Behavioral Health Services Following Implementation of Screening in Massachusetts Medicaid Children

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KEY WORDS
behavioral health services, screening, primary care, Medicaid, children

ABBREVIATIONS
BH—behavioral health
CBHI—Children's Behavioral Health Initiative
CPT—*Current Procedural Terminology*
HCPC—Healthcare Common Procedural Code
ICD-9-CM—*International Classification of Diseases, Ninth Revision, Clinical Modification*
SFY—state fiscal year

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WHAT'S KNOWN ON THIS SUBJECT: Behavioral health (BH) screening is known to increase identification of children with BH issues, but in small-scale studies, rates of follow-up after screening have been reported to be low.

WHAT THIS STUDY ADDS: This study examines the relationship between BH screening and the receipt of BH services in Massachusetts Medicaid children. Nearly 60% of children identified with BH problems received BH services, but only 30% of newly identified children received BH services.

abstract

OBJECTIVES: To determine the relationship of child behavioral health (BH) screening results to receipt of BH services in Massachusetts Medicaid (MassHealth) children.

METHODS: After a court decision, Massachusetts primary care providers were mandated to conduct BH screening at well-child visits and use a *Current Procedural Terminology* code along with a modifier indicating whether a BH need was identified. Using MassHealth claims data, a cohort of continuously enrolled (July 2007–June 2010) children was constructed. The salient visit (first use of the modifier, screening code, or claim in fiscal year 2009) was considered a reference point to examine BH history and postscreening BH services. Bivariate and multivariate logistic regression analyses were performed to determine predictors of postscreening BH services.

RESULTS: Of 261 160 children in the cohort, 45% (118 464) were screened and 37% had modifiers. Fifty-seven percent of children screening positive received postscreening BH services compared with 22% of children screening negative. However, only 30% of newly identified children received BH services. The strongest predictors of postscreening BH services for children without a BH history were being in foster care (odds ratio, 10.38; 95% confidence interval, 9.22–11.68) and having a positive modifier (odds ratio, 3.79; 95% confidence interval, 3.53–4.06).

CONCLUSIONS: Previous BH history, a positive modifier, and foster care predicted postscreening BH services. Only one-third of newly identified children received services. Thus although screening is associated with an increase in BH recognition, it may be insufficient to improve care. Additional strategies may be needed to enhance engagement in BH services. *Pediatrics* 2014;134:737–746

Today, 1 in 5 children suffer from behavioral health (BH) problems but fewer than 30% receive treatment.[1,2] BH screening in primary care is recommended as a way to identify children with BH issues and facilitate their entry into BH treatment.[3,4] However, although screening has improved identification,[5] thus far there has been little evidence to suggest that it leads to adequate BH treatment of newly identified issues.[6]

In 2008, Massachusetts implemented one of the largest enhanced children's mental health programs in the nation, the Children's Behavioral Health Initiative (CBHI), resulting from a court-ordered remedy for the class action suit, Rosie D versus Patrick.[7] Part of the initiative mandated providers to conduct BH screening at well-child visits for all children ≤ 21 years of age who were covered by Medicaid health insurance (MassHealth). Providers could choose from an approved list of 8 validated screening tools (Supplemental Table 5).[8] Screening was reimbursed and billed by using the *Current Procedural Terminology* (CPT) code 96110.[9] In July of 2008, providers were also required to use a modifier along with the 96110 code to indicate whether a child had a BH issue identified at the screening visit although these codes were not required for reimbursement until 2011.[9]

Previous studies of postscreening service utilization have been limited often relying on small samples.[10–12] Of the 2 articles written to date about data from CBHI, the one that explored outcomes revealed that referrals for BH services statewide in Massachusetts increased after the CBHI program was implemented[13] but was cross-sectional in design and could not follow individual children to determine whether they received services. An earlier article by our group on CBHI used multiple years of data but focused on individual background features rather than outcomes.[14]

To date, little is known about whether children who receive screening go on to obtain specialty BH services or what predicts receipt of services. To address this research gap, the current study sought to determine whether screened children, particularly those "newly identified" as having BH issues, received BH services after their screening visits. Secondarily, we sought to identify predictors of BH service receipt among screened children.

METHODS

Data were extracted from the Medicaid State Information System and covered state fiscal years (SFYs) 2008 to 2010 (July 2007–June 2010). The data set included eligibility, all encounter (managed care) and claims (fee-for-service) for physical and BH services, and pharmacy files for all children enrolled in both managed care organizations and fee-for-service arrangements. In Massachusetts, the majority of children are enrolled in 1 of 5 integrated managed care organizations, where physical and BH care are managed, or in the Primary Care Clinician program where BH is managed and physical care remains fee-for-service. Approximately 11% of children are in fee-for-service for both BH and physical care. Children with severe psychiatric disorders and those in foster care were included in the data set. However, BH services provided by non-MassHealth providers (school counselors, Department of Mental Health and Department of Children and Families staff) were not included because these services are not billed. The data were deidentified by MassHealth before delivery and unique study IDs provided. Before primary data analysis, we conducted descriptive quality assurance analyses. No significant irregularities in rates of demographic characteristics over time were found, giving us confidence in the quality of the data. This study was approved by the Cambridge Health Alliance Institutional Review Board in 2011.

Sample

For the derivation of the sample, see Fig 1. The initial sample was constructed by using SFY'09 data (1 year after the modifier scheme was mandated by MassHealth). There were 544 883 children with any enrollment in SFY'09 who were < 16 years of age. To insure continuous enrollment and our ability to capture all BH service utilization, we identified children with 300 or more days of eligibility in SFY'09. This process excluded 154 500 (28%) of children. Excluded children were significantly younger, more likely to be in foster care, and more likely to be of unknown race/ethnicity than those with ≥300 days of enrollment ($P < .0001$). Screens were identified by presence of a 96110 CPT code. Screens with a modifier of U1, 3, or 5 (no BH issue identified) were termed negative modifier or negative screens. Screens with a modifier of U2, 4, or 6 (BH issue identified) were termed positive modifier or positive screen for the purposes of this study. The modifier numbers signified the provider type: physician (1, 2); nurse practitioner (3, 4); and physician assistant (5, 6).

The resulting 390 383 eligible children (the characteristics of this population are described elsewhere[14]) were then categorized into 6 groups (Fig 1) based on their service use and BH screening in SFY'09: (1) at least 1 BH screen with a "negative" modifier but no positive modifier; (2) at least 1 BH screen with a "positive" modifier; (3) at least 1 BH screen but without any modifiers; (4) children with well-child care but no claim for a BH screen; (5) children with neither well-child visits nor BH screen claims; and (6) children with eligibility but no claims or encounters. Given the nature of the data, we cannot determine whether a screen without

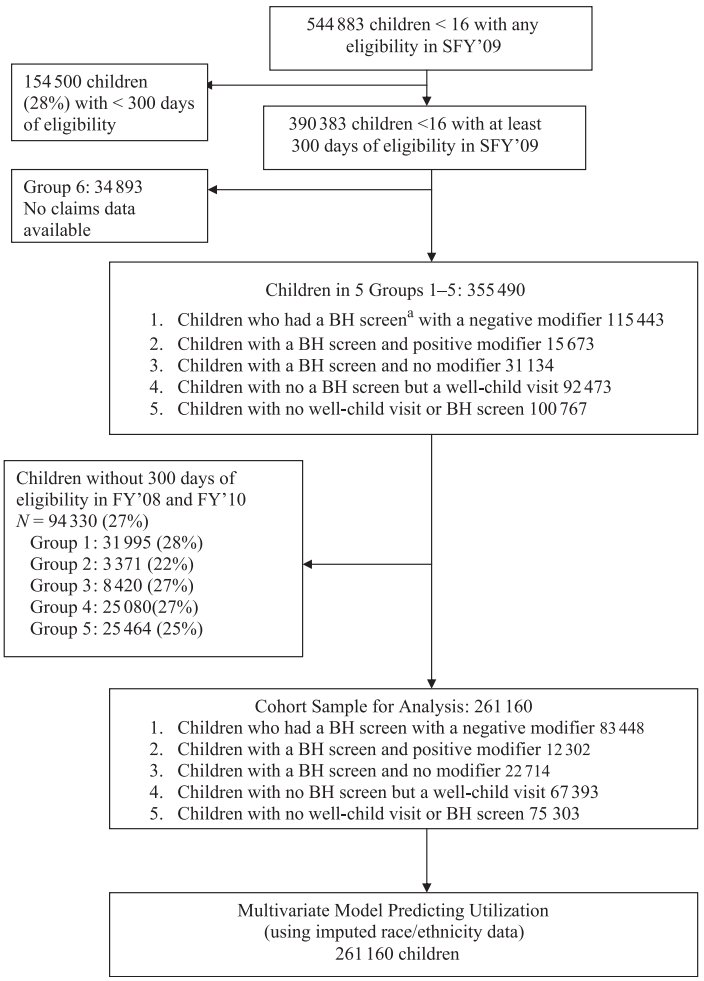

FIGURE 1
Derivation of the sample. [a]BH screen measured by presence of CPT code 96110.

a modifier was positive or negative or why the modifier was missing. However, in a previous study that examined characteristics of children based on modifiers, we found that children with negative modifiers closely resembled those without modifiers.[14]

An index or "salient" screening visit date was assigned to children/youth based on the date of the first negative modifier (for those without positive modifiers, group 1), the first positive modifier (for group 2), and the first use of 96110 for those without any modifiers (group 3). For groups without visits including a screening claim, the first well-child visit (group 4) or the first claim/encounter (group 5) were used as the salient visits. We excluded group 6 (no claims or encounters in SFY'09) from further study since they had no "salient visit" from which to examine past utilization.

To examine services before and after the salient visit, we further limited our sample to children with at least 300 days of eligibility in each of FY'08, FY'09 and FY'10 (July 2007–June 2010). This excluded 94 330 children (27%) who were more likely to be girls, <5 years old, and of unknown race than those with 300 or more days of eligibility ($P < .0001$) in all 3 years. This created a group (261 160) with near-continuous enrollment and a range of 301 to 729 days of coverage before and after the salient visit. Approximately 22% to 27% of children were lost from each group defined above in this process.

Variables

The dependent variable of interest (postscreening specialty BH services) comprised the 4 categories shown in Table 2. These include the following: a psychopharmacology visit defined as a claim for psychopharmacology occurring; a psychiatric visit defined as the presence of any claim/encounter with CPT codes used by psychiatrists, psychologists, and social workers (90801–90899); and a health or behavioral assessment defined as visits with CPT codes (96100–96103, 96105, 96111, 96115–96120, 96125, 96150–96155) and nonphysician mental health visits defined as other BH professional codes (Healthcare Common Procedural Codes [HCPC H] codes). In addition, the new HCPC codes introduced in Massachusetts to track remedy services for the CBHI (S9484 and S9485, crisis intervention; and T1027, T1017, and T2022, family counseling and case management) were included. We examined visits occurring at any time after the salient visit and within 90 days of the salient visit.

Psychopharmacology agents were defined by using the HMO Research Network[15] and the Mental Health Research Network[16] categories for medications based on National Drug Codes. This included attention deficit disorder-other (nonstimulant medications), antidepressants, antianxiety-other (nonbenzodiazepines), anticonvulsants, antipsychotic first generation, antipsychotic second generation, benzodiazepines, COMBO (all combination psychotropic medications), hypnotic-other (eg, zolpidem), lithium, and stimulants (a full list of study medications is available upon request). Drugs with possible dual use were excluded, including the following: antidepressants used primarily for migraines and enuresis in children (imipramine, amitriptyline),

antidepressants used for sleep (doxepin, trazadone) when no other psychiatric medication was being used and there was no BH *International Classification of Diseases, Ninth Revision, Clinical Modification* (ICD-9-CM) code, and anticonvulsants unless accompanied by any BH ICD-9-CM code. For example, if a patient had a bipolar diagnosis on any previous visit and also used an anticonvulsant, they were included as using psychopharmacology. Medication coding was done by algorithm and by data analysts who were naïve as to screening and treatment coding.

The independent variables of interest included race/ethnicity (white, African American, Asian, Hispanic, Native American, mixed race, and unknown), urban/rural residence based on ZIP code coding from the Rural-Urban Commuting Area Codes,[17] foster care, age (as categorical variables: <5, 5–7, 8–10, 11–13, 14–16), and gender.

Past BH history was defined similarly to BH services with 1 addition: the presence of any claim with a BH diagnosis (ICD-9-CM codes 290–319 on any claim) was also included in the definition.

Analysis

Descriptive statistics for demographic and clinical characteristics were generated for each of the 6 groups of children by using SAS 9.3 (SAS Institute, Inc, Cary, NC).[18] As the cohort was developed, sensitivity analyses were conducted to compare the sample to those children who did not meet eligibility criteria by using χ^2 statistics. Intergroup differences were also assessed by using χ^2 statistics and a type 1 error of 0.01.

Multivariate logistic regression was used to determine predictors of future BH treatment of all children. Given the large number of children with unknown race/ethnicity, a problem common to Medicaid claims data studies,[19,20] we imputed race data for our final models by using SAS PROCMI and all available independent and dependent variables. To verify our analyses, we compared results to regression models by using race data without imputation and found similar results. Tests for interaction of variables (BH screen, past BH history, and well-child care) were also conducted. To examine predictors of future BH treatment, models were first fit for all children. In an exploratory, univariate model, BH history was found to be the strongest predictor of future treatment (odds ratio, 9.58; $P < .001$). We therefore assessed the interaction between key variables: BH screen modifier (positive, negative, unknown), past BH history (present or absent), and well-child visit (present or absent) in a fully saturated model. All BH history interaction terms were found to be significant ($P < .001$). Therefore, to enhance the interpretability of results, stratified multivariate logistic regression models were fitted: one for children with a BH history and one for those without a BH history.

RESULTS

Sample Characteristics

There were 261 160 children with at least 300 days of enrollment in each of FY'08, FY'09, and FY'10 (see Table 1 for characteristics). Approximately half (45%) of all children in the sample were screened (n = 118 464). Approximately 19% (n = 22 714) did not have a modifier code. Of the 95 750 patients with modifier codes, 14.7% screened positive. Approximately 29% of all children had well-child visits without screens, and another 29% did not have well-child visits or screens during the index year.

Postscreening Services

Table 2 explores the differences among groups for postscreening specialty BH services. Approximately 27% of all children received some form of BH service after screening, and 98% of them received their services within 90 days after their salient visit. Children with positive modifiers were significantly more likely to receive subsequent BH services than any other group. The leading forms of services (20%) were for "psychiatry visits" (psychiatric evaluation and/or therapeutic procedures by licensed mental health professionals). The most common treatment types within these services were psychotherapy (90806) and initial evaluation (90801). Among children who received BH services, 65% had claims for psychotherapy only, 26% received a combination of psychopharmacology and psychotherapy, and 9% only had claims for psychopharmacology.

For each of the 5 screening groups, Table 3 reveals postscreening BH services for children with and without a BH history. For all BH services except psychopharmacology, children with past BH history and a positive modifier were the most likely to receive BH services. Children without BH history who either had negative modifiers or were screened without modifiers were the least likely to receive services. Children with a BH history but without well-child care or screening were significantly more likely to have claims for psychopharmacology than any other group.

Predictors of Obtaining Services

In our final models (Table 4), predictors of specialty BH services after the salient visit at any time and within 90 days were examined for all children and stratified by BH history. The second strongest predictor of services (regardless of BH history or time frame) is having a positive screening modifier, with only foster care eligibility a uniformly stronger predictor. For children without a BH history, only being in foster care was a stronger predictor of receiving future services. Among children with a BH history, in addition to foster care eligibility, older age (≥8 years) was a slightly stronger predictor of

TABLE 1 Characteristics of SFY'09 Cohort (at Least 300 d of Eligibility in SFY'08 and SFY'10), N = 261 160

Characteristic[a]	Total, N = 261 160, N (%)	Negative Modifier,[b] N = 83 448, N (%)	Positive Modifier, N = 12 302, N (%)	Screen Without Modifier, N = 22 714, N (%)	Well-Child Visit Without Screen, N = 67 393, N (%)	No Well-Child Care or Screen, N = 75 303, N (%)	P
Gender							
Boy	134 825 (51.63)	41 654 (49.92)	7517 (61.10)	11 653 (51.30)	34 635 (51.39)	39 366 (52.28)	<.001
Girl	126 335 (48.37)	41 794 (50.08)	4785 (38.90)	11 061 (48.70)	32 758 (48.61)	35 937 (47.72)	—
Age, y							
<5	68 895 (26.38)	27 026 (32.39)	3581 (29.11)	7790 (34.30)	20 205 (29.98)	10 293 (13.67)	—
5–7	49 692 (19.03)	16 038 (19.22)	2396 (19.48)	4340 (19.11)	12 383 (18.37)	14 535 (19.30)	—
8–10	47 701 (18.27)	14 423 (17.28)	2292 (18.63)	3753 (16.52)	11 292 (16.76)	15 941 (21.17)	<.001
11–13	46 190 (17.69)	13 475 (16.15)	2149 (17.47)	3556 (15.66)	11 265 (16.72)	15 745 (20.91)	—
14–16	48 682 (18.64)	12 486 (14.96)	1884 (15.31)	3275 (14.42)	12 248 (18.17)	18 789 (24.95)	—
Mean age (SD)	8.37/SD (4.63)	7.66/SD (4.64)	7.95/SD (4.57)	7.48/SD (4.66)	8.12 (4.69)	9.73 (4.24)	—
Race/ethnicity							<.001
White	75 135 (28.77)	24 132 (28.92)	3972 (32.29)	5796 (25.52)	19 154 (28.42)	22 081 (29.32)	—
Asian	9564 (3.66)	2993 (3.59)	175 (1.42)	823 (3.62)	3157 (4.68)	2416 (3.21)	—
African American	24 274 (9.29)	6596 (7.90)	1000 (8.13)	2548 (11.22)	6973 (10.35)	7157 (9.50)	—
Hispanic	46 661 (17.87)	15 313 (18.35)	2516 (20.45)	4722 (20.79)	10 997 (16.32)	13 113 (17.41)	<.001
Native American	409 (0.16)	130 (0.16)	18 (0.15)	28 (0.12)	103 (0.15)	130 (0.17)	—
Multiracial	7976 (3.05)	2584 (3.10)	414 (3.37)	729 (3.21)	2190 (3.25)	2059 (2.73)	—
Unknown	97 141 (37.20)	31 700 (37.99)	4207 (34.20)	8068 (35.52)	24 819 (36.83)	28 347 (37.64)	—
Urban[c] (N = 259 308)	252 382 (97.33)	80 621 (97.20)	11 910 (97.38)	22 364 (99.02)	65 287 (97.53)	72 200 (96.77)	<.001
Foster care	3711 (1.42)	1074 (1.29)	384 (3.12)	255 (1.12)	1064 (1.58)	934 (1.24)	<.001
Past BH history	78 008 (29.87)	22 587 (27.07)	7598 (61.76)	6105 (26.88)	20 057 (29.76)	21 661 (8.29)	<.001

[a] Cohort has to have had at least 300 d of eligibility in SFY'08 and at least 300 d of eligibility and utilization in SFY'10.
[b] Modifiers were used to indicated whether a BH need was identified or not.
[c] The N for urban/rural was slightly reduced due to missing data.

receiving services than having a positive modifier. Additionally, minority children (particularly Asians) were less likely to receive BH services than children of white race.

DISCUSSION

In this study, 45% of MassHealth children received BH screening, and 56% of those with positive modifiers received some BH services after their screening visit. Both rates represent the higher range of what has been reported elsewhere.[21–24] Regardless of past BH history, a positive modifier increased the chance of receiving BH services from 10% to 30%. Only being in foster care (∼2% of the sample) was a consistently stronger predictor of receiving BH services.

The finding that BH history predicted receipt of BH services comes as no surprise. Previous research has demonstrated that children with positive modifiers are likely to have a history of BH services[14] and that retrospective BH service use predicts future service use.[25] In Massachusetts, providers were mandated to screen all children regardless of their history. For children with existing BH histories (for whom screening is presumably not needed), a positive screen may prompt a clinician to reevaluate symptoms and treatment recommendations.

For newly identified children, a positive screen predicted the receipt of specialty BH services. Although this is an important finding, it is also important to note that a substantial portion of these children (over 70%) still failed to receive BH services after screening. This is of concern because the positive predictive value of BH screens is ∼55%[24] (the positive predictive value of the positive modifier is unfortunately unknown) and Massachusetts represents an environment with ample specialty supply. Thus the gains in specialty service use seen in this study are modest

TABLE 2 Ambulatory BH Services and Psychopharmacology After Salient Screening Visit in SFY'09 or SFY'10 (N = 261 160)

Service Type	All, N = 261 160, N (%)	Negative Modifier, N = 83 448, N (%)	Positive Modifier, N = 12 302, N (%)	Screen Without Modifier, N = 22 714, N (%)	Well-Child Visit Without Screen, N = 67 393, N (%)	No Well-Child Visit or Screen, N = 75 303, N (%)	P
Any use (includes all of the following)	69 341 (26.6)	18 496 (22.2)	6958 (56.6)	4813 (21.2)	17 242 (25.6)	21 832 (29.0)	<.001
Any use (includes all of the following) within 90 d	64 911 (24.9)	17 288 (20.70)	6721 (54.6)	4530 (19.9)	16 168 (24.0)	20 204 (26.8)	<.001
Psychopharmacology	24 346 (9.3)	5167 (6.2)	2447 (19.9)	1234 (5.4)	6061 (9.0)	9437 (12.5)	<.001
Psychiatry visit[a]	51 543 (19.7)	13 979 (16.8)	5439 (44.2)	3394 (14.9)	12 923 (19.2)	15 808 (21.0)	<.001
Health or behavior assessment[b]	9185 (3.5)	2511 (3.0)	1197 (9.7)	835 (3.7)	2466 (3.7)	2176 (2.9)	<.001
Nonphysician mental health visit[c]	24 088 (9.2)	6119 (7.3)	2965 (24.1)	1858 (8.2)	6058 (9.0)	7089 (9.4)	<.001

[a] Claims/encounters with CPT codes 90801–90899.

[b] Health Behavioral Assessment/Intervention (HBAI) codes 96100–96103, 96105, 96111, 96115–96120, 96125, 96150–96155.

[c] HCPC H codes plus S9484 and S9485 (crisis intervention) and T1027, T1017, T2022 codes (family counseling and case management).

and suggest that screening alone may be insufficient to improve care. It is likely that additional services linking primary care to specialty care may be necessary to fully support entry into BH care.

Even without referral to specialty mental health, it is possible that many newly identified children had their BH needs met in primary care (eg, for attention-deficit/hyperactivity disorder treatment) as recommended by the American Academy of Pediatrics.[26] To test this theory, we examined children with positive modifiers (but no billed BH services) to see if they had subsequent pediatric visits with associated BH diagnoses. In Massachusetts, primary care providers can use BH ICD-9 codes but not psychiatric CPT codes for billing. We found that an additional 394 children with a BH history and 207 children without a BH history obtained at least 1 other pediatric visit with a BH diagnosis within 180 days of their screening visits. If these were included as BH service, it would raise the rate of newly identified children receiving BH service after screening modestly from 30% to 34%, still leaving a majority of positively screened children without evidence of BH services. However, given the use of claims data, it is impossible to determine whether BH services were delivered at these visits.

The other major predictor of services in this study was being in foster care regardless of BH history. Children in foster care have been found to be at higher risk for BH issues than other children insured by Medicaid.[27–32] Both their reasons for placement (eg abuse) as well as the transitions experienced while in foster care, contribute to their risk for BH issues.[33,34] Additionally, the fact that they are more likely to receive specialty care is probably a function of the case management and outreach they receive as part of the foster care system. Other studies have noted that the child welfare system facilitates entry into BH treatment which was demonstrated here as well.[33]

Consistent with other studies, male gender and older age were predictive of future services.[14,33,35–37] We also found that minority children (Hispanic, African American, and Asian) were significantly less likely to receive services after their salient visit when compared with white children despite the introduction of mandatory screening. This was particularly true for the Asian population. According to a recent Institute of Medicine Report, minority youth are less likely to receive BH services when compared with their nonminority counterparts.[38] Disparities persist in BH treatment despite known high risk status[39] even in children involved with the child welfare system.[40] Future work is needed to better understand how mandated screening can improve engagement in BH treatment of minorities.

Lastly, it should be noted that BH services received by newly identified children were more likely to be for psychotherapy than for psychopharmacology suggesting that psychopharmacology was not the first treatment choice for these children. In contrast, children without well-child visits or screens were most likely to have claims for psychopharmacology perhaps because they had more severe psychiatric illness requiring medication but less connection to well-child care where screening occurs.[41]

Limitations

This study was conducted by using data from the first years of implementation of BH screening mandate. The percentage of well-child visits in which screening occurred continued to climb over subsequent years of the program, exceeding 67% by the end of 2011 (over 75% for 3- to 17-year-olds). It is possible that our results would change as

TABLE 3 Ambulatory BH Services and Psychopharmacology After Salient Screening Visit in SFY'09 or SFY'10 by History (N = 261 160)

Service Type	Negative Modifier, N = 83 448		Positive Modifier, N = 12 302		Screen Without Modifier, N = 22 714		Well-Child Visit Without Screen, N = 67 393		No Well-Child Visit or Screen, N = 75 303		P
	Negative BH History, N = 60 861, N (%)	Positive BH History, N = 22 587, N (%)	Negative BH History, N = 4704, N (%)	Positive BH History, N = 7598, N (%)	Negative BH History, N = 16 609, N (%)	Positive BH History, N = 6105, N (%)	Negative BH History, N = 47 336, N (%)	Positive BH History, N = 20 057, N (%)	Negative BH History, N = 53 642, N (%)	Positive BH History, N = 21 661, N (%)	
Any use (includes all of the following)	6076(10.0)	12 420(55.0)	1394(29.6)	5564(73.2)	1652(10.0)	3161(51.8)	5172(11.0)	12 070(60.2)	7158(13.3)	14 674(67.7)	<.001
Any use (includes all of the following) within 90 d	5221(8.6)	12 067(53.4)	1270(27.0)	5451(71.7)	1449(8.7)	3081(50.5)	4435(9.4)	11 733(58.5)	5949(11.1)	14 255(65.8)	<.001
Psychopharmacology	842(1.4)	4325(19.2)	197(4.2)	2250(29.6)	165(1.0)	1069(17.5)	898(1.9)	5163(25.7)	1781(3.3)	7656(35.3)	<.001
Psychiatry visit[a]	4246(7.0)	9733(43.1)	933(19.8)	4506(59.3)	1090(6.6)	2304(37.7)	3603(7.6)	9320(46.5)	5350(10.0)	10 458(48.3)	<.001
Health or behavior assessment[b]	774(1.3)	1737(7.7)	221(4.7)	976 (12.9)	272(1.6)	563(9.2)	710(1.5)	1756(8.8)	594(1.1)	1582(7.3)	<.001
Nonphysician mental health visit[c]	1988(3.3)	4131(18.3)	569(12.1)	2395(31.5)	642(3.9)	1216(19.9)	1576(3.3)	4482(22.4)	1794(3.3)	5295(24.4)	<.001

[a] Claims/encounters with CPT codes 90801–90899.

[b] Health Behavioral Assessment/Intervention (HBAI) codes 96100–96103, 96105, 96111, 96115–96120, 96125, 96150–96155.

[c] HCPC H codes plus S9484 and S9485 (crisis intervention) and T1027, T1017, T2022 codes (family counseling and case management).

screening rates increased and as MassHealth improved access to BH services; however, we were unable to examine this trend given the limited time period covered by the data set. To date, there is no other state that has tracked this information for comparison, but in a previous study of a Massachusetts pediatric practice, screening rates plateaued at ~70% to 80% after 4 years of screening.[42] Some providers may not screen or bill for screening due to fears about insurance billing families, patient low literacy, unavailable translations, developmental delay,[43] or missed well-child visits.

Other limitations of our study include the fact that information was unavailable on a variety of important influential demographic variables such as language of care or other social determinants of health.[44] MassHealth children are likely different than commercially insured children. Moreover, the amount of "unknown" race data limits our ability to fully understand the contribution of race to our outcomes. The psychopharmacology information was limited to claims filled and did not represent prescriptions written. Also, because mental health services delivered in schools were not included in the data, we may have underestimated the amount of BH services received.

We recognize that some children lacking a BH screening CPT code may have been screened without documentation and that screens without modifiers (due to provider oversight or inconclusive results) could have been either positive or negative. Finally, by creating a sample that eliminated children who did not meet criteria, we may have introduced bias into the study even though attrition was similar across groups.

CONCLUSIONS

For children newly identified by BH screens, being in foster care and having

TABLE 4 Predictors of Postscreening BH Services or Psychopharmacology Stratified by BH History, $N = 261\ 160$ ($P \leq .005$)

	Any BH Services or Psychopharmacology After Salient Visit		Any BH Services or Psychopharmacology Within 90 d After Salient Visit	
	BH History Absent, $N = 183\ 152$, Odds Ratio (95% CI)	BH History Present, $N = 78\ 008$, Odds Ratio (95% CI)	BH History Absent, $N = 183\ 152$, Odds Ratio (95% CI)	BH History Present, $N = 78\ 008$, Odds Ratio (95% CI)
Group				
Negative screen	1.00	1.00	1.00	1.00
Positive screen	3.79 (3.54–4.06)	2.29 (2.16–2.43)	3.93 (3.66–4.22)	2.26 (2.13–2.40)
Undetermined screen	1.00 (0.95–1.06)	0.94 (0.88–0.99)	1.03 (0.97–1.09)	0.95 (0.89–1.00)
Well-child visit, no screen	1.09 (1.05–1.14)	1.22 (1.17–1.27)	1.09 (1.04–1.14)	1.21 (1.16–1.26)
No well-child visit, no screen	1.33 (1.13–1.56)	1.20 (1.04–1.39)	1.35 (1.14–1.60)	1.19 (1.03–1.38)
Gender				
Girl	1.00	1.00	1.00	1.00
Boy	1.28 (1.24–1.31)	1.20 (1.17–1.24)	1.27 (1.23–1.31)	1.19 (1.15–1.23)
Age, y				
<5	1.00	1.00	1.00	1.00
5–7	1.16 (1.11–1.21)	1.96 (1.87–2.06)	1.11 (1.06–1.17)	1.92 (1.82–2.01)
8–10	1.24 (1.18–1.29)	2.73 (2.61–2.87)	1.63 (1.11–1.22)	2.66 (2.54–2.78)
11–13	1.32 (1.27–1.39)	2.97 (2.83–3.11)	1.29 (1.23–1.35)	2.88 (2.75–3.02)
14–16	1.52 (1.45–1.59)	3.03 (2.90–3.17)	1.51 (1.44–1.58)	2.93 (2.80–3.06)
Race[a]				
White	1.00	1.00	1.00	1.00
Asian	0.66 (0.62–0.71)	0.70 (0.66–0.74)	0.67 (0.63–0.71)	0.71 (0.67–0.75)
African American	0.77 (0.74–0.81)	0.73 (0.70–0.77)	0.78 (0.73–0.82)	0.72 (0.68–0.77)
Hispanic	0.77 (0.73–0.81)	0.74 (0.71–0.77)	0.79 (0.75–0.83)	0.74 (0.71–0.78)
Native American	0.71 (0.59–0.86)	0.64 (0.53–0.76)	0.70 (0.55–0.88)	0.64 (0.56–0.73)
Multiracial	1.01 (0.93–1.08)	0.86 (0.79–0.94)	0.99 (0.91–1.08)	0.85 (0.79–0.93)
Foster care				
No	1.00	1.00	1.00	1.00
Yes	10.38 (9.22–11.68)	4.51 (3.99–5.09)	9.76 (8.68–10.98)	4.09 (3.64–4.59)
Urban				
No	1.00	1.00	1.00	1.00
Yes	0.89 (0.81–0.97)	0.97 (0.89–1.06)	0.87 (0.79–0.96)	0.99 (0.91–1.08)
Well-child care				
Yes	1.00	1.00	1.00	1.00
No	0.98 (0.84–1.15)	1.23 (1.06–1.42)	0.93 (0.78–1.10)	1.21 (1.05–1.40)

CI, confidence interval.

[a] Race/ethnicity missing/unknown data were imputed by using SAS PROCMI program.

a positive modifier at a screening visit are strong predictors of receiving postscreening specialty BH services. Yet, many newly identified children do not receive services and racial/ethnic disparities persist. Thus although positive screening is strongly associated with increased service use, additional strategies may be necessary to achieve the goal of connecting all children with mental health problems to needed services.

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THE MORE BITS THE BETTER?: *My brother-in-law is an audiophile. He plays several instruments, writes his own music, and has his own recording studio. If we go to a concert together, he hears things I do not – such as how well the band members are in sync with each other, and both very high and low frequency sounds. When I asked him about high resolution audio, however, I was a bit surprised by his apparent lack of interest.*

As reported in The Wall Street Journal *(Digits: July 21, 2014), high resolution audio has only recently been defined. Broadly, the term refers to very high quality digital music – higher than the quality heard on CD. Music is converted to digital form by digitally sampling an original audio source. The more times the music is sampled each second (expressed in hertz), the higher the fidelity to the original sound. The sample is then converted to binary digits (expressed as bits). Again, the greater the number of bits, the greater the fidelity of the digital music to the original source. High-resolution audio typically refers to a standard of 96 kilohertz at 24 bits or higher. In contrast, CDs have a sample rate of 44.1 kilohertz at 16 bits. While engineers and music lovers all agree that high resolution audio is more faithful to the original sound, a key issue is whether the average listener can tell the difference. Most can probably hear the difference between high resolution audio files played on a good music player and the highly compressed MP3 files played on an MP3 player. Fewer will be able to separate the difference between high definition audio and CD-quality music.*

True purists, like my brother-in-law, say nothing compares to the warmth and richness of the vinyl recording. There is also the problem of downloading the songs. As high resolution audio files contain a great deal of information, they can be quite large and take a longer time to download than MP3 files. While I love the concept of high-quality digital music, I think that – at least for the time being, and particularly given my often slow internet connection living in rural Vermont – I am with my brother-in-law on this issue.

Noted by WVR, MD