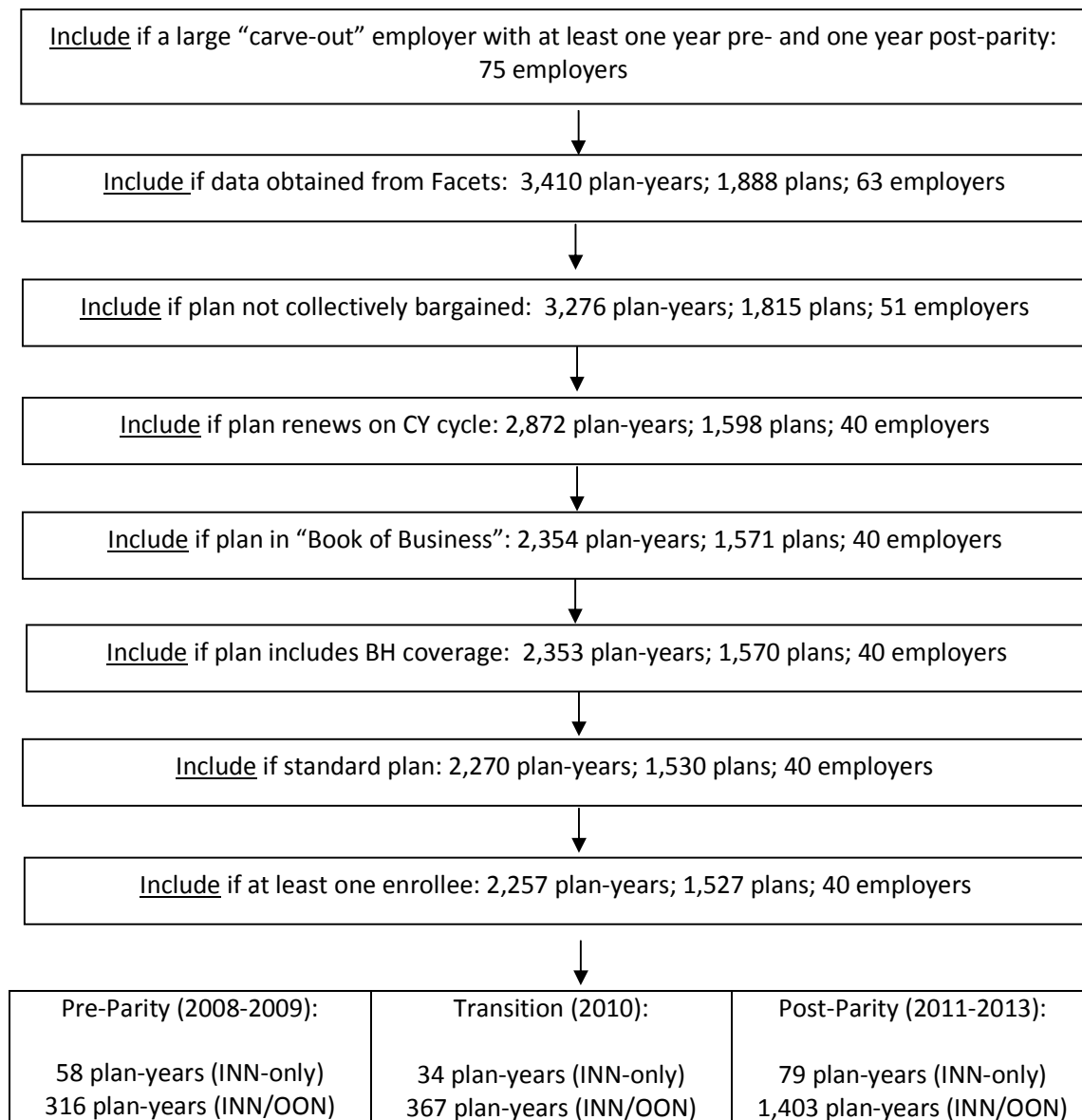
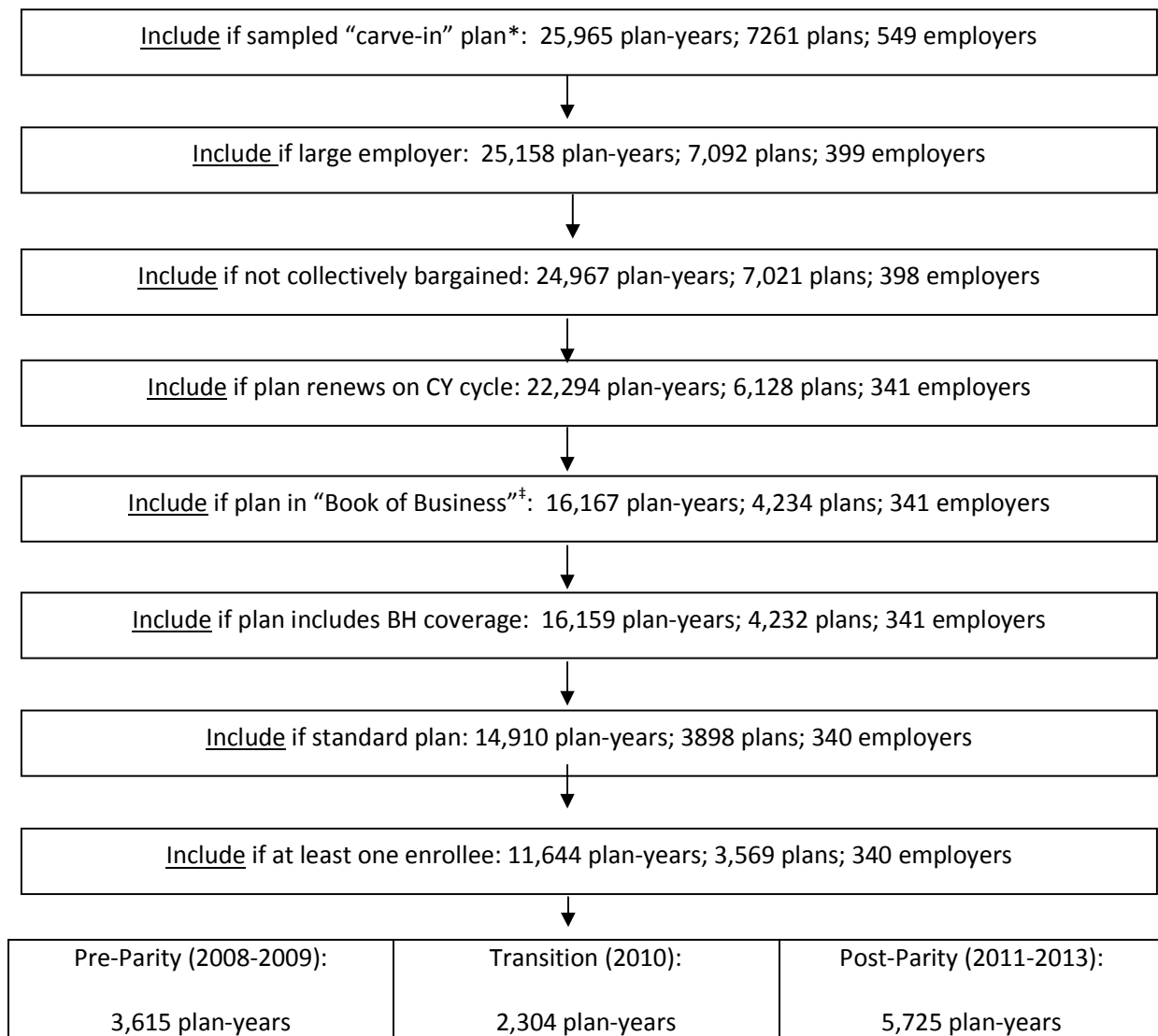


## Supplemental Web Appendices

**Figure A1. Sample flow-chart: number of plan-years, plans, and employers remaining after each sample inclusion criterion, carve-out plans**

Note. CY: Calendar Year; BOB: Book of Business; BH: Behavioral health; INN: In-network benefits; OON: Out-of-network benefits. For longitudinal sample, an additional criteria was imposed to only include employers with plans in all three time periods. This led to a total of 1113 plan-years; 806 plans; 32 employers, of which 56/268 (INN-only/INN&OON) were pre-parity, 31/194 transition, and 55/509 post parity.

**Figure A2. Sample flow-chart: number of plan-years, plans, and employers remaining after each sample inclusion criterion, carve-in plans**



Note. CY: Calendar Year; BH: Behavioral health. For the longitudinal sample, an additional criteria was imposed to only include plans that existed in all three time periods. This led to a total of 6,586 plan-years; 1,287 plans; 234 employers-- 2,194 pre-parity, 1,287 transition, and 3,105 post-parity.

\* The initial carve-in sample included employer groups who were in Optum’s Book of Business during 2009 and/or during at least one year pre-parity (2008-9) and at least one year post-parity (defined as 2010-12 at the time the sample was drawn). We then excluded 12 employers whose benefit design data was not available in the TOPs database.

† The majority of plans not included in the Book of Business had no enrollees

**Table A1. MHPAEA-Related Changes to Mental Health and SUD Services Covered, Carve-Out Plans that did not cover specific services**

Type of Service	Plans with in-network benefits only (N=171 plan-years)					Plans with In- and out-of-Network Benefits (N=2086 plan-years)									
	In-Network Benefits					In-Network Benefits					Out-of-Network Benefits				
	Pre		Transition	Post		Pre		Transition	Post		Pre		Transition	Post	
	N	%	N	N	N	%	N	%	N	N	%	N	%	N	
Outpatient psychotherapy															
<i>Mental Health</i>	0	0	0	0	0	0	0	0	0	2	1	0	0	0	
<i>Substance Use Disorder</i>	0	0	0	0	1	< 1	0	0	0	1	< 1	0	0	0	
Medication management															
<i>Mental Health</i>	0	0	0	0	0	0	0	0	0	2	1	0	0	0	
<i>Substance Use Disorder</i>	0	0	0	0	1	< 1	0	0	0	1	< 1	0	0	0	
Residential Treatment															
<i>Mental Health</i>	1	2	0	0	4	1	3	1	0	13	4	5	1	0	
<i>Substance Use Disorder</i>	2	4	0	0	5	2	3	1	0	14	4	5	1	0	
Inpatient hospitalization															
<i>Mental Health</i>	0	0	0	0	0	0	0	0	0	6	2	0	0	0	
<i>Substance Use Disorder</i>	2	4	0	0	2	1	0	0	0	8	3	0	0	0	

Note. Pre = 2008 and 2009; Transition = 2010, Post = 2011-2013.

**Table A2. Employer and Plan Characteristics**

<b>Employer Characteristics</b>	<b>Carve-Out (N=40 employers)</b>		<b>Carve-In (N=340 employers)</b>	
	<b>n</b>	<b>%</b>	<b>n</b>	<b>%</b>
Average number of enrolled employees				
>40,000	7	18	8	2
10,001 - 40,000	15	38	68	20
5,000 - 10,000	9	23	68	20
<5,000	9	23	196	58
Employer Industry				
Accommodation and Food Services	2	5	7	2
Administrative and Support and Waste Management and Remediation Services	0	0	2	1
Agriculture, Forestry, Fishing and Hunting	0	0	1	0
Arts, Entertainment, and Recreation	0	0	7	2
Construction	0	0	8	2
Educational Services	0	0	7	2
Finance and Insurance	6	15	44	13
Health Care and Social Assistance	3	8	14	4
Information	4	10	28	8
Management of Companies and Enterprises	0	0	2	1
Manufacturing	9	23	100	29
Mining, Quarrying, and Oil and Gas Extraction	0	0	12	4
Other Services (except Public Administration)	0	0	8	2
Professional, Scientific, and Technical Services	6	15	31	9
Public Administration	3	8	4	1
Real Estate Rental and Leasing	0	0	4	1
Retail Trade	3	8	19	6
Transportation and Warehousing	2	5	15	4
Utilities	2	5	15	4
Wholesale Trade	0	0	12	4
Census division				
New England	3	8	18	5
Middle Atlantic	5	13	60	18
East North Central	8	20	51	15
West North Central	1	3	27	8
South Atlantic	3	8	47	14
East South Central	2	5	8	2
West South Central	5	13	69	20
Mountain	0	0	13	4
Pacific	13	33	44	13
Unknown	0	0	3	1

Plan Characteristics	Carve-Out (N=1,527 plans)		Carve-In (N=3,569 plans)	
	N	%	n	%
Plan Type				
Preferred Provider Organization (PPO)	1,251	82	981	27
Point of Service (POS)	147	10	2,211	62
Exclusive Provider Organization (EPO)	125	8	306	9
Managed Indemnity	0	0	71	2
Other	4	0	0	0
Funding				
Administrative Services Only (ASO)	1,385	91	3,445	97
Fully Insured (FI)	142	9	124	3

**Table A3. Summary of Associations of MHPAEA with Changes in Percent of Plans with any BH Annual Limits, Longitudinal Sample Only**

Any Annual Limits	Pre-Parity (2008-09)		Transition (2010)		Post-Parity (2011-13)		P-value	2009 enrollees affected	
<b>Carve-Out Plans with In- and Out-of-Network Benefits (N=971 plan-years)</b>	<b>n</b>	<b>%</b>	<b>n</b>	<b>%</b>	<b>n</b>	<b>%</b>		<b>n</b>	<b>%</b>
Inpatient or Intermediate*	165	62	22	11	3	1	<.001	528,882	56
Outpatient visits	234	87	24	12	3	<1	<.001	712,953	76
<b>Carve-Out Plans with In-Network Benefits Only (N=142 plan-years)</b>	<b>n</b>	<b>%</b>	<b>n</b>	<b>%</b>	<b>n</b>	<b>%</b>		<b>n</b>	<b>%</b>
Inpatient or Intermediate*	43	77	1	3	0	0	<.001	137,419	69
Outpatient visits	52	93	5	16	0	0	<.001	148,512	75
<b>Carve-In Plans (N = 6,586 plan-years)</b>	<b>n</b>	<b>%</b>	<b>n</b>	<b>%</b>	<b>n</b>	<b>%</b>		<b>n</b>	<b>%</b>
Inpatient or Intermediate*	1576	72	69	5	104	3	<.001	1,920,306	69
Outpatient visits	1692	77	76	6	110	4	<.001	2,119,933	76

Notes: P-values are from Fisher's Exact Test. Plan years were included in the counts here if the plan had any limit for the relevant level of care, for MH and/or SUD.-Carve-out enrollees in in-and out-of-network plans = 942,885; in-network only plans = 197,739. Carve-in total enrollees = 2,782,470.

<sup>1</sup> Of these 971 total plan-years, 268 were in the pre-parity, 194 in the transition, and 509 in the post-parity period.

<sup>2</sup> Of these 142 total plan-years, 56 were in the pre-parity, 31 in the transition, and 55 in the post-parity period.

<sup>3</sup> Of these 6,586 total plan-years, 2,194 were in the pre-parity, 1,287 in the transition, and 3,105 in the post-parity period.

\* Intermediate care accumulates against the inpatient limit using standard substitution of benefits ratios: 1 inpatient day = 1.5 residential treatment days, 2 day treatment/partial hospital days, 5 structured outpatient treatment days, or 10 sober living/transitional living days



Substance Use Disorder only	2	1	0	0	0	0	.116	2	2-2	14,829	2
<i>All services courses of treatment, lifetime</i>											
Substance Use Disorder only	25	9	0	0	0	0	<.001	2	2-2	115,420	12
	Pre-Parity (2008-09) N=268		Transition (2010) N=194		Post-Parity (2011-13) N=509		P- value	Pre-Parity Limit, among plans with relevant limit		2009 enrollees affected	
In-Network, Specific Limit Types	n	%	n	%	n	%		Median	Min, Max	n	%
<i>Inpatient hospital days, annual</i>											
BH combined	1	0	1	1	0	0	.226	60	60-60	123	0
Mental Health only	1	0	1	1	0	0	.226	60	60-60	123	0
SUD only	2	1	2	1	0	0	.067	60	60-60	894	0
<i>Inpatient days per admission</i>											
SUD only	1	0	0	0	0	0	.476	3	3-3	789	0
<i>Inpatient or Intermediate days, annual</i>											
Mental Health only	2	1	0	0	0	0	.116	45	45-45	273	0
Substance Use Disorder only	2	1	0	0	0	0	.116	28	28-28	273	0
<i>Inpatient / Intermediate admissions, lifetime</i>											
Substance Use Disorder only	4	2	0	0	0	0	.007	2	2-2	17,669	2
<i>Outpatient visits, annual</i>											
BH combined	2	1	0	0	0	0	.116	40	40-40	797	0
Mental Health only	1	0	0	0	0	0	.476	35	35-35	0	0
Substance Use Disorder only	1	0	0	0	0	0	.476	35	35-35	0	0
<b>Out of Network, Specific Limit Types</b>											
<i>Inpatient hospital days, annual</i>											
BH combined	1	0	1	1	0	0	.226	30	30-30	123	0
Mental Health only	2	1	2	1	0	0	.067	60	60-60	894	0
Substance Use Disorder only	2	1	2	1	0	0	.067	30	30-30	894	0
<i>Inpatient or Intermediate days, annual</i>											
BH combined	28	10	7	4	3	1	<.001	30	20-50	310,004	33
Mental Health only	2	1	0	0	0	0	.116	30	30-30	273	0
Substance Use Disorder only	2	1	0	0	0	0	.116	6	6-6	273	0
<i>Inpatient / Intermediate admissions, lifetime</i>											
Substance Use Disorder only	12	5	2	1	0	0	<.001	2	1-2	107,293	11



<i>Outpatient visits, annual</i>											
BH combined	96	36	13	7	3	1	<.001	50	10-100	510,696	54
Mental Health only	10	4	2	1	0	0	<.001	20	17-28	30,748	3
Substance Use Disorder only	8	3	0	0	0	0	<.001	22.5	17-28	25,693	3
Plans with In-Network Benefits Only (N=142 plan-years), Specific Limit Type	Pre-Parity (2008-09) N=56		Transition -2010 N=31		Post-Parity (2011-13) N=55		P- value	Pre-Parity Limit, among plans with the relevant limit		2009 enrollees affected	
	n	%	n	%	n	%		Median	Min, Max	n	%
<i>Inpatient or Intermediate days, annual</i>											
BH combined	39	70	1	3	0	0	<.001	30	20-50	126,853	64
Mental Health only	4	7	0	0	0	0	.076	45.5	31-60	10,566	5
Substance Use Disorder only	2	4	0	0	0	0	.349	45	45-45	5	0
<i>Inpatient or Intermediate days, lifetime</i>											
BH combined	4	7	0	0	0	0	.076	75	60-90	9,346	5
<i>Inpatient or Intermediate courses, lifetime</i>											
Substance Use Disorder only	9	16	4	13	0	0	.003	2	2-2	11,093	6
<i>Outpatient visits, annual</i>											
BH combined	40	71	1	3	0	0	<.001	40	20-50	126,853	64
Mental Health only	12	21	4	13	0	0	<.001	27.5	20-30	21,659	11
Substance Use Disorder only	2	4	0	0	0	0	.349	20	20-20	5	0
<i>Outpatient courses, lifetime</i>											
Substance Use Disorder only	8	14	4	13	0	0	.004	2	2-2	11,093	6
<i>All services courses, lifetime</i>											
Substance Use Disorder only	2	4	0	0	0	0	.349	2	2-2	8,872	4

Note: P-values are from Fisher's Exact Test. The table does not include rows for types of limits that did not exist in the data (e.g., annual admission limits for any level of care, INN). Carve-out enrollees in in-and out-of-network plans = 942,885; in-network only plans = 197,739.

\*Statistics unavailable; P-value unavailable when no plan in any study period has the given limit type. Median, min, max, and enrollees affected unavailable when no plans have the given limit in the pre-parity period.

**Table A5. Associations of MHPAEA with Changes in the Percent of Plans with BH Quantitative Treatment Limits, Carve-In Longitudinal Sample**

Limit Type	Pre-Parity (2008-09) N=2,194		Transition (2010) N=1,287		Post-Parity (2011-13) N=3,105		P-value	Pre-Parity Limit, among plans with relevant limit		2009 enrollees affected	
	n	%	n	%	n	%		Median	Min, Max	n	%
<i>Inpatient or intermediate days, annual</i>	947	43	36	3	61	2	<.001	30	7, 175	1,086,375	39
BH combined	606	28	31	2	42	1	<.001	30	8, 165	831,989	30
Mental Health only	485	22	12	1	19	<1	<.001	30	7, 183	592,876	21
Substance Use Disorder only											
<i>Inpatient or intermediate days, lifetime</i>	122	6	2	<1	2	<1	<.001	90	30, 190	201,158	7
BH combined	24	1	3	<1	4	<1	<.001	95	45, 150	48,472	2
Mental Health only	122	5	10	1	3	<1	<.001	60	10, 120	150,955	5
Substance Use Disorder only											
<i>Inpatient or intermediate admissions, lifetime</i>											
Substance Use Disorder only	2	<1	1	<1	1	<1	.145	2	2, 2	8	0
<i>Inpatient or intermediate days per admission</i>											
BH combined	25	1	9	<1	13	<1	<.001	30	30, 45	9,533	0
Substance Use Disorder only	14	<1	5	<1	12	<1	<.001	7	7, 28	3,063	0
<i>Outpatient visits, annual</i>	1118	51	54	4	78	3	<.001	30	3, 60	1,283,634	46
BH combined	574	26	23	2	34	1	<.001	30	5, 60	821,218	30
Mental Health only	448	20	17	1	20	<1	<.001	30	10, 120	548,647	20
Substance Use Disorder only											
<i>Outpatient visits, lifetime</i>	45	2	0	0	0	0	<.001	150	30, 400	111,660	4
BH combined	2	<1	0	0	0	0	.111	90	90, 90	1,866	0
Mental Health only	80	4	2	<1	4	<1	<.001	60	20, 120	91,706	3
Substance Use Disorder only											

Note: P-values are from Fisher's Exact Test. The table does not include rows for types of limits that did not exist in the data. For carve-in plans, limits were always combined INN and OON network (if there were OON benefits). Total 2009 enrollees for all carve-in plans = 2,782,470.