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Utilization of Child Psychiatry Consultation Embedded in Primary Care for an Urban, Latino Population

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Abstract

Objective.—In a novel model of embedded primary care child psychiatry serving an urban Latino population, we examined determinants of successful referral and relationship between clinical need and service intensity.

Methods.—We conducted a chart review of referred patients from July 2013-March 2015. We used multiple logistic regressions controlling for confounders to identify determinants of successful referral. We examined the relationship between service intensity and clinical need using Poisson regression, adjusting for exposure time, age, sex, ethnicity, and language.

Results.—Seventy-four percent of patients completed an evaluation. Younger children (p=.0397) and those with a history of therapy (p=.0077) were more likely to make initial contact. The markers of clinical need included PSC -35 Global Scores (p=.0027) and number of psychiatric diagnoses (p=.0178) predicted number of visits.

Conclusions.—Our findings support early referral to improve engagement, and provide initial evidence that embedded child psychiatry consultation is feasible and may increase access to care.

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Keywords

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Nearly 20% of children in the United States suffer from a mental illness, yet only one in five receive treatment.[1] The median delay in obtaining psychiatric treatment across disorders is nearly a decade after symptom onset.[2] Untreated, early-onset mental disorders are associated with increased morbidity and mortality. These disorders also include risks for school failure, teenage childbearing, unstable employment, early marriage, marital instability, violence,[3] psychiatric and physical comorbidities, and substance use disorders.[2] Yet, many barriers to accessing mental health care for children exist, including long wait times, high drop-out rates, high costs, stigma, poor communication between providers, and limited availability of specialists.[1,4] These barriers are particularly pronounced for underserved and minority children, who experience higher rates of poverty, community violence, psychosocial stress, and often cultural factors impeding access to care and adding to impairment associated with mental illness.[3,5]

The integration of mental health services into pediatric primary care has been championed as a strategy to increase access and improve quality of mental health services for children.[1,4,6] Providing behavioral health care embedded in the pediatric clinic could eliminate logistical and financial barriers associated with off-site subspecialty care, destigmatize care by locating the provider within the trusted medical home, improve communication and collaboration between pediatricians and behavioral health providers, and increase opportunities for continuing education as well as practice improvement. Such a model could particularly benefit underserved communities, where patients have lower utilization rates of off-site subspecialty care[7–9] and a high disease burden of mental illness among other chronic conditions.[10,11] Studies of specific integrated interventions have generally supported the feasibility and effectiveness of their use in pediatric primary care.[12–15]

Models integrating a child and adolescent psychiatrist in pediatric primary care are less well studied, despite a persistent lack of access to these subspecialists. Studies to date have focused on collaboration with off-site specialists,[16–20] and none have reported on embedded models. Integrating a child psychiatrist within the pediatrics clinic could have benefits beyond those provided by other integrated mental health professionals, similar to those described in the adult literature.[21] A child psychiatrist can provide a comprehensive diagnostic assessment that includes associated medical symptoms, as well as broad treatment recommendations for therapeutic modalities, family and community-based interventions, diagnostic studies, and medication management. In particular, integrating a child psychiatrist could facilitate care for psychiatrically and/or medically complex patients. This strategy could improve access to evidence-based medication management, facilitate appropriate medical monitoring, and create opportunities for co-management facilitated by a shared medical record, reducing redundancy and error as well as improving communication. As medical professionals, psychiatrists would be less likely to suffer from the culture shock

or professional isolation that has been described as a barrier to integration of other mental health professionals in primary care.[22,23]

Given the scarcity of child psychiatrists, particularly in underserved communities, providing evidence for the feasibility and effectiveness of integrated child psychiatry consultation could facilitate the design of programs that better use subspecialists in child psychiatry to reach a larger number of patients in need. Of particular importance is how this model might address disparities in subspecialty care for vulnerable youth[5] and whether clinical need would drive service use.[24] To this end, this study describes a model that embeds a child psychiatrist in primary care pediatrics at a community health center serving an urban, disadvantaged, Latino population. Our objectives are: 1) to examine how successful referral to an embedded child psychiatrist varies by child sociodemographic and clinical characteristics, and 2) to explore whether indicators of clinical need predict service use intensity.

Methods

The MGH Chelsea HealthCare Center Child Psychiatry Consultation Program.

The MGH Chelsea HealthCare Center ("MGH Chelsea") is a community-based health center affiliated with Massachusetts General Hospital (MGH) located in Chelsea, MA. The clinic is the largest health care provider in Chelsea, which has a high percentage of minority and immigrant children.[25,26] The majority of residents are Latino and speak a language other than English at home. Residents of Chelsea suffer from severe poverty and low educational attainment, with many reporting income below 200% of the federal poverty level,[27] and nearly 32% over age 25 lacking a high school education.[25,26]

MGH Chelsea has the largest MGH-affiliated pediatric practice, where approximately 13,000 well child visits are conducted each year by 19 pediatricians working about eight full-time equivalents (FTEs). The clinic provides team-based care in a patient-centered medical home model. Less than one year after this data collection was completed, the practice was accredited by the National Committee for Quality Assurance (NCQA) as a Level 3 Patient Centered Medical Home (PCMH). The practice serves a majority (over 60%) of publicly-insured children, with the remainder mostly commercially insured and very few uninsured children due to our state's universal healthcare law. As of 2011, pediatricians at MGH Chelsea have worked with a full-time licensed social worker who provides care management support for children with complex psychosocial needs. The health care center also has an on-site behavioral health unit located one floor up from the pediatrics unit, which is staffed by social workers, psychologists, and adult and child psychiatrists. Patients referred to the behavioral health unit are seen first by a therapist (psychologist or social worker), who has the option of referring patients to a psychiatrist after two visits if indicated. Despite many strategies over the years, the Behavioral Health Unit faces a problem familiar to most in child mental health—long wait times and high no-show rates for treatment.

In response to requests for better access to child psychiatry, in 2013 MGH Chelsea conducted a needs assessment in pediatrics. Ten pediatricians (77%) responded to the

survey. The majority of pediatricians indicated that it would be “very useful” to be able to refer directly to a child psychiatrist for diagnostic clarification (90%), initial stabilization followed by as-needed consultation (90%), medication recommendations (80%), and other treatment recommendations (60%). A majority of pediatricians also indicated that it would be “very useful” to have a child psychiatrist available for “curbside consultation” to pediatricians (70%), and that it would be helpful if a consultant could evaluate patients who had otherwise been difficult to engage in behavioral health care (60%). Only a minority of pediatricians (20%) thought it would be “very useful” to have a child psychiatrist follow patients longitudinally. Pediatricians indicated that long waiting lists and no-shows were the most significant barriers affecting their patients’ ability to access psychiatric care.

To address these needs, MGH Chelsea developed a new Integrated Child Psychiatry Consultation Program, embedding a child psychiatrist for .2 FTE in pediatrics. The goals of the new program were: 1) to improve access to diagnostic consultation, treatment recommendations, short-term stabilization, and ongoing collaborative care by a child psychiatrist early after symptom onset for all patients, including those who have not accessed therapeutic services; and 2) to improve engagement in initial psychiatric consultation and treatment by keeping care in the familiar and potentially less stigmatized pediatrics unit. Furthermore, inclusion of a child psychiatrist within the pediatrics unit was expected to provide informal opportunities for curbside consultation and education for pediatricians and staff. There was no grant funding for this program, and the child psychiatrist’s compensated effort was limited to direct patient care.

In the new model, pediatricians can choose to refer patients directly to a child psychiatrist for evaluation, who sees patients in an exam room within the pediatrics unit. Pediatricians make clinically-driven referrals electronically, which are briefly reviewed by the consultant psychiatrist for appropriateness, and an administrator calls patients to schedule their visits. Warm hand-offs (i.e., face-to-face introduction at the time of referral) are usually not possible. Patients referred to the child psychiatry consultant are scheduled to see the psychiatrist for an initial one-hour evaluation, with follow-up appointments as needed. Follow-up is provided short-term, usually over the course of three to six months, with a goal of transferring care back to the primary care provider or managing collaboratively if needed. Given the plan for short-term consultation with transition back to primary care, initiation of the program required education for referring providers about appropriate reasons for referral, as well as information for patients about the goal of treatment. The program was intended for management of mild to moderate cases; patients with serious mental illness requiring long-term follow-up were referred to specialty care. The psychiatrist works closely with the embedded social worker who assists with referrals to the community and care coordination.

The program was designed under the leadership of the program’s first consultant, also the first author of this report (Dr. Spencer), who at the time had five years of experience seeing patients at MGH Chelsea. Dr. Spencer is a bilingual (Spanish/English) early career child and adolescent psychiatrist with general pediatrics training, with a particular expertise in evaluating Latino patients and in the diagnosis and treatment of Attention-Deficit/ Hyperactivity Disorder (ADHD). All providers have been overwhelmingly satisfied with the program, which will be entering its sixth year since initiation in 2013. With this consultation

model, the psychiatrist spends 50% of direct patient care time seeing new patients, and thus schedules about four new patient consultations per week, leaving the remaining time for short-term follow-up appointments. This has maintained patient wait times between two to six weeks.

Procedures.

Data were extracted from the electronic medical record (EMR) for all patients referred to the embedded child psychiatrist at MGH Chelsea Healthcare Center during the period of July 3, 2013 through March 31, 2015 with no exclusions. The Partners HealthCare Institutional Review Board approved this study in an expedited review.

Study variables.

The dependent variables were successful initial contact with the embedded child psychiatrist defined as attendance at initial evaluation, and service use intensity defined as total number of visits attended with the embedded psychiatrist during the study time period (including initial evaluation). Patients referred but not evaluated either did not show up or were never scheduled.

Demographic characteristics recorded were sex, age, ethnicity, and parental primary language (English vs. not English). Language was coded as “not English” if the preferred language listed in the EMR was not English, the clinical evaluation was conducted in a language other than English, or parent-report questionnaires were completed in a language other than English. Clinical characteristics included prior treatment for a psychiatric or developmental problem documented in the EMR; pediatrician’s referral reason (suspected diagnoses); pediatrician’s referral question (general vs. specific to diagnosis or treatment recommendations); and diagnoses (including known developmental disorders) given by the child psychiatrist after initial psychiatric evaluation. When additional diagnoses were documented later on during the course of psychiatric treatment (after initial evaluation), we did not account for these so that our diagnosis number would not be biased by length of time in care. Lifetime prior treatment history was defined as past or present evidence in the EMR of psychotropic medication use or past visits with an outpatient therapist. Two bachelor’s level coders used a detailed coding manual to extract information manually from the EMR. Discrepancies between the two coders were discussed and resolved by the principal investigator (first author).

Clinical need for mental health care was approximated using scores on the Pediatric Symptom Checklist (PSC-35). The PSC-35 is a free, well-validated, 35-item parent-report psychosocial screening instrument written at a 5th grade level and available in many languages. Parents rate symptoms on a three-point Likert scale (Never=0, Sometimes=1, Often=2), and scores are calculated by adding up the number of points to report an overall “Global” score and three subscales: Internalizing, Externalizing, and Attention. The PSC-35 is routinely given to parents to complete during well-child visits in the United States,[28] and it is collected during annual physicals for children ages 5–18 at MGH Chelsea. We obtained the last PSC-35 prior to referral from each child’s medical record. The percentages of children with probable need for mental health care were identified using published cut-

points, indicating clinically significant symptoms, for the global and three subscale scores (global ≥ 28, internalizing ≥ 5, externalizing ≥ 7, attention ≥ 7).[29,30]

Data analysis.

To identify possible determinants of successful referral as measured by evaluation status, bivariate analyses were conducted using Pearson's chi square tests for dichotomized variables and Wilcoxon rank sum tests for continuous variables given that data were not normally distributed. Multiple logistic regression was then applied to assess the association between determinant variables and successful referral after controlling for potential confounders.

To examine the relationship between clinical need and intensity of service use, incident rate ratios for number of follow-up visits with the embedded child psychiatrist were calculated comparing those with higher vs. lower clinical need based on multiple indicators including PSC Global Score, number of elevated PSC subscales, and number of diagnoses. Poisson regression was used, adjusting for exposure time (number of days between initial visit and end date of data collection), age, sex, ethnicity, and primary language. Significance was set at α=.05. All data were analyzed using STATA software, version 14[31] and SAS® software 9.4.[32]

Results

Success of referrals to the embedded child psychiatrist.

Nineteen pediatricians made a total of 211 referrals during the study period, at a rate of approximately two to three referrals per week. Almost three-fourths (74%) of referred patients were successfully referred (evaluated) within the study time period. Referred patients were 61.6% male, 74.4% Latino, and 57.3% non-English speaking. The demographic and clinical characteristics of successfully referred (evaluated) patients (n=157) as well as unsuccessfully referred (not evaluated) patients (n= 54) are summarized in Table 1. Most (83%) of the patients that were never evaluated were scheduled, but did not show for their appointment. The remainder were never scheduled for an evaluation. Sociodemographic characteristics did not vary by evaluation status, with one exception. Evaluated patients were significantly younger (t= 2.45, p=.025) than those not evaluated.

After reviewing pediatricians' stated referral reasons, the reasons were classified into five categories: ADHD symptoms, behavioral problems, development/learning problems, mood symptoms, and anxiety symptoms. The most common symptoms leading to referral were ADHD symptoms (n=109; 51.7%). Of these, 70.6% (n=77) were also referred for symptoms in another category. Other common referral reasons included developmental concerns such as autism, speech or learning difficulties (n=61; 28.9%), mood symptoms (n=56; 26.5%), behavioral problems (n=56; 26.5%), and anxiety (n=44; 20.8%). Evaluated patients were significantly more likely than patients who were not evaluated to have been referred for behavioral problems (30.6% vs. 14.8%, χ^2=5.12, p=.24). Most patients (n=117; 55.5%) were referred due to symptoms in more than one category, and this did not differ by success of referral (57.3% vs. 50.0%, χ^2=.87, p=.350). Almost half of the referred children (43.6%)

had previously been prescribed a psychotropic medication, and the majority (66.8%) had previously engaged in some form of therapy for a mental health condition. Successful referral varied significantly by prior therapeutic services (72.0% vs. 52.0%, χ^2=7.34, p=.007). Pediatricians most often referred with a specific consultation question regarding diagnosis or treatment, which did not differ significantly by referral success.

After psychiatric evaluation, the most common psychiatric diagnosis was ADHD (n= 90; 57.3%), followed by a learning or developmental disorder including autism spectrum disorder (n=57; 36.3%), mood disorder (n= 50; 31.8%), anxiety disorder (n= 33; 21.0%), and disruptive behavior disorder (n=23; 14.6%). Over 60% (n= 98; 62.4%) of evaluated children had more than one diagnosis. The most common treatment recommendations made by the child psychiatrist were for medication (n=105; 66.9%), therapy (n=82; 52.2%), and school accommodations (n=54; 34.4%). Other less common recommendations included parent support, neuropsychological testing, and a higher level of care. The mean number of treatment recommendations was 2.0, with more than one recommendation documented for the majority of patients (n=96; 61.1%).

Table 2 shows the PSC-35 scores of patients referred by evaluation status. Positive PSC-35 scores predicted success of referral. Almost one-third of successfully referred children scored in the clinical range for the PSC-35 Global Score (32.2%) compared with 14.6% of children not evaluated (χ^2=5.40, p=.02). Successfully referred children were also more likely than children never evaluated to score in the clinical range for externalizing problems (19.8% vs. 6.3%, χ^2=4.72, p=.03). Mean PSC Global, Internalizing, and Externalizing Scores were all higher in the successfully evaluated group than in the group of children referred but not evaluated.

In the logistic regression analysis, age remained significantly associated with successful referral both before and after controlling for confounders (primary language, history of prior therapeutic services, referred for behavioral problems, positive PSC Global Score, and positive PSC Externalizing Score). For each additional year older, the odds of being successfully referred decreased by 8.7% (95% CI: (.837, .996); p = .040). History of prior therapeutic services also remained significantly associated with successful referral, both before and after controlling for confounders (age, primary language, referred for behavioral problems, positive PSC Global Score, and positive PSC Externalizing Score). Children with a history of prior therapeutic service had 2.74 times the odds of being evaluated compared with children without a history of prior therapeutic service (95% CI: (1.307, 5.760); p=.008). After controlling for confounders, positive PSC Global Scores (p=.122) and Externalizing Scores (p=.437) were no longer significantly associated with successful referral.

Utilization intensity.

Of those patients who attended at least one visit with the embedded child psychiatrist, 29.3% (n=46) were seen just for the initial evaluation, 51.6% (n=81) were seen for two or fewer visits, and 74.5% of patients (n=117) were seen for four or fewer visits. Less than 5% of patients were seen for 10 or more visits.

Table 3 shows the results of the Poisson regression examining the association between number of visits attended and markers of clinical need. Patients' PSC Global Scores, positive PSC Global Score, number of PSC subscale elevations, and number of diagnoses significantly predicted number of visits with the embedded child psychiatrist. For every one point increase in PSC Global Score, the incidence rate of psychiatry visits increased by 1% (95% CI: (1.00, 1.02), $\chi^2 = 9.03$, p=.003). Subjects with positive PSC Global Scores had 1.28 (95% CI: (1.04, 1.57)) times the rate of psychiatry visits compared with subjects with negative PSC Global Scores ($\chi^2 = 5.39$, p=.020). For every additional PSC subscale elevation, the rate of psychiatry visits increased by 15% (95% CI: (1.04, 1.29)) ($\chi^2 = 6.68$, p=.010). For every additional psychiatric diagnosis, the rate of follow-up visits increased by 12% (95% CI: (1.02, 1.23)) ($\chi^2 = 5.61$, p=.018).

Discussion

In this study, we examined the utilization of integrated child psychiatry consultation in primary care pediatrics in an urban, disadvantaged, Latino population. We examined how successful initial referral to the embedded psychiatrist varied by sociodemographic and clinical characteristics, and how markers of clinical need predicted service use and intensity. We present some of the first evidence that integrated child psychiatry consultation (1) is feasible for providing short-term psychiatric intervention for mostly publicly-insured, non-English-speaking, Latino patients; (2) may increase the likelihood of initial connection with care; and (3) matches service use to clinical need in this population.

In order to understand which families successfully engaged in treatment, we examined determinants of initial contact with child psychiatry. The most important determinants of initial treatment engagement, after controlling for confounders, were age and prior therapeutic services. This finding suggests that families may be more likely to follow through with evaluation of younger children in primary care and supports interventions to improve early access to integrated psychiatric evaluation at a time when families may be most receptive, regardless of clinical severity. Of note, other studies on the effect of child age on family engagement in mental health services have shown conflicting results. Some have shown that younger age predicts engagement in child mental health services, but others have shown the opposite.[33] Thus, there is certainly a need for more research on what factors will best engage families of younger vs. older children in an initial psychiatric evaluation.

Since previous therapy but not previous medication prescription was associated with increased likelihood to show for evaluation, this may be an indicator of a parent's general willingness to engage with a mental health provider. (While we did not report specific data on this, almost all previous psychotropic prescriptions were written by patients' primary care providers.) The fact that previous engagement in therapeutic services, independent of clinical severity, also predicts contact with child psychiatry (even after controlling for clinical severity) could also support earlier intervention in order to increase a family's willingness to engage in treatment. This may also justify the common practice of waiting until families have engaged with therapeutic supports prior to referring to child psychiatry as a method of most effectively utilizing a specialist's time. On the other hand, this could simply be a marker of increased willingness or ability to follow through with care (medical

and psychiatric) in general. Since we did not record engagement in medical care, this hypothesis could not be tested with this dataset.

It is important to note that patients with certain markers of vulnerability including non-English speakers and incomplete PSC may have been even more likely to come for an evaluation, although these findings just missed our a priori threshold for statistical significance, perhaps due to a lack of power. These findings highlight the possibility that this model may be particularly promising in overcoming barriers to care related to sociodemographic characteristics such as language and warrant further investigation. Finally, our data suggest that parents may be likelier to follow through with a psychiatric referral for behavioral problems than for other mental health problems, consistent with previous literature.[33,34,35]

Among patients who presented for initial evaluation we also examined whether utilization intensity as measured by number of follow-up visits was driven by clinical need. Children with greater clinical need, as measured by PSC scores, number of subscale elevations, and number of psychiatric diagnoses were more likely to attend follow-up appointments. This is an important finding in a population experiencing high levels of psychosocial stress and other sociodemographic characteristics associated with reduced family engagement in care, including Latino ethnicity, language barrier, and low socioeconomic status.[33,36,37,38] and provides some evidence that a consultation psychiatrist can be effectively utilized in a clinically appropriate way using an embedded model.

In our model, almost 75% of referred children were seen for an evaluation, which is higher than published estimates of initial connection to subspecialty mental health in similar populations.[33] While very preliminary, this suggests that embedded child psychiatry consultation may improve access to initial evaluation. This could be related to reduced stigma, improved convenience, family preference for team-based care, or other factors. Further studies are needed to confirm and clarify reasons for improved initial contact with this model.

Most patients attended fewer than four visits. This is consistent with previous reports on the usual duration of mental health treatment episodes for urban, economically disadvantaged families.[33] The difference is that our model was designed to be a short-term intervention with planned transition back to primary care and ongoing collaboration as needed. However, we do not have outcomes data to assess the impact of the consultation on patients' symptoms. Using patient-reported outcome measures to track improvements following short-term consultation is an important area for future research. In addition, defining and studying determinants of successful transition back to primary care will be important future work.

The data collected suggest that the embedded child psychiatry consultation program filled pediatricians' need and that referrals were appropriate for the service. The program was designed specifically for consultation on diagnosis or treatment, and most pediatricians referred with a specific diagnostic or treatment question. Prior treatment (including psychotropic use) was common and medication management frequently recommended,

suggesting that input from a child psychiatrist was not likely premature in most cases. Referrals were frequent (two to three per week) but able to be seen in the time allotted (.2 FTE). In the future, understanding referral patterns to embedded psychiatry, contrasting with referrals directly to specialty care or community supports, and formally evaluating provider and patient satisfaction with the service model will be important for optimization.

The model has some limitations. First, scarcity of child psychiatrists contributes significantly to lack of access to these specialists. Without enough child psychiatrists to fill primary care practices, the model may not be scalable. Relatedly, small practices may not be able to fill a child psychiatrist's time. In our experience, the relationship between the psychiatrist and primary care staff (including pediatricians and nurses) as well as access to a shared medical record were two important components of the program, which could in theory be replicated by a collaborative-care, non-embedded arrangement, albeit with greater logistical challenges. However, in order to preserve a more cohesive team-based approach, smaller practices could also consider a bi-weekly or monthly embedded psychiatrist. These represent alternatives to remote tele-psychiatry consultation that may be preferable for certain practices and patients. While tele-consultation has become an important resource in many states for practices without other access to a consultant psychiatrist, this strategy lacks key elements of an embedded, collaborative model including a more intimate understanding of the population served, and shared ongoing management and responsibility.

Our study has some limitations. Information was obtained by retrospective chart review rather than prospectively or by other means, such as patient interviews or claims databases. Thus we were limited by likely imperfect and incomplete information in the electronic medical record. Data collected on the lifetime treatment history was likely incomplete, since patients may have received care that was unrecorded, and could have been biased by length of time in the MGH system, which was not recorded. We also did not have reliable information on type of therapy received (e.g., supportive, cognitive-behavioral therapy, parent guidance, parent management training), and we did not record number of therapy visits. No structured diagnostic interviews were completed, which could have yielded different information than clinical psychiatric diagnoses. We were not able to assess or determine the appropriateness of treatment recommendations made by the child psychiatrist. We did not collect other measures with family or clinic staff such as family satisfaction ratings or qualitative interviews. Follow-up was driven both by provider as well as by family, and we were not able to obtain information about who (provider or family) terminated the treatment episode. We did not track or study care processes between the embedded case manager and child psychiatrist, nor did we track curbside consultations with pediatricians, both important future steps. Furthermore, although the referred children accurately represented the sociodemographic characteristics of the clinic as a whole, we did not collect data on health insurance and race in order to illustrate this fully. Finally, our model may not translate well to other settings since it was designed based on a needs assessment of one practice and was staffed by one psychiatrist.

Despite these limitations, this is the first study to demonstrate the feasibility and preliminary effectiveness of embedded primary care child psychiatry consultation. Our pragmatic results support the application of this model as well as the need for more research in this area.

Because we tested this model in an urban, largely Latino and non-English speaking population, our results have particularly important implications for these patients. We were able to study a fairly large sample of patients and access standardized measures to characterize better the patients served. Extracting information about both initial treatment contact as well as number of visits from the medical record allowed us to study both of these important indices of service utilization and patient engagement.

In conclusion, we provide initial evidence that embedded child psychiatry consultation is feasible and promising for increasing access to and engagement in psychiatric care in a disadvantaged minority community where language and culture may present barriers to care. Future studies are needed in additional settings and which examine clinical outcomes, provider and patient satisfaction, and cost of integrated child psychiatry.

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References

1. American Academy of Child and Adolescent Psychiatry Committee on Health Care Access and Economics Task Force on Mental Health. Improving mental health services in primary care: reducing administrative and financial barriers to access and collaboration. Pediatrics. 2009;123(4): 1248–1251. doi:10.1542/peds.2009-0048. [PubMed: 19336386]
2. Wang PS, Berglund PA, Olfson M, Kessler RC. Delays in initial treatment contact after first onset of a mental disorder. Health Serv Res. 2004;39(2):393–415. doi:10.1111/j.1475-6773.2004.00234.x. [PubMed: 15032961]
3. Mental Illness Exacts Heavy Toll, Beginning in Youth. http://www.nimh.nih.gov/news/science-news/2005/mental-illness-exacts-heavy-toll-beginning-in-youth.shtml. Accessed July 31, 2016.
4. Kolko DJ, Perrin E. The integration of behavioral health interventions in children's health care: services, science, and suggestions. J Clin Child Adolesc Psychol Off J Soc Clin Child Adolesc Psychol Am Psychol Assoc Div 53. 2014;43(2):216–228. doi:10.1080/15374416.2013.862804.
5. Alegria M, Vallas M, Pumariega AJ. Racial and ethnic disparities in pediatric mental health. Child Adolesc Psychiatr Clin N Am. 2010;19(4):759–774. doi:10.1016/j.chc.2010.07.001. [PubMed: 21056345]
6. AACAP Committee on Collaboration with Medical, Professionals. A Guide to Building Collaborative Mental Health Care Partnerships In Pediatric Primary Care; 2010.
7. Coker TR, Elliott MN, Kataoka S, et al. Racial/Ethnic Disparities in the Mental Health Care Utilization of Fifth Grade Children. Acad Pediatr. 2009;9(2):89–96. doi:10.1016/j.acap.2008.11.007. [PubMed: 19329099]
8. McAlpine DD, Mechanic D. Utilization of specialty mental health care among persons with severe mental illness: the roles of demographics, need, insurance, and risk. Health Serv Res. 2000;35(1 Pt 2):277–292. [PubMed: 10778815]
9. Flores G, Tomany-Korman SC. The language spoken at home and disparities in medical and dental health, access to care, and use of services in US children. Pediatrics. 2008;121(6):e1703–1714. doi: 10.1542/peds.2007-2906. [PubMed: 18519474]
10. Price JH, Khubchandani J, McKinney M, Braun R. Racial/ethnic disparities in chronic diseases of youths and access to health care in the United States. BioMed Res Int. 2013;2013:787616. doi: 10.1155/2013/787616. [PubMed: 24175301]

11. Liao Y, Bang D, Cosgrove S, et al. Surveillance of health status in minority communities - Racial and Ethnic Approaches to Community Health Across the U.S. (REACH U.S.) Risk Factor Survey, United States, 2009. Morb Mortal Wkly Rep Surveill Summ Wash DC 2002. 2011;60(6):1–44.
12. Asarnow JR, Rozenman M, Wiblin J, Zeltzer L. Integrated Medical-Behavioral Care Compared With Usual Primary Care for Child and Adolescent Behavioral Health: A Meta-analysis. JAMA Pediatr. 2015;169(10):929–937. doi:10.1001/jamapediatrics.2015.1141. [PubMed: 26259143]
13. Kolko DJ, Campo J, Kilbourne AM, Hart J, Sakolsky D, Wisniewski S. Collaborative care outcomes for pediatric behavioral health problems: a cluster randomized trial. Pediatrics. 2014;133(4):e981–992. doi:10.1542/peds.2013-2516. [PubMed: 24664093]
14. Kolko DJ, Campo JV, Kelleher K, Cheng Y. Improving access to care and clinical outcome for pediatric behavioral problems: a randomized trial of a nurse-administered intervention in primary care. J Dev Behav Pediatr JDBP. 2010;31(5):393–404. doi:10.1097/DBP.0b013e3181dff307. [PubMed: 20495474]
15. Richardson LP, Ludman E, McCauley E, et al. Collaborative care for adolescents with depression in primary care: a randomized clinical trial. JAMA. 2014;312(8):809–816. doi:10.1001/jama.2014.9259. [PubMed: 25157724]
16. Fallucco EM, Blackmore ER, Bejarano CM, et al. Collaborative Care: a Pilot Study of a Child Psychiatry Outpatient Consultation Model for Primary Care Providers. J Behav Health Serv Res. 5 2016. doi:10.1007/s11414-016-9513-z.
17. Hobbs Knutson K, Masek B, Bostic JQ, Straus JH, Stein BD. Clinicians' utilization of child mental health telephone consultation in primary care: findings from Massachusetts. Psychiatr Serv Wash DC. 2014;65(3):391–394. doi:10.1176/appi.ps.201200295.
18. Connor DF, McLaughlin TJ, Jeffers-Terry M, et al. Targeted child psychiatric services: a new model of pediatric primary clinician--child psychiatry collaborative care. Clin Pediatr (Phila). 2006;45(5):423–434. doi:10.1177/0009922806289617. [PubMed: 16891275]
19. Aupont O, Doerfler L, Connor DF, Stille C, Tisminetzky M, McLaughlin TJ. A collaborative care model to improve access to pediatric mental health services. Adm Policy Ment Health. 2013;40(4):264–273. doi:10.1007/s10488-012-0413-0. [PubMed: 22527709]
20. Epstein JN, Rabiner D, Johnson DE, et al. Improving attention-deficit/hyperactivity disorder treatment outcomes through use of a collaborative consultation treatment service by community-based pediatricians: a cluster randomized trial. Arch Pediatr Adolesc Med. 2007;161(9):835–840. doi:10.1001/archpedi.161.9.835. [PubMed: 17768282]
21. Zeidler Schreiter EA, Pandhi N, Fondow MD, et al. Consulting psychiatry within an integrated primary care model. J Health Care Poor Underserved. 2013;24(4):1522–1530. doi:10.1353/hpu.2013.0178. [PubMed: 24185149]
22. Nash JM, McKay KM, Vogel ME, Masters KS. Functional roles and foundational characteristics of psychologists in integrated primary care. J Clin Psychol Med Settings. 2012;19(1):93–104. doi:10.1007/s10880-011-9290-z. [PubMed: 22415522]
23. Bluestein D, Cubic BA. Psychologists and primary care physicians: a training model for creating collaborative relationships. J Clin Psychol Med Settings. 2009;16(1):101–112. doi:10.1007/s10880-009-9156-9. [PubMed: 19259793]
24. Zima BT, Bussing R, Tang L, et al. Quality of Care for Childhood Attention Deficit/Hyperactivity Disorder in a Managed Care Medicaid Program. J Am Acad Child Adolesc Psychiatry. 2010;49(12):1225–123811. doi:10.1016/j.jaac.2010.08.012. [PubMed: 21093772]
25. Spiro A, Oo SA, Marable D, Collins JP. A unique model of the community health worker: the MGH Chelsea Community Health Improvement team. Fam Community Health. 2012;35(2):147–160. doi:10.1097/FCH.0b013e3182465187. [PubMed: 22367262]
26. Chelsea MA Population - Census 2010 and 2000 Interactive Map, Demographics, Statistics, Quick Facts - CensusViewer. http://censusviewer.com/city/MA/Chelsea. Accessed September 7, 2016.
27. Percac-Lima S, Grant RW, Green AR, et al. A culturally tailored navigator program for colorectal cancer screening in a community health center: a randomized, controlled trial. J Gen Intern Med. 2009;24(2):211–217. doi:10.1007/s11606-008-0864-x. [PubMed: 19067085]
28. Romano-Clarke G, Tang MH, Xerras DC, et al. Have rates of behavioral health assessment and treatment increased for Massachusetts children since the Rosie D. decision? A report from two

primary care practices. Clin Pediatr (Phila). 2014;53(3):243–249. doi: 10.1177/0009922813507993. [PubMed: 24220574]

29. Murphy JM, Bergmann P, Chiang C, et al. The PSC-17: Subscale Scores, Reliability, and Factor Structure in a New National Sample. Pediatrics. 2016;138(3). doi:10.1542/peds.2016-0038.
30. Gardner W, Lucas A, Kolko DJ, Campo JV. Comparison of the PSC-17 and alternative mental health screens in an at-risk primary care sample. J Am Acad Child Adolesc Psychiatry. 2007;46(5):611–618. doi:10.1097/chi.0b013e318032384b. [PubMed: 17450052]
31. StataCorp (2015). Statistical Software: Release 14. College Station, TX: StataCorp LP
32. Copyright © [2014] SAS Institute Inc. SAS and all other SAS Institute Inc. product or service names are registered trademarks or trademarks of SAS Institute Inc, Cary, NC, USA.
33. Gopalan G, Goldstein L, Klingenstein K, Sicher C, Blake C, McKay MM. Engaging families into child mental health treatment: updates and special considerations. J Can Acad Child Adolesc Psychiatry J Académie Can Psychiatr Enfant Adolesc. 2010;19(3):182–196.
34. Thurston IB, Phares V, Coates EF, Bogart LM. Child problem recognition and help-seeking intentions among black and white parents. J Clin Child Adolesc Psychol. 2015 Jul-Aug; 44(4): 604–615. [PubMed: 24635659]
35. Rushton J, Bruckman D, Kelleher K. Primary care referral of children with psychosocial problems. Arch Pediatr Adolesc Med. 156, 592–598 (2002). [PubMed: 12038893]
36. Salloum A, Johnco C, Lewin AB, McBride NM, Storch EA. Barriers to access and participation in community mental health treatment for anxious children. J Affect Disord. 2016 5 15;196:54–61. doi: 10.1016/j.jad.2016.02.026. Epub 2016 Feb 10. [PubMed: 26901657]
37. Howell E, McFeeters J. Children's mental health care: differences by race/ethnicity in urban/rural areas. J Health Care Poor Underserved. 2008 2;19(1):237–47. doi: 10.1353/hpu.2008.0008. [PubMed: 18263999]
38. Kataoka SH, Zhang L, Wells KB. Unmet need for mental health care among U.S. children: variation by ethnicity and insurance status. Am J Psychiatry. 2002 9;159(9):1548–55. [PubMed: 12202276]

Table 1.

Patient demographics and clinical characteristics by evaluation status.

	Evaluated	Referred but Not Evaluated	Test Statistic	p-Value
Demographics	**N=157**	**N=54**		
Male	96 (61.1%)	34 (63.0%)	χ^2=.06	.813
Race and Ethnicity				
Hispanic	119 (75.8%)	38 (70.4%)	χ^2=.55	.458
Primary Language English	61 (38.9%)	29 (53.7%)	χ^2=3.62	.057
Mean (±SD) Age in years[a*]	10.21 ± 4.39	11.94 ± 4.68	z=2.45	.025
Age Category			χ^2=2.75	.25
3–5 years old	27 (17.8%)	4 (8.3%)		
6–12 years old	82 (53.9%)	27 (56.3%)		
13–18 years old	43 (28.3%)	17 (35.4%)		
Distance from Home to Clinic			χ^2=1.60	.45
<1 mile	85 (54.1%)	24 (44.4%)		
1–4 miles	50 (31.9%)	20 (37.0%)		
≥5 miles	22 (14.0%)	10 (18.5%)		
Clinical Characteristics				
Treatment History for Psychiatric or Developmental Problems				
Any treatment	126 (80.3%)	37 (68.5%)	χ^2=3.15	.076
Medication	73 (46.5%)	19 (35.2%)	χ^2=2.09	.148
Therapy[b*]	113 (72.0%)	28 (52.0%)	χ^2=7.34	.007
Both	22 (14.0%)	10 (18.5%)	χ^2=.63	.426
Referral Reason				
ADHD Symptoms	78 (49.7%)	31 (57.4%)	χ^2=.96	.327
Behavioral Problems[c*]	48 (30.6%)	8 (14.8%)	χ^2=5.12	.024
Development/Learning Problems	47 (29.9%)	14 (25.9%)	χ^2=.31	.575
Mood Symptoms	41 (26.1%)	15 (27.8%)	χ^2=.06	.811
Anxiety Symptoms	29 (18.5%)	15 (27.8%)	χ^2=2.11	.146
2+ Symptom Categories	90 (57.3%)	27 (50.0%)	χ^2=.87	.350
Referral Question				
General Question	41 (26.1%)	12 (22.2%)	χ^2=.32	.569
Specific Question	116 (73.9%)	42 (77.8%)	χ^2=.32	.569
Diagnosis	86 (54.8%)	28 (51.9%)	χ^2=.14	.710
Treatment	66 (42.0%)	27 (50.0%)	χ^2=1.03	.309
Both	36 (22.9%)	13 (24.1%)	χ^2=.03	.864

[a]A Wilcoxon Rank Sum test indicated that evaluated patients were significantly younger than patients not evaluated.

[b] A Chi Square test indicated that evaluated patients were more likely to have a history of therapeutic services than patients not evaluated.

[c] Patients referred specifically for behavioral problems were more likely to be evaluated than patients referred for other reasons.

SD=standard deviation

* p<.05

Table 2.

Clinical need of referred patients as measured by Pediatric Symptom Checklist (PSC-35) Scores according to evaluation status.

PSC-35 Results	Evaluated	Referred but Not Evaluated	Test Statistic	p-Value
Total Completed[a]	121 (77.1%)	48 (88.9%)	χ^2=3.52	.061
Positive Scores[b]				
Attention ≥ 7	34 (28.1%)	7 (14.6%)	χ^2 =3.42	.065
Internalizing ≥ 5	25 (20.7%)	7 (14.6%)	χ^2=.83	.363
Externalizing ≥ 7 *	24 (19.8%)	3 (6.3%)	χ^2=4.73	.030
Global ≥ 28 *	39 (32.2%)	7 (14.6%)	χ^2=5.40	.020
One or more positive score	53 (43.8%)	18 (37.5%)	χ2=.56	.454
Mean (±SD) Scores[c]				
Attention	4.49±2.78	4.23±2.61	z=−.43	.668
Internalizing *	2.67±2.49	1.90±2.22	z=−2.10	.036
Externalizing *	4.03±3.15	2.52±2.47	z=−2.93	.003
Global *	21.12±11.76	16.62±10.29	z=−2.15	.031

[a] Only valid PSC's with less than 4 missing items were included for analysis.

[b] A Chi Square test indicated that evaluated subjects were more likely to have positive PSC Externalizing and Global scores than patients not evaluated.

[c] A Wilcoxon Rank Sum test indicated that evaluated patients had significantly higher PSC Internalizing, Externalizing, and Global scores than patients not evaluated.

PSC-35=Pediatric Symptom Checklist (full 35-item scale)

SD=Standard Deviation

* p<.05

Table 3.

Relationship of clinical need markers with number of follow up visits.

	Incident Rate Ratio (95% CI)[a]	χ^2	p-Value
PSC-35 Global Score *	1.01 (1.00, 1.02)	9.03	.003
Positive PSC-35 Global Score (≥ 28) *	1.28 (1.04, 1.57)	5.39	.020
Number of PSC-35 Subscale Elevations *	1.15 (1.04, 1.29)	6.68	.010
Number of Psychiatric Diagnoses *	1.12 (1.02, 1.23)	5.61	.018

[a]Rate of increase in number of visits based on Poisson regression controlling for exposure time (number of days between initial visit and end of data collection), age, gender, ethnicity, and primary language.

PSC-35=Pediatric Symptom Checklist (full 35-item scale)

CI=Confidence Interval.

*p<.05