



Published in final edited form as:

Acad Pediatr. 2016 ; 16(7): 676–683. doi:10.1016/j.acap.2016.03.010.

Do On-site Mental Health Professionals Change Pediatricians' Responses to Children's Mental Health Problems?

Sarah McCue Horwitz, Ph.D.¹, Amy Storfer-Isser, Ph.D.², Bonnie D. Kerker, Ph.D.^{1,3}, Moira Szilagyi, M.D., Ph.D.⁴, Andrew S. Garner, M.D., Ph.D.⁵, Karen G. O'Connor, B.S.⁶, Kimberly E. Hoagwood, Ph.D.¹, Cori M. Green, M.D., M.Sc.⁷, Jane M. Foy, M.D.⁸, and Ruth E.K. Stein, M.D.⁹

¹Department of Child and Adolescent Psychiatry, New York University School of Medicine, New York, NY

²Statistical Research Consultants, LLC, Schaumburg, IL

³Nathan Kline Institute of Psychiatric Research, Orangeburg, NY

⁴University of California at Los Angeles, Los Angeles, CA

⁵Case Western Reserve University, School of Medicine, Cleveland, OH

⁶American Academy of Pediatrics, Elk Grove Village, IL

⁷New York-Presbyterian Hospital-Weill Cornell Medical College, New York, NY

⁸Wake Forest University School of Medicine, Winston Salem, NC

⁹Albert Einstein College of Medicine/Children's Hospital at Montefiore, New York, NY

Address Correspondence to: Dr. Sarah Horwitz, Department of Child and Adolescent Psychiatry, New York University School of Medicine, 1 Park Avenue, 7th Floor, New York, NY 10016, Sarah.horwitz@nyumc.org, Telephone: 646-754-5094, Fax: 646 754 5210.

Financial Disclosure: None

Conflict of Interest: None

Contributors' Statement:

Sarah McCue Horwitz, Ph.D.: Dr. Horwitz participated in the development of the survey, conducted the analyses, drafted sections of the article, critically reviewed all drafts, and is accountable for all aspects of the work.

Amy Storfer-Isser, Ph.D.: Dr. Storfer-Isser conducted the analyses, drafted sections of the manuscript, critically reviewed all drafts and is accountable for all aspects of the work.

Bonnie D. Kerker, Ph.D.: Dr. Kerker critically reviewed all drafts and is accountable for all aspects of the work.

Moira Szilagyi, M.D., Ph.D.: Dr. Szilagyi developed a portion of the survey, critically reviewed all drafts and is accountable for all aspects of the work.

Andrew S. Garner, M.D., Ph.D.: Dr. Garner developed a portion of the survey, critically reviewed all drafts and is accountable for all aspects of the work.

Karen G. O'Connor, B.S.: Ms. O'Connor designed and conducted the survey, critically reviewed all drafts and is accountable for all aspects of the work.

Kimberly E. Hoagwood, Ph.D.: Dr. Hoagwood critically reviewed all drafts and is accountable for all aspects of the work.

Cori M. Green, M.D., M.Sc.: Dr. Green critically reviewed all drafts and is accountable for all aspects of the work.

Jane M. Foy, M.D.: Dr. Foy critically reviewed all drafts and is accountable for all aspects of the work.

Ruth EK Stein, M.D.: Dr. Stein participated in the development of the survey, critically reviewed all drafts and is accountable for all aspects of the work.

Publisher's Disclaimer: This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Abstract

Objective—The objectives were to: assess the availability of on-site mental health professionals (MHP) in primary care; examine practice/pediatrician characteristics associated with on-site MHPs; and determine whether presence of on-site MHPs is related to pediatricians' co-managing or more frequently identifying, treat/managing or referring MH problems.

Methods—Analyses included AAP members who participated in an AAP Periodic Survey in 2013 and who practiced general pediatrics (N=321). Measures included socio-demographics, practice characteristics, questions on about on-site MHPs, co-management of MH problems and pediatricians' behaviors in response to 5 prevalent MH problems. Weighted univariate, bivariate and multivariable analyses were performed.

Results—Thirty-five percent reported on-site MHPs. Practice characteristics (medical schools/universities/HMOs, <100 visits/week, <80% of patients privately insured), and interactions of practice location (urban) with visits and patient insurance, were associated with on-site MHPs. There was no overall association between co-location and co-management or whether pediatricians usually identified, treat/managed or referred 5 common child MH problems. Among the subset of pediatricians who reported co-managing there was an association with co-management when the on-site MHP was a child psychiatrist, SA counselor, or social worker.

Conclusions—On-site MHPs are more frequent in settings where low-income children are served and where pediatricians train. Pediatricians who co-manage MH problems are more likely to do so when the on-site MHP is a child psychiatrist, SA counselor, or social worker. Overall, on-site MHPs were not associated with co-management or increased likelihood of pediatricians identifying, treating/managing, or referring children with 5 common child MH problems.

Keywords

On-site mental health; child psychosocial problems; primary care

Introduction

In 1974, when Robert Haggerty first wrote about the “new morbidity,” he effectively presaged the tremendous changes in the complexion of pediatric practice.¹ The effective treatment and prevention of infectious diseases, coupled with the tremendous advances in treatment of chronic diseases and the increased recognition of childhood mental health (MH) problems, means that pediatric generalists are routinely called upon to treat more complex physical and mental health problems. Data suggest that up to 20% of US children meet criteria for a mental health problem, 75% of those children are seen in primary care, but only 50% of those with identified problems receive any specialty mental health treatment for their problems.^{2,3}

A number of professional efforts have been made to address the reality of pediatric primary care as a “defacto mental health system,” especially for infants and preschool children. As of 1997, the Residency Review Committee for Pediatrics of the Accreditation Council for Graduate Medical Education required that pediatric residents have a minimum of a 1-month block rotation of developmental and behavioral training to include both assessment and

treatment/management of identified MH problems as expected competencies.⁴ The *Future of Pediatric Education II* (FOPE II) included recommendations for improving pediatric education with respect to the family and guidelines such as *Bright Futures* focus attention on child and family mental health.⁵⁻⁷ In 2010 the American Academy of Pediatrics (AAP) published a policy statement articulating mental health competencies recommended for pediatric primary care.⁸ However, despite the fact that pediatricians are identifying and treating more children with mental health problems than in the past, the vast majority of children go undiagnosed and untreated.⁹ Pediatricians have endorsed and continue to increasingly endorse many barriers to identifying and treating childhood mental health problems, making understanding why these barriers continue to exist critical for improving care to children with MH needs. A major barrier that continues to be endorsed is lack of availability of MHPs.^{10, 11}

To address the barriers and complex needs of children and families, the AAP has promoted the concept of the medical home since the early 90s.¹² Medical homes are defined as primary care that is accessible, continuous, comprehensive, family-centered, coordinated, compassionate and culturally effective.¹³ The AAP and the American Academy of Child and Adolescent Psychiatry (AACAP) recommend that care for children with mental health problems be initiated in primary care with pediatricians identifying and managing relatively uncomplicated conditions, co-managing intermediate level problems and referring complex problems.¹⁴ The need to provide complex, coordinated care across a range of conditions and to integrate behavioral health care into primary health care has prompted the investigation of strategies beyond simply improving the education of pediatricians. One major focus has been on changing the structure of pediatric practices to improve capacity and to better integrate behavioral health services. Within that context, a promising structural change that has been recommended by the AAP and AACAP is on-site location of one or more child mental health professionals within a primary care pediatric practice.^{15, 16} One of the aims of this structural change is to enhance the level of shared management--- co-management---between MH and primary care professionals, compared with traditional models of “siloed,” poorly coordinated behavioral health and primary care systems. Although promoted as a mechanism to improve the care of children with MH issues, little is known about physically locating a MH professional near or in a pediatric practice or about the influence of on-site MH professionals on pediatricians’ activities with regard to child/adolescent MH issues.¹⁴⁻¹⁷ In an early examination of referrals for child/adolescent MH problems by pediatricians, Williams et al., 2005, found that pediatricians reported that they were likely to use a MH specialist who was on-site in their practice but would be less likely to use either psychopharmacology or behavioral health consultation by phone.¹⁸ Guevara and colleagues (2009) examined pediatricians identified from the American Medical Association’s 2004 physician directory and found that 17% had an onsite MH professional and that those with an onsite MH professional were more likely to consult with and refer to that professional.¹⁹ However, they did not investigate whether on-site MH professionals were associated with increases in pediatricians’ likelihood of identifying and treating common child and adolescent MH problems.¹⁹

In 2013, the American Academy of Pediatrics included a series of questions about on-site MHPs in its Periodic Survey 85 thereby allowing the examination of this under researched,

but potentially important practice change. Therefore, the objectives of these analyses were to: (1) examine the availability of on-site MHPs in practices of pediatricians as well as the characteristics of the practices where on-site services are available; (2) determine if on-site services were related to whether and how often pediatricians co-managed the MH problems of their patients with a MHP, arguably a proxy for integration; and (3) whether on-site services were related to pediatricians more frequently identifying, treat/managing or referring five prevalent child MH problems.

Methods

Periodic Survey (PS) Administration

The sample for these analyses included only pediatricians who responded to a 2013 AAP Periodic Survey and who practiced general pediatrics exclusively (N=321). The study population for the Periodic Survey (PS) consisted of the US non-retired members of the AAP in 2013 (N=54,491) (www.AAP.org). The PS has been conducted multiple times yearly since 1987 to inform policy, develop new initiatives or evaluate current projects. The questionnaire was pretested for clarity and approved by the AAP Institutional Review Board. The 2013 questionnaire was mailed 7 times to a random sample of 1617 members beginning in July, 2013 and ending in December, 2013, (36.7%) responded. An email reminder was sent with a link to an electronic version of the survey.

Survey Questionnaire Measures

The survey included questions used in previous PSs about socio-demographic characteristics (e.g., age, sex, race/ethnicity, years in practice) and practice characteristics (e.g., type of practice, percentage of time spent in general pediatrics, number of ambulatory visits per week, patient race/ethnicity and insurance). Also included were questions about pediatricians' behaviors in response to 5 prevalent MH issues, ADHD, anxiety, depression, behavior problems and learning difficulties. For each problem, they were asked how often (Never, Sometimes, Usually) they inquire/screen, treat/manage/co-manage, refer each of the problems.

In addition, the survey included a series of questions on whether MHPs were located on-site and on co-management of MH problems. Pediatricians were asked whether 7 types of MHPs (child psychologists, child psychiatrists, developmental-behavioral pediatricians, developmental service providers [i.e., early intervention], substance abuse counselors, social workers, and child life specialists) were located onsite at their practices, and the percentage of their patients with MH problems they had co-managed within the past 12 months. Specifically, the questions were:

- **Please mark which of the following mental health providers are located ON SITE at your primary practice, that is, the practice where you spend most of your time?** Providers included: Child psychiatrists, child psychologists, developmental-behavioral pediatricians, developmental services, substance abuse counseling, social workers, adult psychiatrists/psychologists, and child life specialists.

- **In your practice, how frequently do you inquire about, screen for, treat/co-manage and refer each of these problems/conditions?**
Problems for these analyses included: ADHD, child depression, adolescent depression, behavior management problems, and learning disabilities.
- **Within the last 12 months, approximately what percent of your patients with mental health problems have you co-managed with any mental health care provider? ___%**
 - **If you have co-managed patients with mental health problems, please indicate with which providers:**
Providers asked about included: Child psychiatrist, child psychologist, developmental-behavioral pediatrician, developmental services provider, substance abuse counselor, social worker, and other mental health practitioner.

Analysis

Although the sample reflected the AAP membership at the time of the survey, non-response was considerable. Thus, sample weights were created to minimize potential bias due to differential non-response and to ensure that the respondents were representative of the membership. Logistic regression was used to estimate the probability of responding to the survey, and auxiliary information available for both responders and non-responders were included as predictors (age, sex, region, and membership status). The final logistic regression model included the three-way interaction of age, sex, and region, as well as their two-way interactions and main effects; non-respondents were more likely to be younger females practicing in the northeast or Midwest. Ten weighting cells were created using deciles of the response propensity score distribution. The inverse of the mean propensity score for each cell was used to create the sample weights. The sample weights were rescaled such that the mean was unity and the sum was equal to the analytic sample size.

The primary outcome for these analyses was whether any of the 7 types of child/adolescent MHPs were located in the respondent's primary pediatric practice site. Weighted means and standard errors were used to summarize continuous measures, and weighted proportions were used to describe categorical measures. Bivariate comparisons were assessed using weighted linear regression, weighted logistic regression, and the Rao-Scott chi-square test. All two way interactions with variables entered into the models were tested. Analyses were performed using procedures appropriate for survey data in SAS version 9.3 (SAS Institute, Inc., Cary, NC).

Results

About two-thirds (67.6%) of responding pediatricians were female. Respondents were 46 years old on average and 53.4% completed at least 4 weeks of DBP training (Table 1). More than half (51.5%) worked in a pediatric group practices, 39.3% worked in an urban area, and nearly two-thirds (64.8%) reported <100 ambulatory visits per week.

Thirty-five percent of pediatricians reported that child/adolescent MHPs were located onsite. The most common on-site child/adolescent MHPs were social workers (26.8%), followed by psychologists (15.4%) and psychiatrists (13.0%). Developmental services providers were the least common type of on-site MHP (7.7%) (results not shown).

Bivariate analyses showed that practice characteristics were associated with whether child/adolescent MHPs were located onsite (Table 1). Child/adolescent MH professionals were on-site more often in urban practices compared to suburban or rural practices, in medical schools/universities and other types of practices (e.g., HMOs, government and non-government hospitals and clinics, etc.) compared to 1–2 physician practices, pediatric group practices, or multispecialty group practices, in practices where pediatricians have fewer than 100 ambulatory visits per week, in practices where the majority of patients are not Caucasian, and in practices where less than 80% of patients are privately insured all p -values $<.01$, Table 1). Pediatricians who received training in developmental and behavioral pediatrics (DBP) for four or more weeks were also more likely to have an on-site MHP.

Multivariable logistic regression showed that male compared to female physicians had 2.24-fold increased odds of reporting that MHPs were on-site. Consistent with the bivariate analyses, on-site of child/adolescent MHPs were more common in medical school/university settings and HMO and government facilities compared to 1–2 pediatrician practices, pediatric group practices, and multi-specialty group practices. Also consistent with the bivariate analyses, pediatricians who reported <100 vs. ≥ 100 ambulatory visits per week and pediatricians who reported that $<80\%$ vs. $\geq 80\%$ had private insurance had increased odds of on-site child/adolescent MHPs. Although the main effect of area (urban, suburban, rural) was not statistically significant, the two-way interaction of area and the number of ambulatory visits per week, as well as area and patient insurance, were significant ($p=.02$ and $p<.0001$, respectively). Post-hoc pairwise comparisons showed that among pediatricians practicing in urban settings, those who reported <100 vs. ≥ 100 ambulatory visits per week had 10-fold increased odds of on-site child/adolescent MHPs. Among pediatricians with <100 ambulatory visits per week, those in urban settings compared to suburban or rural settings had 3- and 6-fold increased odds, respectively, of on-site child/adolescent MHPs. Post-hoc comparisons of the interaction between area and patient insurance were limited to urban and suburban practices, as there were only 3 rural practices where $\geq 80\%$ of patients had private insurance, and none of these had on-site child/adolescent MHPs. Among pediatricians in urban practices the odds of on-site child/adolescent MH services were almost 9-fold higher among those who reported $<80\%$ of their patients had private insurance compared to those who reported $\geq 80\%$. Among pediatricians who reported that $\geq 80\%$ of patients had private insurance, the odds of on-site child/adolescent MH services were significantly higher for pediatricians in suburban vs. urban practices. Finally, in adjusted analyses, physician residency training in DBP was not associated with on-site of child/adolescent MHPs (Table 2).

Ninety percent of pediatricians reported co-managing child MH problems in the past 12 months and more than one-half (53.4%) reported co-managing more than 25% of their patients (Table 3). Among pediatricians who report doing any co-management (right three columns on Table 4, $N=281$) when certain MHPs, including Child Psychiatrists, Substance

Abuse Counselors and Social Workers were on-site, pediatricians were more likely to co-manage their patients with MH problems (Table 4). In the entire analytic sample (N=321) only an on-site social worker was associated with co-managing. (left hand columns in Table 4) However, overall, there was no association between the percentage of patients with MH problems that pediatricians co-managed and on-site child/adolescent MHPs ($p=.33$, Table 3).

Bivariate associations of pediatricians' usual behaviors regarding inquiring/screening, treating/managing/co-managing, and referring for 5 common child/adolescent MH conditions and on-site child/adolescent MH providers are shown in Table 5. On-site child/adolescent MHPs were not associated with whether pediatricians usually inquired/screened, treated/managed/co-managed, or referred for ADHD, child/adolescent depression, anxiety disorders, behavior management problems, or learning disabilities. In a sensitivity analysis, we examined pediatricians' usual behaviors for these common MH conditions using the on-site professionals that were related to increased co-management (Table 4) and the results were similar to the primary analysis (data not shown).

Discussion

The increasing number of children with mental disorders seen in primary care and the emphasis on providing comprehensive coordinated care within pediatric primary care has focused attention on changing the structure of pediatric practices to improve capacity with respect to MH problems and to better integrate MH services. A promising model, and one recommended to reduce barriers to providing mental health care within pediatric primary care, is having on-site MHPs within or adjacent to pediatrics practices.¹⁶

The data from an AAP Periodic Survey suggests that on-site MHPs are increasing but not uniformly available (35% report onsite MHPs) and largely confined to urban, medical school, HMO or hospital pediatric practices, which serve low-income patients. In the analytic sample (N=321), only on-site social workers appear to be associated with co-management and it is almost impossible to disentangle whether or not that is a function of their frequent placement in larger, more institutional settings where a higher density of more disadvantaged patients are seen. However, this does not appear to alter the rates of detection of mental health problems or other physician behaviors.

Within just the subset of pediatricians who report doing any co-management, co-management occurs more when the on-site MHP is a child psychiatrist, substance abuse counselor, or social worker, than among those not in practices with on-site MHPs. However, there was no overall association of on-site MHPs with co-management or with identifying, managing, and referring children with 5 common child MH problems. These findings are somewhat different than those of Guevara et al. (2009).¹⁹ The reasons for these discrepant findings may relate to somewhat different samples of pediatricians. Guevara et al. surveyed pediatricians from the American Medical Association's 2004 physician directory and these analyses used the 2013 AAP members list. Additionally, comparisons of pediatricians who responded to a 2004 AAP Periodic Survey and this 2013 survey suggest that there are significant socio-demographic and practice characteristic differences that may have driven the differences in the results of Guevara et al.¹⁹ and those reported here.¹¹ Further, the

questions in the current and Guevara et al. survey differed, and Guevara et al. did not specifically ask about individual mental health problems.¹⁹

The greater prevalence of on-site MHPs in practices serving low-income children may reflect business and administrative considerations, which figure importantly into decision-making about on-site MHPs. Settings such as Federally Qualified Health Centers [FQHCs], hospital out-patient clinics, and safety net community health centers, which may receive cost-base reimbursement, facility fees, and/or grant or community financial support, may have more success in sustaining on-site MHPs than settings reliant on private insurance with fee-for-service payment. The higher level of psychosocial needs of this population may also enhance the motivation of pediatricians serving them to have on-site MHPs and to co-manage with MHPs²⁰ as a way of enhancing provider productivity.

As pointed out by Little,²¹ the role of the behavioral health providers in primary care needs to change to facilitate a trans disciplinary model conducive to effective strategies for improving MH care within primary care.²² This need to fully integrate physical and MH care is heavily endorsed in the Patient-Centered Medical Home (PCMH), although behavioral health care has not always been included as practices strive to achieve the goals of PCMH and the need to educate primary care providers has been identified as a critical element for integration.^{23–24}

As with all data, these have certain limitations. The survey has a suboptimal response rate although the rate was not unusual for a survey of physicians.^{25, 26} Analysis of response bias shows little nonresponse bias and this survey was weighted for nonresponse.²⁷ However, it is unlikely that all bias was corrected and we could not correct for differences between responders and non responders on variables featured in these analyses. It is likely that those pediatricians most interested in the topic are most likely to respond.²⁸ These data are cross sectional and do not imply causality. We cannot rule out the possibility that this study failed to reject the null hypothesis when it was false (type 2 error) due to a lack of statistical power to detect the associations of interest. Neither co-management nor on-site location of MHPs were defined in the survey. Pediatricians may have different conceptualizations of what these terms mean and this may have affected both their recall and the reliability of their answers. Further, both of these are process measures and we have no information on whether they were related to children's outcomes. Finally, the survey did not ask about the nature of the relationships between pediatricians and on-site MHPs so no implications about the integration of MHPs can be made.

Conclusions

On-site MHPs are becoming more prevalent and are more common in settings where a higher percentage of low-income children are served and where pediatricians train. Never the less, they are still absent from the majority of the practitioners' primary practice sites. Among the subset of pediatricians who report co-managing any patients (N=281), they are more likely to do so when the on-site MHPs include a child psychiatrist, substance abuse counselor, or social worker, than pediatricians without those particular on-site MHPs. Otherwise, on-site MH services appear to have little impact on either co-management or

pediatricians' activities for common child MH conditions with the possible exception of on-site social workers. These findings suggest that the discipline of the on-site MHP, as well as the socio-demographics of the population served, may be factors in fostering and/or sustaining integration of behavioral health services within pediatric primary care, but, although more prevalent, on-site MHPs alone are insufficient to increase co-management and enhance practices related to common child and adolescent MH problems. Other solutions must be explored if we are to fully integrate behavioral health services within pediatric primary care and improve the care for children with MH problems.

Acknowledgments

Funding Source: American Academy of Pediatrics supported this research. NIMH P30 MH09 0322 (PI K. Hoagwood) supported Dr. Horwitz, Dr. Storfer-Isser, Dr. Kerker and Dr. Hoagwood's participation in this research.

Abbreviations

MH	mental health
AAP	American Academy of Pediatrics
DBP	Developmental and Behavioral Pediatrics
PS	Periodic Survey
MHP	mental health professionals

References

1. Haggerty RJ. The changing role of the pediatrician in child health care. *Am J Dis Child*. 1974; 127(4):545–549. [PubMed: 4821319]
2. Ginsburg, S.; Foster, S.; Santoro, K.; Schoeman, J.; Chockley, N. Strategies to support the integration of mental health into pediatric primary care. United States Department of Health and Human Services; 2009. p. 19-21.
3. Satcher D. Mental health: A report of the Surgeon General--Executive summary. *Prof Psychol Res Pr*. 2000; 31(1):5.
4. Coury DL, Berger SP, Stancin T, Tanner JL. Curricular guidelines for residency training in developmental-behavioral pediatrics. *J Dev Behav Pediatr*. 1999; 20(2 Suppl):S1. [PubMed: 10219694]
5. Jellinek, M.; Patel, BP.; Froehle, MC., editors. Bright Futures in Practice: Mental Health—Volume II. Tool Kit. Arlington, VA: National Center for Education in Maternal and Child Health; 2002.
6. Leslie L, Rappo P, Abelson H, et al. Final report of the FOPE II Pediatric Generalists of the Future Workgroup. *Pediatrics*. 2000; 106(Supplement E1):1199–1223. [PubMed: 11073552]
7. American Academy of Pediatrics. Task Force on the Future of Pediatric Education. The Future of Pediatric Education II: Organizing pediatric education to meet the needs of infants, children, adolescents, and young adults in the 21st century. *Pediatrics*. 2000; 105(Issue Suppl 1):163–212.
8. Siegel B, Foy J, et al. The Future of Pediatrics: Mental Health Competencies for the Care of Children and Adolescents in Primary Care Settings. *Pediatrics*. 2009; 124(1)
9. Kelleher KJ, McInerney TK, Gardner WP, Childs GE, Wasserman RC. Increasing identification of psychosocial problems: 1979–1996. *Pediatrics*. 2000; 105(6):1313–1321. [PubMed: 10835074]
10. Horwitz SM, Kelleher KJ, Stein RE, et al. Barriers to the identification and management of psychosocial issues in children and maternal depression. *Pediatrics*. 2007; 119(1):e208–e218. [PubMed: 17200245]

11. Horwitz SM, Storfer-Isser A, Kerker B, et al. Barriers to the identification and management of psychosocial problems: Changes from 2004 to 2013. *Acad Pediatr*. 2015; 15(6):613–620. [PubMed: 26409303]
12. Dickens MD, Green JL, Kohrt AE, Pearson HA. The medical home. *Pediatrics*. 1992; 90(5):774–774. [PubMed: 1408554]
13. American Academy of Pediatrics: Medical Home Initiatives for Children With Special Needs Project Advisory Committee. The medical home. *Pediatrics*. 2002; 110(1 Pt 1):184. [PubMed: 12093969]
14. Martini, R.; Hilt, R.; Marx, L., et al. Best principles for integration of child psychiatry into the pediatric health home. Washington, DC: American Academy of Child & Adolescent Psychiatry; Jun. 2012
15. Foy JM. Enhancing pediatric mental health care: report from the American Academy of Pediatrics Task Force on Mental Health. *Pediatrics*. 2010; 125:S69. [PubMed: 20519564]
16. American Academy of Pediatrics. Improving mental health services in primary care: Reducing administrative and financial barriers to access and collaboration. *Pediatrics*. 2009; 123(4):1248–1251. [PubMed: 19336386]
17. Cerimele JM, Katon WJ, Sharma V, Sederer LI. Delivering Psychiatric Services in Primary-Care Setting. *Mt Sinai J Med*. 2012; 79(4):481–489. [PubMed: 22786737]
18. Williams J, Palmes G, Klinepeter K, Pulley A, Foy JM. Referral by pediatricians of children with behavioral health disorders. *Clin Pediatr*. 2005; 44(4):343–349.
19. Guevara JP, Greenbaum PE, Shera D, Bauer L, Schwarz DF. Survey of mental health consultation and referral among primary care pediatricians. *Acad Pediatr*. 2009; 9(2):123–127. [PubMed: 19329104]
20. Perou R, Bitsko RH, Blumberg SJ, et al. Mental health surveillance among children—United States, 2005–2011. *Morbidity and Mortality Surveillance Summary*. 2013; 62(Suppl 2):1–35.
21. Little V. Transdisciplinary care: Opportunities and challenges for behavioral health providers. *J Health Care Poor Underserved*. 2010; 21(4):1103–1107. [PubMed: 21099063]
22. Ader J, Stille CJ, Keller D, Miller BF, Barr MS, Perrin JM. The medical home and integrated behavioral health: advancing the policy agenda. *Pediatrics*. 2015; 135(5):909–917. [PubMed: 25869375]
23. Baird M, Blount A, Brungardt S, et al. The development of joint principles: integrating behavioral health care into the patient-centered medical home. *Ann Fam Med*. 2014; 12(2):183–183.
24. Hall J, Cohen DJ, Davis M, et al. Preparing the workforce for behavioral health and primary care integration. *J Am Board Fam Pract*. 2015; 28:S41–S51.
25. Asch DA, Jedrzewski MK, Christakis NA. Response rates to mail surveys published in medical journals. *J Clin Epidemiol*. 1997; 50(10):1129–1136. [PubMed: 9368521]
26. Cummings SM, Savitz LA, Konrad TR. Reported response rates to mailed physician questionnaires. *Health Serv Res*. 2001; 35(6):1347. [PubMed: 11221823]
27. Cull WL, O'Connor KG, Sharp S, Tang SS. Response rates and response bias for 50 surveys of pediatricians. *Health Serv Res*. 2005; 40(1):213–226. [PubMed: 15663710]
28. Groves RM, Presser S, Dipko S. The role of topic interest in survey participation decisions. *Public Opin Quart*. 2004; 68(1):2–31.

What's New

On-site MHPs are increasing. The discipline of on-site MHPs affects pediatricians' co-management of MH problems among pediatricians who do some co-managing, but, overall, on-site MHPs aren't related to co-management or to pediatricians' identification, treat/management or referral of MH problems.

Author Manuscript

Author Manuscript

Author Manuscript

Author Manuscript

Table 1

Physician and Practice Characteristics For the Analytic Sample and Bivariate Associations with On-site MHPs

	Analytic Sample (n=321)	On-site MHPs		p-val
		No (n=209)	Yes (n=112)	
Physician Characteristics				
Sex				
Female	67.6	68.7	65.5	.57
Male	32.4	31.3	34.5	
Age, y; weighted mean (SE)	46.3 (0.6)	47.0 (0.8)	45.1 (1.1)	.17
Years in practice				
<5	20.4	16.4	27.6	.12
5–9	15.9	16.0	15.7	
10–19	30.7	32.0	28.5	
20	33.0	35.6	28.2	
Race/Ethnicity				
Caucasian	74.8	76.0	72.7	.45
Asian	11.8	12.4	10.7	
Other	13.4	11.6	16.6	
Residency/fellowship training in child MH				
< 4 weeks residency rotation in DBP	46.6	50.6	39.3	.05
4 weeks residency rotation in DBP and/or fellowship in child MH	53.4	49.4	60.7	
Practice Characteristics				
Location of practice				
Urban	39.3	29.4	57.3	<.001
Suburban	49.7	59.0	32.7	
Rural	11.0	11.6	10.0	
Type of practice				
1 or 2 physician	9.3	12.7	3.2	<.001
Pediatric group practice	51.5	64.8	27.3	
Multispecialty group	12.3	13.6	10.0	
Medical School/University	7.7	2.1	17.9	
Other *	19.2	6.8	41.6	
Ambulatory visits per week				
< 100	64.8	55.9	80.9	<.001
100	35.2	44.1	19.1	
75% patients are Caucasian				
No	77.7	73.0	86.0	.009
Yes	22.3	27.0	14.0	
Patient insurance				
<80% have private insurance	61.3	54.5	73.6	<.001
80% have private insurance	25.1	33.0	10.7	
Unknown	13.6	12.5	15.7	

Weighted column % shown for categorical variables; weighted mean (SE) shown for continuous measures

* Other type of practices includes HMO (staff model), non-government hospital or clinic, government hospital or clinic, non-profit community health center

Author Manuscript

Author Manuscript

Author Manuscript

Author Manuscript

Table 2

Multivariable Regression Results Examining Physician and Practice Characteristics Associated with the Odds of On-site MHPs

	aOR	95% CI	p-value
Physician Sex			.02
Female		-reference-	
Male	2.24	1.11, 4.53	
Type of Practice			<.001
One or two pediatricians		-reference-	
Pediatric group	1.89	0.60, 5.92	
Multi-specialty group	2.97	0.80, 11.06	
Medical school/university	14.35	2.91, 70.89	
Other (HMO, government, etc.)	24.38	6.64, 89.54	
Interaction: Area & Ambulatory Visits Per Week			.02
Urban: <100 vs. 100+ ambulatory visits	10.59	1.86, 60.21	
Suburban: <100 vs. 100+ ambulatory visits	1.51	0.64, 3.55	
Rural: <100 vs. 100+ ambulatory visits	0.29	0.05, 1.73	
<100 ambulatory visits: urban vs. suburban	3.07	1.24, 7.61	
<100 ambulatory visits: urban vs. rural	6.02	1.63, 22.22	
<100 ambulatory visits: suburban vs. rural	1.96	0.51, 7.58	
100+ ambulatory visits: urban vs. suburban	0.44	0.07, 2.62	
100+ ambulatory visits: urban vs. rural	0.16	0.02, 1.39	
100+ ambulatory visits: suburban vs. rural	0.37	0.08, 1.77	
Interaction: Area and Private Insurance*			<.001
Urban: < 80% private insurance/unknown vs. 80% private insurance	8.96	1.63, 49.34	
Suburban: < 80% private insurance/unknown vs. 80% private insurance	1.41	0.61, 3.22	
< 80% private insurance/unknown urban vs. suburban	0.44	0.07, 2.62	
80% private insurance: urban vs. suburban	0.07	0.01, 0.76	

* Post-hoc pairwise comparisons were limited to urban and suburban practices as there were only n=3 pediatricians who worked in rural areas and reported 80% of patients had private insurance, and none of them reported on-site child/adolescent MH providers

Table 3

Percentage of Patients with MH Problems Pediatricians Co-managed in the Past 12 Months and Bivariate Associations with On-site MHPs

	Analytic Sample (n=311)*	On-site MHPs		p-value
		No (n=201)	Yes (n=110)	
Percentage of Patients Co-managed MH Problems in the Past 12 Months				
0%	9.7	9.1	10.7	.33
1–24%	36.9	40.1	31.2	
25–49%	20.6	21.8	18.5	
50–74%	17.3	14.9	21.7	
75%	15.5	14.1	17.9	

Weighted column % shown

* Note: missing data for n=10 pediatricians.

Table 4

Co-management with Specific MHPs and Whether those MHPs are On-site for the Analytic Sample ($n=311$) and Among The Subset of Pediatricians Who Reported Co-managing Patients with MH Problems in the Past 12 Months ($n=281$)

Co-management: Type of MHP	Analytic Sample ($n=311$)*			Subset of Pediatricians Who Reported Co-managing MH Problems ($n=281$)**				
	Overall	MHP is not On-site	MHP is On-site	p-val	Overall	MHP is not On-site	MHP is On-site	p-val
Child psychiatrists								
No	22.9	23.5	18.9	.52	14.7	16.3	2.4	.02
Yes	77.1	76.5	81.1		85.3	83.7	97.6	
Child psychologists								
No	21.4	21.2	22.6	.83	13.0	13.5	9.9	.53
Yes	78.6	78.8	77.4		87.0	86.5	90.1	
Developmental-behavioral pediatricians								
No	39.3	38.3	50.1	.24	32.8	32.0	41.4	.37
Yes	60.7	61.7	49.9		67.2	68.0	58.6	
Developmental services provider								
No	40.1	39.9	41.9	.85	33.6	33.9	30.4	.76
Yes	59.9	60.1	58.1		66.4	66.1	69.6	
Substance abuse counseling								
No	90.7	91.7	80.6	.06	89.8	90.9	77.5	.04
Yes	9.3	8.3	19.4		10.2	9.1	22.5	
Social workers								
No	60.3	70.6	32.3	<.001	56.3	67.7	25.1	<.001
Yes	39.7	29.4	67.7		43.7	32.3	74.9	

Weighted column % shown.

* $n=10$ pediatricians did not answer the co-management question.

** $n=30$ pediatricians reported that they did not co-manage any patients with MH problems in the past 12 months.

Table 5

Bivariate Associations of Usually Identifying, Treating/Managing/Co-managing and Referring for Child MH Conditions and On-site MHPs

	Analytic Sample (n=321)	On-site MHPs		p-value
		No (n=209)	Yes (n=112)	
ADHD				
Usually inquire/screen				
No	23.8	22.9	25.2	.67
Yes	76.2	77.1	74.8	
Usually treat/manage/co-manage				
No	25.0	22.2	29.9	.14
Yes	75.0	77.8	70.1	
Usually refer				
No	81.3	82.1	79.8	.62
Yes	18.7	17.9	20.2	
Child/Adolescent Depression				
Usually inquire/screen				
No	32.3	34.7	28.0	.24
Yes	67.7	65.3	72.0	
Usually treat/manage/co-manage				
No	72.9	71.6	75.1	.51
Yes	27.1	28.4	24.9	
Usually refer				
No	27.2	29.4	23.1	.25
Yes	72.8	70.6	76.9	
Anxiety Disorders				
Usually inquire/screen				
No	52.2	52.0	52.6	.92
Yes	47.8	48.0	47.4	
Usually treat/manage/co-manage				
No	78.5	75.6	83.9	.10
Yes	21.5	24.4	16.1	
Usually refer				
No	41.9	40.0	45.4	.38
Yes	58.1	60.0	54.6	
Behavior Management Problems				
Usually inquire/screen				
No	42.0	40.6	44.6	.50
Yes	58.0	59.4	55.4	
Usually treat/manage/co-manage				
No	78.9	79.3	78.1	.81

	Analytic Sample (n=321)	On-site MHPs		p-value
		No (n=209)	Yes (n=112)	
Yes	21.1	20.7	21.9	
Usually refer				
No	31.6	32.4	30.0	.68
Yes	68.4	67.6	70.0	
<hr/>				
Learning Disabilities				
Usually inquire/screen				
No	38.7	39.7	36.9	.63
Yes	61.3	60.3	63.1	
Usually treat/manage/co-manage				
No	79.6	80.6	77.8	.56
Yes	20.4	19.4	22.2	
Usually refer				
No	32.3	29.1	38.3	.11
Yes	67.7	70.9	61.7	

Weighted column % shown

Author Manuscript

Author Manuscript

Author Manuscript

Author Manuscript