

Appendices

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A1: Analytic Sample Detailed Steps

Exhibit A1.1: Data processing steps and associated enrollee-year counts

<u>Data Process</u>	<u>Person Years</u>
All Enrollees, 2007-2017	278,342,299
Require Medical, Pharmacy, and Behavioral Health Coverage	128,559,343
Exclude Enrollees with Medicare Advantage or Medicare is Primary Payer	120,339,003
Require Fully Populated Medical and Pharmacy Deductible Data	108,952,938
Require 11 Month Continuous Enrollment within a Person-Year	68,690,019
Require Some Static Attributes within a Person-Year (firm, gender, year of birth, family ID)	68,522,315
Require Medical and Pharmacy Deductibles to Equal One Another When Shared	68,255,606
Require Enrollee Age to be Between 12 and 64	56,415,790
Select 1 Continuous Span of Data From Each Firm Uninterrupted By Large Changes in Firm Size	54,502,157
Characterize Firm-Level HDHP Enrollment Trends and Identify Treatment and Comparison Firms	28,717,236
→ Enrollment Increase From $\leq 5\%$ to $> 5\%$ (Treatment Firm)	14,531,870
→ All Years 0% Enrollment (Comparison Firms)	14,185,366
→ All Years 100% Enrollment	7,791,702
→ All Years $\leq 5\%$ Enrollment (& not all 0%)	2,019,173
→ All Years $> 5\%$ Enrollment (& not all 100%)	11,449,970
→ Enrollment Crosses 5% Threshold Multiple Times	910,989
→ Enrollment Decrease From $> 5\%$ to $\leq 5\%$	319,664

To build our analytic dataset, we first start with plan-side data and clean the appropriate tables to ensure that a single plan is associated with a single deductible level and that there are no overlaps when plans are identified in the same way. We assign firms firm-specific date windows that define their year, driven by the modal start dates of the plans the firm offers. We join individuals to the clean

deductible information and ensure that individuals are associated with a single firm and deductible level for at least 330 days within their firm's year. We do not allow firms to have large year over year changes in enrollment.

We assign treatment status based on the percentage of a firm's enrollees that are enrolled in a high deductible health plan (HDHP). Firms with at least 2 continuous years of data, where the % enrolled in an HDHP goes from below this enrollment threshold to above this enrollment threshold exactly once are considered to be treatment firms. Firms that have no HDHP enrollees in all of its years of data are considered comparison firms. The detailed steps are laid out below.

We start with plan level detail and limit plans to only those that have valid deductible information. We manipulate this data so that plans do not overlap and are unique.

There are initially 741,181 plans. We remove those that don't have valid individual deductible information or have individual deductibles greater than family deductibles when the family deductible is nonzero. Duplicates are removed and plans that have overlapping active dates are collapsed into one. This leaves 562,383 unique plans.

There are initially 5,925,224 unique firm-plans. We remove duplicates, collapse overlapping records, trim dates, and ensure that firm-plans are only offered during a firm's time that it was a customer of the health insurer. These steps leave 5,003,529 firm-plans.

Based on these firm-plans that fit within their firm's active dates, we calculate each firm's modal month that its associated plans start on. Ties result in the earlier month being the mode. Plans can be any length of time, are not weighted by their plan size and the date used is the administrative start date within the firm-plan record (not enrollee start dates). The first of this month is used to drive a 'firm-year' for each year in the data. 67% of resulting enrollee-years are associated with firm-years that start in January and 6.9% are associated with firm years that start July (other months range from 2% to 4% of enrollee-years). Calendar years are defined based on the year in which the firm offered the plan.

We then join plan-level detail with firm-plans and ensure that plan-level detail fits appropriately within firm-plan records. We then join individual member records for individuals that are associated with firm-plans offered at the firm. Upon joining individual member records, we then merge in associated pharmacy plan deductible level. At this stage, we have a single pharmacy and single medical deductible for each individual.

There are 110M enrollee-years that are associated with plans that have a valid deductible, are non-Medicare primary commercial plan with medical, pharmacy, and mental health coverage from 2007 through 2017. Of these, 69M have continuous deductible levels that

span 330 days or longer within a firm-year. 65M of these enrollee-years have full years of continuous enrollment and deductible level within a firm-year. Gaps in enrollment within a calendar year are not allowed.

We ensure that individuals are only associated with a single firm in a year, have a single gender associated with them in a year, have a single year of birth resulting in a non-negative age, and are associated with a single family ID within a year. We also ensure that when individuals are enrolled in medical and pharmacy coverage that have a shared deductible, they have the same deductible listed. We allow for individuals to be associated with different firms in different years, meaning individuals may potentially experience high deductible plans with multiple firms. This leaves 68,255,606 enrollee-years and 23,916,969 unique enrollees.

These enrollee-years are associated with 373,040 firms and 1,036,540 firm-years. We limit the firms to include only enrollees older than 11 and younger than 64 years of age. When there are gaps in the time that the firm had plans in this dataset, we select the span in which the firm (1) has the greatest number of enrollee-years and (2) is the longest length. When firms have enrollment increases or decreases of greater than 50% from one year to the next, we keep the (1) largest and (2) longest span uninterrupted by these large changes. Larger changes in firm sizes may indicate a large change in the composition of the observed enrollees, perhaps due to mergers, large layoffs, or the movement of enrollees to a health plan of an insurer not observed in the data. This keeps 857,097 firm-years associated with 369,239 firms and 51,216,200 enrollee-years associated with 19,168,554 enrollees.

In sensitivity analyses, we vary the firm size change maximum to 25% and 75%. Reducing the firm size change maximum to 25% results in 747,902 firm-years associated with 369,239 firms and 47,475,970 enrollee-years associated with 18,617,962 enrollees. Increasing the firm size change maximum to 75% results in 891,454 firm-years associated with 369,239 firms and 52,410,483 enrollee-years associated with 19,373,139 enrollees. The average firm declines in size 3.6% from the year prior to HDHP offer to the year following HDHP offer.

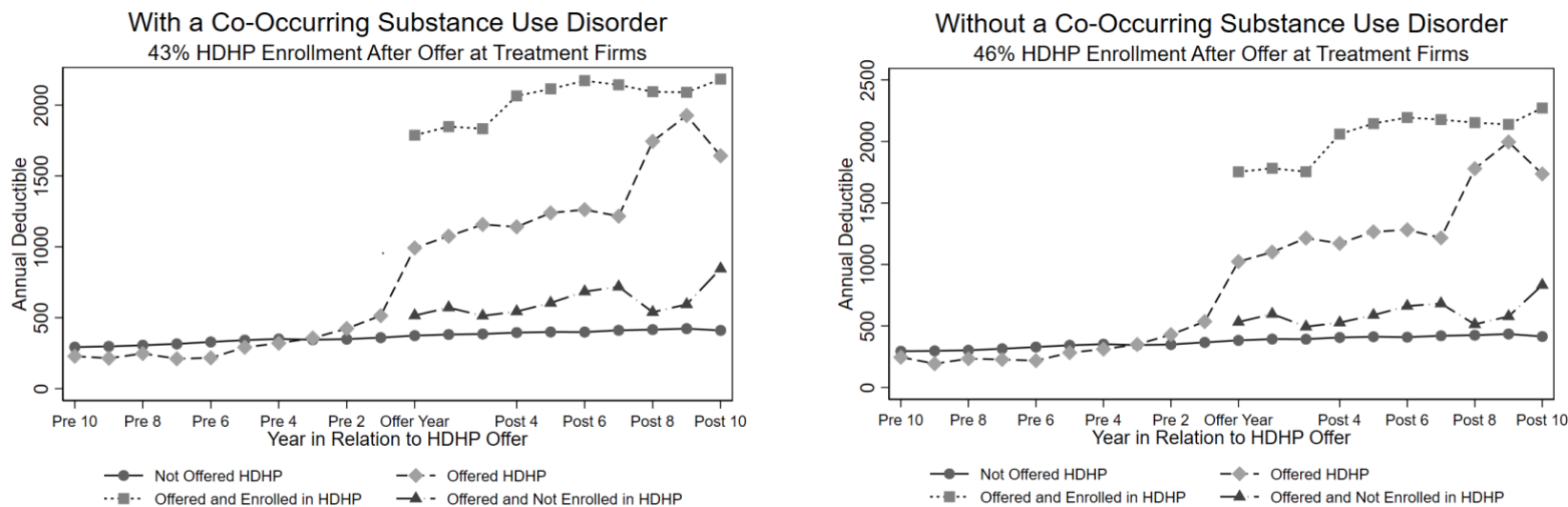
We define an individual's total deductible level as the sum of their in-network medical and pharmacy deductible when the deductibles are not shared or if they are shared, their single deductible listed. In all cases where it is unknown whether the medical and pharmacy deductibles are shared, the pharmacy deductible is \$0 so summing and taking the medical deductible is the same amount. Thus, we keep these records and assign their total as their medical deductible. Plans having individual deductibles greater than the IRS threshold (2007-2008: \$1,100; 2009: \$1,150; 2010-2012: \$1,200; 2013-2014: \$1,250; 2015-2017: \$1,300) were considered an HDHP.

The percentage of enrollees within a firm-year that are enrolled in an HDHP (i.e., take-up) is used to assign firm-level treatment status. We characterize the following types of firms based on their take-up across calendar years in relation to a 5% enrollment threshold.

- Never Take Up: All of the firm’s years are 0% take-up (Even if just a single year)
- All Full Take-Up: All of the firm’s years are 100% take-up (Even if just a single year)
- Low Take-Up: All of the firm’s years are $\leq 5\%$ take-up but is not a Never Take-Up Firm
- Constant Take-Up: All of the firm’s years are $> 5\%$ take-up but is not an All Full Take-Up Firm
- Unstable Take-Up: Take-up crossed the 5% threshold more than one time across all of the firm’s years
- Reverse Take-Up: Take-up crosses the 5% threshold once, from $> 5\%$ to $\leq 5\%$
- Positive Take-Up: Take-up crosses the 5% threshold once, from $\leq 5\%$ to $> 5\%$

Positive Take-Up firms are HDHP treatment firms. Never Take-Up firms are comparison firms. Firms falling into other categories are dropped. Exhibit A1-2 displays the mean annual deductible before and after a HDHP offer among treatment and comparison firms. The year of HDHP offer results in a higher mean deductible at treatment firms, driven in large part by enrollees of the HDHPs. Enrollees of the non-HDHP plans at these firms have similar mean deductibles to those at comparison firms.

Exhibit A1.2: Deductible levels over time in relation to HDHP offer year.



The exhibit displays mean in-network individual deductible levels for the treatment (offered HDHP) and comparison group (not offered HDHP) for enrollees with mental health conditions with and without a co-occurring substance use disorder. Comparison group means are calculated using the average of comparison group characteristics across calendar years and weighted by how often those calendar years appear in the treatment sample is that year relative to HDHP offer.

A 5% enrollment threshold results in 383,140 firm-years associated with 151,300 firms and 28,717,236 enrollee-years associated with 10,095,311 enrollees.

In sensitivity analyses we vary the HDHP enrollment threshold to 3% and 20%. Reducing the HDHP enrollment threshold to 3% results in 383,447 firm-years associated with 151,295 firms and 28,433,966 person-years associated with 10,024,929 people. Increasing the HDHP enrollment threshold to 20% results in 379,810 firm-years associated with 150,684 firms and 21,384,087 person-years associated with 8,130,568 people.

When increasing enrollment thresholds above 5%, we also require that firms offering an HDHP have <5% HDHP enrollment in all years prior to crossing the threshold.

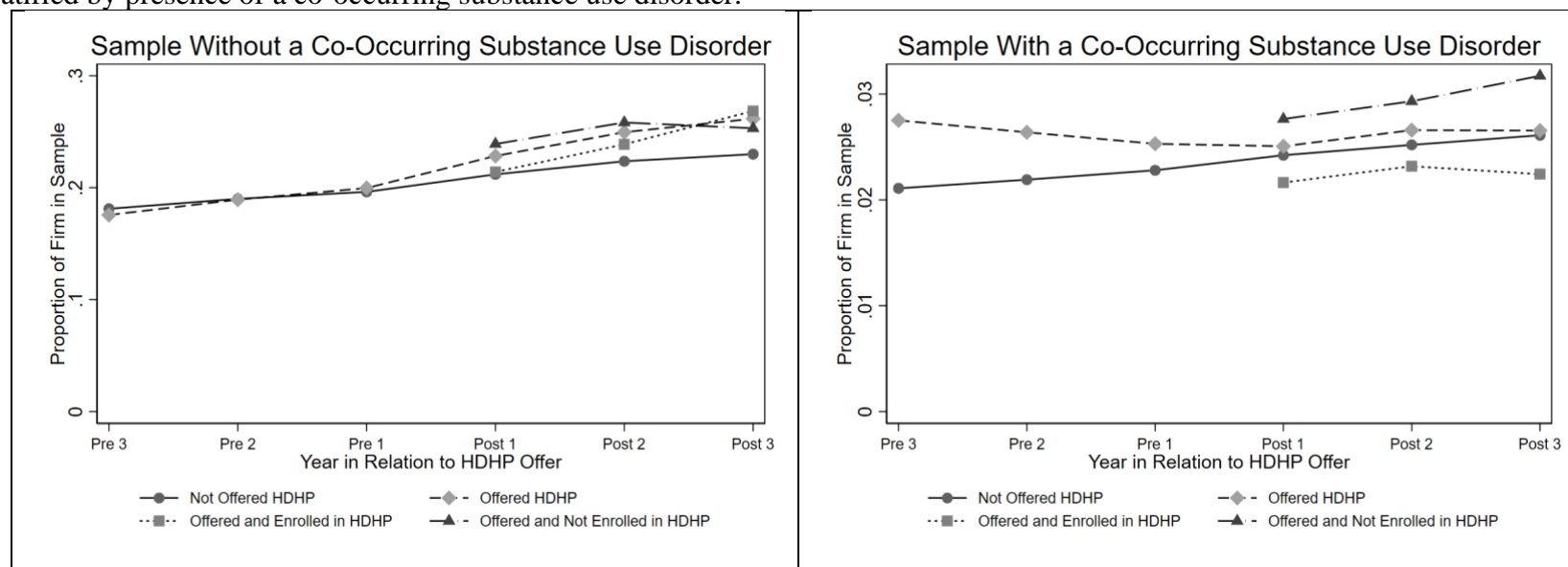
We implemented the following methodology to generate our sample of individuals with mental health conditions with and without a co-occurring substance use disorder: Enrollees who had a mental health condition and at least one substance use disorder diagnosis while observed at a treatment or comparison firm were included in the co-occurring substance use disorder sample beginning in the year in which they received their first diagnosis, whether it was a mental health or substance use disorder diagnosis, and remained in this sample for the duration of their time observed at a treatment or comparison firm. Enrollees with at least one claim with a mental health diagnosis and no claims with a substance use disorder diagnosis are included in the mental health condition without substance use disorder sample beginning in the year in which they first receive their mental health diagnosis and for all subsequent years observed at a treatment or comparison firm. Because a HDHP is likely to reduce the likelihood that an individual seeks mental health or substance use disorder care, we have implemented this sensitive selection criteria. Appendix exhibit A1-4 and A1-5 evaluate differences in the proportion of enrollees that enter the samples at treatment and comparison firms before and after the HDHP offer.

We included demographic, socioeconomic, and additional health status variables in our dataset. The enrollee's geography was defined at the 9-category Census division level. Enrollee race categories (Asian, Black, Hispanic, White, and Unknown) was obtained from the data supplier as an imputed value. Income level categories (<\$40K, >= \$40K and < \$75K, >= \$75K and < \$125K, >= \$125K and < \$200K, > \$200K, or missing) were obtained from the data supplier as an imputed variable. Education level (Less Than High School, Some College, Bachelor's Degree or More), based on the American Community Survey's reported median-level of education on the enrollee's census-block, was also obtained. Forty seven non-mental health and non-SUD comorbidities were also captured as binary indicators at the enrollee-year level using Chronic Condition Warehouse algorithms. Frequencies of these attributes and the full list of variables is found in Appendix 3.

Exhibit A1.3: Substance Use Disorder and Mental Health International Classification of Disease (ICD) 9 and ICD 10 Codes

	ICD9	ICD10
All Substance Use Disorders	291.*-292.*, 303.*-305.* [excluding 305.1 tobacco use disorder and 305.8 antidepressant abuse]	F10-F19.* [excluding F17.2x (tobacco use disorder)]
Alcohol Use Disorder	291.*, 303.*, 305.0*	F10.1*-F10.3*
Opioid Use Disorder	305.5*, 304.0*, 304.7*	F11.1*-F11.3*
All Mental Health Conditions	295.*-302.*, 306.*-314.*	F20.*-F69.*, F84.*, F90.*-F99.*
Bipolar Disorder	296.0*, 296.1*, 296.[4-9]*, 301.11, 301.13	F30.*, F31.*, F34.*
PTSD	309.81	F43.1*
ADD/ADHD	314*	F90.[0-2 8-9]*

Exhibit A1.4: Proportion of enrollees at treatment and comparison firms with mental health conditions before and after HDHP offer, stratified by presence of a co-occurring substance use disorder.



This exhibit displays the proportion of enrollees at treatment and comparison firms, before and after HDHP offer, that are included in the samples. We do not see large differences or differential trends in the proportion of enrollees that are included in the sample, indicating that we are likely mitigating the impact of a HDHP on the likelihood of any mental health or substance use disorder among treatment firms in the post period.

Exhibit A1.5: Standardized Mean Difference of proportion of enrollees with conditions in samples

	Pre 3	Pre 2	Pre 1	Post 1	Post 2	Post 3
Without a Co-Occurring Substance Use Disorder						
N	494,173	609,922	750,138	809,582	709,015	611,783
SMD	0.077	0.066	0.068	0.059	0.065	0.075
With a Co-Occurring Substance Use Disorder						
N	48,901	59,800	72,987	76,807	67,948	58,774
SMD	0.043	0.032	0.023	0.014	0.012	0.010

This exhibit displays a more formal evaluation of the proportion of enrollees at treatment and comparison firms, before and after HDHP offer, that are included in the samples. We measure the standardized mean difference of the proportion of enrollees found in each sample at treatment and comparison firms. All SMDs < 0.1.

A2: Outcome Measures

Exhibit A2.1: Substance Use Disorder and Mental Health International Classification of Disease (ICD) 9 and ICD 10 Codes

	ICD9	ICD10
All Substance Use Disorders	291.*-292.*, 303.*-305.* [excluding 305.1 tobacco use disorder and 305.8 antidepressant abuse]	F10-F19.* [excluding F17.2x (tobacco use disorder)]
Alcohol Use Disorder	291.*, 303.*, 305.0*	F10.1*-F10.3*
Opioid Use Disorder	305.5*, 304.0*, 304.7*	F11.1*-F11.3*
All Mental Health Conditions	295.*-302.*, 306.*-314.*	F20.*-F69.*, F84.*, F90.*-F99.*
Bipolar Disorder	296.0*, 296.1*, 296.[4-9]*, 301.11, 301.13	F30.*, F31.*, F34.*
PTSD	309.81	F43.1*
ADD/ADHD	314*	F90.[0-2][8-9]*

Exhibit A2.2: Outcome Definitions for Enrollees with Mental Health Conditions and a Co-Occurring Substance Use Disorder

Inpatient Hospitalization Spending	<p>We summed all physician and facility claims found within date ranges that contain a valid tax ID, having relevant revenue codes and AMA Place of Service Codes. This includes emergency department visits within one day of the beginning of an inpatient hospitalization.</p> <p>Mental health and SUD-related hospitalizations were identified as those hospitalization where at least 50% of facility claims within the inpatient stay had a SUD or mental health diagnosis in the first diagnosis position.</p>
Emergency Department Visit Spending	<p>We summed all physician and facility claims with relevant place of service, revenue, or procedure codes. Emergency department visits occurring within one day of the beginning of an inpatient hospitalization were excluded.</p> <p>Mental health and SUD-related emergency department visits were identified by the presence of a SUD or mental health diagnosis code in the first diagnosis position.</p>
Evaluation and Management Visit Spending	<p>We summed all physician and facility claims that include relevant procedure codes to identify evaluation and management claims. Relevant codes include non-physician evaluation and management services for mental health. These codes were included to include any potential price shopping to non-physician providers of mental health services.</p>

	Mental health and SUD-related evaluation and management services visits were identified by the presence of a SUD or mental health diagnosis code in the first diagnosis position.
Psychotropic Medication Spending	We summed all physician and facility claims that included relevant medication administration procedure codes for the treatment of mental health conditions and all pharmacy claims that included relevant NDC codes for the treatment of mental health medications. Some medications for ADD/ADHD, bipolar disorder and PTSD required diagnosis codes for these conditions in a previous or contemporaneous year, as the medications can be used to treat some non-mental health conditions. Anti-EPs medications required that the enrollee be using an anti-psychotic medication during the contemporaneous year.
Substance Use Disorder Medication Spending	We summed all physician and facility claims that included relevant medication administration procedure codes for the treatment of substance use disorder and all pharmacy claims that included relevant NDC codes for the treatment of substance use disorder. An alcohol use disorder diagnosis was required in the previous or contemporaneous year for Topiramate to count as a SUD medication. An opioid use disorder diagnosis was required in the previous or contemporaneous year for Clonidine to count as a SUD medication, as it can be used to treat the symptoms of withdrawal.
All Mental Health and Substance Use Disorder Spending	We summed all claims associated with mental health or SUD-related inpatient hospitalizations, all mental health and SUD medication claims, all screening, brief intervention and referral to treatment (SBIRT) claims, and all other claims that had a mental health or SUD primary diagnosis code, unless they were part of an inpatient hospitalization that was not designated as a mental health or SUD inpatient hospitalization.
All Other Spending	We summed all physician, facility, and pharmacy claims that were not captured in the mental health or SUD spending.
All Other Medication Spending	We summed all pharmacy claims were not designated as SUD or mental health medications.

Exhibit A2.3: Outcome Definitions for Enrollees with Mental Health Conditions without a Co-Occurring Substance Use Disorder

<p>Inpatient Hospitalization Spending</p>	<p>We summed all physician and facility claims found within date ranges that contain a valid tax ID, having relevant revenue codes and AMA Place of Service Codes. This includes emergency department visits within one day of the beginning of an inpatient hospitalization.</p> <p>Mental health-related hospitalizations were identified as those hospitalization where at least 50% of facility claims within the inpatient stay had a mental health diagnosis in the first diagnosis position.</p>
<p>Emergency Department Visit Spending</p>	<p>We summed all physician and facility claims with relevant place of service, revenue, or procedure codes. Emergency department visits occurring within one day of the beginning of an inpatient hospitalization were excluded.</p> <p>Mental health-related emergency department visits were identified by the presence of a mental health diagnosis code in the first diagnosis position.</p>
<p>Evaluation and Management Visit Spending</p>	<p>We summed all physician and facility claims that include relevant procedure codes to identify evaluation and management claims. Relevant codes include non-physician evaluation and management services for mental health. These codes were included to include any potential price shopping to non-physician providers of mental health services.</p> <p>Mental health evaluation and management visits were identified by the presence of a mental health diagnosis code in the first diagnosis position.</p>
<p>Psychotropic Medication Spending</p>	<p>We summed all physician and facility claims that included relevant medication administration procedure codes for the treatment of mental health and all pharmacy claims that included relevant NDC codes for the treatment of mental health conditions. Some medications for ADD/ADHD, bipolar disorder and PTSD required diagnosis codes for these conditions in a previous or contemporaneous year, as the medications can be used to treat some non-mental health conditions. Anti-EPS medications required that the enrollee be using an anti-psychotic medication during the contemporaneous year.</p>
<p>All Mental Health Spending</p>	<p>We summed all claims associated with mental health inpatient hospitalizations, all mental health medication claims, all screening, brief intervention and referral to treatment (SBIRT) claims, and all other claims that had a mental health disorder primary diagnosis code, unless they were part of an inpatient hospitalization that was not designated as a mental health-related inpatient hospitalization.</p>

All Other Spending	We summed all physician, facility, and pharmacy claims that were not captured in the mental health spending.
All Other Pharmacy Spending	We summed all pharmacy claims were not designated as mental health medications.

Exhibit A2.4: Outcome Definitions for Decomposed Price and Quantity Outcomes for Psychotropic Medications and Outpatient E&M Services

Quantity of Days' Supply and Cost per Days' Supply of Psychotropic Medications	<p>These measure was calculated separately for the sample without a co-occurring SUD and for the sample with a co-occurring SUD.</p> <p>All pharmacy, physician, and facility claims captured in the Psychotropic Medication Spending categories were assigned a days' supply based on the value provided in the pharmacy claims or based on the relevant procedure codes. The quantity of total days supplied and the sum of all health plan and out-of-pocket spending for all psychotropic medications were summed within a year for each enrollee. The sum of health plan and out-of-pocket spending was divided by the quantity of total days supplied to calculate the cost per days' supply, which is used as our proxy for price.</p>
Quantity of Visit Days and Cost per Visit Day for Outpatient E&M Services	<p>These measures were calculated separately for mental health E&M services and non-mental health E&M services among the sample of enrollees without a co-occurring substance use disorder.</p> <p>All physician and facility claims in the mental health E&M services and the non-mental health E&M services categories had their health plan and out-of-pocket spending summed within the year. The count of the number of unique days with these claims within a year were assigned as the number of visit-days. The count of individual claims were not used to avoid multiple claims for a single visit. The summed spending within a year divided by the quantity of visit-days was calculated as the cost per visit-day</p>

A3: Sample Characteristics

Exhibit A3.1: Full Sample Characteristics and Standardized Mean Differences Among Enrollees with Mental Health Conditions with a Co-Occurring Substance Use Disorder Offered and Not Offered a High Deductible Health Plan

	Enrollees with Mental Health Conditions and a Co-Occurring Substance Use Disorder					
	Treatment Group	Comparison Group	SMD Across Groups	Treatment Group Year Prior to Offer	Comparison Group Year Prior to Offer	SMD Across Groups Year Prior to Offer
	N=332,722	N=265,828		N=45,573	N=27,414	
Age; Mean (SD)	37.8 (14.4)	37.4 (14.3)	0.03	37.8 (14.3)	37.2 (14.3)	0.04
Gender; N (%)						
Male	177,858 (53.5%)	145,204 (54.6%)	0.023	24,260 (53.2%)	14,994 (54.7%)	0.028
Female	> 154,853 (46.5%)	120,603 (45.4%)	<0.1	> 21,302 (>46.7%)	> 12,409 (>45.2%)	<0.1
Unknown	< 11 (0%)	21 (0%)	<0.1	< 11 (<0.1%)	< 11 (<0.1%)	<0.1
Family Size, Top Coded at 6; N (%)						
1	82,048 (24.7%)	72,262 (27.2%)	0.058	11,581 (25.4%)	7,527 (27.4%)	0.044
2	72,488 (21.8%)	56,254 (21.2%)	0.015	9,989 (21.9%)	5,814 (21.2%)	0.018
3	61,134 (18.4%)	46,654 (17.6%)	0.021	8,344 (18.3%)	4,797 (17.5%)	0.020
4	69,145 (20.8%)	52,408 (19.7%)	0.027	9,401 (20.6%)	5,417 (19.7%)	0.022
5	32,173 (9.7%)	25,218 (9.5%)	0.006	4,261 (9.3%)	2,557 (9.4%)	0.001
6+	15,734 (4.7%)	13,032 (4.9%)	0.008	1,997 (4.4%)	1,302 (4.8%)	0.020
Race; N (%)						
Asian	4,788 (1.4%)	3,580 (1.3%)	0.008	587 (1.3%)	363 (1.3%)	0.004
Black	28,811 (8.7%)	20,852 (7.8%)	0.030	4,185 (9.2%)	2,107 (7.7%)	0.052
Hispanic	22,886 (6.9%)	21,014 (7.9%)	0.039	2,947 (6.5%)	2,140 (7.8%)	0.053
White	228,019 (68.5%)	181,492 (68.3%)	0.006	31,985 (70.2%)	18,992 (69%)	0.026
Unknown	48,218 (14.5%)	38,890 (14.6%)	0.004	5,869 (12.9%)	3,812 (14.1%)	0.037
Census Division Geography; N (%)						
New England	12,353 (3.7%)	11,599 (4.4%)	0.033	1,701 (3.7%)	1,272 (4.5%)	0.040
Mid Atlantic	25,574 (7.7%)	23,251 (8.7%)	0.039	3,229 (7.1%)	2,439 (8.8%)	0.065
East North Central	47,812 (14.4%)	45,987 (17.3%)	0.081	6,578 (14.4%)	4,773 (17.4%)	0.083
West North Central	30,168 (9.1%)	17,674 (6.6%)	0.089	3,968 (8.7%)	1,821 (6.7%)	0.075
South Atlantic	102,593 (30.8%)	69,393 (26.1%)	0.105	14,911 (32.7%)	7,171 (26.1%)	0.144
East South Central	11,537 (3.5%)	12,805 (4.8%)	0.068	> 1,621 (>3.5%)	> 1,302 (>4.7%)	<0.1
West South Central	43,037 (12.9%)	41,107 (15.5%)	0.073	5,683 (12.5%)	4,250 (15.4%)	0.087
Mountain	31,383 (9.4%)	26,336 (9.9%)	0.016	4,363 (9.6%)	2,648 (9.8%)	0.007
Pacific	28,225 (8.5%)	17,538 (6.6%)	0.071	3,497 (7.7%)	1,716 (6.3%)	0.052
Other	< 11 (0%)	57 (0%)	<0.1	< 11 (<0.1%)	< 11 (<0.1%)	<0.1
Unknown	> 29 (0%)	81 (0%)	<0.1	< 11 (<0.1%)	< 11 (<0.1%)	<0.1
Census Block Education; N (%)						
Less Than High School	2,608 (.8%)	2,498 (.9%)	0.017	443 (1%)	296 (1%)	0.006
High School	95,020 (28.6%)	82,329 (31%)	0.053	14,559 (31.9%)	8,798 (31.8%)	0.004
Some College	168,331 (50.6%)	129,632 (48.8%)	0.037	22,371 (49.1%)	13,112 (48.2%)	0.019
Bachelors or more	65,505 (19.7%)	50,176 (18.9%)	0.021	8,033 (17.6%)	5,086 (18.6%)	0.026
Unknown	1,258 (.4%)	1,193 (.4%)	0.011	167 (.4%)	123 (.4%)	0.013

Enrollees with Mental Health Conditions and a Co-Occurring Substance Use Disorder

	Treatment Group	Comparison Group	SMD Across Groups	Treatment Group Year Prior to Offer	Comparison Group Year Prior to Offer	SMD Across Groups Year Prior to Offer
Annual Income; N (%)						
< \$40K	41,721 (12.5%)	33,612 (12.6%)	0.003	5,968 (13.1%)	3,383 (12.3%)	0.023
>= \$40K and < \$75K	80,936 (24.3%)	64,480 (24.3%)	0.002	11,669 (25.6%)	6,734 (24.5%)	0.026
>= \$75K and < \$125K	95,127 (28.6%)	74,263 (27.9%)	0.015	13,028 (28.6%)	7,750 (28.1%)	0.010
>= \$125K and < \$200K	54,084 (16.3%)	40,582 (15.3%)	0.027	6,916 (15.2%)	4,212 (15.3%)	0.003
> \$200K	40,013 (12%)	29,968 (11.3%)	0.023	4,871 (10.7%)	3,112 (11.3%)	0.019
Missing	20,841 (6.3%)	22,923 (8.6%)	0.091	3,121 (6.8%)	2,224 (8.5%)	0.063
Non-Mental Health/Non-SUD Co-Occurring Conditions						
Acquired Hypothyroidism	22,679 (6.8%)	17,461 (6.6%)	0.010	3,089 (6.8%)	1,779 (6.5%)	0.011
Acute Myocardial Infarction	894 (.3%)	856 (.3%)	0.010	138 (.3%)	86 (.3%)	0.002
Alzheimer's Disease	124 (0%)	114 (0%)	0.003	23 (.1%)	12 (0%)	0.004
Alzheimer's/Related Disorders/Dementia	1,005 (.3%)	896 (.3%)	0.006	136 (.3%)	78 (.3%)	0.002
Anemia	22,639 (6.8%)	19,045 (7.2%)	0.014	3,453 (7.6%)	1,989 (7.2%)	0.013
Asthma	15,451 (4.6%)	13,150 (4.9%)	0.014	2,321 (5.1%)	1,351 (4.9%)	0.007
Atrial Fibrillation	2,955 (.9%)	2,531 (1%)	0.007	415 (.9%)	253 (.9%)	0.002
Benign Prostatic Hyperplasia	2,324 (.7%)	2,184 (.8%)	0.014	323 (.7%)	216 (.8%)	0.010
Cataract	4,177 (1.3%)	3,420 (1.3%)	0.003	584 (1.3%)	345 (1.3%)	0.002
Chronic Kidney Disease	8,302 (2.5%)	7,007 (2.6%)	0.009	1,141 (2.5%)	647 (2.4%)	0.006
COPD and Bronchiectasis	9,902 (3%)	8,901 (3.3%)	0.021	1,532 (3.4%)	921 (3.4%)	0.000
Diabetes	19,430 (5.8%)	16,174 (6.1%)	0.010	2,811 (6.2%)	1,634 (6%)	0.008
Glaucoma	4,618 (1.4%)	3,904 (1.5%)	0.007	654 (1.4%)	406 (1.5%)	0.003
Heart Failure	4,425 (1.3%)	4,029 (1.5%)	0.016	684 (1.5%)	405 (1.5%)	0.001
Hip/Pelvic Fracture	482 (.1%)	439 (.2%)	0.005	84 (.2%)	47 (.2%)	0.004
Hyperlipidemia	43,957 (13.2%)	36,321 (13.7%)	0.013	6,328 (13.9%)	3,781 (13.7%)	0.005
Hypertension	65,278 (19.6%)	54,109 (20.4%)	0.018	9,573 (21%)	5,542 (20.3%)	0.019
Ischemic Heart Disease	12,736 (3.8%)	11,946 (4.5%)	0.034	1,925 (4.2%)	1,245 (4.5%)	0.015
Osteoporosis	445 (.1%)	270 (.1%)	0.009	83 (.2%)	29 (.1%)	0.019
Rheumatoid Arthritis/Osteoarthritis)	28,636 (8.6%)	23,652 (8.9%)	0.010	4,029 (8.8%)	2,367 (8.7%)	0.005
Stroke/TIA	3,020 (.9%)	2,773 (1%)	0.014	478 (1%)	292 (1.1%)	0.001
Breast Cancer	2,110 (.6%)	1,541 (.6%)	0.007	288 (.6%)	156 (.6%)	0.008
Colorectal Cancer	635 (.2%)	546 (.2%)	0.003	98 (.2%)	57 (.2%)	0.002
Prostate Cancer	197 (.1%)	193 (.1%)	0.005	30 (.1%)	18 (.1%)	0.001
Lung Cancer	477 (.1%)	511 (.2%)	0.012	91 (.2%)	53 (.2%)	0.002
Endometrial Cancer	71 (0%)	70 (0%)	0.003	12 (0%)	< 11 (0%)	<0.1
Cerebral Palsy	144 (0%)	98 (0%)	0.003	25 (.1%)	< 11 (0%)	<0.1
Cystic Fibrosis & Metabolic Developmental Disorders	809 (.2%)	687 (.3%)	0.003	112 (.2%)	66 (.2%)	0.001
Epilepsy	4,516 (1.4%)	3,797 (1.4%)	0.006	603 (1.3%)	392 (1.4%)	0.009
HIV/AIDS	1,256 (.4%)	1,010 (.4%)	0.000	152 (.3%)	97 (.4%)	0.004

Enrollees with Mental Health Conditions and a Co-Occurring Substance Use Disorder

	Treatment Group	Comparison Group	SMD Across Groups	Treatment Group Year Prior to Offer	Comparison Group Year Prior to Offer	SMD Across Groups Year Prior to Offer
Intellectual Disabilities & Related Conditions	273 (.1%)	173 (.1%)	0.006	32 (.1%)	18 (.1%)	0.002
Learning Disabilities	278 (.1%)	228 (.1%)	0.001	39 (.1%)	22 (.1%)	0.002
Leukemias and Lymphomas	1,034 (.3%)	979 (.4%)	0.010	147 (.3%)	99 (.4%)	0.007
Liver disease, cirrhosis & Non-Hepatitis liver conditions	8,808 (2.6%)	8,300 (3.1%)	0.029	1,280 (2.8%)	841 (3.1%)	0.016
Migraine/Chronic Headache	13,588 (4.1%)	10,516 (4%)	0.007	1,895 (4.2%)	1,058 (3.9%)	0.014
Mobility Impairments	1,397 (.4%)	1,227 (.5%)	0.006	211 (.5%)	122 (.4%)	0.002
Multiple Sclerosis and transverse myelitis	1,165 (.4%)	954 (.4%)	0.001	161 (.4%)	98 (.4%)	0.001
Muscular Dystrophy	56 (0%)	44 (0%)	0.000	13 (0%)	< 11 (0%)	<0.1
Obesity	15,357 (4.6%)	12,201 (4.6%)	0.001	1,991 (4.4%)	1,111 (4.2%)	0.009
Other Developmental Delays	261 (.1%)	178 (.1%)	0.004	43 (.1%)	18 (.1%)	0.010
Peripheral Vascular Disease	2,173 (.7%)	2,025 (.8%)	0.013	350 (.8%)	211 (.8%)	0.001
Pressure and Chronic Ulcers	1,528 (.5%)	1,369 (.5%)	0.008	226 (.5%)	139 (.5%)	0.002
Blindness and Visual Impairment	83 (0%)	85 (0%)	0.004	14 (0%)	< 11 (0%)	<0.1
Deafness and Hearing Impairment	1,641 (.5%)	1,375 (.5%)	0.003	215 (.5%)	137 (.5%)	0.005
Spina Bifida & Congenital Anomalies of the Nervous System	244 (.1%)	245 (.1%)	0.007	35 (.1%)	25 (.1%)	0.005
Spinal Cord Injury	523 (.2%)	448 (.2%)	0.003	66 (.1%)	42 (.2%)	0.003
Viral Hepatitis	4,080 (1.2%)	3,269 (1.2%)	0.000	574 (1.3%)	337 (1.2%)	0.002

The exhibit displays characteristics for the treatment (offered HDHP) and comparison group (not offered HDHP) for all enrollee-years 2007-2017 (columns 2 & 3) and enrollee-years the year prior to HDHP Offer (columns 5 & 6) among the sample with mental health conditions and a co-occurring substance use disorder. Comparison group means are calculated using the average of comparison group characteristics across calendar years and weighted by how often those calendar years appear in the treatment sample. Comparison group means for the year prior to HDHP offer are constructed by weighting the average of comparison group characteristics across calendar years and by how often those calendar years appear in the treatment sample in the year preceding the HDHP offer year. Standardized mean differences are calculated for each characteristic using Hedges' g. Chronic conditions are derived from the Chronic Conditions Warehouse (CCW). Mental health and substance use disorder-related CCW conditions are excluded.

Exhibit A3.2: Full Sample Characteristics and Standardized Mean Differences Among Enrollees with Mental Health Conditions without a Co-Occurring Substance Use Disorder Offered and Not Offered a High Deductible Health Plan

Enrollees with Mental Health Conditions without a Substance Use Disorder						
	Treatment Group	Comparison Group	SMD Across Groups	Treatment Group Year Prior to Offer	Comparison Group Year Prior to Offer	SMD Across Groups Year Prior to Offer
	N=3,230,356	N=2,798,222		N=458,182	N=291,955	
Age; Mean (SD)	39.9 (14.3)	39.4 (14.1)	0.04	39.9 (14.2)	39.4 (14.0)	0.04
Gender; N (%)						
Male	1,229,353 (38.1%)	1,096,395 (39.2%)	0.023	169,649 (37%)	113,649 (39.1%)	0.042
Female	2,000,867 (61.9%)	1,701,547 (60.8%)	0.023	288,518 (63%)	178,275 (60.9%)	0.042
Unknown	136 (0%)	280 (0%)	0.007	15 (0%)	30 (0%)	0.009
Family Size, Top Coded at 6; N (%)						
1	880,453 (27.3%)	821,764 (29.4%)	0.047	130,987 (28.6%)	87,639 (29.7%)	0.025
2	666,598 (20.6%)	572,079 (20.4%)	0.005	97,441 (21.3%)	60,429 (20.6%)	0.016
3	554,957 (17.2%)	452,939 (16.2%)	0.027	77,921 (17%)	46,860 (16.1%)	0.024
4	698,586 (21.6%)	572,071 (20.4%)	0.029	94,868 (20.7%)	58,703 (20.3%)	0.011
5	295,699 (9.2%)	257,442 (9.2%)	0.002	39,579 (8.6%)	26,177 (9.1%)	0.015
6+	134,063 (4.2%)	121,927 (4.4%)	0.010	17,386 (3.8%)	12,147 (4.2%)	0.023
Race; N (%)						
Asian	84,535 (2.6%)	63,635 (2.3%)	0.022	10,347 (2.3%)	6,481 (2.2%)	0.001
Black	312,601 (9.7%)	211,976 (7.6%)	0.075	47,001 (10.3%)	21,965 (7.5%)	0.094
Hispanic	233,906 (7.2%)	257,460 (9.2%)	0.072	32,344 (7.1%)	26,616 (9.1%)	0.077
White	2,172,355 (67.2%)	1,870,891 (66.9%)	0.008	315,281 (68.8%)	198,495 (67.5%)	0.027
Unknown	426,959 (13.2%)	394,260 (14.1%)	0.025	53,209 (11.6%)	38,398 (13.6%)	0.059
Census Division Geography; N (%)						
New England	97,572 (3%)	104,296 (3.7%)	0.039	13,599 (3%)	11,627 (3.9%)	0.050
Mid Atlantic	216,385 (6.7%)	253,950 (9.1%)	0.089	27,959 (6.1%)	26,822 (9.2%)	0.119
East North Central	441,934 (13.7%)	472,081 (16.9%)	0.089	62,581 (13.7%)	49,756 (17.1%)	0.096
West North Central	267,645 (8.3%)	207,348 (7.4%)	0.032	35,641 (7.8%)	21,356 (7.3%)	0.018
South Atlantic	1,167,528 (36.1%)	744,419 (26.6%)	0.206	176,042 (38.4%)	77,265 (26.5%)	0.254
East South Central	105,331 (3.3%)	120,789 (4.3%)	0.056	15,476 (3.4%)	12,395 (4.3%)	0.047
West South Central	414,295 (12.8%)	474,663 (17%)	0.117	57,072 (12.5%)	50,626 (17.2%)	0.136
Mountain	247,922 (7.7%)	232,399 (8.3%)	0.023	36,260 (7.9%)	23,440 (8.1%)	0.008
Pacific	271,215 (8.4%)	186,628 (6.7%)	0.065	33,460 (7.3%)	18,516 (6.4%)	0.035
Other	223 (0%)	964 (0%)	0.020	40 (0%)	85 (0%)	0.017
Unknown	306 (0%)	685 (0%)	0.012	52 (0%)	66 (0%)	0.009
Census Block Education; N (%)						
Less Than High School	25,294 (.8%)	29,845 (1.1%)	0.030	4,649 (1%)	3,668 (1.2%)	0.016
High School	937,315 (29%)	822,932 (29.4%)	0.009	152,006 (33.2%)	89,675 (30.2%)	0.063
Some College	1,586,015 (49.1%)	1,357,954 (48.5%)	0.011	216,508 (47.3%)	138,765 (47.9%)	0.013
Bachelors or more	669,498 (20.7%)	571,483 (20.4%)	0.007	83,413 (18.2%)	58,139 (20.1%)	0.048
Unknown	12,234 (.4%)	16,008 (.6%)	0.028	1,606 (.4%)	1,707 (.6%)	0.032
Annual Income; N (%)						

Enrollees with Mental Health Conditions without a Substance Use Disorder						
	Treatment Group	Comparison Group	SMD Across Groups	Treatment Group Year Prior to Offer	Comparison Group Year Prior to Offer	SMD Across Groups Year Prior to Offer
< \$40K	377,870 (11.7%)	301,397 (10.8%)	0.029	56,710 (12.4%)	31,091 (10.7%)	0.053
>= \$40K and < \$75K	750,457 (23.2%)	625,618 (22.4%)	0.021	111,555 (24.3%)	66,332 (22.7%)	0.038
>= \$75K and < \$125K	943,785 (29.2%)	792,779 (28.3%)	0.020	134,280 (29.3%)	84,097 (28.8%)	0.012
>= \$125K and < \$200K	568,571 (17.6%)	470,441 (16.8%)	0.021	76,145 (16.6%)	49,555 (17%)	0.009
> \$200K	415,337 (12.9%)	347,801 (12.4%)	0.013	52,236 (11.4%)	36,516 (12.5%)	0.034
Missing	174,336 (5.4%)	260,186 (9.3%)	0.151	27,256 (5.9%)	24,364 (8.4%)	0.097
Non-Mental Health/Non-SUD Co-Occurring Conditions						
Acquired Hypothyroidism	270,124 (8.4%)	225,414 (8.1%)	0.011	39,039 (8.5%)	23,515 (8.1%)	0.016
Acute Myocardial Infarction	3,851 (.1%)	3,737 (.1%)	0.004	659 (.1%)	384 (.1%)	0.004
Alzheimer's Disease	821 (0%)	738 (0%)	0.001	131 (0%)	82 (0%)	0.001
Alzheimer's/Related Disorders/Dementia	3,467 (.1%)	3,173 (.1%)	0.002	529 (.1%)	304 (.1%)	0.003
Anemia	160,308 (5%)	138,573 (5%)	0.000	24,526 (5.4%)	14,693 (5%)	0.016
Asthma	111,986 (3.5%)	101,533 (3.6%)	0.009	17,063 (3.7%)	10,615 (3.6%)	0.005
Atrial Fibrillation	15,946 (.5%)	14,431 (.5%)	0.003	2,328 (.5%)	1,484 (.5%)	0.000
Benign Prostatic Hyperplasia	18,795 (.6%)	18,806 (.7%)	0.011	2,787 (.6%)	1,950 (.7%)	0.008
Cataract	50,814 (1.6%)	43,648 (1.6%)	0.001	7,605 (1.7%)	4,528 (1.6%)	0.008
Chronic Kidney Disease	44,767 (1.4%)	37,914 (1.4%)	0.003	5,887 (1.3%)	3,421 (1.2%)	0.007
COPD and Bronchiectasis	39,119 (1.2%)	38,136 (1.4%)	0.014	6,432 (1.4%)	4,051 (1.4%)	0.003
Diabetes	187,133 (5.8%)	157,924 (5.6%)	0.006	28,417 (6.2%)	16,477 (5.6%)	0.023
Glaucoma	61,876 (1.9%)	56,043 (2%)	0.006	8,967 (2%)	5,919 (2%)	0.005
Heart Failure	20,341 (.6%)	18,265 (.7%)	0.003	3,244 (.7%)	1,918 (.7%)	0.007
Hip/Pelvic Fracture	1,250 (0%)	1,131 (0%)	0.001	211 (0%)	123 (0%)	0.002
Hyperlipidemia	433,941 (13.4%)	383,515 (13.7%)	0.008	67,272 (14.7%)	41,064 (13.9%)	0.021
Hypertension	510,914 (15.8%)	438,791 (15.7%)	0.004	79,130 (17.3%)	46,146 (15.7%)	0.041
Ischemic Heart Disease	85,493 (2.6%)	85,529 (3.1%)	0.025	13,428 (2.9%)	9,183 (3.1%)	0.010
Osteoporosis	3,829 (.1%)	3,128 (.1%)	0.002	636 (.1%)	351 (.1%)	0.005
Rheumatoid Arthritis/Osteoarthritis)	153,609 (4.8%)	135,663 (4.8%)	0.004	22,891 (5%)	13,799 (4.8%)	0.011
Stroke/TIA	15,253 (.5%)	14,507 (.5%)	0.007	2,427 (.5%)	1,563 (.5%)	0.000
Breast Cancer	30,348 (.9%)	25,053 (.9%)	0.005	4,318 (.9%)	2,604 (.9%)	0.005
Colorectal Cancer	5,362 (.2%)	4,261 (.2%)	0.003	813 (.2%)	431 (.1%)	0.007
Prostate Cancer	1,382 (0%)	1,401 (.1%)	0.003	210 (0%)	147 (.1%)	0.002
Lung Cancer	2,728 (.1%)	2,591 (.1%)	0.003	446 (.1%)	275 (.1%)	0.001
Endometrial Cancer	782 (0%)	633 (0%)	0.001	110 (0%)	61 (0%)	0.002
Cerebral Palsy	1,956 (.1%)	1,548 (.1%)	0.002	274 (.1%)	160 (.1%)	0.002
Cystic Fibrosis & Metabolic						
Developmental Disorders	5,937 (.2%)	5,081 (.2%)	0.001	844 (.2%)	498 (.2%)	0.002
Epilepsy	17,132 (.5%)	14,778 (.5%)	0.000	2,573 (.6%)	1,523 (.5%)	0.005
HIV/AIDS	4,339 (.1%)	3,649 (.1%)	0.001	463 (.1%)	329 (.1%)	0.005
Intellectual Disabilities & Related Conditions						
	3,614 (.1%)	2,902 (.1%)	0.002	506 (.1%)	287 (.1%)	0.003

Enrollees with Mental Health Conditions without a Substance Use Disorder						
	Treatment Group	Comparison Group	SMD Across Groups	Treatment Group Year Prior to Offer	Comparison Group Year Prior to Offer	SMD Across Groups Year Prior to Offer
Learning Disabilities	3,669 (.1%)	3,247 (.1%)	0.001	462 (.1%)	292 (.1%)	0.001
Leukemias and Lymphomas	8,209 (.3%)	7,179 (.3%)	0.000	1,194 (.3%)	733 (.3%)	0.002
Liver disease, cirrhosis & Non-Hepatitis liver conditions	27,341 (.8%)	25,388 (.9%)	0.007	3,954 (.9%)	2,534 (.9%)	0.001
Migraine/Chronic Headache	97,036 (3%)	86,589 (3.1%)	0.005	14,209 (3.1%)	8,739 (3%)	0.005
Mobility Impairments	6,059 (.2%)	5,419 (.2%)	0.001	940 (.2%)	566 (.2%)	0.003
Multiple Sclerosis and transverse myelitis	10,944 (.3%)	9,961 (.4%)	0.003	1,577 (.3%)	1,047 (.4%)	0.002
Muscular Dystrophy	393 (0%)	327 (0%)	0.000	45 (0%)	32 (0%)	0.001
Obesity	140,135 (4.3%)	119,467 (4.3%)	0.003	19,103 (4.2%)	10,867 (3.9%)	0.015
Other Developmental Delays	1,993 (.1%)	1,910 (.1%)	0.003	294 (.1%)	186 (.1%)	0.000
Peripheral Vascular Disease	10,560 (.3%)	10,469 (.4%)	0.008	1,691 (.4%)	1,115 (.4%)	0.001
Pressure and Chronic Ulcers	6,168 (.2%)	5,482 (.2%)	0.001	1,009 (.2%)	576 (.2%)	0.005
Blindness and Visual Impairment	489 (0%)	401 (0%)	0.001	65 (0%)	41 (0%)	0.000
Deafness and Hearing Impairment	15,865 (.5%)	14,342 (.5%)	0.003	2,239 (.5%)	1,471 (.5%)	0.003
Spina Bifida & Congenital Anomalies of the Nervous System	2,120 (.1%)	1,842 (.1%)	0.000	298 (.1%)	189 (.1%)	0.000
Spinal Cord Injury	1,271 (0%)	1,235 (0%)	0.002	174 (0%)	121 (0%)	0.002
Viral Hepatitis	39,850 (1.2%)	34,189 (1.2%)	0.001	6,324 (1.4%)	3,886 (1.3%)	0.006

The exhibit displays characteristics for the treatment (offered HDHP) and comparison group (not offered HDHP) for all enrollee-years 2007-2017 (columns 2 & 3) and enrollee-years the year prior to HDHP Offer (columns 5 & 6) among the sample with mental health conditions without substance use disorder.

Comparison group means are calculated using the average of comparison group characteristics across calendar years and weighted by how often those calendar years appear in the treatment sample. Comparison group means for the year prior to HDHP offer are constructed by weighting the average of comparison group characteristics across calendar years and by how often those calendar years appear in the treatment sample in the year preceding the HDHP offer year.

Standardized mean differences are calculated for each characteristic using Hedges' g. Chronic conditions are derived from the Chronic Conditions Warehouse (CCW). Mental health and substance use disorder-related CCW conditions are excluded.

A4: Full Model Results and Estimates for Figures 1-4

Exhibit A4.1: Full model results for select outcomes

	Enrollees with Mental Health Conditions with a Co-Occurring Substance Use Disorder				Enrollees with Mental Health Conditions without a Co-Occurring Substance Use Disorder	
	All Mental Health & Substance Use Disorder Spending	Spending on Medications to Treat Substance Use Disorder	Psychotropic Medication Spending	All Non-Mental Health and Non-Substance Use Disorder Spending	All Mental Health Spending	All Non-Mental Health Spending
Sample Size	598,550	598,550	598,550	598,550	6,028,578	6,028,578
Model F-Value	36	14	64	175	274	761
Model R-Squared	0.08677	0.12649	0.13118	0.40421	0.06301	0.32756
Pre Period Mean At Treatment Firms	3,012	120	785	11,426	821	6,908
HDHP Offer	-39.29 (-182.61 to 104.04)	2.42 (-7.46 to 12.31)	-35.49*** (-56.16 to -14.82)	126.83 (-183.87 to 437.53)	-39.62*** (-59.25 to -19.98)	-128.11* (-231.16 to -25.06)
Age	-70.90*** (-77.34 to -64.46)	1.39*** (1.13 to 1.66)	1.26*** (0.53 to 1.99)	-14.29*** (-22.74 to -5.84)	-11.72*** (-12.55 to -10.89)	8.98*** (6.50 to 11.47)
Race						
Asian	Reference 301.44	Reference 5.35	Reference 16.48	Reference -25.73	Reference 161.37***	Reference -41.63
Black	(-14.30 to 617.17) 64.41	(-21.15 to 31.86) 3.74	(-58.68 to 91.64) -1.43	(-1403.88 to 1352.43) -10.76	(115.50 to 207.24) 84.33***	(-191.02 to 107.76) 59.62
Hispanic	(-265.43 to 394.26) 822.04***	(-18.98 to 26.45) 56.52***	(-81.69 to 78.82) 189.17***	(-1225.65 to 1204.13) 955.40	(45.62 to 123.04) 290.69***	(-90.51 to 209.75) 626.70***
White	(508.66 to 1135.43) 601.38***	(37.13 to 75.90) 51.63***	(119.00 to 259.35) 143.61***	(-280.51 to 2191.30) 920.97	(245.52 to 335.86) 250.51***	(486.31 to 767.10) 608.33***
Unknown	(277.80 to 924.96)	(28.65 to 74.61)	(69.44 to 217.79)	(-290.56 to 2132.50)	(207.12 to 293.90)	(462.94 to 753.71)
Annual Income						
< \$40K	Reference -23.76	Reference 3.36	Reference 53.76***	Reference 116.06	Reference 46.60***	Reference 102.89**
>= \$40K and < \$75K	(-127.43 to 79.92) 127.25	(-8.63 to 15.35) 0.15	(27.77 to 79.74) 114.14***	(-219.08 to 451.21) 374.37	(38.58 to 54.61) 78.08***	(24.75 to 181.02) 205.06***
>= \$75K and < \$125K	(-2.12 to 256.62) 233.07**	(-12.45 to 12.74) -2.07	(84.04 to 144.24) 152.94***	(-10.50 to 759.24) 408.33*	(70.36 to 85.81) 99.70***	(105.33 to 304.79) 331.56***
>= \$125K and < \$200K	(87.06 to 379.08) 309.35***	(-17.17 to 13.04) -18.16*	(114.87 to 191.00) 226.83***	(11.69 to 804.97) 407.30	(88.47 to 110.93) 139.32***	(211.29 to 451.82) 360.02***
> \$200K	(130.04 to 488.66) 543.79***	(-33.32 to -3.00) 6.66	(185.21 to 268.44) 64.54**	(-80.62 to 895.21) 229.81	(124.24 to 154.40) 75.35***	(240.93 to 479.11) 269.34***
Missing	(366.41 to 721.17)	(-9.33 to 22.65)	(25.98 to 103.10)	(-224.81 to 684.44)	(62.23 to 88.47)	(124.33 to 414.36)
Census Block Education Less Than High School	Reference -129.86	Reference 18.67	Reference 76.22**	Reference 936.81	Reference 21.79	Reference 286.25***
High School	(-406.62 to 146.90) 239.08	(-6.95 to 44.29) 10.95	(25.87 to 126.56) 154.85***	(-59.01 to 1932.63) 1202.10*	(-2.08 to 45.66) 97.26***	(122.18 to 450.32) 392.19***
Some College	(-37.73 to 515.90) 836.88***	(-16.76 to 38.66) 2.62	(102.18 to 207.52) 257.28***	(218.18 to 2186.03) 1216.08*	(74.42 to 120.11) 276.53***	(225.97 to 558.41) 687.17***
Bachelors or more	(543.94 to 1129.81) -281.11	(-25.54 to 30.77) -8.25	(197.24 to 317.33) 235.10*	(219.68 to 2212.48) 884.69	(249.38 to 303.67) 138.16***	(511.08 to 863.26) 161.56
Unknown	(-815.13 to 252.90)	(-57.26 to 40.75)	(33.28 to 436.91)	(-1315.38 to 3084.76)	(90.63 to 185.70)	(-159.52 to 482.64)

	Enrollees with Mental Health Conditions with a Co-Occurring Substance Use Disorder				Enrollees with Mental Health Conditions without a Co-Occurring Substance Use Disorder	
	All Mental Health & Substance Use Disorder Spending	Spending on Medications to Treat Substance Use Disorder	Psychotropic Medication Spending	All Non-Mental Health and Non-Substance Use Disorder Spending	All Mental Health Spending	All Non-Mental Health Spending
Gender						
Male	Reference 284.14***	Reference -36.89***	Reference 219.83***	Reference 933.04***	Reference 43.04***	Reference 697.18***
Female	(200.13 to 368.16)	(-47.18 to -26.60)	(202.17 to 237.49)	(718.86 to 1147.22)	(33.50 to 52.59)	(625.18 to 769.18)
Unknown	-193.63 (-3350.47 to 2963.20)	-51.39 (-121.79 to 19.01)	-181.40 (-580.14 to 217.33)	-4578.96* (-8217.11 to -940.81)	253.73** (93.73 to 413.73)	375.90 (-821.98 to 1573.77)
Census Division						
Geography						
New England	Reference 708.26***	Reference 18.54	Reference 49.71	Reference 214.69	Reference 136.29***	Reference 138.94
Mid Atlantic	(315.61 to 1100.91)	(-10.78 to 47.86)	(-29.12 to 128.55)	(-596.28 to 1025.66)	(99.36 to 173.21)	(-81.14 to 359.01)
East North Central	-670.54*** (-999.87 to -341.20)	-11.84 (-38.07 to 14.40)	45.74 (-31.04 to 122.51)	-511.68 (-1194.06 to 170.69)	-79.85*** (-120.24 to -39.46)	-123.94 (-340.86 to 92.98)
West North Central	-470.75* (-848.88 to -92.62)	-71.80*** (-98.53 to -45.07)	98.53* (23.48 to 173.59)	-503.07 (-1348.24 to 342.10)	-62.87* (-124.31 to -1.43)	-186.50 (-427.68 to 54.67)
South Atlantic	-448.28* (-891.13 to -5.43)	-19.34 (-43.95 to 5.28)	72.09 (-7.92 to 152.11)	-276.14 (-938.04 to 385.75)	-114.71*** (-145.02 to -84.40)	-381.17*** (-568.95 to -193.39)
East South Central	-752.31*** (-1166.15 to -338.47)	38.02 (-5.60 to 81.65)	99.29* (22.67 to 175.91)	-2070.84*** (-2867.11 to -1274.57)	-127.21*** (-170.66 to -83.77)	-987.36*** (-1224.32 to -750.41)
West South Central	-445.32* (-834.15 to -56.48)	3.06 (-25.34 to 31.46)	189.29*** (103.38 to 275.20)	1797.80*** (1077.70 to 2517.90)	-75.85*** (-115.74 to -35.95)	442.94*** (202.18 to 683.70)
Mountain	-389.53* (-713.12 to -65.95)	-32.04* (-61.23 to -2.85)	-3.90 (-87.39 to 79.59)	655.75 (-161.47 to 1472.98)	-149.79*** (-187.39 to -112.18)	3.20 (-231.64 to 238.04)
Pacific	366.16 (-175.02 to 907.34)	-33.77** (-58.58 to -8.97)	12.42 (-64.32 to 89.17)	3033.90*** (2175.47 to 3892.34)	-11.92 (-61.84 to 38.00)	1061.52*** (711.92 to 1411.12)
Other	-212.45 (-3912.31 to 3487.41)	-99.32 (-217.94 to 19.30)	-334.32 (-935.32 to 266.67)	-1435.77 (-5937.07 to 3065.53)	-290.72 (-622.64 to 41.21)	1019.76 (-3575.57 to 5615.09)
Unknown	-712.77 (-2465.23 to 1039.70)	56.56 (-181.67 to 294.80)	-202.47 (-420.43 to 15.49)	-386.89 (-3243.59 to 2469.82)	72.46 (-156.31 to 301.22)	-607.38 (-1557.72 to 342.97)
Calendar Year						
2007	Reference -150.47***	Reference 9.40*	Reference -3.90	Reference 143.68	Reference -126.35***	Reference 98.46**
2008	(-238.39 to -62.54)	(2.02 to 16.78)	(-23.61 to 15.82)	(-205.95 to 493.31)	(-143.25 to -109.46)	(32.13 to 164.80)
2009	-191.23*** (-291.87 to -90.59)	23.74*** (13.56 to 33.92)	-52.06*** (-76.48 to -27.64)	145.20 (-229.09 to 519.49)	-219.82*** (-231.31 to -208.34)	138.01*** (62.79 to 213.22)
2010	21.70 (-92.62 to 136.01)	36.28*** (25.26 to 47.31)	-65.14*** (-93.58 to -36.71)	473.70* (82.59 to 864.81)	-260.65*** (-276.53 to -244.77)	331.85*** (244.46 to 419.24)
2011	392.14*** (258.88 to 525.41)	55.84*** (43.04 to 68.64)	-71.15*** (-101.98 to -40.33)	995.15*** (549.51 to 1440.78)	-284.28*** (-302.65 to -265.92)	563.40*** (455.37 to 671.42)
2012	530.88*** (368.37 to 693.39)	83.50*** (69.19 to 97.82)	-127.68*** (-159.27 to -96.08)	1257.45*** (794.39 to 1720.50)	-331.59*** (-350.27 to -312.91)	739.02*** (614.89 to 863.16)
2013	677.60*** (503.35 to 851.85)	88.75*** (70.90 to 106.59)	-183.34*** (-219.40 to -147.28)	1860.61*** (1340.51 to 2380.71)	-352.82*** (-378.14 to -327.50)	1082.90*** (930.33 to 1235.48)
2014	748.24*** (566.02 to 930.47)	68.71*** (50.68 to 86.75)	-209.53*** (-249.48 to -169.58)	2449.48*** (1885.49 to 3013.47)	-392.49*** (-415.92 to -369.06)	1280.83*** (1122.14 to 1439.52)

	Enrollees with Mental Health Conditions with a Co-Occurring Substance Use Disorder			Enrollees with Mental Health Conditions without a Co-Occurring Substance Use Disorder		
	All Mental Health & Substance Use Disorder Spending	Spending on Medications to Treat Substance Use Disorder	Psychotropic Medication Spending	All Non-Mental Health and Non-Substance Use Disorder Spending	All Mental Health Spending	All Non-Mental Health Spending
2015	1064.46*** (875.21 to 1253.71)	66.57*** (45.98 to 87.16)	-243.85*** (-284.84 to -202.86)	2430.56*** (1812.32 to 3048.80)	-421.67*** (-445.09 to -398.24)	1164.63*** (994.45 to 1334.80)
2016	1448.71*** (1184.67 to 1712.75)	82.97*** (59.89 to 106.06)	-194.67*** (-236.68 to -152.65)	2817.67*** (2157.62 to 3477.72)	-396.25*** (-419.49 to -373.01)	1792.56*** (1641.13 to 1944.00)
2017	1718.47*** (1264.87 to 2172.07)	102.06*** (78.62 to 125.49)	-140.31*** (-193.09 to -87.54)	4222.65*** (3432.37 to 5012.93)	-363.26*** (-391.88 to -334.65)	3017.54*** (2793.23 to 3241.84)
Non-Mental Health/Non Substance Use Disorder Conditions						
Acquired	1125.49***	31.21***	402.91***	2017.02***	211.01***	1163.29***
Hypothyroidism	(947.92 to 1303.06)	(16.85 to 45.58)	(356.41 to 449.41)	(1509.57 to 2524.47)	(199.18 to 222.83)	(1072.82 to 1253.77)
Acute Myocardial Infarction	-913.47** (-1476.19 to -350.75)	1.13 (-35.84 to 38.11)	-152.51*** (-237.89 to -67.12)	35149.15*** (31003.90 to 39294.40)	-188.78*** (-233.98 to -143.59)	35237.19*** (33969.83 to 36504.55)
Alzheimer's Disease	-5341.32*** (-7682.34 to -3000.31)	-88.30** (-140.90 to -35.70)	-312.03 (-676.36 to 52.31)	-9005.09 (-1.8e+04 to 418.65)	-1156.33*** (-1460.67 to -851.99)	-9390.27*** (-1.2e+04 to -6991.89)
Alzheimer's/Related Disorders/Dementia	7633.93*** (5872.12 to 9395.73)	-1.49 (-37.20 to 34.21)	686.71*** (499.48 to 873.94)	14742.20*** (10152.96 to 19331.44)	2032.65*** (1800.32 to 2264.97)	13221.24*** (11048.21 to 15394.27)
Anemia	880.00*** (740.70 to 1019.31)	18.46** (5.82 to 31.11)	102.67*** (76.81 to 128.54)	22719.08*** (21652.71 to 23785.45)	90.84*** (75.55 to 106.13)	12637.59*** (12109.05 to 13166.12)
Asthma	2016.70*** (1774.57 to 2258.84)	-13.90* (-24.68 to -3.12)	278.99*** (233.95 to 324.03)	6810.18*** (6112.21 to 7508.15)	257.83*** (237.82 to 277.85)	5678.32*** (5531.68 to 5824.97)
Atrial Fibrillation	-267.02 (-658.40 to 124.37)	-26.70 (-58.92 to 5.52)	-241.59*** (-301.45 to -181.73)	16523.16*** (13944.31 to 19102.01)	-104.09*** (-130.22 to -77.96)	14062.77*** (13102.68 to 15022.86)
Benign Prostatic Hyperplasia	302.83 (-78.44 to 684.10)	-21.64 (-55.39 to 12.11)	80.99* (16.63 to 145.35)	5303.81*** (3516.62 to 7091.00)	58.28*** (36.41 to 80.14)	4750.99*** (4420.82 to 5081.16)
Cataract	-191.02 (-413.22 to 31.17)	-49.79*** (-67.69 to -31.90)	19.24 (-37.07 to 75.54)	2460.61*** (1423.47 to 3497.75)	123.73*** (105.94 to 141.51)	1621.39*** (1447.16 to 1795.63)
Chronic Kidney Disease	278.16* (45.90 to 510.43)	-13.51 (-28.69 to 1.66)	47.42* (7.55 to 87.30)	29532.80*** (27701.22 to 31364.39)	53.41*** (30.41 to 76.41)	18978.90*** (18469.53 to 19488.28)
COPD and Bronchiectasis	763.58*** (517.65 to 1009.52)	-2.50 (-19.80 to 14.80)	115.55*** (67.21 to 163.88)	10113.40*** (9081.06 to 11145.74)	123.38*** (104.75 to 142.00)	8289.85*** (7919.13 to 8660.57)
Diabetes	-213.41** (-370.55 to -56.27)	-11.54 (-25.37 to 2.29)	90.38*** (50.43 to 130.32)	3649.51*** (2910.72 to 4388.29)	64.79*** (52.44 to 77.15)	2182.75*** (2044.58 to 2320.92)
Glaucoma	-275.99** (-462.74 to -89.25)	-43.26*** (-60.80 to -25.72)	50.73 (-17.40 to 118.86)	-480.80 (-1416.04 to 454.43)	38.22*** (20.97 to 55.48)	502.48*** (374.13 to 630.83)
Heart Failure	-90.95 (-411.21 to 229.31)	-14.76 (-32.79 to 3.26)	-19.09 (-80.68 to 42.50)	22982.83*** (20530.85 to 25434.82)	6.47 (-20.81 to 33.74)	18429.14*** (17483.29 to 19374.99)
Hip/Pelvic Fracture	-144.50 (-1007.68 to 718.68)	-30.74 (-83.87 to 22.40)	-171.84*** (-268.75 to -74.92)	55762.31*** (48436.77 to 63087.84)	-76.43 (-169.34 to 16.48)	58823.65*** (55642.75 to 62004.54)
Hyperlipidemia	-9.57 (-115.20 to 96.06)	-35.41*** (-44.83 to -25.99)	123.54*** (100.20 to 146.87)	-733.51*** (-1116.65 to -350.38)	81.41*** (71.68 to 91.15)	214.72*** (147.51 to 281.93)
Hypertension	1061.95*** (929.43 to 1194.48)	-8.74 (-17.81 to 0.34)	-18.78 (-39.63 to 2.06)	2790.38*** (2478.44 to 3102.33)	29.72*** (23.27 to 36.16)	2247.42*** (2152.18 to 2342.66)
Ischemic Heart Disease	-117.63 (-270.25 to 35.00)	-22.64*** (-35.72 to -9.56)	-71.93*** (-106.62 to -37.25)	6825.89*** (6058.09 to 7593.69)	-8.04 (-20.75 to 4.67)	6180.56*** (5842.45 to 6518.67)

	Enrollees with Mental Health Conditions with a Co-Occurring Substance Use Disorder			Enrollees with Mental Health Conditions without a Co-Occurring Substance Use Disorder		
	All Mental Health & Substance Use Disorder Spending	Spending on Medications to Treat Substance Use Disorder	Psychotropic Medication Spending	All Non-Mental Health and Non-Substance Use Disorder Spending	All Mental Health Spending	All Non-Mental Health Spending
Osteoporosis	-523.01*	-54.58*	44.72	6785.06*	224.27***	3237.43***
Rheumatoid Arthritis/Osteoarthritis)	(-1023.45 to -22.58)	(-106.97 to -2.19)	(-116.82 to 206.26)	(862.09 to 12708.04)	(135.45 to 313.09)	(2373.07 to 4101.80)
Stroke/TIA	-181.83***	8.09	231.51***	13711.77***	240.88***	10622.65***
Breast Cancer	(-284.81 to -78.84)	(-3.82 to 20.01)	(194.07 to 268.96)	(12998.04 to 14425.50)	(229.65 to 252.11)	(10396.63 to 10848.67)
Colorectal Cancer	-439.94*	-19.00	-123.41***	14205.28***	34.41	11687.18***
Prostate Cancer	(-815.07 to -64.81)	(-40.73 to 2.74)	(-188.02 to -58.80)	(11570.79 to 16839.77)	(-5.21 to 74.04)	(11014.76 to 12359.59)
Lung Cancer	52.11	-12.44	144.51*	25008.40***	64.33***	23367.85***
Endometrial Cancer	(-305.12 to 409.34)	(-55.82 to 30.94)	(21.97 to 267.06)	(22000.16 to 28016.63)	(39.18 to 89.47)	(22426.64 to 24309.07)
Cerebral Palsy	-960.81**	-69.97***	-139.59	42355.45***	-63.49*	41503.91***
Cystic Fibrosis & Metabolic Disorders	(-1576.32 to -345.31)	(-103.50 to -36.43)	(-283.98 to 4.81)	(35051.36 to 49659.54)	(-114.97 to -12.02)	(39549.36 to 43458.46)
Epilepsy	1126.36	-77.19**	-81.54	22352.95***	12.24	17028.82***
HIV/AIDS	(-576.99 to 2829.72)	(-127.13 to -27.24)	(-268.10 to 105.01)	(14554.34 to 30151.56)	(-90.52 to 115.00)	(15259.21 to 18798.43)
Intellectual Disabilities & Related Conditions	-1412.51***	-50.85	-114.58	65464.88***	-134.10***	63254.48***
Learning Disabilities	(-2016.43 to -808.59)	(-102.75 to 1.04)	(-341.39 to 112.22)	(53985.29 to 76944.47)	(-189.88 to -78.32)	(60239.62 to 66269.35)
Leukemias and Lymphomas	405.17	32.37	-60.72	34867.97***	-11.55	26476.52***
Liver disease, cirrhosis & Non-Hepatitis liver conditions	(-1544.42 to 2354.77)	(-80.56 to 145.31)	(-363.81 to 242.37)	(18766.13 to 50969.82)	(-158.02 to 134.93)	(23196.99 to 29756.05)
Migraine/Chronic Headache	-1755.53	-87.75***	242.18	5415.72	-28.40	12041.42***
Mobility Impairments	(-3669.00 to 157.94)	(-122.74 to -52.75)	(-307.20 to 791.57)	(-5273.38 to 16104.81)	(-256.52 to 199.72)	(8798.94 to 15283.90)
Multiple Sclerosis and transverse myelitis	1666.00**	25.91	113.33	26272.17***	239.80***	15181.75***
Muscular Dystrophy	(654.20 to 2677.79)	(-22.37 to 74.18)	(-15.18 to 241.84)	(18565.17 to 33979.18)	(152.25 to 327.35)	(12969.43 to 17394.06)
Obesity	4037.68***	40.66**	356.68***	13124.01***	681.55***	13633.60***
	(3519.50 to 4555.87)	(11.12 to 70.20)	(272.65 to 440.71)	(11650.34 to 14597.69)	(620.17 to 742.94)	(12928.19 to 14339.02)
	1194.50*	-70.40***	11.69	38971.24***	25.15	42917.86***
	(273.35 to 2115.65)	(-102.52 to -38.28)	(-103.00 to 126.38)	(35255.18 to 42687.30)	(-43.77 to 94.06)	(41084.55 to 44751.16)
	9690.73***	-42.88	1867.55***	9584.74**	2310.16***	7224.58***
	(6183.29 to 13198.17)	(-96.74 to 10.97)	(954.31 to 2780.80)	(2917.19 to 16252.30)	(1985.14 to 2635.19)	(5776.07 to 8673.09)
	5746.22***	-52.87**	1016.74***	1987.23	2181.41***	1769.02***
	(3764.91 to 7727.53)	(-86.99 to -18.75)	(698.20 to 1335.29)	(-1900.11 to 5874.58)	(1955.14 to 2407.68)	(1044.18 to 2493.86)
	-788.44***	-23.30	-108.80	62789.30***	-20.28	44534.57***
	(-1207.68 to -369.21)	(-64.46 to 17.87)	(-218.53 to 0.93)	(56719.57 to 68859.03)	(-63.37 to 22.81)	(42846.41 to 46222.72)
	2390.20***	-28.78***	-190.61***	21338.90***	44.50***	20843.41***
	(2062.84 to 2717.56)	(-44.19 to -13.37)	(-222.85 to -158.37)	(19945.12 to 22732.67)	(22.07 to 66.93)	(20099.24 to 21587.59)
	1531.62***	34.15***	411.58***	9787.44***	336.75***	4738.21***
	(1285.86 to 1777.37)	(20.12 to 48.19)	(362.04 to 461.12)	(8979.28 to 10595.60)	(318.79 to 354.71)	(4573.21 to 4903.20)
	-1051.83***	-37.98**	-6.35	48366.35***	5.90	35685.37***
	(-1516.25 to -587.41)	(-63.00 to -12.96)	(-120.11 to 107.41)	(43685.94 to 53046.77)	(-83.01 to 94.81)	(33055.06 to 38315.69)
	452.13	-50.66**	454.04***	38431.48***	442.28***	36081.23***
	(-157.24 to 1061.49)	(-84.00 to -17.32)	(284.31 to 623.76)	(32285.89 to 44577.07)	(353.11 to 531.45)	(33760.97 to 38401.48)
	-246.88	-51.28	17.64	17910.92**	472.20***	15884.83***
	(-2192.02 to 1698.26)	(-145.46 to 42.91)	(-449.31 to 484.60)	(5288.32 to 30533.52)	(146.52 to 797.88)	(11209.99 to 20559.67)
	701.72***	2.04	215.57***	7612.05***	142.80***	5194.38***
	(491.78 to 911.65)	(-9.53 to 13.61)	(179.00 to 252.14)	(6787.67 to 8436.44)	(125.39 to 160.22)	(4996.41 to 5392.35)

	Enrollees with Mental Health Conditions with a Co-Occurring Substance Use Disorder			Enrollees with Mental Health Conditions without a Co-Occurring Substance Use Disorder		
	All Mental Health & Substance Use Disorder Spending	Spending on Medications to Treat Substance Use Disorder	Psychotropic Medication Spending	All Non-Mental Health and Non-Substance Use Disorder Spending	All Mental Health Spending	All Non-Mental Health Spending
Other Developmental Delays	6653.74*** (3372.15 to 9935.32)	-50.11* (-89.32 to -10.90)	823.39*** (475.59 to 1171.19)	587.57 (-3291.94 to 4467.09)	2059.38*** (1836.74 to 2282.02)	6454.68*** (5035.12 to 7874.24)
Peripheral Vascular Disease	-657.29*** (-991.02 to -323.57)	2.46 (-26.93 to 31.86)	-132.06*** (-193.00 to -71.13)	15179.11*** (12712.08 to 17646.15)	-6.54 (-53.47 to 40.40)	11357.82*** (10655.04 to 12060.61)
Pressure and Chronic Ulcers	-302.82 (-818.37 to 212.73)	36.29 (-26.11 to 98.68)	95.76* (3.54 to 187.98)	35767.26*** (31229.08 to 40305.44)	64.10* (14.57 to 113.63)	26952.11*** (25661.73 to 28242.49)
Blindness and Visual Impairment	5442.91*** (2292.82 to 8593.00)	138.20 (-41.24 to 317.64)	197.47 (-167.63 to 562.57)	20836.50** (5829.23 to 35843.78)	216.48 (-56.64 to 489.60)	22845.76*** (17705.14 to 27986.39)
Deafness and Hearing Impairment	676.15* (136.27 to 1216.02)	-28.43* (-56.60 to -0.25)	137.81** (41.02 to 234.61)	7360.79*** (5256.27 to 9465.31)	204.31*** (171.85 to 236.77)	6267.18*** (5818.75 to 6715.61)
Spina Bifida & Congenital Anomalies of the Nervous System	930.00 (-1207.68 to 3067.69)	-53.73* (-103.03 to -4.43)	30.40 (-212.45 to 273.25)	31518.65*** (23092.86 to 39944.43)	107.56 (-46.87 to 261.98)	19807.95*** (17212.27 to 22403.63)
Spinal Cord Injury	-107.40 (-760.83 to 546.03)	-29.14 (-67.20 to 8.92)	-32.50 (-154.41 to 89.41)	61710.79*** (53808.85 to 69612.73)	-11.57 (-127.01 to 103.88)	48021.92*** (44637.39 to 51406.45)
Viral Hepatitis	2353.96*** (1692.78 to 3015.15)	25.46* (0.30 to 50.61)	51.34 (-3.19 to 105.87)	6769.53*** (5202.72 to 8336.34)	89.93*** (72.63 to 107.22)	2423.42*** (2135.16 to 2711.69)

The exhibit displays OLS model estimates and 95% confidence intervals for all non-mental mental and non-substance use disorder spending outcomes using main model specifications among the sample of enrollees with co-occurring substance use disorder and mental health. (***) p < 0.001, **p<0.01, *p<0.05.)

A4.2: Coefficients for Main Independent Variable for All Regression Models in Figures 1 and 3

Sample	Spending Outcome	Pre-Period Mean at Treatment Firms (\$)	Change in Spending Attributable to HDHP Offer (\$)	95% Confidence Interval (\$)
Enrollees with Mental Health Conditions with a Co-Occurring Substance Use Disorder	All Non-Mental Health and Non-Substance Use Disorder Care	11,426	126.83	(-183.87 to 437.53)
	Non-Mental Health and Non-Substance Use Disorder Inpatient Hospitalizations	4,258	163.18	(-85.21 to 411.57)
	Non-Mental Health and Non-Substance Use Disorder Emergency Department Visits	1,065	14.25	(-27.64 to 56.14)
	Non-Mental Health and Non-Substance Use Disorder Evaluation and Management Visits	831	-38.84***	(-58.26 to -19.42)
	Non-Psychotropic and Non-Substance Use Disorder Medications	1,674	-4.18	(-92.46 to 84.09)
	All Mental Health and Substance Use Disorder Care	3,012	-39.29	(-182.61 to 104.04)
	Mental Health and Substance Use Disorder Inpatient Hospitalizations	811	58.56	(-2.96 to 120.09)
	Mental Health and Substance Use Disorder Emergency Department Visits	153	2.11	(-8.94 to 13.17)
	Mental Health and Substance Use Disorder Evaluation and Management Visits	156	-5.67	(-16.26 to 4.93)
	Psychotropic Medications and Medications to Treat Substance Use Disorder	905	-33.61**	(-56.52 to -10.71)
	Medications to Treat Substance Use Disorder	120	2.42	(-7.46 to 12.31)
Psychotropic Medications	785	-35.49***	(-56.16 to -14.82)	
Enrollees with Mental Health Conditions without a Co-Occurring Substance Use Disorder	All Non-Mental Health Care	6,908	-128.11*	(-231.16 to -25.06)
	Non-Mental Health Inpatient Hospitalizations	1,716	-12.46	(-54.92 to 29.99)
	Non-Mental Health Emergency Department Visits	495	-7.72	(-23.27 to 7.83)
	Non-Mental Health Evaluation and Management Visits	685	-18.24***	(-28.76 to -7.73)
	Non-Psychotropic Medications	1,223	-17.11	(-58.50 to 24.28)
	All Mental Health Care	821	-39.62***	(-59.25 to -19.98)
	Mental Health Inpatient Hospitalizations	56	-1.41	(-5.72 to 2.90)
	Mental Health Emergency Department Visits	25	2.83*	(0.25 to 5.41)
	Mental Health Evaluation and Management Visits	75	-6.77**	(-11.51 to -2.04)
Psychotropic Medications	469	-22.74***	(-34.22 to -11.26)	

The exhibit displays OLS model estimates and 95% confidence intervals for a Post*Treat interaction coefficient for all spending outcomes using main model specifications among enrollees with mental health conditions with and without a co-occurring substance use disorder. (***) p < 0.001, **p<0.01, *p<0.05.)

A4.3: Coefficients for Independent Variables of Interest for Figure 2

Spending Outcome	Mean in Year Prior to HDHP Offer at Treatment Firms (\$)	3 Years Before Offer (Pre 3, \$)	2 Years Before Offer (Pre 2, \$)	1 Year Before Offer (Pre 1, \$)	Offer Year (Post 1, \$)	1 Year After Offer (Post 2, \$)	2 Year After Offer (Post 3, \$)
Psychotropic Medications	775	31.89 (-6.29 to 70.06)	10.98 (-8.00 to 29.96)	Reference Year	-25.45** (-43.45 to -7.45)	-33.57* (-61.37 to -5.77)	-33.91 (-75.79 to 7.96)
Medications to Treat Substance Use Disorder	133	-5.10 (-18.05 to 7.85)	-3.82 (-13.13 to 5.48)	Reference Year	2.87 (-4.89 to 10.65)	-9.26 (-23.09 to 4.58)	-4.85 (-23.12 to 13.42)

The exhibit displays OLS model estimates and 95% confidence intervals for spending on mental health and substance use disorder medications using an event study model among the sample of enrollees with mental health conditions and a co-occurring substance use disorder. (***) p < 0.001, **p<0.01, *p<0.05.)

A4.4: Coefficients for Independent Variables of Interest for Figure 4

Outcome	Units	Pre-Period Mean at Treatment Firms	Change Attributable to HDHP Offer	95% Confidence Interval
Psychotropic Medications Among Enrollees Without a Co-Occurring Substance Use Disorder	Quantity of Days' Supplied within a Year	191.07	-8.05*	(-14.24 to -1.87)
	Cost Per Quantity of Days' Supplied within a Year	2.15	0.03	(-0.06 to 0.11)
Psychotropic Medications Among Enrollees With a Co-Occurring Substance Use Disorder	Quantity of Days' Supplied within a Year	286.55	-7.59*	(-14.77 to -0.42)
	Cost Per Quantity of Days' Supplied within a Year	2.39	-0.04	(-0.11 to 0.04)
Mental Health Outpatient E&M Services Among Enrollees Without a Co-Occurring Substance Use Disorder	Quantity of Visit Days within a Year	0.84	-0.07***	(-0.10 to -0.03)
	Cost Per Quantity of Visit-Days within a Year	90.22	-0.59	(-1.67 to 0.50)
Non-Mental Health Outpatient E&M Services Among Enrollees Without a Co-Occurring Substance Use Disorder	Quantity of Visit Days within a Year	5.07	-0.12***	(-0.18 to -0.06)
	Cost Per Quantity of Visit-Days within a Year	123.54	-0.66	(-1.67 to 0.35)

The exhibit displays OLS model estimates and 95% confidence intervals for the estimates included in Figure 4. (***) $p < 0.001$, ** $p < 0.01$, * $p < 0.05$.)

A5: Sensitivity Analyses

Exhibit A5.1: Sensitivity of Statistically Significant Outcomes to Treatment Firm Specifications

Sample	Spending Outcome	Sample Selection Specification				
		5% Take-Up, 50% Firm Size Swing (Main Specification)	3% Take-Up, 50% Firm Size Swing	20% Take-Up, 50% Firm Size Swing	5% Take-Up, 25% Firm Size Swing	5% Take-Up, 75% Firm Size Swing
Enrollees with Mental Health Conditions without a Co-Occurring Substance Use Disorder	All Non-Mental Health Care	-128.11* (-231.16 to -25.06)	-127.53* (-236.89 to -18.17)	-64.10*** (-419.74 to -108.46)	-151.08* (-271.48 to -30.68)	-115.06* (-216.70 to -13.43)
	Non-Mental Health Evaluation and Management Visits	-18.24*** (-28.76 to -7.73)	-18.51*** (-29.24 to -7.77)	-27.54*** (-43.58 to -11.49)	-17.46** (-28.74 to -6.17)	-18.28*** (-28.28 to -8.28)
	All Mental Health Care	-39.62*** (-59.25 to -19.98)	-35.68*** (-56.26 to -15.10)	-45.64** (-73.84 to -17.43)	-53.08*** (-77.89 to -28.26)	-36.63*** (-56.28 to -16.98)
	Mental Health Emergency Department Spending	2.83* (0.25 to 5.41)	2.62 (-0.05 to 5.28)	2.89 (-1.90 to 7.67)	3.00** (0.93 to 5.08)	2.40 (-0.08 to 4.88)
	Mental Health Emergency Department Visits	-6.77** (-11.51 to -2.04)	-5.99* (-11.26 to -0.73)	-9.46*** (-14.36 to -4.56)	-8.15** (-13.01 to -3.28)	-6.34** (-10.99 to -1.68)
	Psychotropic Medications	-22.74*** (-34.22 to -11.26)	-18.27** (-30.91 to -5.63)	-27.61*** (-42.23 to -12.99)	-29.53*** (-43.17 to -15.89)	-20.26*** (-31.49 to -9.03)
Enrollees with Mental Health Conditions with a Co-Occurring Substance Use Disorder	Non-Mental Health and Non-Substance Use Disorder Evaluation and Management Visits	-38.84*** (-58.26 to -19.42)	-38.84*** (-58.84 to -18.84)	-57.84*** (-84.89 to -30.79)	-26.51* (-48.36 to -4.66)	-32.66** (-52.16 to -13.16)
	Psychotropic Medications and Medications to Treat Substance Use Disorder	-33.61** (-56.52 to -10.71)	-28.78* (-51.59 to -5.98)	-38.66* (-69.09 to -8.24)	-43.79** (-70.71 to -16.87)	-31.22** (-52.93 to -9.52)

Baseline specifications used a 50% threshold to identify large changes in firm size (i.e., swing size). This was varied to 25% and 75%. Baseline specifications used a 5% HDHP enrollment threshold (i.e., take-up) to identify firms that go from not offering a HDHP to offering a HDHP. This was varied to 3% and 20%. OLS model estimates and 95% confidence intervals are reported for the interaction term identifying the post period among treatment firms. (***) $p < 0.001$, (**) $p < 0.01$, (*) $p < 0.05$.)

Exhibit A5.2: Sensitivity Analysis Using Enrollee Fixed Effects among enrollees without a co-occurring substance use disorder

Outcome	Baseline Specification	Enrollee Fixed Effects Estimate
All Non-Mental Health Spending	-127.35* (-230.13 to -24.58)	-194.54*** (-268.45 to -120.63)
Non-Mental Health E&M Visit Spending	-18.05*** (-28.57 to -7.54)	-21.90*** (-27.82 to -15.97)
All Mental Health Spending	-39.59*** (-59.18 to -19.99)	-29.13*** (-36.14 to -22.12)
Mental Health E&M Visit Spending	-6.77** (-11.50 to -2.04)	-6.01*** (-7.05 to -4.97)

Baseline specifications used enrollees that had been diagnosed in either the pre or post period and a statistical model that used calendar year and firm fixed effects. The enrollee fixed effect model used enrollee fixed effects in place of firm fixed effects and require that enrollees at treatment firms be included in the pre and post period in order to be estimated. Point estimates and 95% confidence intervals from OLS models are displayed (***) $p < 0.001$, ** $p < 0.01$, * $p < 0.05$).

Exhibit A5.3: Sensitivity Analyses using various top-coding thresholds among enrollees without a co-occurring substance use disorder

Top-code Percentile	99.9th Percentile (Baseline Specification)	99th Percentile	95th Percentile	90th Percentile	75th Percentile
All Non-Mental Health Spending	-127.35* (-230.13 to -24.58)	-139.90** (-229.79 to -50.01)	-136.45*** (-210.88 to -62.02)	-121.86*** (-183.58 to -60.15)	-99.65*** (-139.25 to -60.05)
Non-Mental Health E&M Visit Spending	-18.05*** (-28.57 to -7.54)	-16.98*** (-26.45 to -7.52)	-17.59*** (-26.59 to -8.59)	-17.86*** (-26.40 to -9.32)	-17.15*** (-24.51 to -9.78)
All Mental Health Spending	-39.59*** (-59.18 to -19.99)	-36.45*** (-54.52 to -18.37)	-31.60*** (-47.05 to -16.14)	-28.92*** (-42.84 to -15.01)	-22.14*** (-32.07 to -12.21)
Mental Health E&M Visit Spending	-6.77** (-11.50 to -2.04)	-6.08** (-10.17 to -1.99)	-5.47** (-8.90 to -2.04)	-5.12** (-8.19 to -2.04)	-4.51*** (-7.05 to -1.96)

Baseline specifications top-coded spending outcome at the 99.9th percentile among spenders within each calendar year and within each treatment group. This top-coding threshold was varied. Point estimates and 95% confidence intervals from OLS models are displayed (***) $p < 0.001$, ** $p < 0.01$, * $p < 0.05$).

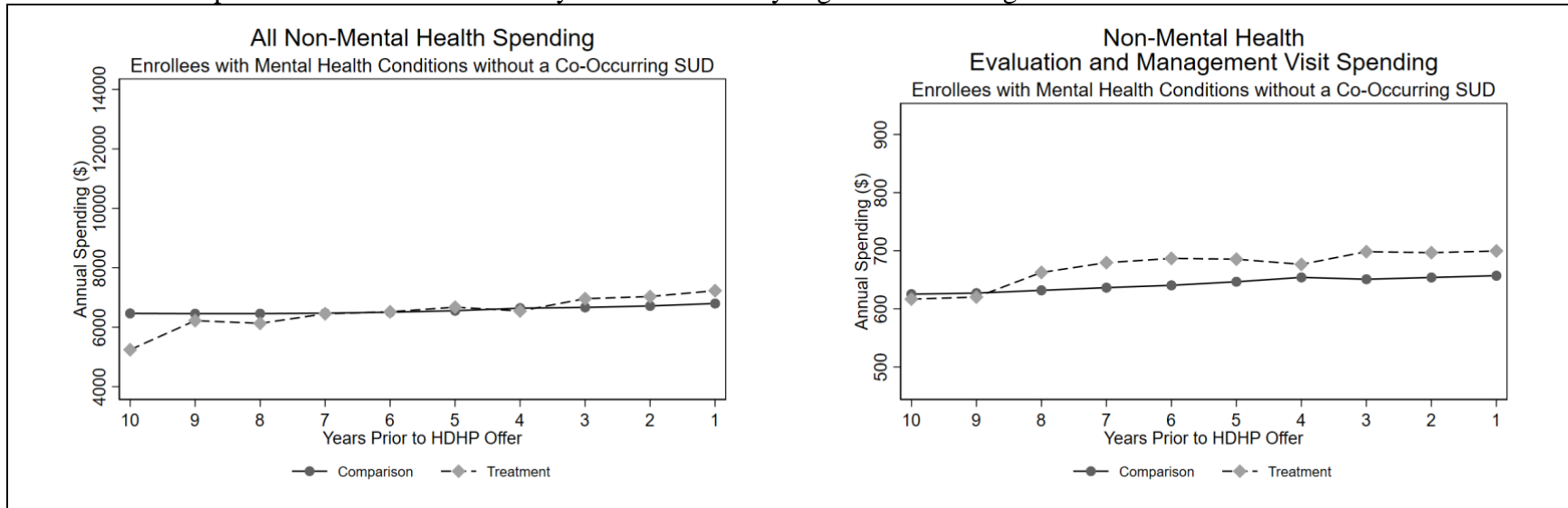
Exhibit A5.4: Sensitivity Analyses using Alternative Substance Use Disorder Sample Criteria to Identify Enrollees with a Co-occurring Substance Use Disorder

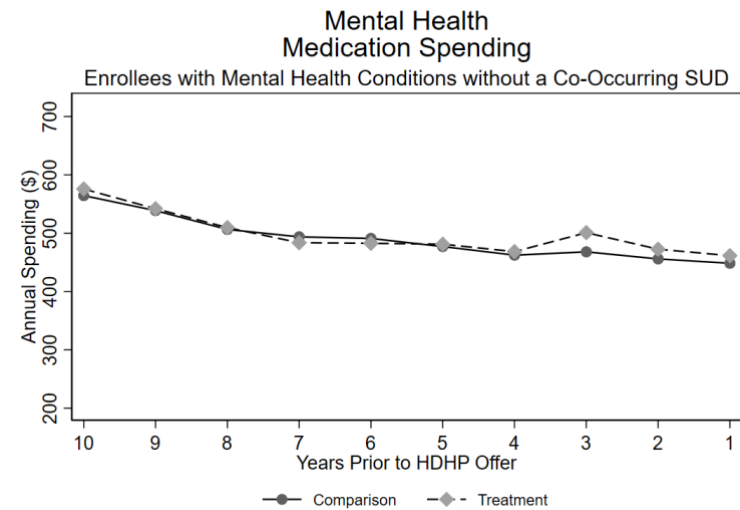
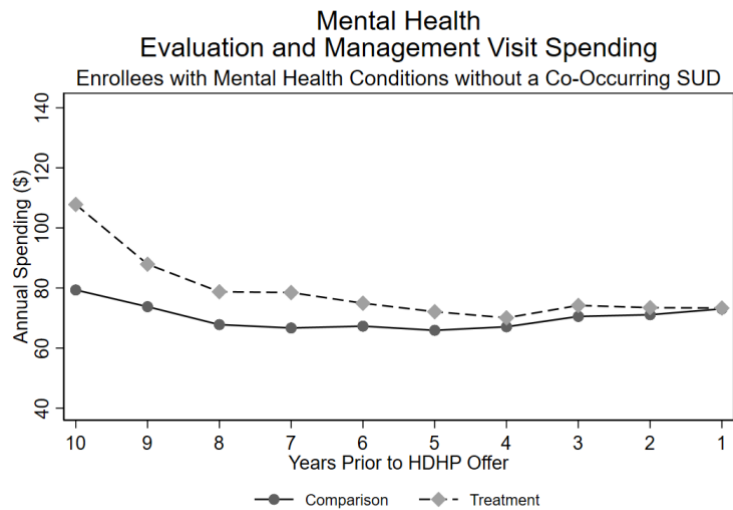
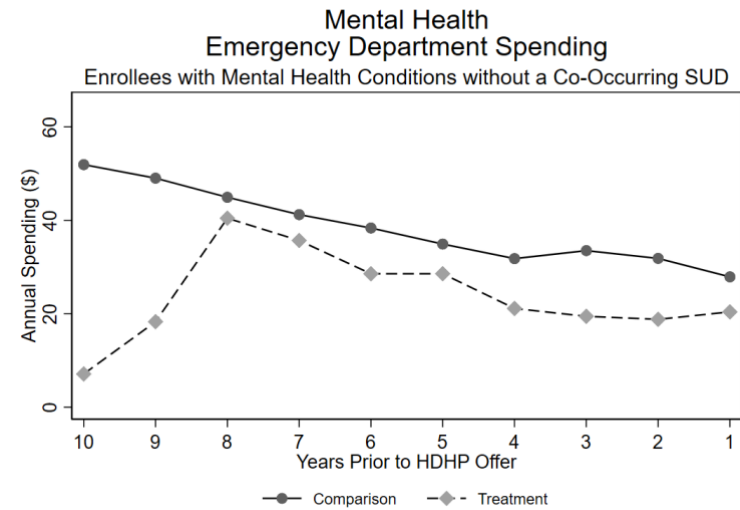
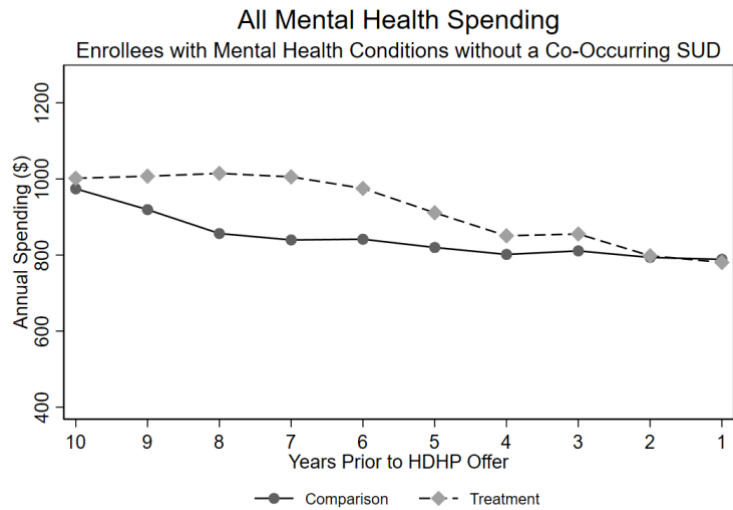
	Diagnosis Codes Only (n = 598,550)	CCW Algorithms (n = 524,416)
Non-Mental Health and Non-Substance Use Disorder Evaluation and Management Visit Spending (\$)	-38.84*** (-58.26 to -19.42)	-29.00* (-51.49 to -6.50)
Psychotropic Medications and Medications to Treat Substance Use Disorder Spending (\$)	-33.61** (-56.52 to -10.71)	-28.85* (-53.80 to -3.90)

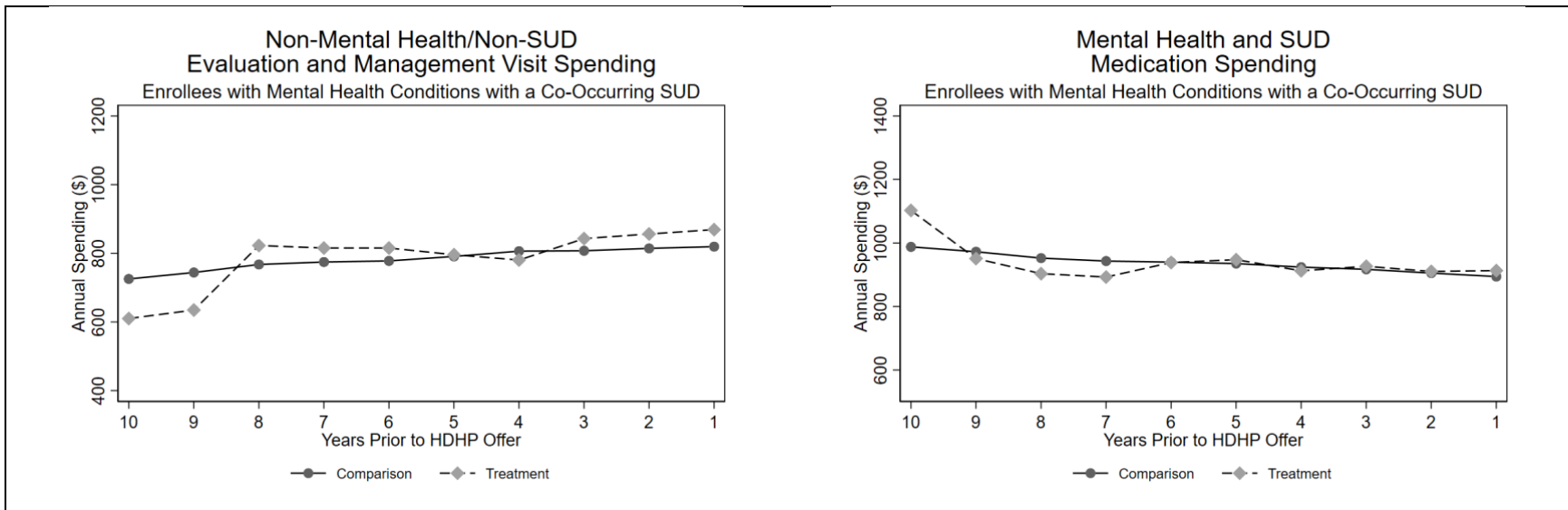
Baseline specifications used a set of diagnosis codes to indicate whether an enrollee had a co-occurring substance use disorder. An alternative specification used Chronic Conditions Warehouse algorithms for Other Chronic Health, Mental Health, and Potentially Disabling Conditions (<https://www2.ccwdata.org/web/guest/condition-categories>) to indicate whether an enrollee had a co-occurring substance use disorder. If an enrollee met an Alcohol Use Disorder, Drug Use Disorder, or Opioid Use Disorder CCW flag, then the enrollee was considered to have had a co-occurring substance use disorder. Point estimates and 95% confidence intervals from OLS models are displayed (**p < 0.01, *p < 0.05).

A6: Pre-Period Trends Evaluation and Event Study Models

Exhibit A6.1: Graphical Pre-Period Trend Analysis for Statistically Significant Findings

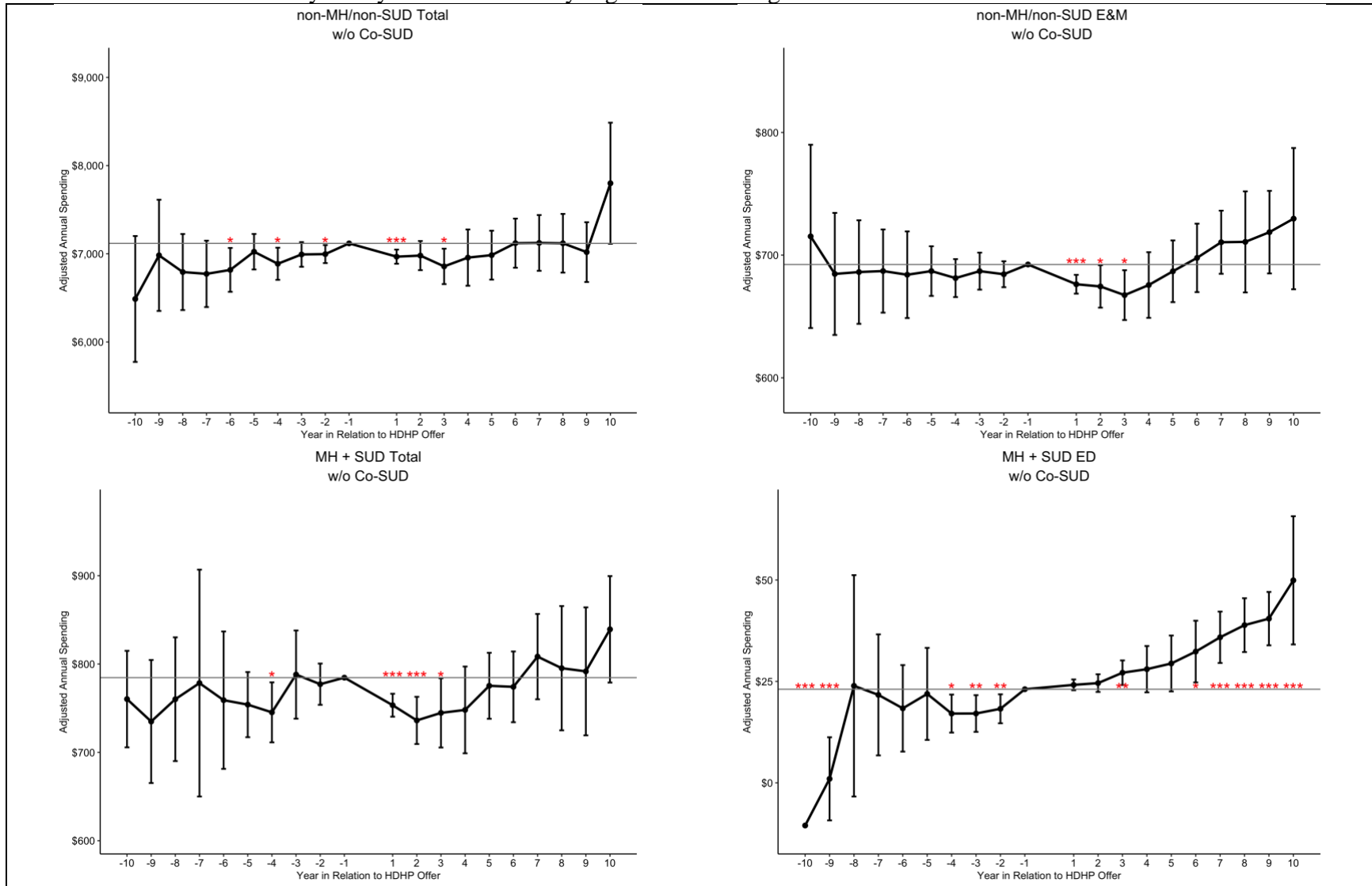


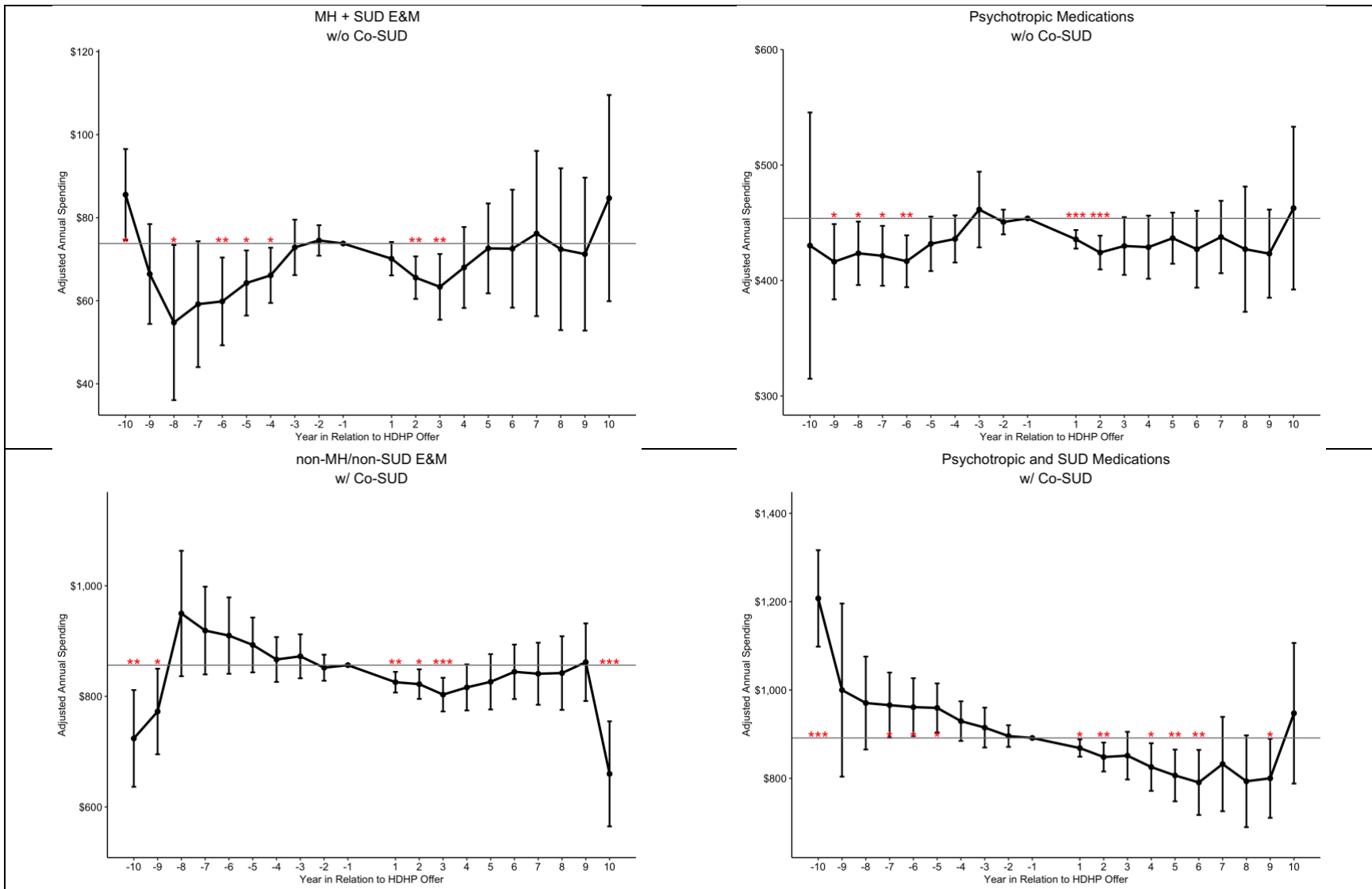




The exhibit displays pre-period means for the treatment (offered HDHP) and comparison group (not offered HDHP) for statistically significant outcomes in the main models. Comparison group means are calculated using the average of comparison group outcomes across calendar years and weighted by how often those calendar years appear in the treatment sample is that year prior to HDHP offer.

Exhibit A6.2: Full Event Study Analysis for Statistically Significant Findings





The exhibit displays a graphical representation of event study OLS model estimates and 95% confidence intervals for all statistically significant findings in main model specifications. This method of pre-trend analysis included all treatment firm data and all comparison firm data. Pre-period trend coefficients displayed are indicators for the number of years away from the HDHP offer interacted with the treatment firm indicator. The year immediately prior to the HDHP offer is left out of the model and is used as the reference year. Models include firm and calendar year fixed effects and all covariates included in main OLS models. (** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$.)

Exhibit A6.3: Sensitivity Analysis Informed by Pre-Period Trend Analysis for Statistically Significant Findings

	Mental Health Conditions without a Co-Occurring Substance Use Disorder						Mental Health Conditions with a Co-Occurring Substance Use Disorder	
	All Non-Mental Health Spending	Non-Mental Health Evaluation and Management Visit Spending	All Mental Health Spending	Mental Health Emergency Department Spending	Mental Health Evaluation and Management Visit Spending	Psychotropic Medication Spending	Non-Mental Health/Substance Use Disorder Evaluation and Management Visit Spending	Spending on Psychotropic Medications and Treat Substance Use Disorder
Effect Size in Main Model	-128.11* (-231.16 to -25.06)	-18.24*** (-28.76 to -7.73)	-39.62*** (-59.25 to -19.98)	2.83* (0.25 to 5.41)	-6.77** (-11.51 to -2.04)	-22.74*** (-34.22 to -11.26)	-38.84*** (-58.26 to -19.42)	-33.61** (-56.52 to -10.71)
Limiting Treatment Firm Data to Within 4 Years of HDHP Offer	-112.9* (-218.34 to -7.47)	-14.90** (-24.90 to -4.90)	-36.06*** (-55.11 to -17.01)	3.97*** (1.75 to 6.19)	-6.12** (-10.39 to -1.84)	-22.59*** (-33.41 to -11.78)	-36.32*** (-55.43 to -17.21)	-37.16** (-61.48 to -12.85)

The exhibit displays a sensitivity analysis varying the amount of treatment firm data included in the model. Baseline specification used all treatment firm data from 10 years prior to HDHP offer and 10 years after HDHP offer. In this sensitivity analysis, treatment firm data was limited to 4 years prior to HDHP offer and 4 years after HDHP offer after examining pre-period trends. OLS model estimates and 95% confidence intervals are reported for the interaction term identifying the post period among treatment firms. (***) p < 0.001, **p<0.01, *p<0.05.)