaries Identified as having a MH Diagnosis or MH-Related Service Use through Diagnoses, Procedures, or Prescription Fills, 2008-2017										
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total number (in millions)	5.5	5.7	5.9	6.2	6.5	7.5	7.7	8.0	8.3	8.5
Diagnosis										
%	80.2%	80.8%	81.8%	86.8%	87.0%	79.0%	80.3%	81.7%	82.6%	84.8%
Procedure										
%	16.4%	16.2%	15.9%	15.5%	15.1%	9.4%	9.3%	9.2%	9.5%	9.6%
Prescription Drug*										
%	58.1%	57.8%	57.5%	56.8%	57.8%	69.6%**	70.0%	70.4%	71.2%	70.6%
Note: Diagnosis, procedure, and prescription drug categories are not mutually exclusive.										
* Percent of Medicare beneficiaries identified based on prescription drug fills was calculated using the full Medicare FFS population, not the Part D only population.										
**Medicare Part D began covering benzodiazepines in 2013, which is the likely driver of this increase.										

Primary Outcome Variables. The main outcomes of interest included monthly mental health OOP payments per service user, monthly percentage of mental health outpatient service use among beneficiaries with a MH diagnosis or MH-related service use, and the rate of mental health outpatient service use per the sample population. We required the principal diagnosis of a

mental health condition on the Medicare claim for a service to be included in the outcome calculation. Specifically, we defined our monthly population-level outcomes the following way:

- *Any mental health outpatient visit.* We calculated the total monthly number of beneficiaries with any mental health outpatient visit by identifying the principal diagnosis code for any visit to an outpatient facility or provider using the carrier and outpatient files. We excluded visits to the emergency department. We divided the number of beneficiaries with any mental health outpatient visit by the total number of Medicare beneficiaries with a MH diagnosis or MH-related service use we identified during that year.
- *Rate of mental health outpatient visits.* We calculated the total monthly number of mental health outpatient visits using any claim from the outpatient or carrier file with a principal diagnosis of a mental health condition. We excluded visits to the emergency department. We divided that sum of visits by the total number of beneficiaries with a MH diagnosis or MH-related service use and multiplied by 1,000.
- *Part B OOP payments.* We calculated the monthly average OOP payments per user of mental health outpatient services. We summed the beneficiary coinsurance and deductible amounts from the outpatient and carrier files.²⁵

Secondary Outcome Variables. Reductions in OOP costs may increase the use of mental health outpatient visits, forestalling emergency department visits and hospitalizations, while also increasing access to mental health prescription drugs. To test these hypotheses, we constructed the following secondary outcome variables:

- *Any Part D Prescription drug fills.* We calculated the monthly percent of Medicare beneficiaries with a mental health condition who had any mental health Part D prescription drug fills where the service date occurred during the month of observation and the NDC was associated with treating a mental health condition.
- *Any mental health emergency department visits.* We calculated the monthly percent of Medicare beneficiaries who had a mental health emergency department visit based on the principal diagnosis. We used outpatient claims and counted any claim where the revenue code had the following values: 0450, 0451, 0452, 0456, 0459, 0981, or 0762 or 0762 with HCPCS=G0378. We removed any claims where there was a corresponding inpatient claims during the same day so that we capture emergency department visits that did not result in a hospitalization.
- *Mental health inpatient spending.* We calculated the monthly average mental health inpatient spending using inpatient file to identify acute and psychiatric inpatient admissions where the principal diagnosis was mental health condition.
- *Total mental health FFS spending.* We calculated the monthly average for all mental health FFS spending summing the claim payments from the inpatient, outpatient, carrier, DME, home health, skilled nursing facility, and hospice files where mental health condition was

the principal diagnosis. We divided by the number of beneficiaries in our sample for that year.

Sensitivity Outcome Variables. The robustness of the ITS model depends in some part on whether there are observed changes in the trend of outcomes that would not be related to reductions in Part B coinsurance for outpatient behavioral health services. To make this determination, we specified the following sensitivity outcome variables:

- *Rate of non-mental health Evaluation and Management (E&M) visits.* We calculated the rate of non-mental health E&M visits by summing claims with E&M Healthcare Common Procedure Coding System (HCPCS) codes and visits to federally qualified health centers from the outpatient and carrier files. We summed the number of non-mental health E&M visits during the month and scaled by 1,000, divided by the total number of Medicare beneficiaries in the sample for that year.
- *Non-mental health OOP payment for outpatient services.* We calculated the average monthly amount of OOP payments from the outpatient and carrier file for services that did not have a principal diagnosis of any mental health condition.

Subgroup Categories. We created monthly population-level subgroup estimates for our outcomes. We included the following subgroups (see *Appendix A* for full definitions):

- Age category (65-74, 75-84, 85+).
- Race and ethnicity categories (White, Black, Asian, Hispanic).
- Dual eligibility (which was defined separately as having at least 1 month of full dual eligibility and or partial dual eligibility (Yes/No).
- Rurality (urban, large rural, small rural, and isolated rural settings).
- Any SUD diagnosis or SUD-related service use, which was defined using a similar approach as for mental health (Yes/No).
- Weighted Charlson Comorbidity Score (0, 1, 2 or more).

A description of beneficiaries with a MH diagnosis or MH-related service use by these characteristics during the year can be found in *Appendix C, Exhibit C-1*.

Statistical Approach. We calculated the number of services, payments, and users of services per month and produced a population-level average for each outcome per month. We then graphed monthly averages over time for the pre-MIPPA period (2008-2009), MIPPA Phase 1 (2010-2011), MIPPA Phase 2 (2012), MIPPA Phase 3 (2013), and MIPPA Phase 4 (2014-2017). Each phase corresponds with a percentage point reduction in coinsurance required for Part B mental health outpatient services, changing from 50 percent to 45 percent in Phase 1, 45 percent to 40 percent in Phase 2, 40 percent to 35 percent in Phase 3, and from 35 to 20 percent in Phase 4.

To test the impact of MIPPA on our primary, secondary, and sensitivity outcomes we used a monthly population-level ITS regression model, similar to other recent parity analyses.^{20,26} The basic specification of the model is as follows:

$$Y_t = \beta_0 + \beta_1 \text{Trend}_t + \beta_2 \text{Post}_t + \beta_3 (\text{Post}_t * \text{Trend}_t) + \mu X_t + \varepsilon_t.$$

Where Y_t is a continuous monthly aggregated outcome, $Trend$ is a continuous monthly indicator, $Post$ is a dummy variable representing observations during and after the start of MIPPA (2010), and $(Post_t * Trend_t)$ is an interaction term. The X_t term represents monthly indicators (0/1) to adjust for seasonality, and a continuous variable for monthly inflation percentage derived from the Consumer Price Index to account for inflation over time.²⁷ Coefficients of interest are β_2 , which represents the immediate level shift in the outcome during the first month of MIPPA relative to the baseline period (2008 and 2009), and β_3 which represents the difference in the slope or trajectory of the outcome during post-MIPPA months relative to the baseline period. This model was extended to identify the phase-specific impacts of MIPPA on the outcomes of interest. We include phase-specific indicators such as *Phase 1*, *Phase 2*, *Phase 3*, and *Phase 4* as dummy indicators equal to 1 for months during and after the start of the phase, and 0 otherwise. The phase-specific regression models were used to detect phase-effects relative to the previous phase, as well as relative to the baseline period using a linear combination of the *Phase*Trend* interaction coefficients. We found evidence of autocorrelation in the error terms across quarters using a Breusch-Godfrey test. As a result, we calculated Newey-West standard errors with three lags.

RESULTS

3.1 What are the trends in mental health service utilization before, during, and after the implementation of MIPPA?

Exhibits 2 through 4 display the unadjusted monthly trends of the primary outcomes for Medicare beneficiaries with a MH diagnosis or MH-related service use before, during, and after MIPPA implementation. For the monthly trends in secondary and sensitivity outcomes, see *Appendix B, Exhibits B-1 through B-7*.

Exhibit 2 displays the monthly percent of Medicare beneficiaries with a MH diagnosis or MH-related service use who had any mental health outpatient visits. The monthly percentage of Medicare beneficiaries with any mental health outpatient visit ranged from 5.7 percent to 7.8 percent in the 2008-2017 period. The unadjusted monthly trend in mental health visits decreased slightly from 2010 to 2014; there occurs a level decrease in the percent with a mental health-visit from approximately 7.5 percent to slightly below 6 percent from late 2012 to early 2013. This decline is likely due to changes in Part D prescription drug benefits.²⁸ The unadjusted monthly trend in the percentage of beneficiaries with any mental health outpatient visit increased steadily from 2014 to 2017.

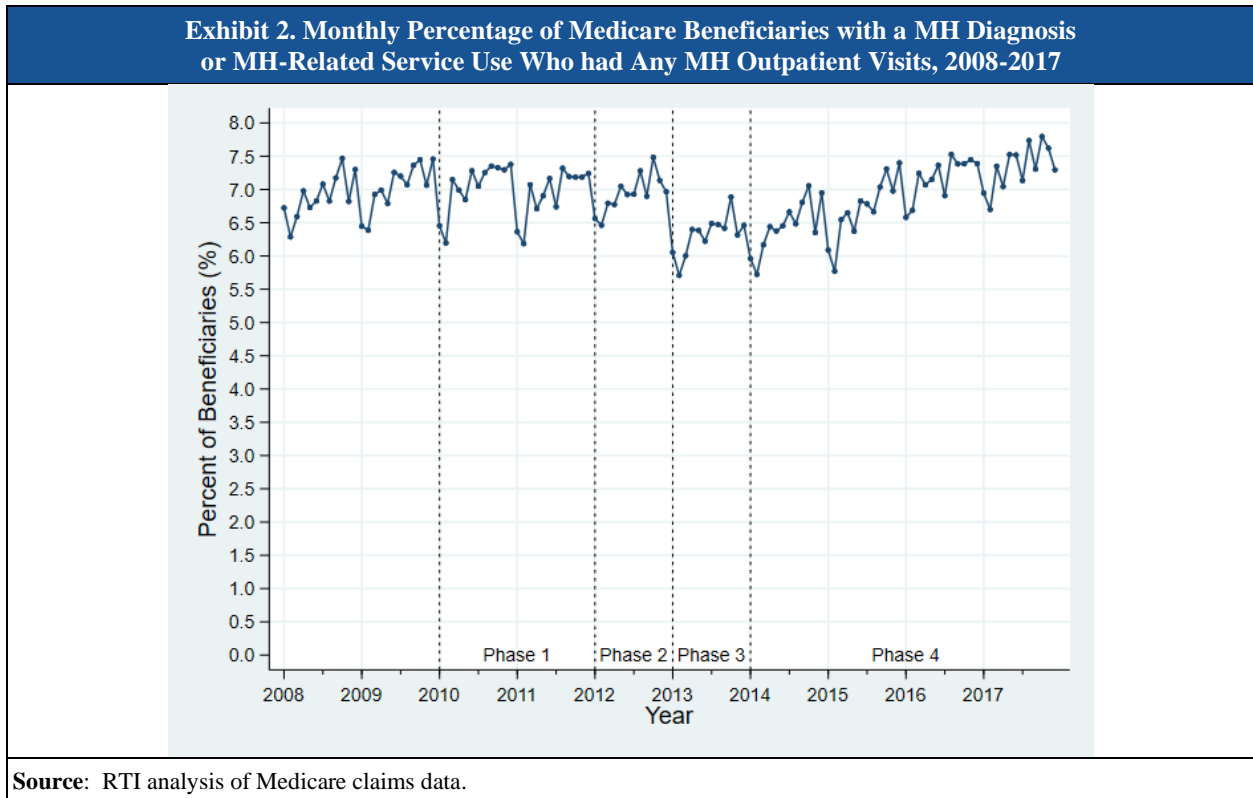


Exhibit 3 displays the monthly average rate of mental health outpatient visits per 1,000 Medicare beneficiaries with a MH diagnosis or MH-related service use. The rate of mental health outpatient visits ranged from 87.2 to 128.5 visits per 1,000 Medicare beneficiaries in the 2008-2017 period. The rate of mental health outpatient visits declined slightly from a monthly average in Phase 1 (2010-2011) of 109.5 visits per 1,000 beneficiaries, to a monthly average in Phase 3 (2013) of 99.1 visits per 1,000 beneficiaries. Starting in 2014, this trend increased from 92.7 visits in January 2014 to 114.2 visits per 1,000 beneficiaries by December 2017.

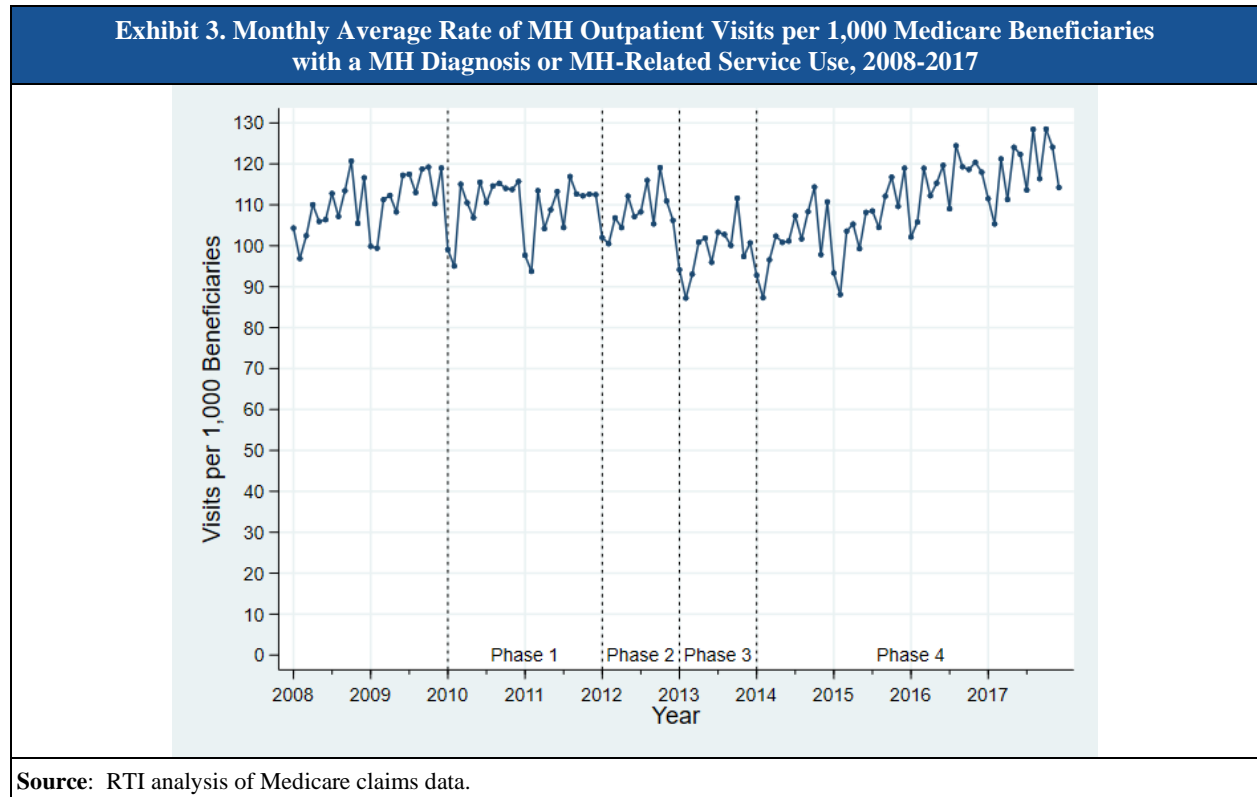
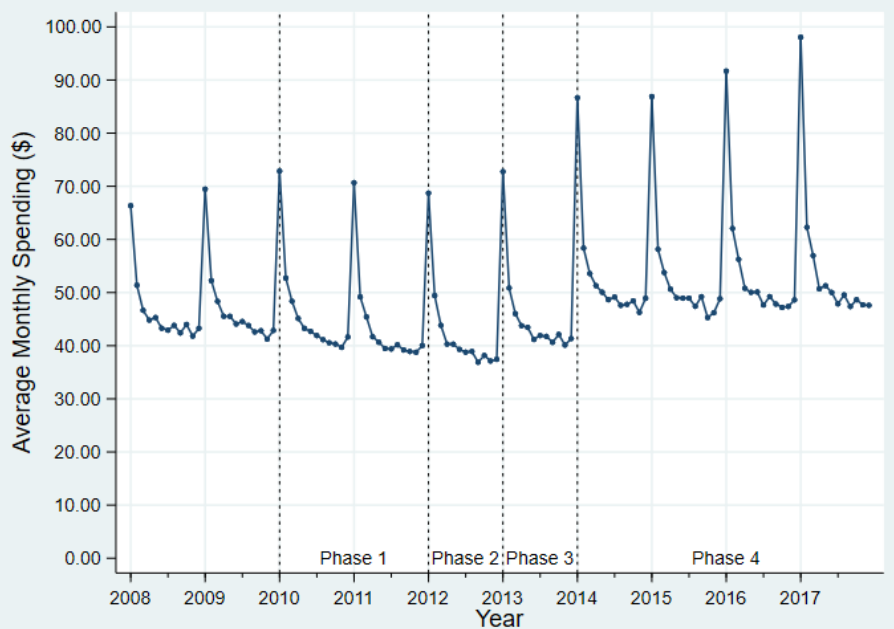


Exhibit 4 displays the monthly average mental health Part B OOP payments per service user among Medicare beneficiaries with a MH diagnosis or MH-related service use. The average mental health OOP payments per mental health outpatient service user ranged from \$37 to \$89 in the 2008-2017 period.²⁹ There appeared to be a continuous decline in average Part B OOP payments per user of \$73 in January 2010 to \$41 in December 2013 (Phases 1-3). Despite a 15-percentage point reduction in coinsurance requirements starting in 2014 (Phase 4), there was an observable increase in the average OOP payments from 2014 to 2017, likely related to increases in the utilization observed in *Exhibits 2 and 3*.

Exhibit 4. Monthly Average MH Part B OOP Payments per User of MH Part B Outpatient Services among Medicare Beneficiaries with a MH Diagnosis or MH-Related Service Use, 2008-2017



Source: RTI analysis of Medicare claims data.

Exhibits 2 through 4 all show a similar trend: payment and utilization patterns remained the same at baseline (2008-2009), decreased slightly from Phase 1 through Phase 3 (2010-2014), and increased steadily starting from 2014 through 2017. An observed decline in OOP Part B payments during Phase 1-3 was expected, but an observed increase in Phase 4 was not. Despite a reduction in coinsurance requirements from 50 percent to 35 percent from Phase 1 through Phase 3, there were observed declines in both the rate and use of any mental health outpatient visit during that period (*Exhibits 2 and 3*). Phase 4 appeared to be associated with expected increases in the use and rate of mental health outpatient visits.

3.2 Are there differences in trends based on beneficiary characteristics such as age, race, dual eligibility, co-occurring SUD, rurality, or comorbidity status?

There were limited differences in mental health utilization trends based on beneficiary characteristics. We examined the trends in our primary outcomes across subgroups of interest. *Appendix B, Exhibits B-8 through B-25* illustrate these trends by group. Some groups had a higher level of mental health outpatient visits than other groups, such as beneficiaries ages 65-74 (*Appendix B, Exhibit B-10*), those with a SUD diagnosis or SUD-related service use (*Appendix B, Exhibit B-19*), those residing in urban areas (*Appendix B, Exhibit B-22*), and those with a weighted Charlson Comorbidity Score of 2 or more (*Appendix B, Exhibit B-25*). Across most subgroup figures, the utilization trends after the introduction of MIPPA in 2010 show small declines between 2010 and 2014 (Phases 1-3) and an uptick starting in 2014-2017.

There were no observable differences in the trends between the groups with some exceptions. Full and partial dual eligibility status appeared to be associated with an observable shift in the trend in the outcomes starting during Phase 4, relative to beneficiaries without full dual eligibility (*Appendix B, Exhibits B-15 and B-16*).³⁰ However, this observed trend among beneficiaries with at least 1 month of full dual eligibility in the year should be interpreted with caution. Beneficiaries who have full dual eligibility have very limited or no cost-sharing requirements³¹ and were not expected to be impacted by coinsurance reductions. As such, other factors may have contributed to the observed increase in utilization among dual eligibles, such as the indirect effects of Medicaid expansion.³²

We conducted an ITS regression analysis to formally test the changes in the level and trend of the outcomes at different phases for the overall sample, and separately for beneficiaries with and without dual eligibility.

3.3 Has there been a change in mental health services among Medicare beneficiaries with a mental health diagnosis or mental health-related service use after the implementation of MIPPA: ITS Analysis?

Exhibit 5. Key Takeaways from ITS Analysis
<ul style="list-style-type: none"> • We found mixed evidence on the association of MIPPA with changes in MH service utilization. The final phased reduction of coinsurance (Phase 4) was associated with a small (0.02 percentage point) increase in the monthly trend of beneficiaries with any MH outpatient visits, relative to the pre-MIPPA period. Over 4 years (2014-2017), this amounts to a 0.7 percentage point increase in the proportion of beneficiaries with any MH outpatient visit. • There was no evidence that MH outpatient utilization increased during earlier years of MIPPA coinsurance reductions, relative to the pre-MIPPA period. • Between 2014 and 2017, we did not find that MIPPA was associated with a monthly decrease in mental health OOP spending trends relative to the pre-MIPPA period. However, we did find a small monthly decrease of \$0.27, \$6.55 over the first 2 years, in the trend of mental health OOP payments between 2010 and 2011, relative to the pre-MIPPA period. • A subgroup analysis on beneficiaries with at least 1 month of partial dual eligibility and those with no full dual eligibility show MIPPA was associated with small increases in the percent of beneficiaries with any mental health outpatient visit (0.01 and 0.02 percentage points, respectively).

We employed an ITS regression approach to determine MIPPA’s impact on the primary, secondary, and non-mental health outcomes with regards to both immediate shifts in the level of OOP spending and utilization as well as the trend over time. *Exhibit 6* displays the average overall impact of MIPPA on mental health OOP payments, utilization, and spending for all outcomes of interest from 2010 through 2017.

Exhibit 6. Overall Impact of MIPPA on MH OOP Payments, Utilization, and Spending, 2008-2017				
Outcomes	Difference in Level Pre- and Post-MIPPA	p-Value	Difference in Trend Pre- and Post-MIPPA	p-Value
Primary outcomes				
Percent with any MH-outpatient visit	-0.003	0.017	-0.000	0.302
MH-outpatient visits per 1,000 beneficiaries	-9.189	0.001	-0.171	0.109
MH-Part B OOP payments (\$)	-7.248	<0.001	-0.050	0.656
Secondary outcomes				
Percent with any MH prescription drug fills	-0.012	0.033	0.001	<0.001
Percent with any MH inpatient use	-0.000	0.559	-0.000	0.001
Percent with any MH ED use	<0.000	<0.001	<0.000	0.861
MH-inpatient spending (\$)	0.114	0.640	-0.064	<0.001
MH-total FFS spending (\$)	-2.146	<0.001	-0.085	<0.001
Sensitivity Outcomes				
Non-MH Part B OOP payments (\$)	1.462	0.334	-0.301	<0.001
Non-MH E&M visit per 1,000 beneficiaries	-25.055	0.012	-1.459	0.066
Source: RTI analysis of Medicare claims data. Results show the coefficients derived from the ordinary least squares model. Results were rounded to 3 digits. The coefficients for statistically significant results that were rounded to zero were the following: <i>Percent with any MH Inpatient Use</i> [level], 0.00001; <i>Percent with any MH ED Use</i> [level], 0.00009; <i>Percent with any MH Inpatient Use</i> [Trend], -0.000004.				

There was a statistically significant decrease of 0.33 percentage points in the use of any mental health outpatient visit during the first month of the post-MIPPA period compared to the pre-MIPPA period ($p < 0.05$). There was a corresponding decrease in the rate of mental health outpatient visits (nine visits per 1,000 beneficiaries, $p < 0.001$) and Part B mental health OOP payments (\$7.25 $p < 0.001$) during the first month of MIPPA compared to the pre-MIPPA period. There was no evidence that MIPPA impacted the monthly trend in Part B mental health OOP payments or mental health outpatient use.

We also found statistically significant impacts on our secondary outcomes. There was a 0.1 percentage point increase in the monthly trend of beneficiaries who had any mental health prescription drug fills ($p < 0.001$),³³ a 0.0004 percentage point decrease in the monthly trend of mental health inpatient admissions ($p < 0.01$), a \$0.06 and \$0.09 decrease in the monthly trend of average mental health-inpatient spending and total mental health Medicare spending, respectively, relative to the pre-MIPPA trend (< 0.001). There was also a \$0.30 average monthly decrease in non-mental health Part B OOP payments ($p < 0.01$). As there was no evidence of

changes in rate and use of mental health-outpatient visits over time, we cannot attribute these results to MIPPA coinsurance reductions.

Exhibit 7. Difference in Phase-Specific Trend on MH OOP Payments, Utilization, and Spending Relative to Pre-MIPPA, 2008-2017								
Outcomes	Difference in Trend between Phase 1 and pre-MIPPA	p-Value	Difference in Trend between Phase 2 and pre-MIPPA	p-Value	Difference in Trend between Phase 3 and pre-MIPPA	p-Value	Difference in Trend between Phase 4 and pre-MIPPA	p-Value
Primary Outcomes								
Percent with any MH-outpatient visit	-0.000	0.012	-0.000	0.073	-0.000	0.054	<0.000	0.002
MH-outpatient visits per 1,000 beneficiaries	-0.356	0.002	-0.557	0.009	-0.361	0.063	0.202	0.051
MH-Part B OOP payments (\$)	-0.273	0.024	-0.008	0.970	0.101	0.584	-0.151	0.163
Secondary Outcomes								
Percent with any MH prescription drug fills	-0.000	0.268	-0.000	0.352	0.001	<0.001	<0.000	0.064
Percent with any MH inpatient use	-0.000	0.060	-0.000	0.028	-0.000	0.477	-0.000	0.024
Percent with any MH ED use	<0.000	<0.001	0.000	0.101	<0.000	0.792	-0.000	0.101
MH-inpatient spending (\$)	-0.028	0.052	-0.082	0.003	-0.039	0.196	-0.045	0.001
MH-total FFS spending (\$)	-0.135	<0.001	-0.226	<0.001	-0.162	0.003	-0.042	0.053
Sensitivity Outcomes								
Non-MH-Part B OOP payments (\$)	-0.072	0.511	-0.658	0.006	-0.461	0.105	-0.230	0.002
Non-MH E&M visit per 1,000 beneficiaries	-0.380	0.719	-5.550	0.004	-3.692	0.103	-1.056	0.218
Source: RTI analysis of Medicare claims data. Results show the coefficients derived from the ordinary least squares model. Results were rounded to 3 digits. The coefficients for statistically significant results that were rounded to zero were the following: <i>Percent with any MH-Outpatient Visit</i> [Phase 1 vs. pre-MIPPA], -0.0001 and [Phase 4 vs. pre-MIPPA] 0.0002; <i>Percent with any MH Inpatient Use</i> , [Phase 2 vs. pre-MIPPA] -0.000004 and [Phase 4 vs. pre-MIPPA] -0.000003; <i>Percent with any MH ED Use</i> [Phase 1 vs pre-MIPPA], 0.000004.								

Exhibit 7 displays phase-specific trends in mental health OOP payments, utilization, and spending relative to the pre-MIPPA trend. We found mixed evidence that MIPPA-specific phases were associated with increases in mental health outpatient visits. Specifically, during Phase 1 (2010-2011) there was a statistically significant decrease of 0.01 percentage points in the monthly trend of beneficiaries with any mental health outpatient visit ($p < 0.05$), a monthly decrease of 0.36 in mental health outpatient visits per 1,000 beneficiaries ($p < 0.05$), as well as a statistically significant decrease of \$0.27 in the monthly trend of average Part B mental health

OOP payments ($p < 0.01$), relative to the pre-MIPPA trend.³⁴ The rate of mental health outpatient visits continued to decrease in Phase 2 (2012) but began to increase in Phase 4 (2014), the latter change being marginally statistically insignificant ($p = 0.051$).

Exhibit 8. Change in Trend During Phase 4 Relative to the Baseline Period, by Dual Eligible Status, 2014-2017						
Outcomes	Full Dual Eligible Beneficiaries		Partial Dual Eligible Beneficiaries		Non-Full Dual Eligible Beneficiaries*	
	Difference in Trend between Phase 4 and Pre-MIPPA	p-Value	Difference in Trend between Phase 4 and Pre-MIPPA	p-Value	Difference in Trend between Phase 4 and Pre-MIPPA	p-Value
Primary outcomes						
Percent with any MH-outpatient visit	<0.000	<0.001	0.000	0.031	<0.000	<0.001
MH-outpatient visits per 1,000 beneficiaries	0.534	0.010	0.211	0.023	0.262	0.005
MH-Part B OOP payments (\$)	0.003	0.973	0.014	0.921	-0.233	0.046
Secondary outcomes						
Percent with any MH prescription drug fills	-0.001	0.001	0.000	0.068	<0.000	<0.001
Percent with any MH inpatient use	<-0.000	0.072	-0.000	0.497	-0.000	0.058
Percent with any MH ED use	<-0.000	0.427	0.000	0.360	-0.000	0.082
MH-inpatient spending (\$)	-0.066	0.031	-0.051	0.150	-0.033	0.006
MH-total FFS spending (\$)	-0.001	0.976	-0.090	0.050	-0.032	0.080
Sensitivity Outcomes						
Non-MH-Part B OOP payments (\$)	0.364	<0.001	-0.168	0.023	-0.172	0.019
Non-MH E&M visit per 1,000 beneficiaries	-1.678	0.069	-0.599	0.533	-0.625	0.459
<p>Source: RTI analysis of Medicare claims data. Results show the coefficients derived from the ordinary least squares model. The coefficients for statistically significant results that were rounded to zero were the following: Percent with any MH-Outpatient Visit [Full Dual] 0.0003, [Partial Dual] 0.0001, [Non-Dual] 0.0002; Percent with any MH Prescription Drug Use [Non-Dual] 0.0005.</p> <p>* Approximately 2.5-2.7% of beneficiaries without any month of full dual eligibility had at least 1 month Qualified Medicare Beneficiary status and have no cost-sharing requirements. A separate analysis removing these beneficiaries from the sample of non-full dual eligibles produced results similar in magnitude and statistical significance as the results presented in this table.</p>						

The MIPPA coinsurance reduction in Phase 4 was associated with a monthly 0.02 percentage point increase in the percent of beneficiaries with any mental health outpatient use ($p < 0.05$), relative to the pre-MIPPA trend. This translates to approximately 0.7 percentage point increase in the use of any mental health outpatient services, relative to the pre-MIPPA trend. The

increase in monthly percent of beneficiaries with any mental health outpatient visits corresponded with a slight monthly decrease in the percent of beneficiaries with any mental health hospitalization (-0.0003 percentage points or approximately one half a percent of the total number of mental health hospitalizations during the pre-MIPPA period, $p < 0.05$), and \$0.05 average monthly decrease in mental health inpatient spending ($p < 0.001$).³⁵ There was an average \$0.23 decrease in monthly non-mental health Part B OOP payments during Phase 4, relative to the pre-MIPPA trend ($p < 0.01$).

The unadjusted trends in mental health outpatient visits by dual eligibility status indicated a difference between full dual eligibility and partial and non-dual eligibility, as observed in *Appendix B, Exhibit B-16*. To formally determine whether MIPPA was associated with differences in trends among those without full dual eligibility or with partial dual eligibility (who are low-income and exposed to cost-sharing for mental health services), we ran three ITS models separately for full dual eligible, partial dual eligible, and non-full dual eligible beneficiaries. *Exhibit 8* displays the change in utilization and spending trends during Phase 4 (2014-2017), relative to the pre-MIPPA period, by dual eligibility status. There was an expected statistically significant increase in the rate of mental health outpatient visits per 1,000 beneficiaries among non-dual eligible beneficiaries and partial dual eligible, relative to the pre-MIPPA trends. However, there was also an unexpected increase in mental health outpatient visits among the full dual eligible population, relative to the pre-MIPPA trends. The percentage of beneficiaries with a mental health outpatient visit increased among full dual, partial dual, and non-full dual eligible beneficiaries (0.03 percentage points among full dual eligible beneficiaries, $p < 0.001$; 0.01 percentage points among partial dual eligible beneficiaries, $p < 0.05$; 0.02 percentage points among non-full dual eligible, $p < 0.001$). There was also a corresponding statistically significant decrease in average mental health inpatient spending of \$0.07 among full dual eligible beneficiaries and \$0.03 among non-full dual eligible beneficiaries, respectively ($p < 0.05$). Among non-full dual eligible beneficiaries, there was a statistically significant monthly decrease in the trend of Part B mental health OOP per service user of \$0.23, relative to the pre-MIPPA trend ($p < 0.05$), as well as a small increase of 0.05 percentage points in the use of any mental health prescription drugs ($p < 0.01$).

These results should be interpreted with caution. Beneficiaries who have full dual eligibility have limited or no cost-sharing requirements³¹ and were not expected to be impacted by coinsurance reductions.³⁶ As such, other factors may have contributed to the observed increase in utilization among dual eligibles, such as the indirect effects of Medicaid expansion.³² Even so, results among the partial and non-full dual eligible population are consistent with our main findings illustrated in *Exhibit 7*.

SECTION 4. CONCLUSION

We found evidence that MIPPA was associated with small increases in the percentage of beneficiaries with outpatient mental health visits among older Medicare beneficiaries with a MH diagnosis or MH-related service use during the last implementation phase of MIPPA, which started in 2014. There was no evidence of changes overall in mental health visits when examining the full implementation period (2010-2017) or during earlier phases before Phase 4. Phase 4 had the largest coinsurance reduction, 15 percentage points, compared to Phases 1-3 that only had 5 percentage point reductions. Phase 4 moved coinsurance rates to be the same (20 percent) as with other physical health coinsurance rates. Moreover, the impact MIPPA coinsurance reductions during Phase 4 impacted beneficiaries who were partially dual-eligible for both Medicare and Medicaid, many of whom are exposed to coinsurance requirements and are also low-income, as well as non-dually eligible beneficiaries. Among these populations, MIPPA was associated with an increase in outpatient mental health visits and, among those not fully dual eligible, a decrease in mental health OOP payments compared to pre-MIPPA trends.

These findings add to the growing literature on impacts of mental health parity policy more broadly^{20,37} and MIPPA more specifically.^{6,7} Recent MIPPA-related work that focused on low-income and mostly under 65 Medicare beneficiaries did not find that coinsurance reductions were associated with more behavioral health outpatient visits.^{6,7} The authors suggested that a 20 percent coinsurance rate may still present financial barriers to low-income Medicare beneficiaries to accessing outpatient mental health services. In contrast, we found small but statistically significant increases in the monthly percent of beneficiaries with any outpatient mental health visits starting in 2014, even while non-mental health E&M visits appeared to be unchanged (see *Appendix B, Exhibit B-7*), and Part B mental health OOP payments appeared to be declining relative to the pre-MIPPA period (*Exhibit 7*), particularly among non-full dual eligible beneficiaries (*Exhibit 8*).

Other work examining the effects of MIPPA on OOP payments and behavioral health outpatient use among Medicare beneficiaries also demonstrated mixed results.^{6,7} Fung and colleagues (2020) found MIPPA was not associated with any increases in outpatient mental health visits, though was associated with significant reductions in OOP payments among partial dual eligibles and beneficiaries receiving Part D low-income subsidies, relative to beneficiaries fully eligible for Medicaid. Our findings also indicate that MIPPA was associated with a small average monthly decrease of \$0.27 in Part B mental health OOP payments during the first 2 years relative to the pre-MIPPA trend (or approximately \$6.55 over 2 years), but this trend did not continue through the rest of the study period. Moreover, the size of this effect is unlikely to have influenced utilization of primary care or acute services like hospitalizations. Similar to findings from Le Cook et al. (2020), we found evidence that MIPPA was associated with a small monthly increase in the use of mental health prescription drugs; this was notable particularly in 2013 where the level increase was 4.8 percentage points, relative to 2012, in part due to the

expansion of Part D coverage for benzodiazepines and barbiturates for mental health treatment in 2013 (see *Appendix C, Exhibit C-2*).

We also found MIPPA to be associated with a very small monthly decrease in the use of any mental health inpatient use and spending compared to the pre-MIPPA period. Although this could indicate that greater outpatient use led to reductions in inpatient use, it is difficult to argue that this impact is meaningful with such a small estimated impact on outpatient use. More research is needed on the declines in mental health inpatient use, as it has decreased in general over the study period. Furthermore, other payment policies and quality initiatives may have impacted these results. First, access to psychiatric medications has been shown to be associated with decreased hospitalizations;³⁸ thus increases in mental health prescription drug use from 2013 to 2014 may have contributed to a decrease in mental health hospitalizations. Second, the change in the trend during 2014-2017 is relative to pre-MIPPA; other policies may have contributed to the downward slope in mental health hospitalizations starting in 2010 such as the Hospital Readmission Reduction Program³⁹ (see *Appendix B, Exhibit B-2*). Finally, the difference between the trend in mental health hospitalizations during 2014-2017 was not statistically significantly different than the trend observed in 2013 (see *Appendix C, Exhibit C-2*), suggesting that the change in the slope of mental health inpatient admissions that occurred during and after 2014 was not statistically significantly different than the downward trend already occurring prior to 2014.

There are limitations to this analysis. The internal validity of an ITS model is vulnerable to other economic or policy changes occurring during the study period. The introduction of Medicare Part D coverage of benzodiazepines and barbiturates in 2013 may have caused an increase in the sample identified through mental health-related NDCs but not through mental health diagnosis. This would cause a corresponding level decrease in average mental health service utilization identified through primary diagnosis because of the increase in the number of beneficiaries in the sample in 2013 (see *Exhibits 2 and 3*). This likely explains increases in prescription drug use observed from 2012 to 2013 (see *Appendix B, Exhibit B-1*). Additionally, we included beneficiaries dually eligible for Medicare and Medicaid, who theoretically should not be affected by MIPPA co-insurance reductions. Relatedly the indirect benefits of Medicaid expansion, which started in 2014, on the dual eligible population may have biased our results. For example, improved insurance coverage prior to turning 65 may have connected individuals to a mental health provider prior to becoming eligible for Medicare; as full dual eligible beneficiaries accounted for 15-18 percent of the sample from 2014 to 2017 (see *Appendix C, Exhibit C -1*); this could help to explain increases in mental health-outpatient visits observed among dual eligible beneficiaries during and after 2014. Even so, our results were similar when examining non-full dual eligible beneficiaries. Other effects of Medicaid expansion may have indirectly benefited our study sample, biasing upwards the 2014-2017 results.³² We used a broad definition of mental health outpatient services; thus, service utilization and OOP payment changes specific to different provider types such as psychiatrists, social workers, or primary care

physicians were not captured in this study. Finally, we chose an inclusive, three-pronged approach that may include a significant number of adults without a MH condition, as described in Section 2: Data and Methods.

Our findings indicate that MIPPA was associated with small monthly increases in mental health outpatient visits during the last implementation phase, relative to the pre-MIPPA period. However, there was no evidence of favorable increases in outpatient mental health visits or overall decreases in Part B mental health OOP payments from 2010 to 2017, or during early stages of implementation (2010-2013). The monthly increase in the trend of the percent of beneficiaries with any mental health outpatient visits during Phase 4 are very small and unlikely to have meaningfully impacted decreases in mental health inpatient utilization and spending, as our results indicated.

Similar to other work, this evidence suggests reducing coinsurance for mental health outpatient services to the same rate as coinsurance for outpatient medical services is a necessary step to ensuring adequate access to mental health outpatient services among older adults but insufficient as a standalone policy change. Coinsurance reduction is just one policy mechanism to improve access to mental health services, and evidence suggests limited or modest impacts of such a policy.^{6,40}

Other non-financial factors may influence access to mental health services, such as shortages of behavioral health providers,¹⁴ particularly in rural settings and low-income areas, and a fragmented delivery system.¹³ Efforts to improve the availability of providers may be warranted to ensure older adult have adequate access to mental health services. These efforts may include broadening scope-of-practice laws, increasing reimbursement for psychiatric outpatient services,⁴¹ or further expanding flexibilities related to telehealth, such as dropping requirements of in-person mental health services or making permanent the allowance of providers to provide out-of-state care.¹²

ENDNOTES

1. Toth, M., Gibbons, B., Levinson, A., Kar, N., Keyes, V., Nye., E., Jacobus-Kantor, L., and Creedon, T. (in review). *Behavioral Health Prevalence, Utilization, and Spending Among Older Adult Medicare Beneficiaries: A Chartbook*. Washington, DC: Office of the Assistant Secretary for Planning and Evaluation.
2. Sanglier, T., Saragoussi, D., Milea, D., & Tournier, M. (2015). Depressed older adults may be less cared for than depressed younger ones. *Psychiatry Research*, 229(3): 905-912.
3. Choi, N.G., DiNitto, D.M., Marti, N.C., & Choi, B.Y. (2015). Associations of mental health and substance use disorders with presenting problems and outcomes in older adults' emergency department visits. *Academic Emergency Medicine*, 22(11): 1316-1326. doi:10.1111/acem.12803.
4. Carlo, A.D., Barnett, B.S., & Frank, R.G. (2020). Behavioral health parity efforts in the US. *JAMA*, 324(5): 447-448, doi: 10.1001/jama2020.3505.
5. Han, B., Gfroerer, J.C., Colpe, L.J., Barker, P.R., & Colliver, J.D. (2011). Serious psychological distress and mental health service use among community-dwelling older US adults. *Psychiatric Services*, 62(3): 291-298.
6. Fung, V., Price, M., Nierenberg, A.A., Hsu, J., Newhouse, J.P., & Cook, B. (2020). Assessment of behavioral health service use among low-income Medicare beneficiaries after reductions in coinsurance fees. *JAMA Network Open*, 3(10): 1-11, doi: 10.1001/jamanetworkopen.2020.19854.
7. Le Cook, B., Flores, M., Zuvekas, S.H., Newhouse, J.P., Hsu, J., Sonik, R., Lee, E., & Fung, V. (2020). The impact of Medicare's mental health cost-sharing parity on use of mental health care services. *Health Affairs*, 39(5): 819-827, doi: 10.1377/hlthaff.2019.01008.
8. Zuvekas, S, & Meyerhoefer, C. (2006). Coverage for mental health treatment: Do the gaps still persist? *Journal of Mental Health Policy & Economics*, 9(2): 155-163.
9. Garrison, M.M., Katon, W.J., & Richardson, L.P. (2005). The impact of psychiatric comorbidities on readmissions for diabetes in youth. *Diabetes Care*, 28(9): 2150-2154, doi: 10.2337/diacare.28.9.2150.
10. Dahlen, I., & Janson, C. (2002). Anxiety and depression are related to the outcome of emergency treatment in patients with obstructive pulmonary disease. *Chest*, 122(5): 1633-1637, doi: 10.1378/chest.122.5.1633.
11. Figueroa, J.F., Phelan, J., Orav, E.J., Patel, V., & Jha, A.K. (2020). Association of mental health disorders with health care spending in the Medicare population. *JAMA Network Open*, 3(3): e201210-e201210.

12. Mehrotra, A., Huskamp, H.A., Souza, J., Uscher-Pines, L., Rose, S., Landon, B.E., Jena, A.B., & Busch, A.B. (2017). Rapid growth in mental health telemedicine use among rural Medicare beneficiaries, wide variation across states. *Health Affairs*, 36(5): 909-917.
13. Bishop, T.F., Press, M.J., Keyhani, S., & Pincus, H.A. (2014). Acceptance of insurance by psychiatrists and the implications for access to mental health care. *JAMA Psychiatry*, 71(2): 176-181, doi: 10.1001/jamapsychiatry.2013.2862.
14. Kepley, H.O., & Streeter, R.A. (2018). Closing behavioral health workforce gaps: A HRSA program expanding direct mental health service access in underserved areas. *American Journal of Preventive Medicine*, 54(6 suppl 3): S190-S191, doi: 10.1016/j.amepre.2018.03.0066.
15. Ziller, E.C., Anderson, N.J., & Coburn, A.F. (2010). Access to rural mental health services: Service use and out-of-pocket costs. *Journal of Rural Health*, 26(3): 214-224.
16. Slade, E.P., Salkever, D.S., Rosenheck, R., Swanson, J., Swartz, M., Shern, D., ... & Russo, P. (2005). Cost-sharing requirements and access to mental health care among Medicare enrollees with schizophrenia. *Psychiatric Services*, 56(8): 960-966. <https://ps.psychiatryonline.org/doi/full/10.1176/appi.ps.56.8.960>.
17. Trivedi, A.N., Swaminathan, S., & Mor, V (2008). Insurance parity and the use of outpatient mental health care following a psychiatric hospitalization. *JAMA*, 300(24): 2879-85.
18. Bernal, J.L., Cummins, S., & Gasparrini, A. (2017). Interrupted time series regression for the evaluation of public health interventions: A tutorial. *Int J Epidemiol*, 46(1): 348-355, doi: 10.1093/ije/dyw098.
19. Kontopantelis, E., Doran, T., Springate, D.A., Buchan, I., & Reeves, D. (2015). Regression based quasi-experimental approach when randomisation is not an option: Interrupted time series analysis. *BMJ*, 350.
20. Mulvaney-Day, N., Gibbons, B.J., Alikhan, S., & Karakus, M. (2019). Mental Health Parity and Addiction Equity Act and the use of outpatient behavioral health services in the United States, 2005-2016. *American Journal of Public Health*, 109(S3): S190-S196.
21. Chronic Conditions Warehouse. (2022). *Other Chronic Health, Mental Health, and Potentially Disabling Conditions*. <https://www2.ccwdata.org/web/guest/condition-categories-other>.
22. Substance Abuse and Mental Health Services Administration. (2019). *Behavioral Health Spending and Use Accounts, 2006-2015*. Rockville, MD: Substance Abuse and Mental Health Services Administration, HHS Pub. No. (SMA) 19-5095.

23. Davenport, S., Gray, I., & Melek, S. (2020). *How do Individuals with Behavioral Health Conditions Contribute to Physical and Total Healthcare Spending?* Milliman Research Report. <https://www.milliman.com/-/media/milliman/pdfs/articles/milliman-high-cost-patient-study-2020.ashx>.
24. We added the beneficiary Part B revenue center deductible, beneficiary Part B coinsurance payment, and any blood deductible payments (e.g., payment for the first three units of blood delivered in an outpatient facility) from the outpatient files to calculate outpatient OOP payments.
25. Stuart, E.A., McGinty, E.E., Kalb, L., Huskamp, H.A., Busch, S.H., Gibson, T.B., Goldman, H., & Barry, C.L. (2017). Increased service use among children with autism spectrum disorder associated with mental health parity law. *Health Affairs*, 36(2): 337-345.
26. U.S. Bureau of Labor Statistics. *Consumer Price Index*. <https://www.bls.gov/cpi/data.htm>.
27. Specifically, Medicare Part D began covering barbiturates and benzodiazepines for treatment of chronic mental illness. We believe that this policy change is associated with: (1) an approximately 12 percentage point increase in the prevalence of mental health NDC codes, along with an approximate 6 percentage point decrease in the sampled identified only through diagnoses or procedures between 2012 and 2013; and (2) a level decrease in *diagnosed based* utilization starting in 2013.

SOURCE: Centers for Medicare & Medicaid Services. (2012). Memo: Transition to Part D Coverage of Benzodiazepines and Barbiturates Beginning in 2013. <https://www.cms.gov/Medicare/Prescription-Drug-Coverage/PrescriptionDrugCovContra/Downloads/BenzoandBarbituratesin2013.pdf>.
28. The monthly trends showing higher OOP payments during the first months of the year are related to annual deductible amounts resetting.
29. **Appendix B, Exhibits B-11 through B-13** show a decline in mental health OOP spending and mental health visits among Hispanic beneficiaries starting shortly before 2010. This decline is primarily in costs and OOP payments among claims in the outpatient file. We do not think this decline is associated with MIPPA as it appeared to begin in 2009. Further research is needed to better understand this trend in mental health-related OOP and service use among Hispanics.
30. Centers for Medicare & Medicaid Services. *Dually Eligible Individuals--Categories*. <https://www.cms.gov/Medicare-Medicaid-Coordination/Medicare-and-Medicaid-Coordination/Medicare-Medicaid-Coordination-Office/Downloads/MedicareMedicaidEnrolleeCategories.pdf>.

31. McInerney, M., McCormack, G., Mellor, J.M., & Sabik, L.M. (2022). Association of Medicaid expansion with Medicaid enrollment and health care use among older adults with low income and chronic condition limitations. *JAMA Health Forum*, 3(6): e221373-e221373.
32. The percent of the sample identified with only mental health Part D prescription drug use declined from 28 percent to 24 percent from 2008 to 2012; increased to 31 percent in 2013 and declined to 26 percent in 2017. Restricting the sample to only beneficiaries with 12 months of Part D enrollment resulted in a similar increase in the trend of the percent of beneficiaries with any mental health prescription drug use in Phase 3 of 0.1 percentage points, relative to the pre-MIPPA trend.
33. **Appendix C, Exhibit C-5** shows the overall and phase-specific estimates on mental health OOP payments per visit. Under this specification, there was not a statistically significant decrease in payments per visit during Phase 1. This suggests that perhaps the population using mental health services accessed fewer services, but the mix of mental health providers seen may have changed resulting in non-significant changes in mental health OOP payments per visit.
34. **Appendix B, Exhibit B-12** shows an outlier drop in mental health inpatient use and spending during October 2015, the start of the ICD-9/ICD-10 switch. The trend recovered starting November 2015. To determine whether this monthly observed value biased our results, we removed October 2015 from the regression model. Removing this outlier month did not result in any meaningful changes in our results.
35. Over 80 percent of the full dual eligible beneficiaries in our sample had 12 months of full dual eligibility during the calendar year. Restricting the sample to beneficiaries with only 12 months of full dual eligibility did not meaningfully change these results.
36. Busch, A.B., Yoon, F., Barry, C.L., Azzone, V., Normand, S.L.T., Goldman, H.H., & Huskamp, H.A. (2013). The effects of mental health parity on spending and utilization for bipolar, major depression, and adjustment disorders. *American Journal of Psychiatry*, 170(2): 180-187.
37. Huskamp, H.A., West, J.C., Rae, D.S., Rubio-Stipec, M., Regier, D.A., & Frank, R.G. (2009). Part D and dually eligible patients with mental illness: Medication access problems and use of intensive services. *Psychiatric Services*, 60(9): 1169-1174.
38. Centers for Medicare & Medicaid Services. (2022). *Hospital Readmissions Reduction Program (HRRP)*. <https://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/AcuteInpatientPPS/Readmissions-Reduction-Program>.
39. Chaiyachati, K.H., Livesey, C., & Liao, J.M. (2020). Going beyond cost-sharing parity to improve behavioral health access. *JAMA Network Open*, 3(10): e2020232, doi: 10.1001/jamanetworkopen.2020.2023.

40. Yu, J., Jena, A.B., Mandic, P.K., & Golberstein, E. (2019). Factors associated with psychiatrist opt-out from US Medicare: An observational study. *Journal of General Internal Medicine*, 34(11): 2460-2466.

APPENDIX A: MEASURE AND SUBGROUP DEFINITIONS

Exhibit A-1. Definition of MH-Specific Service Utilization and Spending Measures	
Service Category	Definition
Utilization	
MH inpatient admissions	Number of admissions during the month where the 3rd digit of the provider number is not a character, and 3 rd through 6th digits of the provider number fall within the 0001-0879 range OR the 3rd through 6th digits of PRVDR_NUM fall within the 1300-1399 range and the principal diagnosis was a MH condition.
MH ED visits (treat and release)	Number of outpatient claims with a principal diagnosis of MH condition during the month where the revenue codes were the following: 0450, 0451, 0452, 0456, 0459, 0981, or 0762 or 0762 with HCPCS=G0378.
Non-MH E&M visits	Number of claims per person per year from the outpatient or carrier file with any E&M procedure code, or revenue center code indicating a visit to the rural health center or federally qualified health center: 0510-0519, 0520-0529, 0982-0983.
MH outpatient visits	Any outpatient or carrier claim with a principal diagnosis of a MH condition. We excluded any claim that was an ED visit.
MH Part D prescription drug use	Any NDC that corresponded with the following class of psychotherapeutic drugs during the observation month: benzodiazepines, anxiolytics, sedatives, and hypnotics; antipsychotics and antimanics; antidepressants; analeptics (ADHD medications); and some anticonvulsants.
Spending	
MH Part B OOP payments	OOP payments were derived from outpatient and carrier files. We combined the deductible and coinsurance amounts from the claim and the revenue lines where the principal diagnosis was a MH condition.
Non-MH Part B OOP payments	OOP payments were derived from outpatient and carrier files. We combined the deductible and coinsurance amounts from the claim and the revenue lines where the principal diagnosis was not a MH condition.
MH inpatient spending	Sum of payment amounts among acute and psychiatric hospitalizations where the principal diagnosis was a MH condition.
Total MH spending	Sum of the payment amounts from inpatient, outpatient, carrier, skilled nursing facility, hospice, home health, and DME files where the principal diagnosis on the claim was a MH condition.

Exhibit A-2. Subgroup Definitions	
Subgroup	Definition
Age Group	Defined as 65-74, 75-84, and 85 and older based on the first day of the month.
Race	We used the RTI_RACE_CD from the MBSF to identify White, Black, Hispanic, and Asian.
Dual Eligibility	We defined full dual eligibility as any beneficiary with at least 1 month in the year of full eligibility for Medicare and Medicaid services. We defined partial dual eligibility as having at least 1 month of partial dual eligibility for both Medicare and Medicaid services.
Substance Use	We identified anyone with a SUD diagnosis during the year from the inpatient, outpatient and carrier files. We used ICD-9 and ICD-10 codes listed in the CCW to identify alcohol use disorder, drug use disorder, and opioid use disorder. We also checked SUD procedure codes and NDCs. For NDCs, we used medication-assisted treatment NDCs, including buprenorphine for opioid use disorder, acamprosate, disulfiram, naloxone, and naltrexone. These drug classes include medications that may be used for alcohol use disorder or opioid use disorders. Methadone treatment for opioid use disorder was captured using procedure codes in the outpatient files.
Rurality	We used the Rural Urban Commuting Area (RUCA) codes to identify Urban (RUCA = 1, 1.1, 2, 2.1, 3, 4.1, 5.1, 7.1, 8.1, 10.1), Large Rural (4, 4.2, 5, 5.2, 6, 6.1), Small Rural (7, 7.2, 7.3, 7.4, 8, 8.2, 8.3, 8.4, 9, 9.1, 9.2), and isolated rural (10, 10.2, 10.3, 10.4, 10.5, 10.6). RUCA classifications are based on the size and direction of primary and secondary commuting flows.
Charlson Comorbidity Groups	We used the inpatient, outpatient and carrier claims for each beneficiary during the year of observation (i.e., if they were eligible for 12 months during the year) to create a weighted Charlson Comorbidity Score. We grouped beneficiaries into 3 groups (0 = no comorbidities; 1 = only 1 comorbidity; 2+ = at least 2 comorbidities or 1 weighted comorbidity).

APPENDIX B: UNADJUSTED MONTHLY TREND GRAPHS

In this appendix, we present *Exhibits B-1 through B-7* showing the monthly population trends of the secondary and sensitivity outcomes for the overall sample of beneficiaries with a MH diagnosis or MH-related service use. *Exhibits B-8 through B-25* show the monthly population trends for the primary outcomes by subgroup.

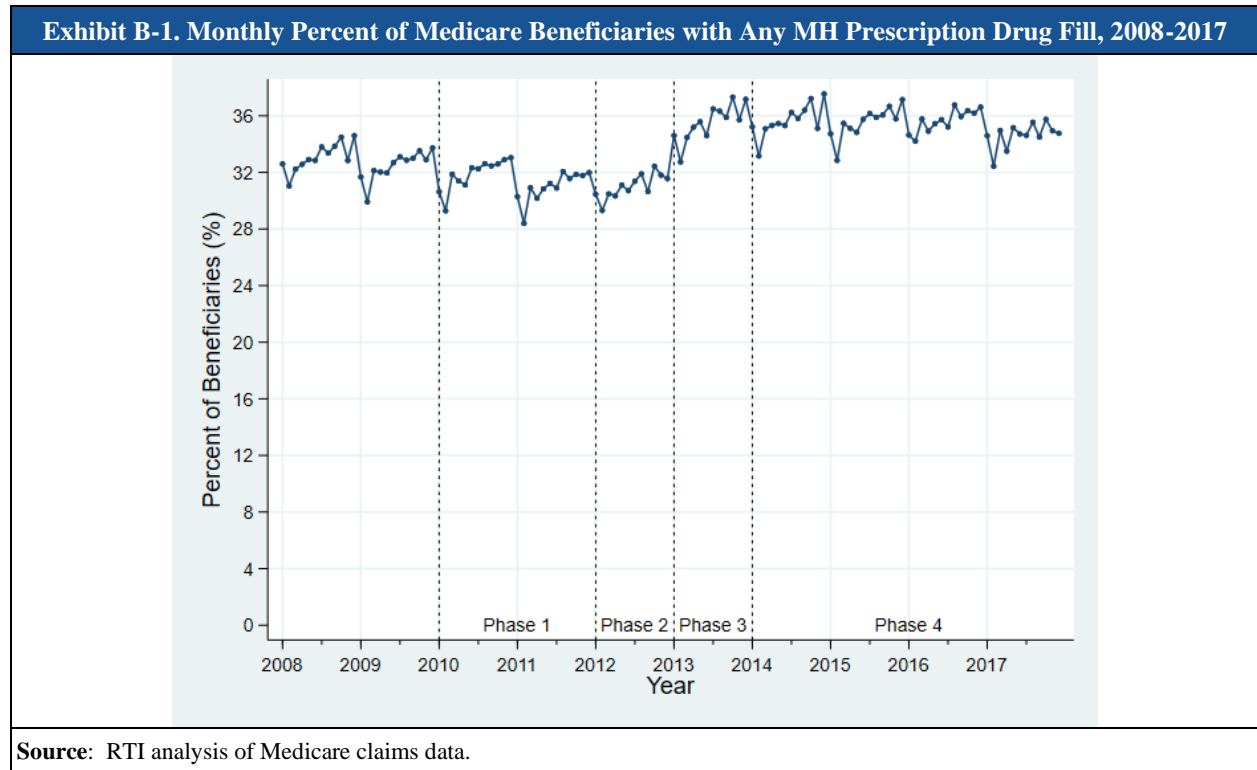
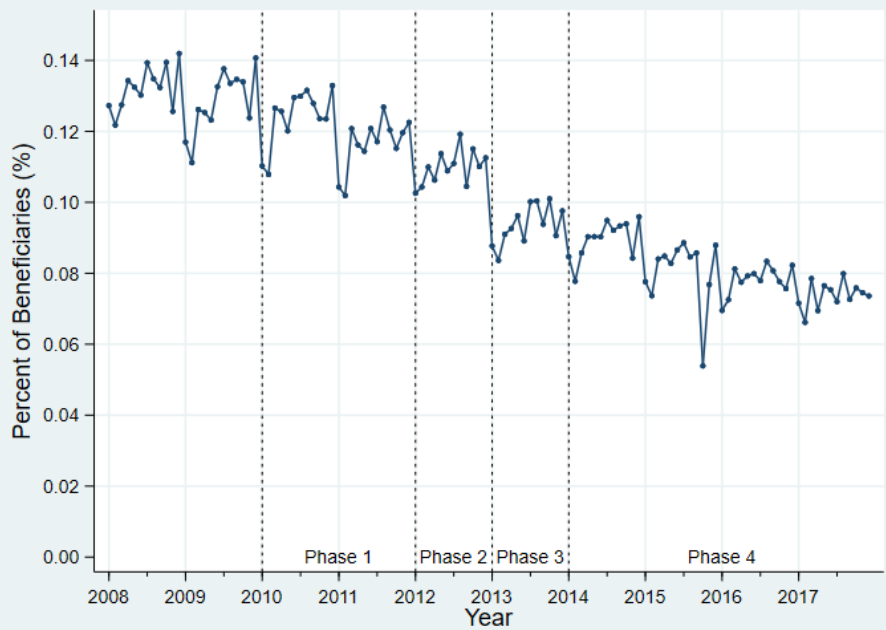
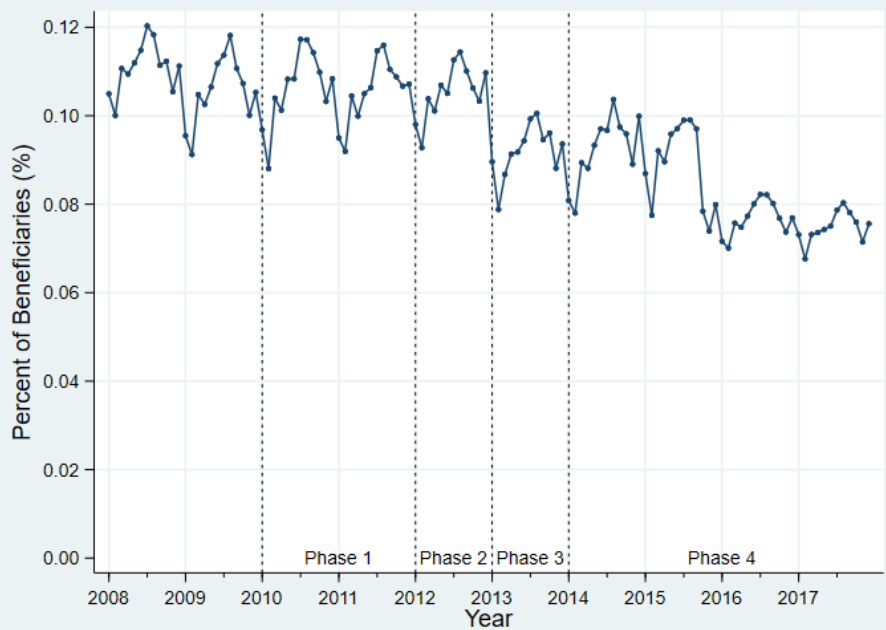


Exhibit B-2. Monthly Percent of Medicare Beneficiaries with Any MH Hospitalization, 2008-2017



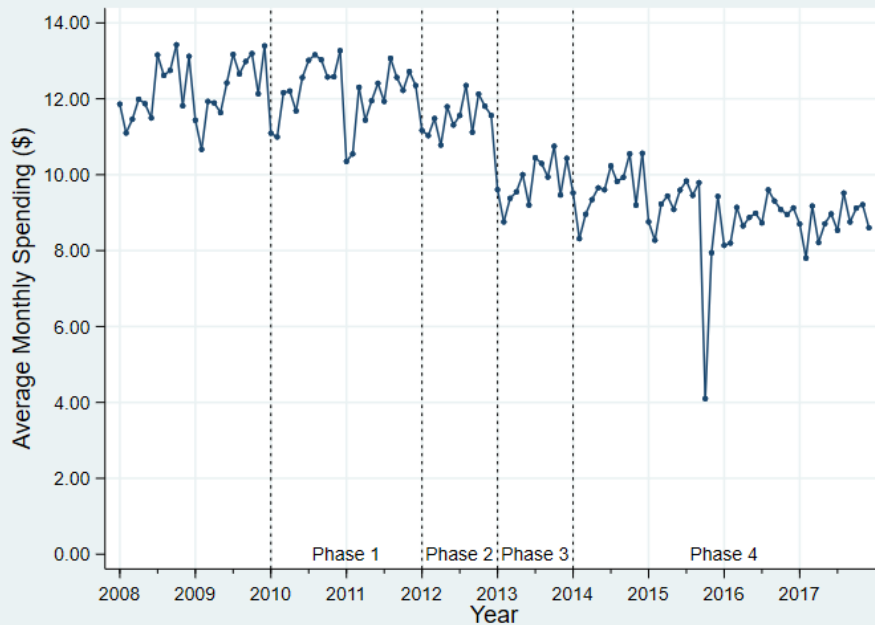
Source: RTI analysis of Medicare claims data.

Exhibit B-3. Monthly Percent of Medicare Beneficiaries with Any MH ED Visit, 2008-2017



Source: RTI analysis of Medicare claims data.

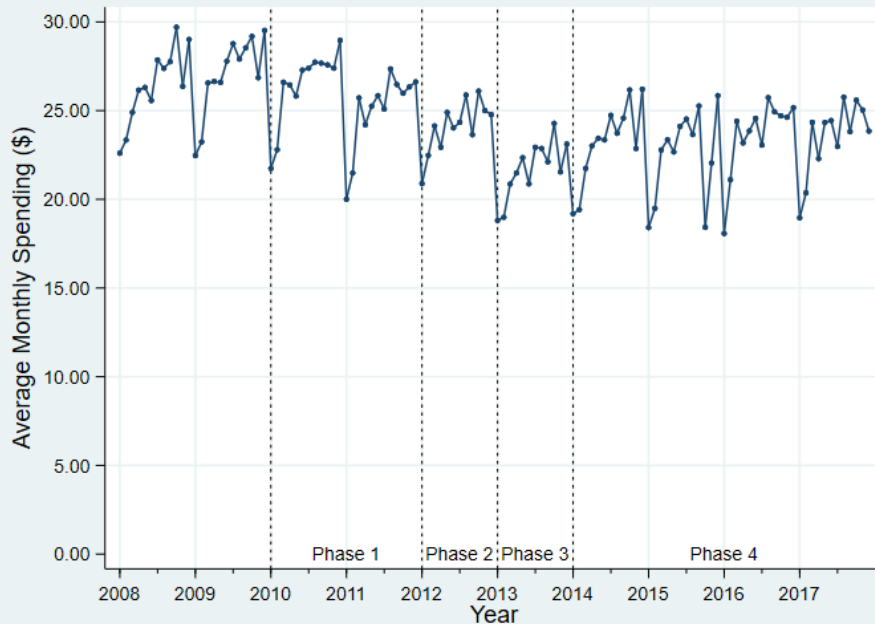
Exhibit B-4. Monthly Average MH Inpatient Spending among Medicare Beneficiaries with a MH Diagnosis or MH-Related Service Use, 2008-2017



Source: RTI analysis of Medicare claims data.

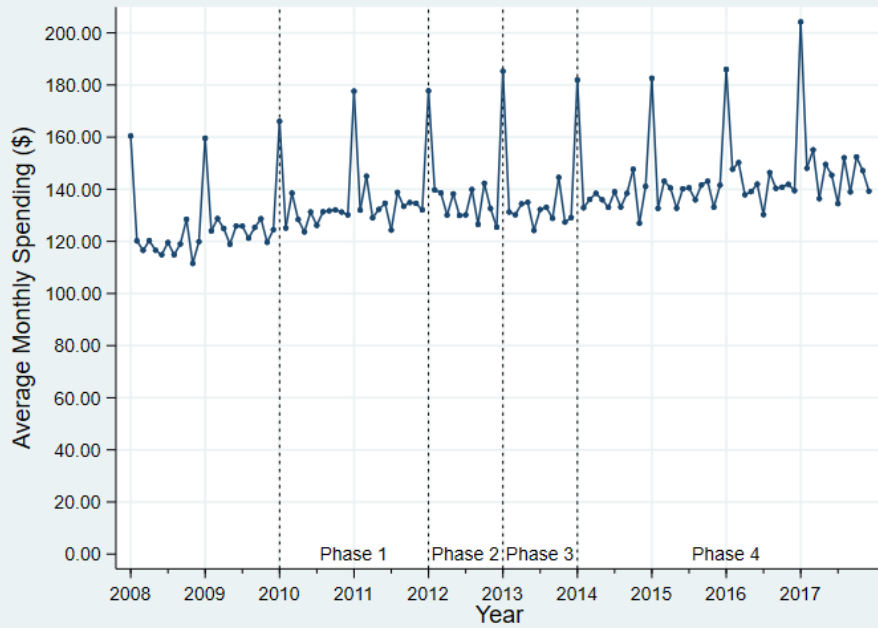
Note: The drop in spending occurring in October 2015 was related to the switch from ICD-9 to ICD-10.

Exhibit B-5. Monthly Average Total MH FFS Spending among Medicare Beneficiaries with a MH Diagnosis or MH-Related Service Use, 2008-2017



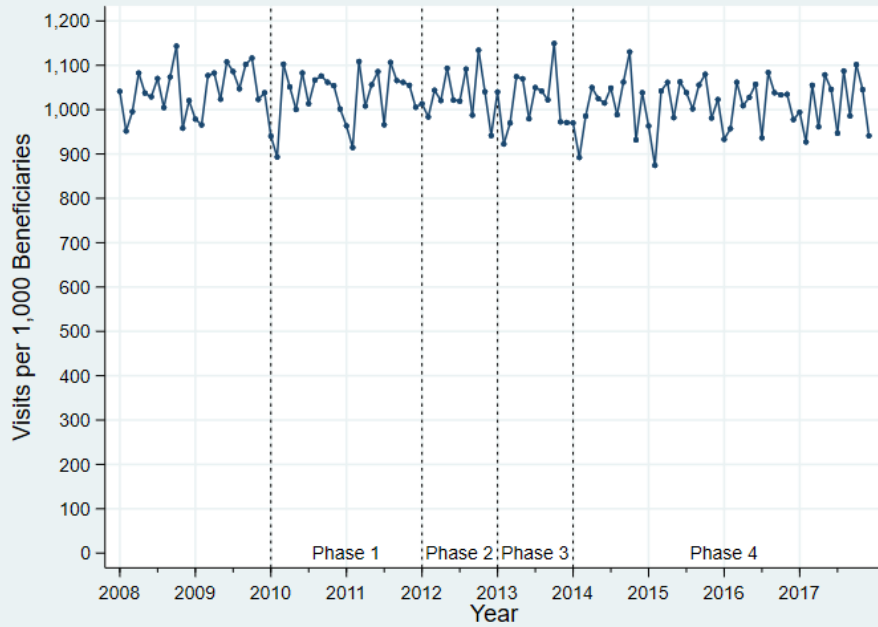
Source: RTI analysis of Medicare claims data.

Exhibit B-6. Monthly Average Part B OOP Payments for Non-MH Services among Medicare Beneficiaries with a MH Diagnosis or MH-Related Service Use, 2008-2017



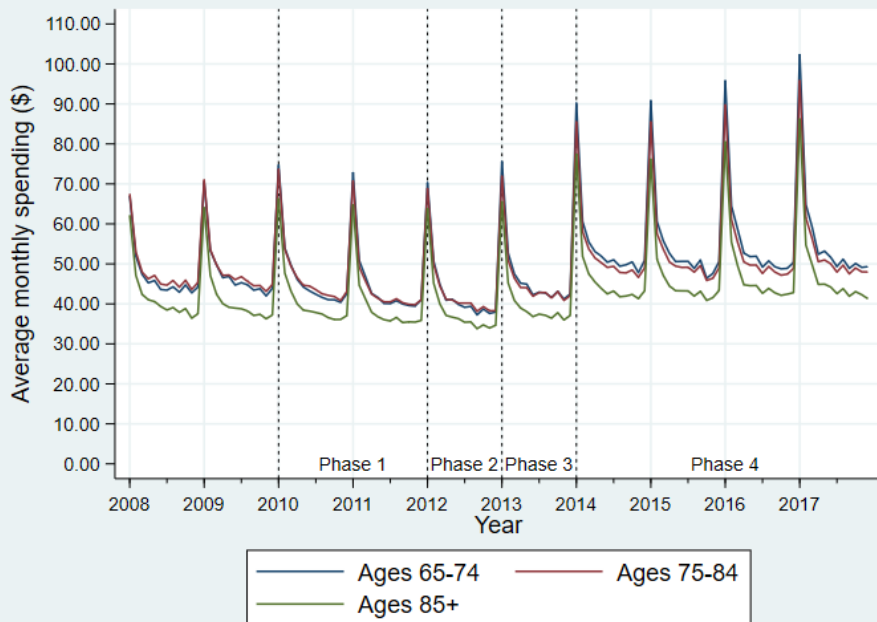
Source: RTI analysis of Medicare claims data.

Exhibit B-7. Monthly Rate of Non-MH E&M Visits among Medicare Beneficiaries with a MH Diagnosis or MH-Related Service Use, 2008-2017



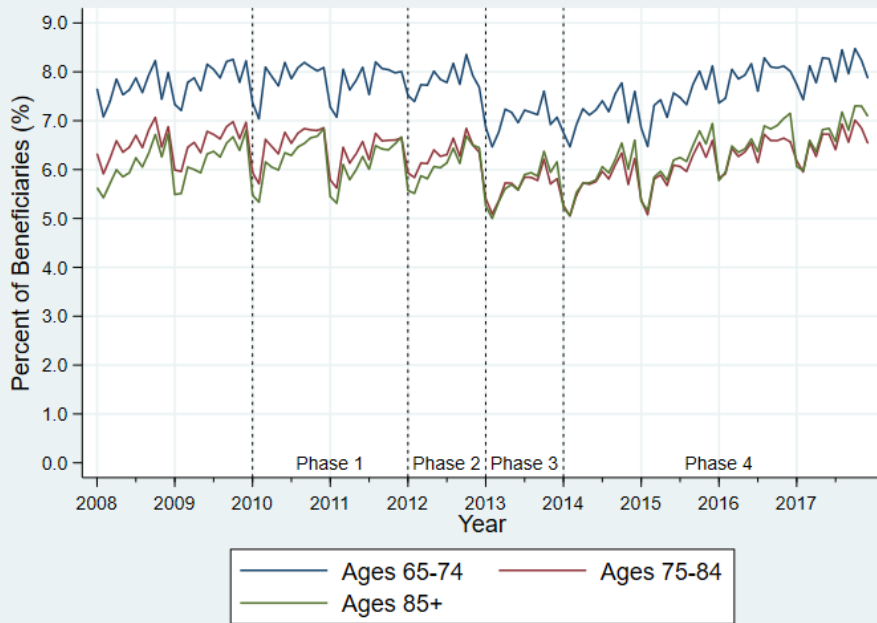
Source: RTI analysis of Medicare claims data.

Exhibit B-8. Monthly MH Part B OOP Payments per User of MH Part B Outpatient Services among Medicare Beneficiaries with a MH Diagnosis or MH-Related Service Use, by Age Group, 2008-2017



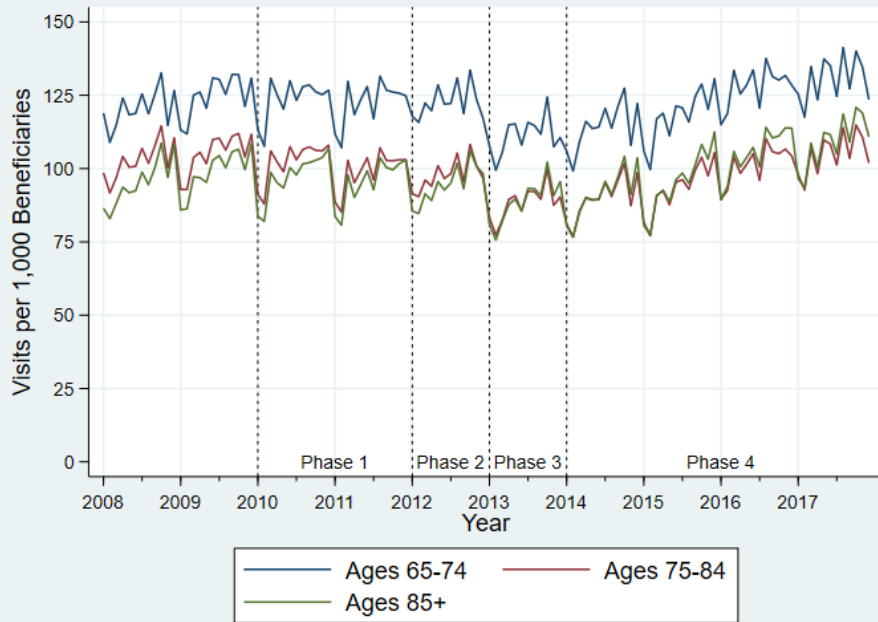
Source: RTI analysis of Medicare claims and enrollment data.

Exhibit B-9. Monthly Percent of Medicare Beneficiaries with a MH Diagnosis or MH-Related Service Use Who had Any MH Outpatient Visit, by Age Group, 2008-2017



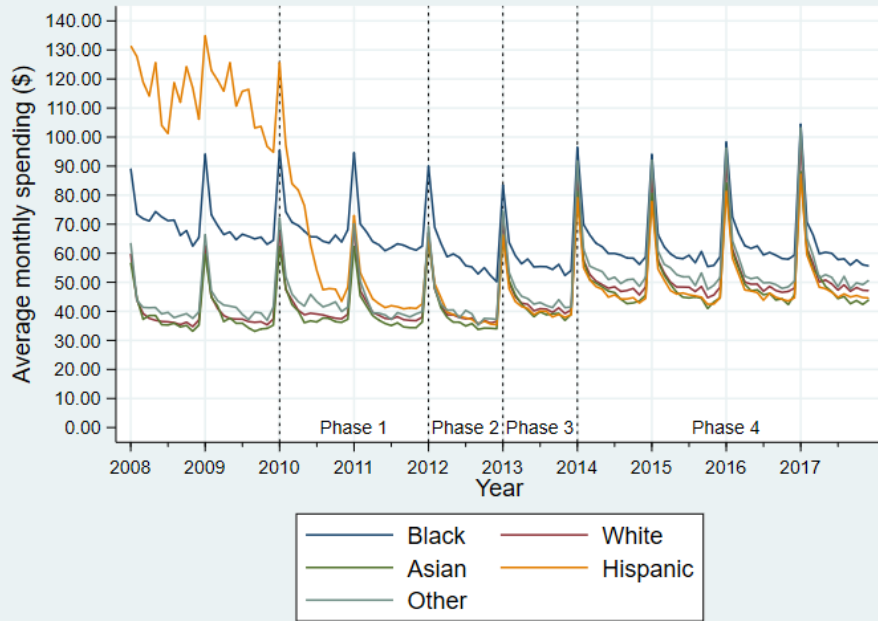
Source: RTI analysis of Medicare claims and enrollment data.

Exhibit B-10. Monthly Rate MH Outpatient Visits per 1,000 Medicare Beneficiaries with a MH Diagnosis or MH-Related Service Use, by Age Group, 2008-2017



Source: RTI analysis of Medicare claims and enrollment data.

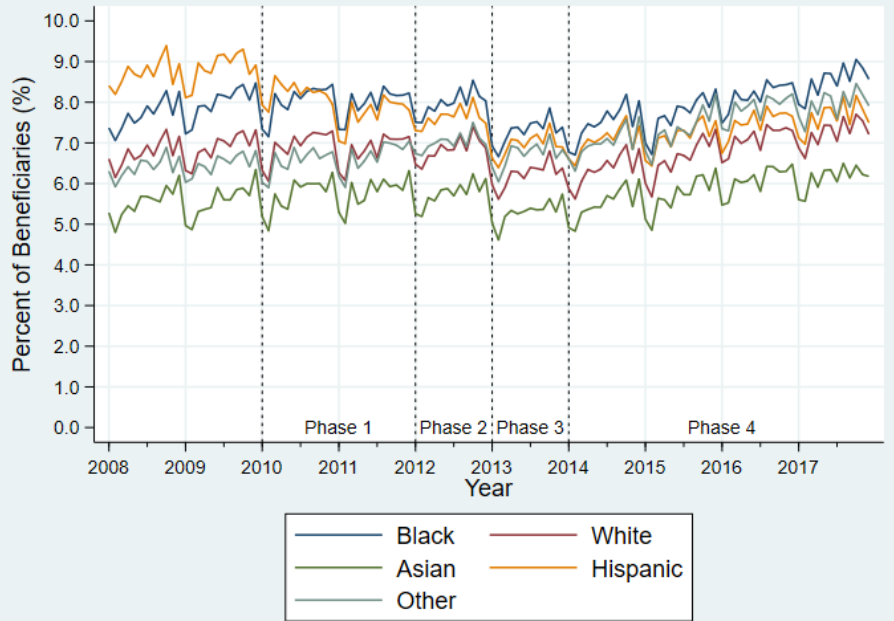
Exhibit B-11. Monthly MH Part B OOP Payments per User of MH Part B Outpatient Services among Medicare Beneficiaries with a MH Diagnosis or MH-Related Service Use, by Race, 2008-2017



Source: RTI analysis of Medicare claims and enrollment data.

Note: Further investigation is needed to better understand the decrease in MH OOP payments among Hispanic MH beneficiaries prior to 2010. The decrease in MH use and payments began in mid-2009 and occurs within the outpatient Medicare claims files only.

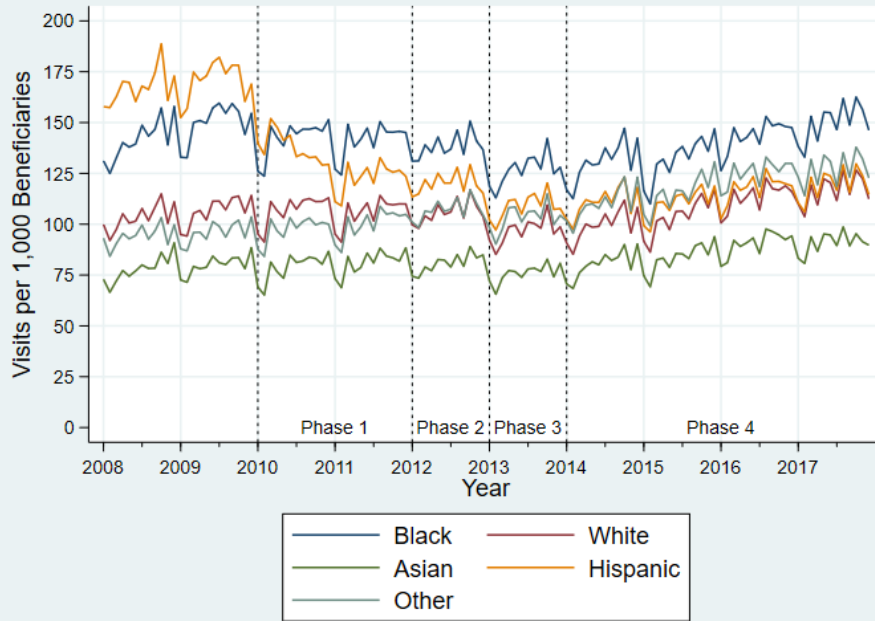
Exhibit B-12. Monthly Percent of Medicare Beneficiaries with a MH Diagnosis or MH-Related Service Use Who had Any MH Outpatient Visit, by Race, 2008-2017



Source: RTI analysis of Medicare claims and enrollment data.

Note: Further investigation is needed to better understand the decrease in MH outpatient visits among Hispanic MH beneficiaries prior to 2010. The decrease in MH use and payments began in mid-2009 and occurs within the outpatient Medicare claims files only.

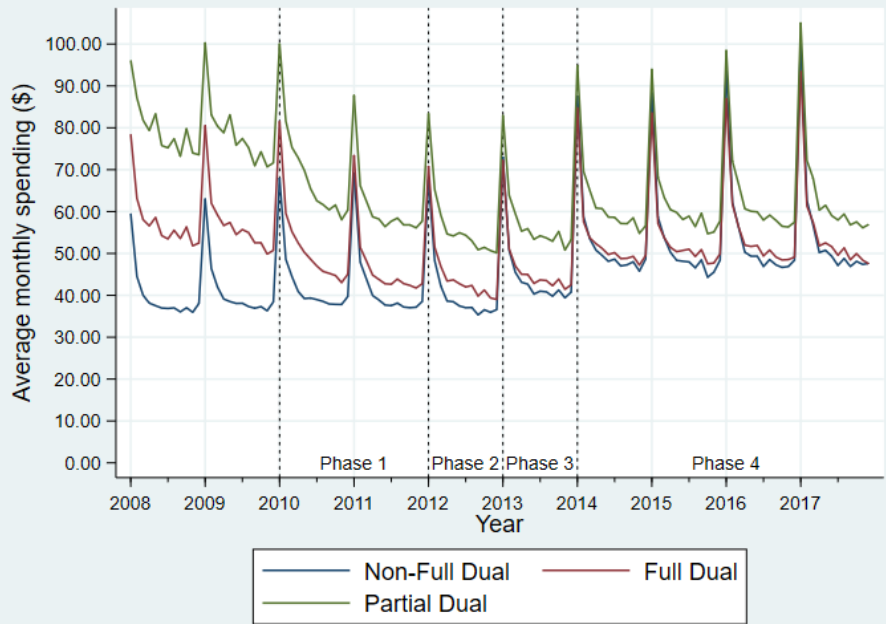
Exhibit B-13. Monthly Rate MH Outpatient Visits per 1,000 Medicare Beneficiaries with a MH Diagnosis or MH-Related Service Use, by Race, 2008-2017



Source: RTI analysis of Medicare claims and enrollment data.

Note: Further investigation is needed to better understand the decrease in MH outpatient visits among Hispanic MH beneficiaries prior to 2010. The decrease in MH use and payments began in mid-2009 and occurs within the outpatient Medicare claims files only.

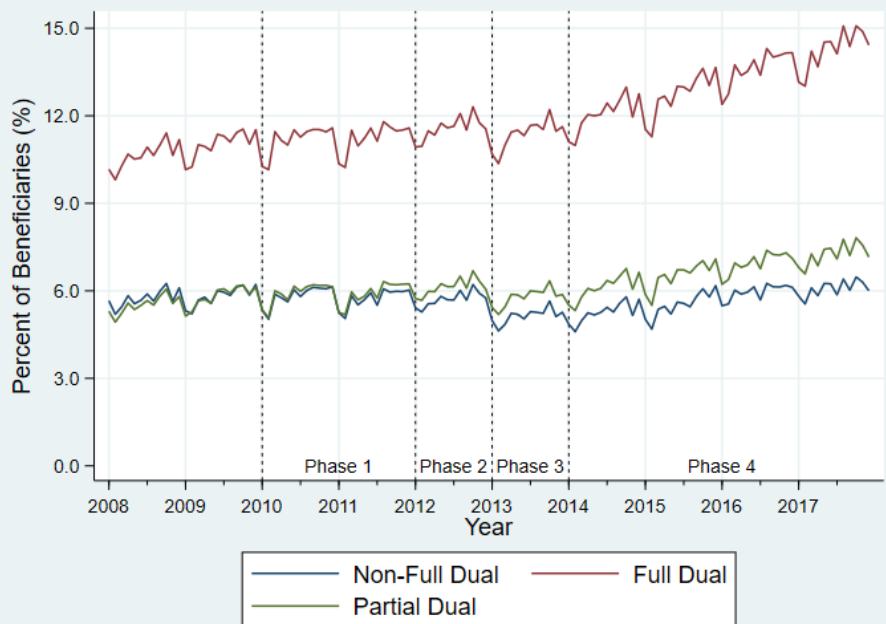
Exhibit B-14. Monthly MH Part B OOP Payments per User of MH Part B Outpatient Services among Medicare Beneficiaries with a MH Diagnosis or MH-Related Service Use, by Dual Eligibility Status, 2008-2017



Source: RTI analysis of Medicare claims and enrollment data.

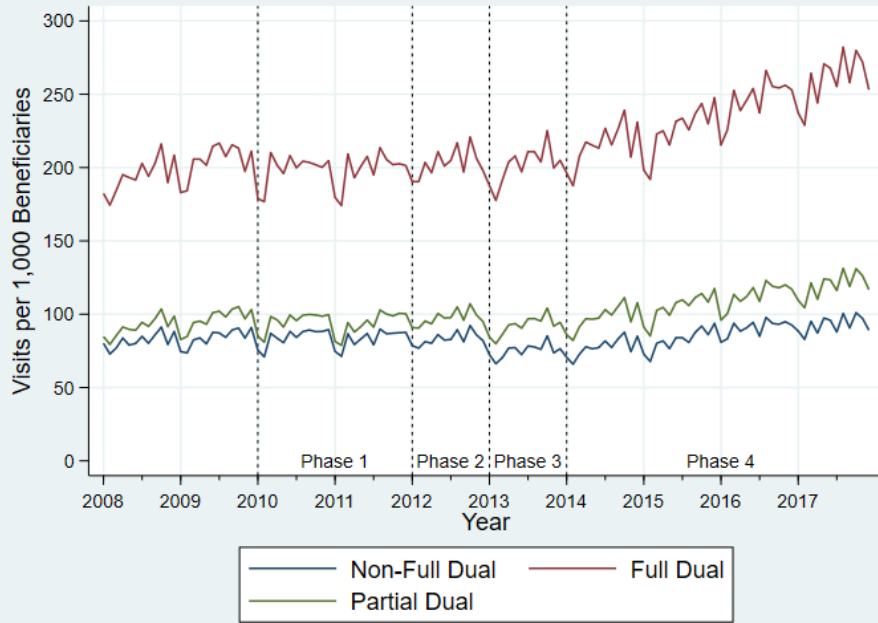
Note: OOP payments for full dual beneficiaries are likely paid by Medicaid, payments not captured in Medicare claims.

Exhibit B-15. Monthly Percent of Medicare Beneficiaries with a MH Diagnosis or MH-Related Service Use Who had Any MH Outpatient Visit, by Dual Eligibility Status, 2008-2017



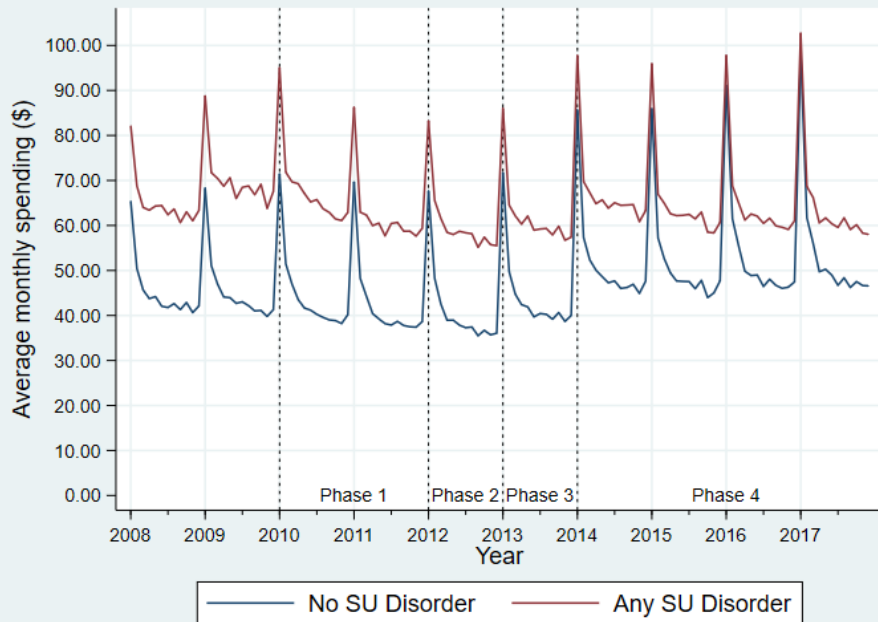
Source: RTI analysis of Medicare claims and enrollment data.

Exhibit B-16. Monthly Rate MH Outpatient Visits per 1,000 Medicare Beneficiaries with a MH Diagnosis or MH-Related Service Use, by Dual Eligibility Status, 2008-2017



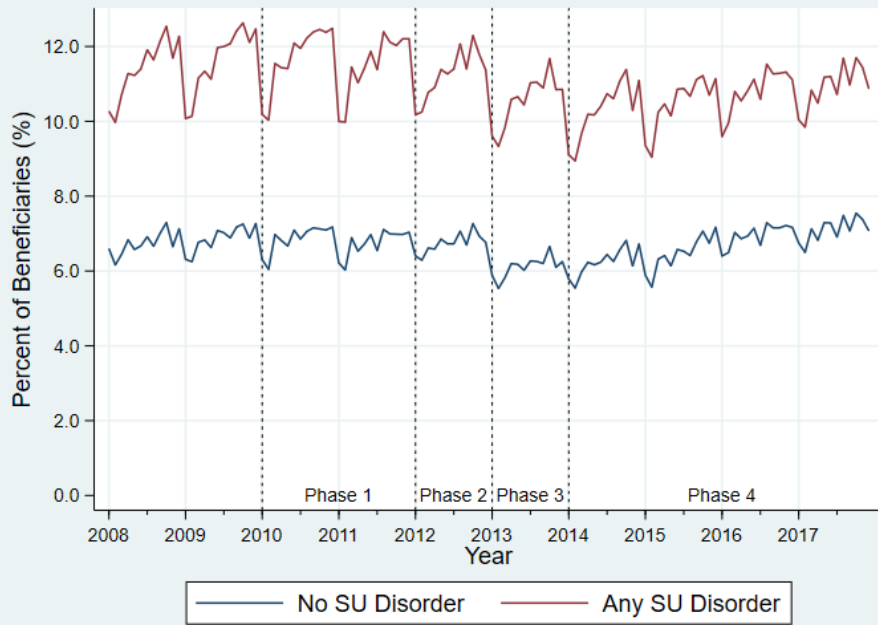
Source: RTI analysis of Medicare claims and enrollment data.

Exhibit B-17. Monthly MH Part B OOP Payments per User of MH Part B Outpatient Services among Medicare Beneficiaries with a MH Diagnosis or MH-Related Service Use, by SUD, 2008-2017



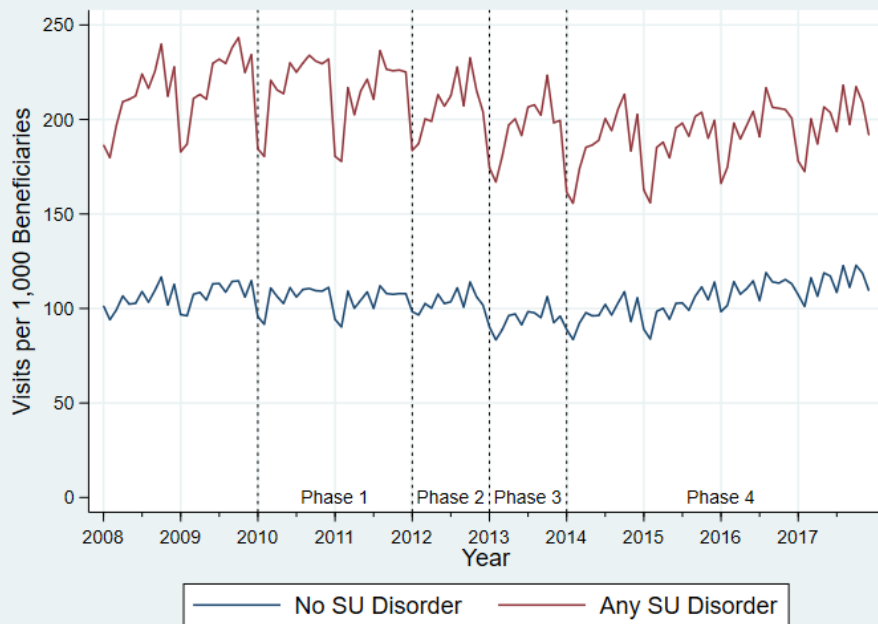
Source: RTI analysis of Medicare claims and enrollment data.

Exhibit B-18. Monthly Percent of Medicare Beneficiaries with a MH Diagnosis or MH-Related Service Use Who had Any MH Outpatient Visit, by SUD, 2008-2017



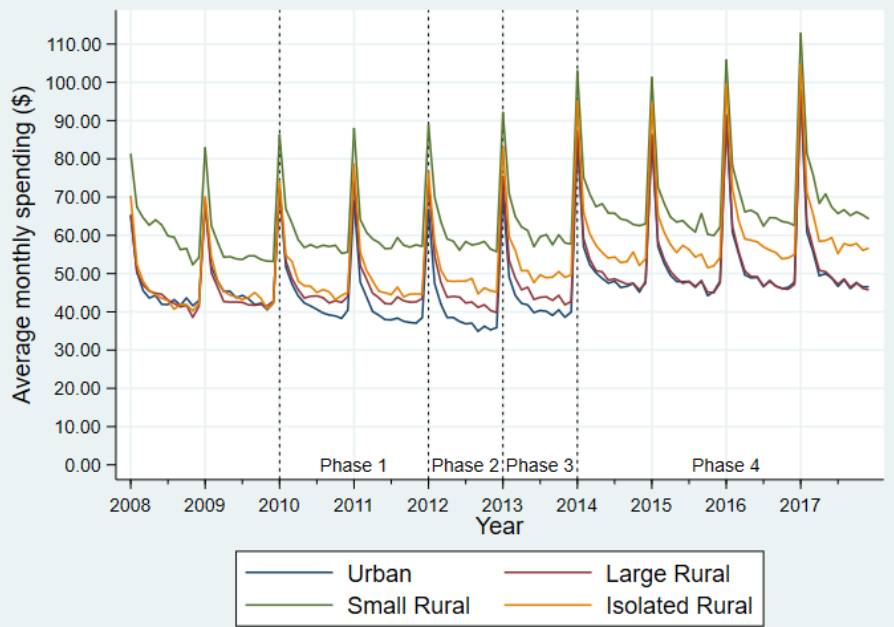
Source: RTI analysis of Medicare claims and enrollment data.

Exhibit B-19. Monthly Rate MH Outpatient Visits per 1,000 Medicare Beneficiaries with a MH Diagnosis or MH-Related Service Use, by SUD, 2008-2017



Source: RTI analysis of Medicare claims and enrollment data.

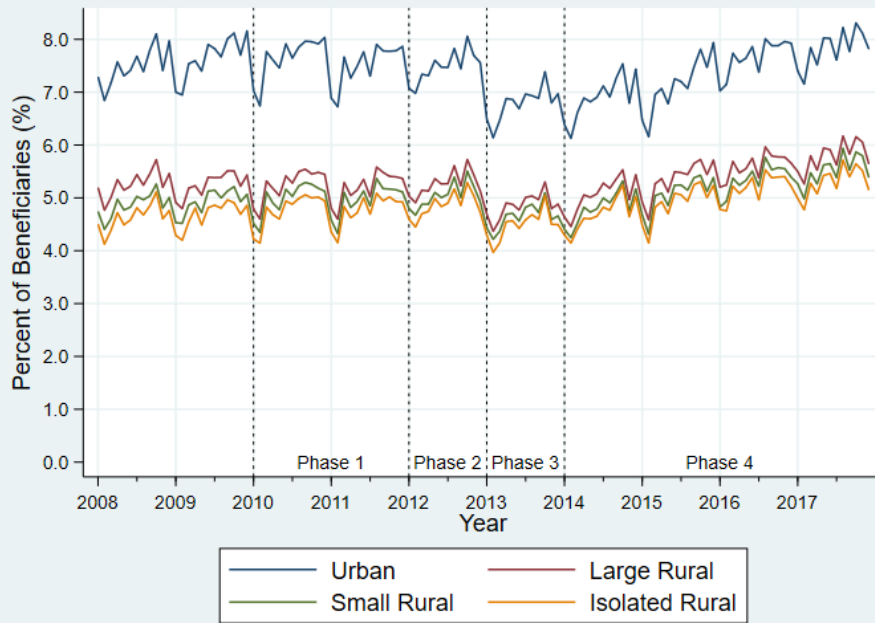
Exhibit B-20. Monthly MH Part B OOP Payments per User of MH Part B Outpatient Services among Medicare Beneficiaries with a MH Diagnosis or MH-Related Service Use, by Rural Status, 2008-2017



Source: RTI analysis of Medicare claims and enrollment data.

Note: We used the RUCA codes to identify Urban (RUCA = 1, 1.1, 2, 2.1, 3, 4.1, 5.1, 7.1, 8.1, 10.1), Large Rural (4, 4.2, 5, 5.2, 6, 6.1), Small Rural (7, 7.2, 7.3, 7.4, 8, 8.2, 8.3, 8.4, 9, 9.1, 9.2), and Isolated Rural (10, 10.2, 10.3, 10.4, 10.5, 10.6). RUCA classifications are based on the size and direction of primary and secondary commuting flows.

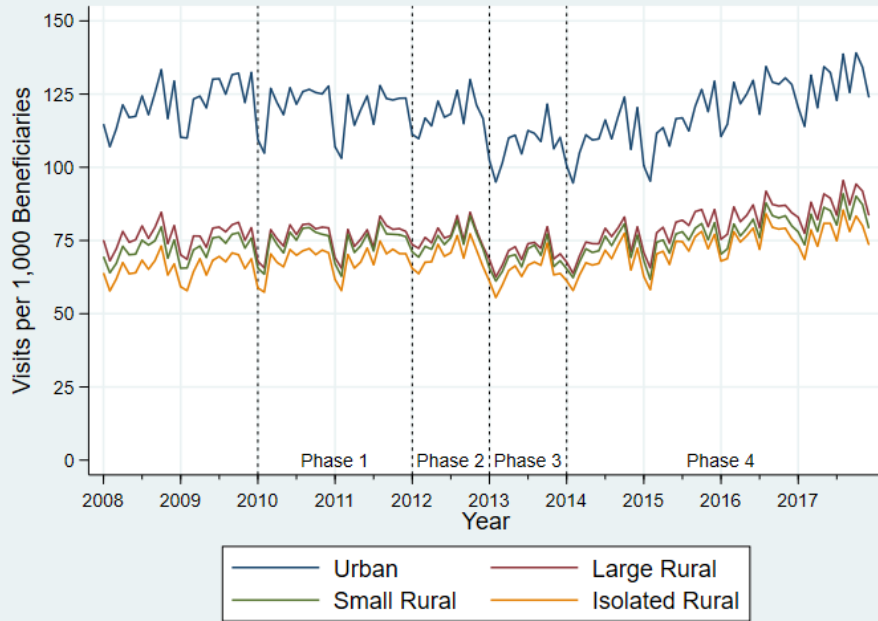
Exhibit B-21. Monthly Percent of Medicare Beneficiaries with a MH Diagnosis or MH-Related Service Use Who had Any MH Outpatient Visit, by Rural Status, 2008-2017



Source: RTI analysis of Medicare claims and enrollment data.

Note: We used the RUCA codes to identify Urban (RUCA = 1, 1.1, 2, 2.1, 3, 4.1, 5.1, 7.1, 8.1, 10.1), Large Rural (4, 4.2, 5, 5.2, 6, 6.1), Small Rural (7, 7.2, 7.3, 7.4, 8, 8.2, 8.3, 8.4, 9, 9.1, 9.2), and Isolated Rural (10, 10.2, 10.3, 10.4, 10.5, 10.6). RUCA classifications are based on the size and direction of primary and secondary commuting flows.

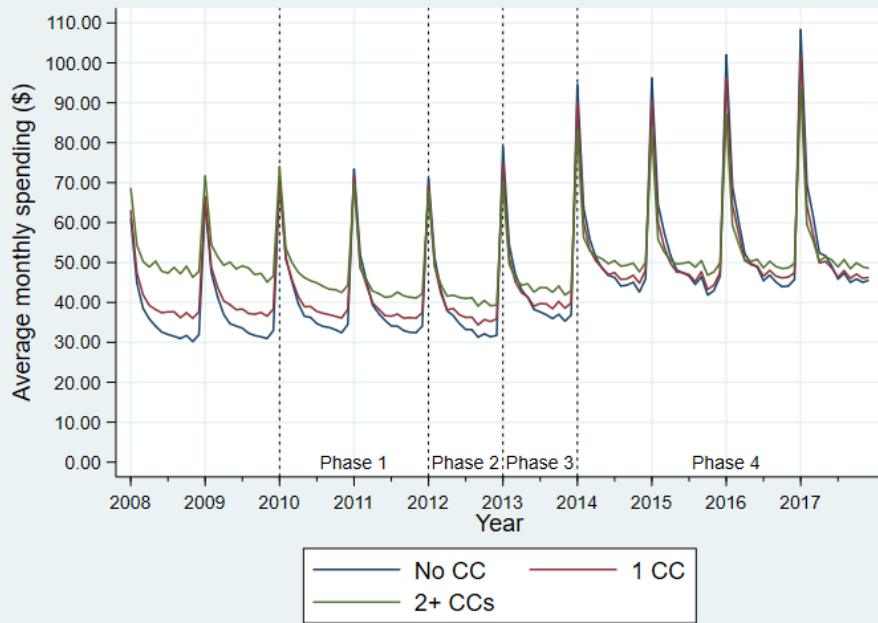
Exhibit B-22. Monthly Rate MH Outpatient Visits per 1,000 Medicare Beneficiaries with a MH Diagnosis or MH-Related Service Use, by Rural Status, 2008-2017



Source: RTI analysis of Medicare claims and enrollment data.

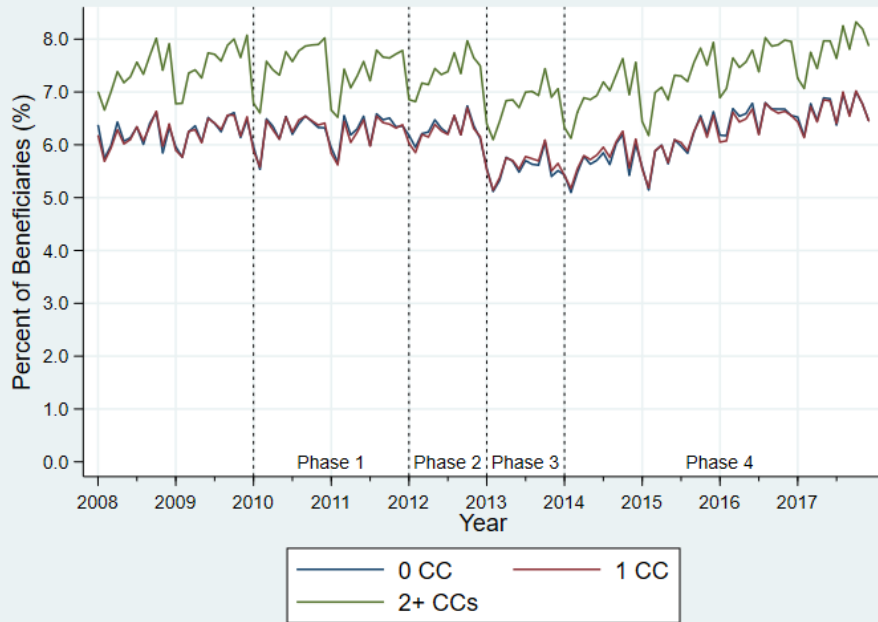
Note: We used the RUCA codes to identify Urban (RUCA = 1, 1.1, 2, 2.1, 3, 4.1, 5.1, 7.1, 8.1, 10.1), Large Rural (4, 4.2, 5, 5.2, 6, 6.1), Small Rural (7, 7.2, 7.3, 7.4, 8, 8.2, 8.3, 8.4, 9, 9.1, 9.2), and Isolated Rural (10, 10.2, 10.3, 10.4, 10.5, 10.6). RUCA classifications are based on the size and direction of primary and secondary commuting flows.

Exhibit B-23. Monthly Average MH Part B OOP Payments per User among Medicare Beneficiaries with a MH Diagnosis or MH-Related Service Use, by Charlson Comorbidity Categories, 2008-2017



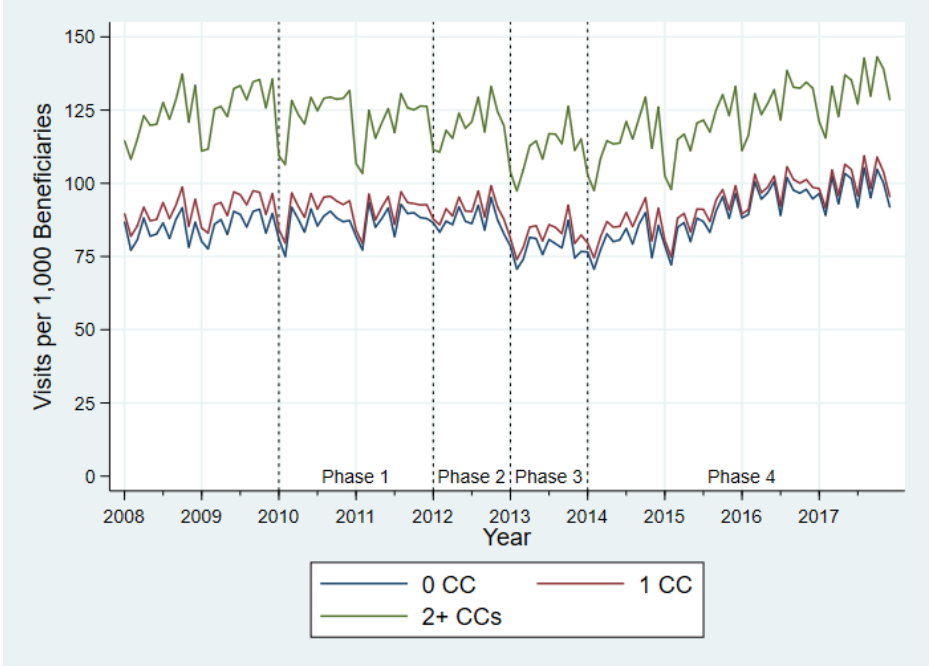
Source: RTI analysis of Medicare claims and enrollment data.

Exhibit B-24. Monthly Percent of Medicare Beneficiaries with a MH Diagnosis or MH-Related Service Use Who had Any MH Outpatient Visit, by Charlson Comorbidity Category, 2008-2017



Source: RTI analysis of Medicare claims and enrollment data.

Exhibit B-25. Monthly Rate MH Outpatient Visits per 1,000 Medicare Beneficiaries with a MH Diagnosis or MH-Related Service Use, by Charlson Comorbidity Categories, 2008-2017



Source: RTI analysis of Medicare claims and enrollment data.

**APPENDIX C: DESCRIPTIVE TABLES AND
SUPPLEMENTAL RESULTS**

Exhibit C-1. Demographic Characteristics of Medicare Beneficiaries with a MH Diagnosis or MH-Related Service Use during Pre-MIPPA Years, 2008-2009				
	2008		2009	
	Frequency	%	Frequency	%
Overall	5,527,732		5,678,397	
Age Group				
Ages 65-74	2,268,607	41%	2,382,387	42%
Ages 75-84	2,057,755	37%	2,061,018	36%
Ages 85+	1,201,370	22%	1,234,992	22%
Race				
White	4,775,186	86%	4,888,821	86%
Black	341,812	6%	354,888	6%
Asian	83,118	2%	87,468	2%
Hispanic	277,501	5%	293,420	5%
Other	50,115	1%	53,800	1%
Rural Category				
Urban	4,196,587	76%	4,323,807	76%
Large Rural	673,333	12%	688,348	12%
Small Rural	384,163	7%	390,737	7%
Isolated Rural	268,767	5%	273,675	5%
SUD Status				
Any SUD	183,140	3%	203,636	4%
No SUD	5,344,592	97%	5,474,761	96%
Full Dual Status				
Full Dual	1,305,516	24%	1,325,634	23%
Non-Full Dual	4,222,216	76%	4,352,763	77%
Partial Dual Status				
Partial Dual	274,618	5%	290,494	5%
Non-Partial Dual	5,253,114	95%	5,387,903	95%
Charlson Comorbidity Category				
No Comorbid Condition	1,085,563	20%	1,111,356	20%
1 Comorbid Condition	1,094,091	20%	1,110,966	20%
2+ Comorbid Conditions	3,348,078	61%	3,456,075	61%

Exhibit C-2. Demographic Characteristics of Medicare Beneficiaries with a MH Diagnosis or MH-Related Service Use during MIPPA Implementation Phase 1-Phase 3, 2010-2013								
	2010		2011		2012		2013	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%
Overall	5,908,406		6,240,446		6,540,104		7,524,417	
Age Group								
Ages 65-74	2,524,701	43%	2,709,484	43%	2,913,215	45%	3,474,684	46%
Ages 75-84	2,104,622	36%	2,192,591	35%	2,252,779	34%	2,550,943	34%
Ages 85+	1,279,083	22%	1,338,371	21%	1,374,110	21%	1,498,790	20%
Race								
White	5,075,242	86%	5,356,287	86%	5,615,880	86%	6,472,936	86%
Black	372,651	6%	394,710	6%	409,399	6%	460,264	6%
Asian	93,757	2%	99,644	2%	105,368	2%	121,797	2%
Hispanic	308,731	5%	325,203	5%	335,192	5%	371,584	5%
Other	58,025	1%	64,602	1%	74,265	1%	97,836	1%
Rural Category								
Urban	4,508,443	76%	4,774,865	77%	5,023,302	77%	5,811,509	77%
Large Rural	712,124	12%	748,516	12%	777,563	12%	880,932	12%
Small Rural	403,070	7%	421,293	7%	435,373	7%	489,689	7%
Isolated Rural	283,238	5%	294,503	5%	302,684	5%	341,102	5%
SUD Status								
Any SUD	224,028	4%	247,940	4%	282,038	4%	345,534	5%
No SUD	5,684,378	96%	5,992,506	96%	6,258,066	96%	7,178,883	95%
Full Dual Status								
Full Dual	1,345,064	23%	1,364,363	22%	1,364,567	21%	1,417,738	19%
Non-Full Dual	4,563,342	77%	4,876,083	78%	5,175,537	79%	6,106,679	81%
Partial Dual Status								
Partial Dual	313,901	5%	342,806	5%	354,281	5%	387,095	5%
Non-Partial Dual	5,594,505	95%	5,897,640	95%	6,185,823	95%	7,137,322	95%
CC Category								
No CC	1,155,818	20%	1,209,209	19%	1,300,289	20%	1,583,297	21%
1 CC	1,146,545	19%	1,185,825	19%	1,246,835	19%	1,457,431	19%
2+ CCs	3,606,043	61%	3,845,412	62%	3,992,980	61%	4,483,689	60%

Exhibit C-3. Demographic Characteristics of Medicare Beneficiaries with a MH Diagnosis or MH-Related Service Use during MIPPA Implementation Phase 4 and Later Years, 2014-2017								
	2014		2015		2016		2017	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%
Overall	7,717,391		7,975,194		8,257,671		8,478,599	
Age Group								
Ages 65-74	3,647,034	47%	3,868,111	49%	4,098,036	50%	4,254,160	50%
Ages 75-84	2,570,877	33%	2,619,360	33%	2,696,328	33%	2,786,731	33%
Ages 85+	1,499,480	19%	1,487,723	19%	1,463,307	18%	1,437,708	17%
Race								
White	6,654,880	86%	6,885,251	86%	7,106,137	86%	7,280,803	86%
Black	459,501	6%	461,547	6%	472,571	6%	476,866	6%
Asian	122,581	2%	126,909	2%	137,267	2%	146,108	2%
Hispanic	363,648	5%	363,037	5%	379,332	5%	388,333	5%
Other	116,781	2%	138,450	2%	162,364	2%	186,489	2%
Rural Category								
Urban	5,974,751	77%	6,191,325	78%	6,434,637	78%	6,610,977	78%
Large Rural	897,712	12%	920,759	12%	945,319	11%	972,117	11%
Small Rural	497,208	6%	507,850	6%	517,016	6%	526,461	6%
Isolated Rural	346,658	4%	354,318	4%	359,826	4%	368,251	4%
SUD Status								
Any SUD	403,903	5%	467,101	6%	464,851	6%	507,463	6%
No SUD	7,313,488	95%	7,508,093	94%	7,792,820	94%	7,971,136	94%
Full Dual Status								
Full Dual	1,357,432	18%	1,306,423	16%	1,305,333	16%	1,304,123	15%
Non-Full Dual	6,359,959	82%	6,668,771	84%	6,952,338	84%	7,174,476	85%
Partial Dual Status								
Partial Dual	389,251	5%	388,502	5%	386,734	5%	382,075	5%
Non-Partial Dual	7,328,140	95%	7,586,692	95%	7,870,937	95%	8,096,524	95%
CC Category								
No CC	1,653,814	21%	1,686,971	21%	1,778,032	22%	1,828,836	22%
1 CC	1,491,278	19%	1,508,957	19%	1,560,371	19%	1,582,947	19%
2+ CCs	4,572,299	59%	4,779,266	60%	4,919,268	60%	5,066,816	60%

Exhibit C-4. Phase-Specific Impact of MIPPA on MH OOP Payments, Utilization, and Spending, 2008-2017

Outcomes	Difference in level between Phase 2 and Phase 1	p-value	Difference in trend between Phase 2 and Phase 1	p-value	Difference in level between Phase 3 and Phase 2	p-value	Difference in trend between Phase 3 and Phase 2	p-value	Difference in level between Phase 4 and Phase 3	p-value	Difference in trend between Phase 4 and Phase 3	p-value
Primary Outcomes												
Any MH-outpatient visit	<0.000	0.820	-0.000	0.658	-0.005	0.000	<0.000	0.989	<0.000	0.544	<0.000	0.000
MH-outpatient visits per 1,000 beneficiaries	1.062	0.511	-0.201	0.326	-6.976	0.001	0.195	0.401	0.189	0.905	0.563	0.005
MH-Part B OOP payments	-2.16	0.293	0.265	0.109	0.186	0.928	0.108	0.502	5.76	0.000	-0.252	0.121
Secondary Outcomes												
Percent with any MH prescription drug fills	0.007	0.003	-0.000	0.632	0.048	0.000	0.001	0.000	0.003	0.199	-0.001	0.016
Percent with any MH inpatient use	-0.000	0.537	-0.000	0.262	-0.000	0.001	<0.000	0.247	<0.000	0.878	-0.000	0.818
Percent with any MH ED use	-0.000	0.993	-0.000	0.365	-0.000	0.000	-0.000	0.318	0.000	0.004	-0.000	0.378
MH-inpatient spending (\$)	-0.249	0.458	-0.054	0.039	-1.296	0.002	0.043	0.116	-0.023	0.954	-0.007	0.839
MH-total FFS spending (\$)	0.314	0.513	-0.091	0.070	-0.801	0.201	0.063	0.323	2.070	0.000	0.121	0.033
Sensitivity Outcomes												
Non-MH-Part B OOP payments	-1.904	0.347	-0.586	0.022	-0.724	0.820	0.198	0.510	2.214	0.318	0.230	0.430
Non-MH E&M visit per 1,000 beneficiaries	16.584	0.216	-5.170	0.006	30.769	0.122	1.858	0.499	7.451	0.638	2.637	0.229

Exhibit C-5. Difference in Overall and Phase-Specific Trend on MH OOP Spending per Visit, Relative to the Pre-MIPPA Trend, 2008-2017

Outcomes	Difference in trend pre- and post-MIPPA	p-value	Difference in trend between Phase 1 and pre-MIPPA	p-value	Difference in trend between Phase 2 and pre-MIPPA	p-value	Difference in trend between Phase 3 and pre-MIPPA	p-value	Difference in trend between Phase 4 and pre-MIPPA	p-value
MH OOP spending per visit (\$)	-0.013	0.858	-0.138	0.071	0.069	0.614	0.080	0.495	-0.096	0.176

Source: RTI analysis of Medicare claims data.

**Exhibit C-6. Difference in Phase-Specific Trend on MH OOP Payments, Utilization, and Spending
Relative to Pre-MIPPA, Non-Full Dual Eligible Beneficiaries, 2008-2017**

Outcomes	Difference in trend between Phase 1 and pre-MIPPA	p-value	Difference in trend between Phase 2 and pre-MIPPA	p-value	Difference in trend between Phase 3 and pre-MIPPA	p-value	Difference in trend between Phase 4 and pre-MIPPA	p-value
Primary Outcomes								
Percent with any MH-outpatient visit	-0.000	0.116	-0.000	0.309	-0.000	0.072	<0.000	<0.001
MH-outpatient visits per 1,000 beneficiaries	-0.172	0.058	-0.346	0.059	-0.318	0.060	0.262	0.005
MH-Part B OOP payments (\$)	-0.213	0.090	-0.034	0.881	0.003	0.989	-0.233	0.046
Secondary Outcomes								
Percent with any MH prescription drug fills	<0.000	0.069	<0.000	0.786	0.001	<0.001	<0.000	<0.001
Percent with any MH inpatient use	-0.000	0.081	-0.000	0.093	-0.000	0.080	-0.000	0.058
Percent with any MH ED use	<0.000	<0.001	<0.000	0.027	<0.000	0.934	-0.000	0.082
MH-inpatient spending (\$)	-0.017	0.152	-0.050	0.014	-0.049	0.048	-0.033	0.006
MH-total FFS spending (\$)	-0.079	<0.001	-0.167	<0.001	-0.167	<0.001	-0.032	0.080
MH OOP spending per visit (\$)	-0.126	0.138	0.056	0.716	0.028	0.830	-0.169	0.036
Sensitivity Outcomes								
Non-MH-Part B OOP payments (\$)	0.006	0.959	-0.542	0.019	-0.342	0.229	-0.172	0.019
Non-MH E&M visit per 1,000 beneficiaries	0.075	0.943	-5.132	0.007	-3.200	0.155	-0.625	0.459

Source: RTI analysis of Medicare claims data.

Note: Approximately 2.5-2.7% of beneficiaries without any month of full dual eligibility had at least 1 month Qualified Medicare Beneficiary status and have no cost-sharing requirements. A separate analysis removing these beneficiaries from the sample of non-full dual eligibles produced results similar in magnitude and statistical significance as the results presented in this table.