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ASSESSING THE USABILITY OF 2011 BEHAVIORAL HEALTH ORGANIZATION MEDICAID ENCOUNTER DATA

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ABSTRACT

This brief assesses the completeness and quality of encounter data for Medicaid managed care behavioral health organizations (BHOs) in 2011. It provides an update to a similar study conducted using MAX 2009 data. It describes state variation in the use of delivery systems, which benefits are covered, and the types of Medicaid beneficiaries enrolled in BHOs. Of the 15 states with BHOs in 2011, 13 had data available at the time we started the analysis in December 2015. We find that 10 of the 13 states with BHO programs had behavioral health encounter records available in MAX. Three states (Kansas, Massachusetts, and Utah) had outpatient and other services data deemed usable for all eligibility groups, whereas two others (Iowa and Washington) had outpatient data deemed usable for some but not all eligibility groups. Compared to 2009, more states submitted inpatient BHO encounter data in 2011. Although the data were high quality for all plans in all states, our analysis found the inpatient data were not complete for all eligibility groups in any state. The brief concludes with an assessment of the data's overall usability for program monitoring and research, and notes some study limitations.

INTRODUCTION AND BACKGROUND

In 2009, Medicaid accounted for 25 percent of national mental health and substance use disorder spending (together referred to as behavioral health) (SAMHSA 2014). The 20 percent of Medicaid enrollees with a behavioral health condition account for 50 percent of all Medicaid spending. Enrollees with a behavioral health diagnosis have average yearly expenditures of $13,303 for physical, behavioral health, and long-term care services compared to $3,564 per enrollee without one (MACPAC 2015).

The implementation of the Patient Protection and Affordable Care Act (ACA) and the Mental Health Parity and Addiction Equity Act (MHPAEA) are expected to expand access to behavioral health services. The Medicaid expansion under the ACA expanded Medicaid eligibility up to 133 percent of the federal poverty level (FPL). In states that implemented the expansion, low-income adults with high behavioral health needs, but who were not eligible on the basis of disability and previously did not meet Medicaid eligibly criteria, were able to obtain coverage. MHPAEA requires that benefits coverage for behavioral and physical health services be equal, so individuals with both public and private coverage should experience improved access to care (CMS 2015).

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In the Medicaid program, behavioral health services are provided through both fee-for-service (FFS) and managed care delivery systems. When provided through managed care, services are either "carved in" and provided through comprehensive managed care organizations (MCOs) or "carved out" and provided through separate stand-alone behavioral health organizations (BHOs). As of 2014, 60 percent of Medicaid beneficiaries nationwide were enrolled in MCOs, and 16 percent of Medicaid beneficiaries were enrolled in BHOs (CMS 2016). States may organize delivery of behavioral health services entirely through an MCO or through a BHO. However, states also commonly use a variety of delivery mechanisms concurrently, such as using both a BHO and an MCO or one of the two types of managed care with FFS. When states use multiple delivery mechanisms, delivery system enrollment can vary by eligibility group (for example, children enrolled in FFS and adults enrolled in a BHO), by need/intensity (for example, all eligibility groups enrolled in an MCO and individuals with serious mental illness concurrently enrolled in a BHO), or by geographic region (for example, BHO used in urban areas and FFS in rural areas).

To monitor beneficiaries' access to behavioral health services and evaluate their cost and quality, data from managed care plans are essential. Managed care data from all 50 states and the District of Columbia are contained in the Medicaid Analytic eXtract (MAX), a research-ready data set that includes data for all Medicaid beneficiaries and services in FFS and managed care programs. Managed care program data included in MAX consist of eligibility data, capitation payment data, and encounter records. Eligibility data contain information on beneficiary characteristics and enrollment data. Capitation payment data record the monthly amount Medicaid pays to a managed care plan per enrollee for all services covered by the plan. Encounter records are similar to health care claims data; they contain service utilization information, although they do not necessarily have information about the amounts the MCOs pay to providers.

Historically, analysts and researchers have not used the encounter data included in MAX due to concerns about its quality and completeness. These concerns reflect the challenges states face in collecting complete and high quality encounter data because providers do not need to submit encounter data to receive payment. Furthermore, until recently, encounter data submitted to the Centers for Medicare & Medicaid Services (CMS) did not undergo the same quality checks as FFS data. Since 2010, CMS has invested resources to expand the body of knowledge on Medicaid encounter data and provided technical assistance to states to assist them in their data improvement efforts.

CMS recently revised and updated federal Medicaid Managed Care Regulations (primarily contained in 42 CFR 438) and, as part of the update, addressed states' and managed care plans' responsibility for collecting and reporting encounter data (42 CFR §438.242). The regulations and related documents emphasize encounter data's vital role in all aspects of managed care oversight, and make it clear that CMS intends to move to stronger enforcement of long-standing requirements on states to submit the data to CMS. Particularly notable is that the regulations describe new financial penalties that can be imposed for failure to submit encounter data and submitting data of poor quality (42 CFR §438.818). In describing plans for future technical assistance, CMS also makes clear that it's preference is to work with states in a collaborative, nonpunitive manner.

As part of CMS's encounter data work, CMS funded several studies analyzing the reliability of Medicaid encounter data, in which "reliability" encompasses both (1) completeness, or the degree to which encounter records contain all services provided to managed care enrollees; and (2) quality, which concerns the amount or quality of information on the encounter record itself and is assessed based on measures such as having diagnosis and procedure codes that meet national standards. A series of issue briefs on encounter data

reliability for MCOs (Byrd and Dodd 2015; Dodd et al. 2012; Byrd et al. 2012) focused primarily on physical health services during 2007–2011. Additionally, in 2013, an issue brief analyzed BHO data in MAX 2009; it concluded that only limited BHO data were available and usable at that time (Nysenbaum et al. 2013).

This brief updates the study of MAX 2009 BHO data. It assesses the completeness and quality of BHO data in MAX 2011—the most current year of data available for a majority of states at the time of this study. It first describes state variation in the use of delivery systems, which benefits are covered, and the types of Medicaid beneficiaries enrolled in BHOs. It then describes our methods for conducting the completeness and quality analysis, followed by the analysis results. We conclude by assessing the data's overall usability and describing limitations to this study.

STATE VARIATION IN BEHAVIORAL HEALTH DELIVERY SYSTEMS, BENEFITS, AND POPULATIONS

In 2011, 15 states provided behavioral health services to Medicaid enrollees through BHOs (Table 1), the same number as in 2009.[1] Thirty states had MCOs that provided services for either mental health (MH) or substance use disorders (SUDs), or both. Ten states had MCOs that covered behavioral health services, and contracted with BHOs as well (CMS 2011). For example, the MCO may have covered behavioral health services for those with minor or moderate mental health or substance use disorder needs, whereas the BHO enrolled and provided services for enrollees with serious mental health conditions. In these states, individuals were enrolled concurrently in both the MCO and the BHO, or in only one of the two programs.

Table 1. Medicaid Managed Care Coverage of Behavioral (MH and/or SUD) Health Services, BHOs and MCOs, 2011

BHO and MCO Covering BH	BHO Only	MCO Covering BH	No Coverage of BH Through Capitated Managed Care
AZ, CA, FL, MA, MI, NM, OR, UT, WA, WI	CO, IA, KS, NC, PA	CT, DC, DE, GA, HI, IL, IN, MD, MN, MO, NJ, NV, NY, OH, RI, SC, TN, TX, VA, VT	AK, AL, AR, ID, KY, LA, ME, MS, MT, ND, NE, NH, OK, SD, WV, WY

Source: Mathematica analysis of 2011 Medicaid Managed Care Enrollment and Program Summary Reports, CMS.
Notes: BH = behavioral health; MH = mental health; SUD = substance use disorder.

Coverage of behavioral health services in BHOs. In addition to variation in the delivery systems used to provide behavioral health services, states also vary in the behavioral health services they cover, either through FFS or through managed care. According to federal guidelines, states must cover certain categories of services (mandatory services) and may receive matching federal funds for other categories if they choose to cover them (optional services).[2] Optional services, which are covered in some states but not others, include psychologist services, prescription drugs, clinic services, community supports, and targeted case management. In addition, states covering a specific benefit may vary greatly in the generosity of the benefit and limitations of coverage (Nysenbaum et al. 2013).

Due to the flexibility granted to states by federal law, each state varies with respect to the scope of behavioral health services covered through BHO contracts, whether services are covered on a statewide or regional basis, and which eligibility groups are enrolled. As of 2011, California, Colorado, Florida, Utah, and Washington had BHOs that covered only

mental health services, whereas the remainder of states with BHOs covered both mental health and substance use disorder treatment through the plans (Table 2). The majority of BHO programs provided inpatient and outpatient services. The BHOs in 5 states (California, North Carolina, Utah, Washington, and Wisconsin) were available in some but not all regions. In the remaining 10 states, BHOs were available on a statewide level. Some states enrolled nearly all Medicaid beneficiaries in BHOs and MCOs, whereas others targeted specific populations, such as children with serious emotional disturbance (SED). A table describing the specific services and populations covered by each state's BHO program is available in Appendix A.

Table 2. Summary of BHO Characteristics, 2011

State	Categories of Services Covered	Statewide or Region Specific
AZ	MH + SUD	Statewide
CA	MH	City, County
CO	MH	Statewide
FL	MH	Statewide
IA	MH + SUD	Statewide
KS	MH + SUD	Statewide
MA	MH + SUD	Statewide
MI	MH + SUD	Statewide
NC	MH + SUD	County
NM	MH + SUD	Statewide
OR	MH + SUD	Statewide
PA	MH + SUD	Statewide
UT	MH	County
WA	MH	County, Region
WI	MH + SUD	County

Source: Mathematica analysis of the 2011 Medicaid Managed Care Enrollment and Program Summary Reports.

Consequently, the percentage of Medicaid enrollees in BHOs in 2011 varied widely across states and by eligibility group (adults, children, disabled, aged) (Table 3). In California and Wisconsin, less than 1 percent of the Medicaid population across all groups was enrolled (the BHO programs in California and Wisconsin were targeted to a small number of children with severe emotional disturbance), whereas there was nearly universal enrollment in Washington. In some states, the enrollment rate varied significantly by eligibility group. Kansas, Florida, Massachusetts, and Pennsylvania reported much lower enrollment rates for the aged group than other eligibility groups. Iowa, New Mexico, and Utah reported lower enrollment rates for adults than they did for children, persons with disabilities, and the aged.

Table 3. Percentage of Medicaid Enrollees in BHOs, by Basis of Eligibility, MAX 2011

State	Adults	Children	Disabled	Aged
AZ	Unavailable	Unavailable	Unavailable	Unavailable
CA[a]	<0.01	<0.01	<0.01	<0.01
CO	Unavailable	Unavailable	Unavailable	Unavailable
FL	13.4	29.5	25.8	4.7
IA	55.6	99.3	97.4	98.0
KS	99.7	99.9	96.2	60.5
MA	46.1	39.4	39.2	1.4
MI	99.2	99.1	97.5	94.9
NM	52.7	84.5	85.8	91.2
NC	8.9	7.4	7.7	8.2
OR	96.2	95.2	93.9	94.6
PA	97.6	97.6	96.0	54.6
UT	71.9	97.3	92.3	92.3
WA	99.9	99.9	99.5	99.7
WI[a]	<0.01	0.2	0.4	<0.01

Source: Mathematica Analysis of MAX 2011 data.
Notes: Data for Arizona and Colorado were not available when we started this analysis in December 2015.
[a] The BHO programs in California and Wisconsin were targeted to a small number of children with severe emotional disturbance.

DATA AND METHODS

Of the 15 states with BHOs in 2011, 13 had data available at the time we started the analysis in December 2015. Data from Arizona and Colorado were not available and could not be included. We restricted the analytic file to full-benefit Medicaid enrollees with a minimum of one month of enrollment in Medicaid or Children's Health Insurance (CHIP). Our analysis assessed each of the four MAX file types: inpatient facility data (IP), long-term care data (LT), outpatient and other services data (OT), and pharmacy data (RX). In Appendix B, we provide additional information on the data and methods, including a description of the types of data included in each MAX file.

Completeness Metrics. To assess data completeness, we constructed four measures. First, for the outpatient and other services data, we calculated the number of encounter records per person months of enrollment (PMEs). We calculated our measures in PMEs because some enrollees were enrolled in Medicaid for only part of the year, with a length of enrollment anywhere from one to 11 months. By calculating measures in PME, we standardized the unit of analysis. We then calculated measures for the outpatient and other services data—the percentage of BHO enrollees with any encounter records and the number of records per user of services. For inpatient facility data, we calculated our completeness metric in 1,000 PMEs due to the low frequency of inpatient visits. We conducted the completeness analysis by state at the eligibility group level to account

for variation in the average number of expected services by population. For example, children typically use fewer behavioral health services on average than the disabled. We created FFS reference ranges to use as benchmarks for managed care encounter record completeness, based on mental health and substance use disorder claims in 9 states that had no BHOs and no or limited use of MCOs: Alabama, Alaska, Arkansas, Montana, New Hampshire, North Dakota, Oklahoma, South Dakota, and Wyoming.[3] The FFS reference ranges represented the minimum and maximum value of the completeness metrics for the reference states in 2011; to meet the completeness benchmarks, the BHO data had to exceed the lower bound of the reference ranges.

Data Quality Metrics. To assess data quality, we constructed measures to examine whether diagnosis and procedure codes met national standards, and evaluated the average number of diagnoses codes. We created measures for outpatient and other services data, and inpatient facility data, based on the percentage of records that included (1) at least one diagnosis code, and (2) a diagnosis code greater than three digits (diagnoses codes with four or five digits provide a higher level of specificity than three-digit codes). For the outpatient and other services data, we assessed the percentage of records with a valid Healthcare Common Procedure Coding System (HCPCS) or Current Procedural Terminology (CPT) procedure code; for the inpatient facility data, we also assessed the average number of diagnosis codes reported. We did not expect quality to vary by eligibility group but quality does commonly vary across plans. Thus, we conducted the quality analysis at the plan level.

We assessed completeness metrics by state by eligibility group and, for purposes of this analysis required that data judged to be complete had to meet two of three completeness metrics for outpatient and other services data, and one metric for inpatient services. We assessed quality metrics at the plan level with all eligibility groups combined. For a plan's data to be judged high quality, outpatient and other services data had to be considered of high quality for two of the three metrics; to be judged medium quality, data had to be considered of medium quality for two of the three metrics. The same standards—meeting two of three metrics for each category—apply to the data quality analysis for the inpatient facility data.

RESULTS

Data Completeness

All of the 13 BHO states included in this analysis reported enrollment and capitation data in MAX 2011 (Table 4). Although most submitted complete data, Florida did not submit enrollment data for one of its 6 plans, and Pennsylvania submitted limited enrollment (fewer than 200 person months of enrollment) and no capitation data for one of its 31 plans. Ten states submitted encounter records for all plans; however, encounter records were missing for all plans in California, Pennsylvania, and Wisconsin.

Data completeness improved in comparison to 2009 (Nysenbaum et al. 2013). In that year, neither Utah nor Washington submitted capitation data; in 2011, however, they reported data for all BHO plans. Massachusetts, Michigan, Oregon, Utah, and Washington did not report encounter records in 2009 but did so for all BHO plans in 2011. In addition, of the seven states with encounter records in 2009, five states had data available for analysis at the time of this brief and all reported encounter records in 2011 (Nysenbaum et al. 2013).

Table 4. Summary of Eligibility, Capitation, and Encounter Data Reporting in States with BHOs, MAX 2011

State	Number of Plans Submitting	Plans Reporting Eligibility Data (N)	Plans Reporting Capitation Data (N)	Plans Reporting Encounter Data (N)
AZ	Unavailable	NA	NA	NA
CA	1	1	1	None
CO	Unavailable	NA	NA	NA
FL	6	5	6	6
IA	1	1	1	1
KS[a]	1	1	1	1
MA	1	1	1	1
MI	18	18	18	18
NM	1	1	1	1
NC	1	1	1	1
OR	10	10	10	10
PA	31	30, and limited data for 1[b]	30	None
UT	10	10	10	10
WA	13	13	13	13
WI	2	2	2	None

Source: Mathematica analysis of the MAX 2011 Managed Care Crosswalk, MAX 2011 files, the Medicaid Managed Care Enrollment Report, and the Medicaid Managed Care Program Summary Report.
Note: Data for Arizona and Colorado were not available when we started this analysis in December 2015.
[a] Kansas reported two plans—an MH plan and an SUD plan. The same population is enrolled in both of these plans, so we combined them into a single one.
[b] "Limited data" is defined as fewer than 200 person months of enrollment or fewer than 200 capitation or encounter records.

Ten states reported encounter records for outpatient and other services; these data varied in completeness based on state, eligibility group, and the specific metric. We used three measures to assess outpatient and other services encounter record completeness: (1) the number of encounter records per person month enrolled, (2) the percentage of enrollees with an outpatient and other services BHO record, and (3) the number of outpatient and other services BHO records per service user. Encounter records were most complete for adults, with a consistently high number of states meeting each of the three completeness measures for this group. For the number of OT records per month enrolled, eight states met the completeness benchmark for adults and the disabled, six met the benchmark for children, and five met the benchmark for the aged (Table 5). On this metric, Kansas and Utah had complete data for all eligibility groups, whereas five states (Iowa, Massachusetts, Michigan, New Mexico, and Washington) had complete data for three of the four eligibility groups. Oregon's data were above the reference range for adults and the aged, which may indicate either overreporting or greater availability, accessibility, and use of behavioral health services compared to other states.

Table 5. Comparison of FFS and BHO Outpatient and Other Services Records, per Month Enrolled, MAX 2011

State	Number of Outpatient and Other Services Records, per Month Enrolled			
	Adults	Children	Disabled	Aged
BHOs Covering MH and SUD				
FFS Reference Range	0.05–0.51	0.08–0.49	0.40–1.60	0.07–0.31
IA	0.19	0.21	0.52	0.03
KS	0.18	0.29	1.58	0.09
MA	0.21	0.16	0.50	0.06
MI	0.11	0.03	0.88	0.26
NC[a]	0.00	0.00	0.00	0.00
NM	0.17	0.22	0.70	0.04
OR	0.63	0.37	0.95	0.60
BHOs Covering Only MH				
FFS Reference Range	0.04–0.14	0.08–0.48	0.40–1.60	0.04–0.30
FL	0.05	0.02	0.03	0.03
UT	0.08	0.10	1.38	0.16
WA	0.12	0.07	0.79	0.14

Source: Mathematica analysis of MAX 2011 data.
Note: California, Pennsylvania, and Wisconsin are excluded from this table because they did not submit OT BHO encounter data.
[a] North Carolina reported 436 OT encounter records. The number of records per month enrolled rounded to zero for each eligibility group.

For the percentage of enrollees with an outpatient and other services BHO record, 7 of the 10 states with such records met the benchmark for adults, 7 met it for the disabled, 5 met the benchmark for the aged, and 4 met it for children (Table 6). On this measure, Kansas, Massachusetts, and New Mexico met the completeness benchmark for all eligibility groups. For the number of OT records per service user, 8 of the 10 states met the benchmark for children and the aged, and 7 met it for adults and the disabled. Iowa, Kansas, New Mexico, Utah, and Washington met the completeness benchmarks for all eligibility groups. North Carolina reported fewer than 500 OT encounter records in total and met none of the benchmarks. Michigan had the highest number of OT records per service user for adult, disabled, and aged groups, which again could signify either duplicate records or greater availability, accessibility, and use of behavioral health services for these groups compared to other states.

Table 6. Percentages of Enrollees with an Outpatient and Other Services Record, and Number of Records per Service User, MAX 2011

State	Percentage of Enrollees with an Outpatient and Other Services BHO Record				Number of Outpatient and Other Services Records per Service User			
	Adults	Children	Disabled	Aged	Adults	Children	Disabled	Aged
BHOs Covering MH and SUD								
FFS Reference Range	6.60–22.60	6.18–15.10	20.85–37.65	2.69–11.37	7.14–26.95	13.79–43.90	15.94–65.26	4.97–67.18
IA	16.21	13.27	27.59	1.46	9.50	15.46	20.39	17.87
KS	12.46	10.68	29.43	3.57	11.12	27.32	54.90	23.77
MA	13.32	7.55	30.58	4.93	12.67	16.98	15.41	6.51
MI	2.89	1.58	9.97	2.11	33.12	19.28	94.78	120.27
NC	0.80	0.07	0.40	0.01	1.12	1.07	1.14	1.00
NM	11.86	9.56	27.66	6.49	11.39	24.03	27.44	5.58
OR	19.13	21.84	21.15	13.63	29.32	15.57	47.95	44.64
BHOs Covering Only MH								
FFS Reference Range	5.60–19.06	6.02–15.01	20.04–35.93	2.49–11.27	5.71–16.33	11.99–43.83	15.21–65.39	4.94-66.96
FL	3.11	2.43	2.04	2.13	10.49	6.15	15.66	12.52
UT	6.66	4.86	26.14	6.09	8.88	18.24	53.48	25.45
WA	6.74	4.27	24.51	6.78	13.78	17.63	32.79	20.5

Source: Mathematica Analysis of MAX 2011 data.
Note: California, Pennsylvania, and Wisconsin are excluded from this table because they did not submit OT BHO encounter data.

Inpatient facility BHO encounter data were less complete than outpatient and other services BHO data. Nine of 10 states with any BHO encounter records submitted inpatient data. However, we omitted Washington's data from the analysis due to two problems: (1) all encounter records for the BHO plans were erroneously labeled as records for a comprehensive MCO; and (2) many FFS records were submitted for the BHO plans. Of the 8 remaining states with inpatient BHO encounter data analyzed, none met the completeness benchmark for the number of inpatient BHO encounter records per 1,000 person months enrolled for all population groups (Table 7). However, 4 met the completeness benchmark for the disabled (Iowa, New Mexico, Oregon, and Utah), 3 met the benchmark for adults (Michigan, New Mexico, and Utah), 3 met it for children (Iowa, Massachusetts, and Oregon), and 2 met the benchmark for the aged (Florida and Massachusetts). North Carolina reported no inpatient BHO encounter data. Kansas reported only 56 records. New Mexico reported no records for the aged, although aged individuals are enrolled in its BHO plans.

Notably, in many cases in which the encounter records did not fall in the reference range, the number of IP records per 1,000 months enrolled was substantially higher for the BHOs. For example, the reference range for adults was 0.34 to 1.55 records per 1,000 months enrolled, but Massachusetts had 4.35 records and Oregon 2.75 records per 1,000 months enrolled. Behavioral health inpatient use above the FFS reference ranges for adults could be due to more generous benefits or greater availability and accessibility of such services. However, these two states did not have consistently high record counts for other eligibility groups. Massachusetts data met the completeness benchmarks for children and the aged but was above range for adults and the disabled. Oregon data met the completeness benchmarks for children and the disabled but was substantially above range for adults and the aged.

Table 7. Comparison of FFS and BHO Inpatient Facility Records per 1,000 Months Enrolled, MAX 2011

State	Number of Inpatient Facility Records per 1,000 Months Enrolled			
	Adults	Children	Disabled	Aged
BHOs Covering MH and SUD				
FFS Reference Range	0.34–1.55	0.31–4.87	1.38–3.98	0.04–0.28
IA	1.82	0.91	3.67	0.03
KS	0.01	0.00	0.07	0.00
MA	4.35	0.46	4.68	0.18
MI	0.48	0.00	1.13	0.01
NM	0.73	0.00	1.78	0.00
OR	2.75	0.87	3.24	2.85
BHOs Covering Only MH				
FFS Reference Range	0.40–1.68	0.33–4.97	1.84–4.83	0.07–0.33
FL	0.21	0.04	0.23	0.18
UT	0.80	0.18	2.08	0.04

Source: Mathematica analysis of MAX 2011 data.
Notes: California, North Carolina, Pennsylvania, and Wisconsin are excluded from this table because they did not submit IP BHO encounter data. Washington is excluded due to issues with the submitted data.

Data Quality

We found outpatient and other services encounter data generally to be of high quality for three metrics: (1) having at least one diagnosis code, (2) having a primary diagnosis code greater than three digits (more digits provide more specificity), and (3) having a valid procedure code. For each of these metrics, we classified plans' data quality based on the percentage of records meeting the coding standard, with more than 90 percent equaling high quality, 80–90 percent equaling medium quality, and less than 80 percent equaling low quality (Table 8). We summarized data quality at the plan level. Many plans reported a primary diagnosis code on every record; the majority of plans reported a primary diagnosis code of greater than three digits on at least 80 percent of their records. Reporting of valid procedure codes was also strong, with all plans reporting valid codes on at least 85 percent of records. Data judged high quality for at least two metrics were considered high quality at the plan level. To be considered medium quality, at least two metrics needed to meet the definition of medium quality or higher. Plans that did not meet either of these benchmarks were considered to have low quality data. In most cases, the quality of data did not vary across plans within a state. In the majority of states analyzed—Iowa, Kansas, Massachusetts, Michigan, North Carolina, Utah, and Washington—data were high quality for all plans. Data in New Mexico and Oregon were of medium quality for all plans. Florida's data were high quality for one plan, medium quality for two plans, and low quality for two plans.

Table 8. Outpatient and Other Services Data Quality, MAX 2011

State	With Primary Diagnosis Code	With Primary Diagnosis Code Length Greater Than Three Digits	With Valid HCPS or CPT Procedure Code
Reference Metrics			
High Quality	> 90%	> 90%	> 90%
Medium Quality	80–90%	80–90%	80–90%
Low Quality	< 80%	< 80%	< 80%
BHOs Covering MH and SA			
IA	100.0%	95.7%	99.9%
KS	100.0%	96.7%	99.9%
MA	100.0%	96.1%	98.0%
MI	92.4–100.0%	82.4–95.0%	95.8–98.5%
NC	100%	98.6%	99.7%
NM	86.4%	82.9%	98.2%
OR	84.1–89.3%	81.1–85.9%	96.4–98.2%
BHOs Covering Only MH			
FL	43.1–93.2%	40.8–88.8%	92.8–98%
UT	100–100%	94.9–99.6%	85.1–99.8%
WA	100–100%	95.1–96.9%	93.9–97.8%

Source: Mathematica analysis of MAX 2011 data.
Notes: For states with multiple BHO plans, we display the lowest and highest value across plans. California, Pennsylvania, and Wisconsin are excluded from this table because they did not submit OT BHO encounter data.

For the inpatient data, we found that all states had high quality data for all plans based on three metrics: (1) having at least one diagnosis code; (2) the primary[4] diagnosis code being greater than three digits, and (3) average number of diagnosis codes on the record. As with the outpatient and other services measures, for the IP diagnosis code metrics, we classified plans' data quality based on the percentage of records meeting the coding standard with greater than 90 percent equaling high quality, 80–90 percent equaling medium quality, and less than 80 percent equaling low quality (Table 9). All plans submitted all records with a primary diagnosis code; the majority of plans submitted a primary diagnosis code greater than three digits on more than 90 percent of records. For the average number of diagnosis codes, we considered data to be of high quality when there were two or more codes, as inpatient records are expected to have more than one diagnosis code. We defined medium quality as an average number of diagnosis codes between one and two (but not including two), and low quality data as averaging less than one diagnosis code. All plans analyzed met the high quality standard for average number of diagnosis codes except for Iowa's. Data assessed as high quality for at least two metrics were considered high quality at the plan level; all plans in all states met this level.

Table 9. Inpatient Facility Data Quality, MAX 2011

State	With Primary Diagnosis Code	With Primary Diagnosis Code Length Greater Than Three Digits	Number of Diagnosis Codes
Reference Metrics			
High Quality	>= 90%	>= 90%	>= 2
Medium Quality	80–90%	80–90%	1–2
Low Quality	< 80%	< 80%	< 1
BHOs Covering MH and SA			
IA	100.0%	93.0%	1.9
KS	100.0%	96.1%	3.8
MA	100.0%	95.9%	3.5
MI	100.0%	94.6–97.2%	4–5.7
NM	100.0%	95.0%	5.4
OR	100.0%	95.1–97.3%	4.2–5.7
BHOs Covering Only MH			
FL	100.0%	79.4 - 90.0%	2.8–4.0
UT	100.0%	89.5–100.0%	2.1–4.7

Source: Mathematica Analysis of MAX 2011 data.
Notes: California, North Carolina, Pennsylvania, and Wisconsin are excluded from this table because they did not submit IP BHO encounter data. Washington is excluded due to issues with the submitted data.

Long-Term Care and Prescription Drug Encounter Data

Four states (Michigan, New Mexico, Oregon, and Washington) submitted long-term care encounter records in MAX 2011. Although we did not create FFS reference benchmarks due to the small number of states, we reviewed the number of records across these states to gain initial insights. Michigan, New Mexico, and Oregon each had a minimum of several thousand records, with the greatest number of records being for children, followed by the disabled. Because Medicaid did not pay for inpatient psychiatric care in facilities with more than 16 beds for individuals ages 21–64 (the Institutions for Mental Disease [IMD] exclusion), we expected a large proportion of these records to be for children. Records for the disabled may represent records for children with disabilities, who are categorized in the disabled group, or records for disabled adults treated in freestanding psychiatric wings of acute care hospitals (as noted above, these records are included with the long-term care data). A review of the service types and taxonomy codes on the data showed categories appropriate for BHO records, such as psychiatric units, residential treatment facilities, and community mental health centers. Washington submitted only 316 records in total (for 11,187 PME), likely indicating that these data were incomplete.

Oregon, Florida, and Massachusetts had prescription drug encounter records; however, we found that the data were not complete or of high quality. To assess the data, we reviewed the five most frequently submitted national drug codes (NDCs) for each plan. For the data to be categorized as accurate, most or all records for prescription drugs for BHOs would need to be related to mental health or substance use disorder. However, most of the codes reviewed showed that the data were for prescriptions for asthma, heart disease, or stroke. Only one plan in Florida had mental health or substance use disorder-related pharmaceuticals for the majority of its top NDC codes (four of five). Thus, we concluded that the BHO prescription drug encounter data were neither complete nor of high quality for the submitting states.

USABILITY OF BHO ENCOUNTER DATA FOR PROGRAM MONITORING AND RESEARCH

To be usable for monitoring and research, encounter data must be reliable by meeting minimum completeness and quality benchmarks. Usability is assessed by combining the completeness metrics for each eligibility group with the data quality metrics by plan to produce summary results by eligibility group by plan. A plan's data are considered usable for an eligibility group if they meet the eligibility group's completeness benchmarks and the plan had high or medium quality data.

Among 13 states with BHO plans that had MAX data available in 2011, 10 submitted encounter data. All of these states submitted outpatient and other services data, but only 4 states (Kansas, Massachusetts, New Mexico, and Utah) had complete data for all eligibility groups enrolled in their BHO program; another 4 (Florida, Iowa, Oregon, and Washington) had complete data for at least one eligibility group but not all (Table 10). Every state except for Florida had high or medium quality outpatient and other services data for all plans. Three states (Kansas, Massachusetts, and Utah) had outpatient and other services data deemed usable for all groups and 2 states (Iowa and Washington) had outpatient and other services data deemed usable for some but not all eligibility groups.

Of the eight states with analyzed inpatient data; seven met the completeness benchmark for at least one eligibility group (Florida, Iowa, Massachusetts, Michigan, New Mexico, Oregon, and Utah); no states met the completeness benchmarks for all eligibility groups. All eight states submitting inpatient encounter data had high quality data. Seven states (Florida, Iowa, Massachusetts, Michigan, New Mexico, Oregon, and Utah) had inpatient encounter data deemed usable for at least one eligibility group.

Table 10. Summary of Encounter Data Completeness and Quality Findings, MAX 2011

State	Outpatient and Other Services Data			Inpatient Facility Data		
	Eligibility Groups with Complete Data	Data Quality (by Plan)	Usability	Eligibility Groups with Complete Data	Data Quality (by Plan)	Usability
AZ	NA	NA	NA	NA	NA	NA
CA	NR	NR	NR	NR	NR	NR
CO	NA	NA	NA	NA	NA	NA
FL[a]	Adults	High (1 plan), Medium (2 plans) Low (2 plans)	Data may be usable for some plans for adults	Aged	High (All plans)	Aged
IA	Adults, Children, Disabled	High (All plans)	Adults, Children, Disabled	Children, Disabled	High (All plans)	Children, Disabled
KS	Adults, Children, Disabled, Aged	High (All plans)	Adults, Children, Disabled, Aged	None	High (All plans)	None
MA	Adults, Children, Disabled, Aged	High (All plans)	Adults, Children, Disabled, Aged	Children & Aged	High (All plans)	Children & Aged
MI	None	High (All plans)	None	Adults	High (All plans)	Adults
NC	None	High (All plans)	None	BHO data not reported	BHO data not reported	BHO data not reported
NM	Adults, Children, Disabled, Aged	Medium (All plans)	Data do not meet usability standards	Adults & Disabled	High (All plans)	Adults & Disabled
OR	Children & Disabled	Medium (All plans)	Data do not meet usability standards	Children & Disabled	High (All plans)	Children & Disabled
PA	NR	NR	NR	NR	NR	NR
UT	Adults, Children, Disabled, Aged	High (All plans)	Adults, Children, Disabled, Aged	Adults & Disabled	High (All plans)	Adults & Disabled
WA	Adults, Disabled, Aged	High (All plans)	Adults, Disabled, Aged	Reported data not analyzed due to issues	Reported data not analyzed due to issues	Reported data not analyzed due to issues
WI	NR	NR	NR	NR	NR	NR

Source: Mathematica analysis of MAX 2011.
Notes: NA = not applicable; NR = not reported.
MAX 2011 data for Arizona and Colorado were not available at the time of this analysis. California, Pennsylvania, and Wisconsin did not submit data for their BHO plans. Washington's inpatient data were not analyzed due to mislabeling of BHO data as MCO data, as well as a significant number of FFS claims. To be considered complete, data had to meet two of three completeness measures for the OT file, and the one measure for the IP file. To be judged high quality, data for each plan had to meet the high quality thresholds for at least two of three measures for each file type. To be judged medium quality, data for each plan had to meet the medium quality thresholds for at least two of three measures. Plans with data that did not meet either high or medium quality standards are considered low quality.
[a] Florida reported eligibility data for only five of the six BHO plans on which it reported. We excluded the plan missing its eligibility data from the completeness, quality, and usability analysis.

LIMITATIONS

Part of this analysis is based on the assumption that FFS data for states that did not provide behavioral health through managed care provide a reasonable benchmark for judging the completeness of encounter data. Although we believe the FFS data to be the best available comparison, there are several drawbacks. First, the FFS states, when compared to states using managed care, have relatively small populations, are more rural, and have lower median incomes. In addition, these states may have a less generous package of behavioral health benefits covered through their programs. Both factors would produce lower service utilization patterns among FFS beneficiaries compared to those for managed care enrollees in the states in this analysis. There may also be other differences between the FFS and BHO states, such as in the acuity of enrollees. Utilization may be higher or lower for individuals receiving services through managed care due to care management practices. To the extent these differences exist, they may weaken the comparison. Individuals interested in using the MAX BHO data for analytic purposes are encouraged to utilize the analysis presented here as a starting point for additional data exploration.

CONCLUSIONS

The completeness and quality of BHO encounter data found in MAX 2011 varied across states and eligibility groups. In 2011, 10 of the 13 states with BHO programs had BHO encounter records available in MAX at the time of our analysis. Three states (Kansas, Massachusetts, and Utah) had outpatient and other services data deemed usable for all eligibility groups; two states (Iowa and Washington) had outpatient and other services data deemed usable for some but not all eligibility groups. In comparison, in 2009, two states (Arizona and Iowa) were found to have usable outpatient and other services data for all groups. More states submitted inpatient BHO encounter data in 2011 than 2009 (nine versus four). Although the data were high quality for all plans in all states, our analysis found that the inpatient data were not complete for all eligibility groups in any state. Overall, there appears to have been some improvement in the completeness and quality of BHO encounter data from 2009 to 2011. It is important to recognize that these results may reflect other factors beyond accurate reporting of BHO encounter data, including different service use patterns between the FFS and BHO states. These results reinforce the need to use caution in using MAX data to conduct national or cross-state analyses of BHO service utilization, and the need for significant further improvements in encounter data reporting and validation.

ENDNOTES

[1] Our 2009 brief classified Hawaii, Nebraska, Tennessee, and Texas as having BHOs, and California as not having a BHO. Hawaii's BHO classification was subsequently determined to be an error. Nebraska and Texas had BHOs that covered behavioral health services, but because these plans were primarily paid FFS, we excluded them from this analysis, as we restricted BHOs to those plans that were primarily paid capitated rates. Tennessee reported capitation payments and encounter records with a plan type of BHO in 2009 and 2011. However, Tennessee integrated behavioral health services into its comprehensive managed care plans in 2007, so its program should have been classified as a MCO rather than a BHO. California's BHO was excluded in 2009 due to the small number of enrollees (fewer than 200 people); this brief does not use an enrollment cutoff, so we include California in this analysis.

[2] Mandatory mental health and substance use disorder services include the following: Medically necessary inpatient hospital care; physician services; and early and periodic screening, diagnostic, and treatment (EPSDT) services for individuals younger than 21 years old. Treatment for health needs identified as part of these screenings must also be covered; additionally, states that have elected to expand Medicaid eligibility to childless adults within 133 percent of the FPL must ensure that these newly eligible adults receive "benchmark equivalent" care for behavioral health treatment.

[3] When states have limited MCO enrollment, we excluded any individuals enrolled from the analysis. One shortcoming of this study is the use of FFS claims data for predominantly FFS states as a benchmark. This group of states is more rural than states using BHOs and may have lower use of behavioral health services due to availability and access. In addition, given the variation in behavioral health benefit coverage across states, the benefits covered across the FFS states may not be equivalent to those covered in each BHO state. We discuss this point further in the limitations section.

[4] In the MAX files, the first diagnosis code on inpatient claims is formally called the principal diagnosis code.

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APPENDIX A: PROGRAM DETAILS OF MEDICAID BHOS, 2011

State	Program Name	Categories of Services Covered	Specific Benefits Covered	Populations Enrolled	Statewide or Region Specific
AZ	MH/SUD PIHP (Department of Health Services)	MH + SUD	Case Management, Crisis, Detoxification, Emergency and Non-Emergency Transportation, Individual Therapy and Counseling, Inpatient Mental Health, Inpatient Psychiatric, Inpatient Substance Use Disorders, Laboratory, Mental Health Outpatient, Mental Health Rehabilitation, Mental Health Residential, Mental Health Support, Opiate Treatment Programs, Outpatient Substance Use Disorders, Pharmacy, Residential Substance Use Disorders Treatment Programs, X-Ray	Adoption Subsidy Children, Adults Without Minor Children Title XIX Waiver (frozen as of 7/8/2011), Aged and Related Populations, Blind/Disabled Adults and Related Populations, Blind/Disabled Children and Related Populations, Families with Dependent Children Under Age 18 (1931) and Continuing Coverage (TMA/CS), Federal Poverty Level Children Under Age 19 (SOBRA), Foster Care Children, Medicare Dual Eligibles, Pregnant Women (SOBRA), Section 1931 Families with Children and Related Populations, Title XIX Waiver Spend Down (terminated 9/30/11)	Statewide
CA	PIHP (Emotional and Mental Health Support, "Family Mosaic")	MH	Crisis, Emotional Support, Inpatient Mental Health, Mental Health Rehabilitation, Mental Health Support, Outpatient Mental Health, Pharmacy	Blind/Disabled Children and Related Populations, Foster Care Children, Section 1931 Children and Related Populations	City, County
CO	MH PIHP (Colorado Medicaid Community Mental Health Services Program)	MH	Assertive Community Treatment, Clinic, Case Management, Home-Based Services for Children and Adolescents, IMD, Inpatient Mental Health, Intensive Case Management, Medication Management, Mental Health Outpatient, Mental Health Rehabilitation, Mental Health Residential, Mental Health Support, Peer Support for Mental Health, Prevention Programs (MH), Psychiatrist, Psychosocial Rehabilitation, Recovery, School-Based Services	Aged and Related Populations, American Indian/Alaska Native, Blind/Disabled Adults and Related Populations, Blind/Disabled Children and Related Populations, Foster Care Children, Medicare Dual Eligibles, Section 1931 Adults and Related Populations, Section 1931 Children and Related Populations, Special Needs Children (Balanced Budget Act [BBA] defined)	Statewide
FL	MH PIHP (Florida Managed Health Care)	MH	Community Mental Health, Crisis, Inpatient Mental Health Services, Mental Health Outpatient, Mental Health Rehabilitation, Mental Health Support, Physician (MH), Targeted Case Management	Aged and Related Populations, Blind/Disabled Adults and Related Populations, Blind/Disabled Children and Related Populations, Foster Care Children, Section 1931 Adults and Related Populations, Section 1931 Children and Related Populations	Statewide
IA	MH/SUD PIHP (Iowa Plan for Behavioral Health)	MH + SUD	Ambulance, Clinic, Detoxification, Home Health, Inpatient Mental Health, Inpatient Substance Use Disorders, Laboratory, Mental Health Outpatient, Outpatient Substance Use Disorders, X-Ray	Aged and Related Populations, American Indian/Alaska Native, Blind/Disabled Adults and Related Populations, Blind/Disabled Children and Related Populations, Foster Care Children, Medicaid Eligibility for Persons with Disability, Medicare Dual Eligibles, Section 1931 Adults and Related Populations, Section 1931 Children and Related Populations, Title XXI CHIP	Statewide

State	Program Name	Categories of Services Covered	Specific Benefits Covered	Populations Enrolled	Statewide or Region Specific
KS	SUD PIHP and MH PAHP	MH + SUD	SUD PIHP—Detoxification, Inpatient Substance Use Disorders, Outpatient Substance Use Disorders, Residential Substance Use Disorders Treatment Programs, Substance Use Disorders Support MH PAHP—Case Conferencing, Crisis, Evidence-Based Mental Health Practices, Mental Health Outpatient, Mental Health Rehabilitation, Mental Health Support, Peer Support for Mental Health, Personal Care, SED Waiver, Targeted Case Management	The same populations are enrolled in both: Adoption Support, Aged and Related Populations, American Indian/Alaska Native, Blind/Disabled Adults and Related Populations, Blind/Disabled Children and Related Populations, Breast/Cervical Cancer, Foster Care Children, Medically Improved, Medicare Dual Eligibles, Poverty-Level Pregnant Women, Presumptive XIX, Section 1931 Adults and Related Populations, Section 1931 Children and Related Populations, Special Needs Children (State defined), Working Disabled	Statewide
MA	MH/SUD PIHP (Mass Health)	MH + SUD	Crisis, Detoxification, Inpatient Mental Health, Inpatient Substance Use Disorders, Mental Health Outpatient, Mental Health Residential, Opioid Treatment Programs, Outpatient Substance Use Disorders, Residential Substance Use Disorders Treatment Programs	American Indian/Alaska Native, Blind/Disabled Adults and Related Populations, Blind/Disabled Children and Related Populations, Foster Care Children, Section 1931 Adults and Related Populations, Section 1931 Children and Related Populations, Title XXI CHIP, Special Needs Children (BBA defined)	Statewide
MI	MH PIHP (Specialty Prepaid Inpatient Health Plans)	MH + SUD	Assertive Community Treatment Assessments, Assistive Technology, Behavior Management Review, Child Therapy, Clubhouse, Community Living Supports, Crisis Interventions, Crisis Residential, Enhanced Pharmacy, Environmental Modifications, Family Support and Training, Fiscal Intermediary Services, Health, Home-Based, Housing Assistance, Intermediate Care Facilities (ICF)/Mental Retardation (MR), Inpatient Psychiatric, Intensive Crisis Stabilization, Medication Admin/Review, MH Therapies, Nursing Facility Monitoring, Occupational, Physical, and Speech Therapies, Outpatient Partial Hospitalization, Peer- Delivered Support, Personal Care in Specialized Residential, Prevention-Direct Models, Respite Care, Skill-Building Assistance, Substance Abuse, Support and Service Coordination, Supported Employment, Targeted Case Management, Transportation, Treatment Planning, Wrap-Around for Children and Adolescents	Persons with serious mental illness, developmental disabilities, substance use orders, and children with SED falling into the following Medicaid eligibility categories: Aged and Related Populations, Blind/Disabled Adults and Related Populations, Blind/Disabled Children and Related Populations, Foster Care Children, Section 1931 Adults and Related Populations, Section 1931 Children and Related Populations, Medicare Dual Eligibles	Statewide

State	Program Name	Categories of Services Covered	Specific Benefits Covered	Populations Enrolled	Statewide or Region Specific
NC	MH/SUD PIHP (Mental Health, Developmental Disabilities, & Substance Abuse Services)	MH + SUD	Assistive Technology Equipment and Supplies, Care Giver Training, Community Guide, Community Networking, Community Transitions Support, Crisis, Day Support, Detoxification, Financial Management, Home Modifications, ICF/Individuals with Intellectual Disabilities (IID), Individual Directed Goods and In-Home Intensive Supports, In-Home Skill Building, Inpatient Mental Health, Inpatient Substance Use Disorders, Mental Health Outpatient, Mental Health Rehabilitation, Mental Health Residential, Mental Health Support, Natural Supports Education, Opioid Treatment Programs, Outpatient Substance Use Disorders, Personal Care, Residential Substance Use Disorders Treatment Programs, Residential Support, Respite, Specialized Consultation, Supported Employment, Vehicle Modifications	Adoption Assistance, Aged and Related Populations, American Indian/Alaska Native, Blind/Disabled Adults and Related Populations, Blind/Disabled Children and Related Populations, Foster Care Children, Medicare Dual Eligibles, Section 1931 Adults and Related Populations, Section 1931 Children and Related Populations, Special Needs Children	County
NM	MH PIHP (Salud! Behavioral Health)	MH + SUD	Inpatient Mental Health, Inpatient Substance Use Disorders Services, Mental Health Outpatient, Mental Health Rehabilitation, Mental Health Residential, Mental Health Support, Opioid Treatment Programs, Outpatient Substance Use Disorders, Peer Support for Substance Use Disorders, Peer Support Services for Mental Health, Pharmacy, Residential Substance Use Disorders Treatment Programs, Substance Use Disorders Support	Aged and Related Populations, Blind/Disabled Adults and Related Populations, Blind/Disabled Children and Related Populations, Foster Care Children, Medicare Dual Eligibles, Section 1931 Adults and Related Populations, Section 1931 Children and Related Populations, Title XXI CHIP	Statewide
OR	MH/SUD PIHP (Oregon Health Plan Plus)	MH + SUD	Crisis, IMD, Inpatient Mental Health, Mental Health Outpatient, Mental Health Rehabilitation, Mental Health Support, Opioid Treatment Programs, Outpatient Substance Use Disorders, Screening, Identification, and Brief Intervention	Aged and Related Populations, Blind/Disabled Adults and Related Populations, Blind/Disabled Children and Related Populations, Medicare Dual Eligibles, Poverty-Level Pregnant Women, Section 1931 Adults and Related Populations, Section 1931 Children and Related Populations, Special Needs Children (BBA defined), Title XXI CHIP, American Indian/Alaska Native, Foster Care Children	Statewide
PA	MH/SUD PIHP (Health Choices Behavioral Health)	MH + SUD	Inpatient Hospital Behavioral Health, Outpatient Hospital Behavioral health, EPSDT, Case Management	Low-Income Adults, Aged, Blind or Disabled Children or Adults, Non-Disabled Children, Full Dual Eligibles, Partial Dual Eligibles, Children with Special Health Care Needs, Native American/Alaskan Native, Foster Care and Adoption Assistance Children	Statewide

State	Program Name	Categories of Services Covered	Specific Benefits Covered	Populations Enrolled	Statewide or Region Specific
UT	MH PIHP (Prepaid Mental Health Program)	MH	Crisis, Inpatient Mental Health, Outpatient Mental Health, Mental Health Rehabilitation, Transportation	Aged and Related Populations, Blind/Disabled Adults and Related Populations, Blind/Disabled Children and Related Populations, Foster Care Children, Medicare Dual Eligibles, Non-Traditional, Poverty-Level Pregnant Women, Section 1931 Children and Related Populations	County
WA	MH PIHP (Washington State Integrated Community Mental Health Program)	MH	Brief Intervention Treatment, Crisis Services, Day Support, EPSDT, Evaluation and Treatment/Community Hospitalization, Family Treatment, Federally Qualified Health Center (FQHC), Group Treatment Services, High-Intensity Treatment, Individual Treatment Services, Inpatient Hospital Psychiatric, Inpatient Mental Health Services, Intake Evaluation, Medication Management, Mental Health Services Provided in Residential Settings, Peer Support Services for Mental Health, Psychological Assessment, Rehabilitation Case Management, Rural Clinic Services, Special Population Evaluation, Stabilization Services, Therapeutic Psychoeducation	Aged and Related Populations, Blind/Disabled Adults and Related Populations, Blind/Disabled Children and Related Populations, Foster Care Children, Individuals with Serious and Persistent Mental Health and/or Substance Abuse, Medicare Dual Eligibles, Reside in Nursing Facility or ICR/MR, Section 1931 Adults and Related Populations, Section 1931 Children and Related Populations, Title XXI CHIP	County, Region
WI	(1) MH/SUD PIHP (Children Come First) (2) MH/SUD PIHP (Wraparound Milwaukee)	MH + SUD	(1 & 2) Community Support Program (CSP), Crisis, Emergency, IMD, Inpatient Mental Health, Inpatient Substance Use Disorders, Medical Day Treatment, Mental Health Outpatient, Mental Health Rehabilitation, Mental Health Residential, Mental Health Support, Outpatient Substance Use Disorders, Targeted Case Management	(1 & 2) American Indian/Alaska Native, Blind/Disabled Children and Related Populations, Foster Care Children, Section 1931 Children and Related Populations, Title XXI CHIP	(1 & 2) County

APPENDIX B: DATA AND METHODS

Initial Assessment of Data by File Type

We first assessed reporting of BHO data at the state level. For each state, we reviewed whether enrollment, capitation, and encounter data were submitted for each BHO plan. We also conducted an overall assessment of the volume of encounter data submitted for each of four MAX file types: inpatient facility data (IP), long-term care data (LT), outpatient and other services data (OT), and pharmacy data (RX). Below we provide a brief summary of the types of data included in each MAX file.

- Inpatient Facility (IP)—Inpatient hospitals
- Long-Term Care (LT)—Nursing facilities, intermediate care facility services for individuals with intellectual disabilities, psychiatric hospitals, and freestanding psychiatric wings of acute care hospitals
- Other Services (OT)—All services other than those provided by an inpatient hospital, long-term care facility, or pharmacy, including services provided by physicians, clinics, nurse midwives, nurse practitioners, and private duty nursing; services such as dental, home health, lab and x-ray, transportation, personal care, targeted case management, rehabilitation, physical therapy, occupational therapy, speech, and hearing; and hospice benefits (although this file formally is called the "other services" file, we refer to the data from this file as "outpatient and other services data" in this brief)
- Pharmacy (RX)—Prescription/over-the-counter drugs and durable medical equipment provided by a pharmacy

Based on our assessment of the volume of encounter data for each type, we concluded that there was a large volume of data for inpatient facilities and outpatient and other services that merited detailed completeness and quality analysis. As there were limited data for long-term care and pharmacy services, we decided to conduct only a limited analysis of these data types.

FFS Ranges and Completeness

As discussed in the main text of the brief, we created FFS reference ranges to use as benchmarks for managed care encounter record completeness, based on mental health and substance abuse claims in nine states that had no BHOs and no or limited use of MCOs: Alabama, Alaska, Arkansas, Montana, New Hampshire, North Dakota, Oklahoma, South Dakota, and Wyoming. To identify FFS claims for mental health and substance abuse, we used primary diagnosis codes. For outpatient and other services data, we also identified mental health and substance abuse services based on claims tagged with a MAX-specific code (type of service equal to 53) that identifies "psychiatric services," a category that includes services such as counseling, therapy, cognitive behavioral therapy, and detoxification. We created two sets of reference ranges because some states' BHOs covered only mental health, whereas others covered both mental health and substance use disorders. We then divided the BHO states into the two groups, using descriptions from the 2011 National Summary of State Medicaid Managed Care Programs (CMS 2011).

The FFS reference ranges represented the minimum and maximum value in 2011 of the completeness metrics for the reference states. For example, the reference range for the number of outpatient and other services claims per enrolled month for mental health and substance use disorder services among the disabled was 0.40–1.6; 0.40 was the lowest observed value among reference states (South Dakota) and 1.6 was the highest observed value (Arkansas).

To meet the completeness benchmarks, the BHO data had to exceed the lower bound of the reference ranges. In addition, we implemented an upper bound on our ranges. Thus, states that submitted "too much" data did not meet completeness benchmarks. We used this restriction because unexpectedly high volumes of encounter data could indicate duplicate records for a single service or mislabeled data (for example, MCO records erroneously labeled as BHO records).