Published in final edited form as:

J Dev Behav Pediatr. 2016 ; 37(2): 113–120. doi:10.1097/DBP.0000000000000255.

Identifying Maternal Depression in Pediatric Primary Care: Changes over a Decade

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

¹Nathan Kline Institute of Psychiatric Research, Orangeburg, NY

²Statistical Research Consultants, LLC, Schaumburg, IL

³Department of Child and Adolescent Psychiatry, New York University School of Medicine, New York, NY

⁴Albert Einstein College of Medicine/Children's Hospital at Montefiore, New York, NY

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

⁶University of California at Los Angeles, Los Angeles, CA

⁷American Academy of Pediatrics, Elk Grove Village, IL

⁸New York State Office of Mental Health, Albany, NY

Abstract

Objective—Maternal depression affects 10%-40% of mothers with young children and has negative consequences for children's health and development. The American Academy of Pediatrics (AAP) recommends that pediatricians identify women with maternal depression. We examined trends in inquiring about (asking informal questions) or screening for (using a standardized instrument) maternal depression by pediatricians in 2004 and 2013, and identified correlates of usually inquiring/screening to identify maternal depression.

Methods—Data were ascertained from 778 non-trainee pediatricians exclusively practicing general pediatrics who completed the 2004 (n=457) and 2013 (n=321) AAP Periodic Surveys. Pediatricians answered questions about physician and practice characteristics, training, attitudes, and inquiring/screening to identify maternal depression. Sample weights were used to reduce non-response bias. Weighted descriptive and logistic regression analyses were conducted.

Results—The prevalence of usually inquiring/screening to identify maternal depression increased from 33% to 44% ($p<.01$). In both years, pediatricians who usually inquired about child/adolescent depression had increased odds of usually inquiring/screening to identify maternal

Address Correspondence to: Dr. Bonnie Kerker, Department of Child and Adolescent Psychiatry, New York University School of Medicine, 1 Park Avenue, 7th Floor, New York, NY 10016, [Bonnie.Kerker@nyumc.org], Telephone: 646-754-5087, Fax: 646 754 5210.

Financial Disclosure: None

Conflict of Interest: No other conflicts of interests have been declared.

depression. Patient race/ethnicity and training in adult DSM diagnostic criteria for depression were associated with inquiring/screening in 2004, and believing that family screening is within the scope of the pediatrician was associated with inquiring/screening in 2013.

Conclusion—Although inquiring/screening about maternal depression has increased since 2004, less than half of pediatricians usually screen or inquire about maternal depression, representing a missed opportunity to identify depression and manage or refer women for treatment. Further training on the importance of mental and family health to children's health may increase identification of maternal depression in pediatric primary care.

Introduction

Depression affects approximately 10%-40% of mothers with young children,^{1,2,3,4,5} and can have negative consequences for women and their children.^{6,7} Mothers who are depressed, particularly if the depression is chronic, report feeling less attached to and more negatively towards their children,^{7,8,9,1} and insecure attachment has been linked to less supportive and more hostile parenting.¹¹

Depression has been shown to impact caregiving activities such as reducing the length of breastfeeding³ and increasing the likelihood of placing infants to sleep in the prone position,^{12,13} as well as other unhealthy acts.^{12,13} Infants whose mothers have depressive symptoms also have been shown to have an increased use of emergency department care, and a decreased use of preventive services.¹⁴ In addition, some evidence exists linking maternal depression to poor cognitive outcomes in children,^{15,16,17} and many studies have found maternal depression to be associated with internalizing and externalizing problems in children and adolescents.^{18,19} Animal studies (rat and nonhuman primates) and observations in humans have consistently shown that disturbances in mother-child interactions, even when within the range of normal interactions, produce differential responsivity to stress within and among various brain regions, including those involved in executive functions critical for working memory and behavioral inhibition, important for academic achievement and social functioning.^{20,21,22,23,24,25} Fortunately, once depressed mothers are treated, negative consequences for their children often decrease.^{26,27}

Maternal depression is difficult to identify and treat because women with mental health (MH) issues often do not access routine healthcare for themselves.²⁸ However, most parents report that infants do receive well-child visits,²⁹ and the American Academy of Pediatrics (AAP) recommends 7 well-child visits for children during the first year of life.³⁰ As a result of these healthcare utilization patterns and the impact of maternal depression on children, pediatricians' offices are a promising venue for identifying and managing maternal depression.^{2,31,32} Although some research suggested this in the early 2000's,² it wasn't until later in the decade that the AAP formally encouraged pediatricians to identify maternal depression.³³

The AAP conducts Periodic Surveys (PS) of its members, providing an opportunity to understand whether the increase in attention to maternal depression has had an impact on pediatric practice. Analyses of data from a 2004 PS identified characteristics of pediatricians and their practices that were associated with the identification and management of mothers

with depression.³⁴ Heneghan et al. found that attitudes about maternal depression and its effects on children, practices used to address maternal depression, and the provision of child/adolescent MH services were positively associated with self-reported identification and management.³⁴ An AAP PS in 2013 included questions that were the same as or similar to the 2004 survey. The goals of this study were to: 1) examine changes in the prevalence of inquiring about and/or screening for maternal depression among pediatricians exclusively practicing general pediatrics in 2004 and 2013; and 2) examine associations of sociodemographic characteristics, practice characteristics, and attitudes/beliefs with inquiring about and/or screening for maternal depression in each year.

Methods

Survey Administration

The AAP has conducted a PS of pediatricians 3 or 4 times each year since 1987 to obtain information on current pediatric topics to inform policy, to develop new initiatives, and/or to evaluate current projects. Approximately 1600 US non-retired AAP members were randomly selected and asked to complete the PS (1,600 of 50,818 in 2004; 1,617 of 54,491 in 2013). Each PS contained largely closed-ended questions, asking about sociodemographic and practice characteristics, and included questions about attitudes, training, and behaviors about child/adolescent and maternal MH. The questionnaires were pretested and approved by the AAP institutional review board before the mailings. Data collection occurred between March and August of 2004 for the PS59 survey and between July and December 2013 for the PS85 survey. Our sample included non-trainee members who exclusively engaged in direct general pediatric patient care and completed the questions about identifying, referring, and treating maternal depression. Information about the survey is available at www.aap.org/en-us/professional-resources/Research/pediatrician-surveys/Pages/Periodic-Survey-of-Fellows.aspx.

Sample weights

Overall, 832 AAP members responded in 2004 (52%) and 594 in 2013 (37%). Despite these sub-optimal response rates, the random samples selected for participation in both surveys were similar to the full AAP membership with respect to age, sex, geographic region and membership status. Respondents in both years were slightly older than non-respondents; in 2004, respondents were more likely to be female and to be Fellows. Sample weights were created to reduce potential bias and ensure that the respondents were representative of the AAP membership.

The sample weights for the 2004 survey have been described elsewhere.⁴ Briefly, for both surveys, saturated logistic regression models, with age and sex as predictors in 2004 and age, sex, and region in 2013, were used to estimate the probability of response. In 2004, sample weights were created by taking the inverse of the probability of responding to the survey. In 2013, 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. For both surveys, the sample weights were rescaled such that the mean was unity and the sum was equal to the analytic sample size.

Exposure variables

Variables available in both the 2004 and 2013 surveys were included in this analysis. Sociodemographic factors included providers' race/ethnicity, sex and age; practice characteristics included number of years in practice, type of practice, number of ambulatory visits per week, and patient characteristics (e.g., race/ethnicity, insurance). Providers were asked how often they inquire (usually, sometimes, never) about 7 common child/adolescent MH conditions, including depression. In addition, providers were asked if they had received residency or fellowship training in adult MH, including interviewing techniques, DSM diagnostic criteria for depression, strategies for managing/treating depression, and dosing with antidepressants. Providers also reported availability of adult psychiatrists/psychologists within their practice community (very, somewhat, not at all).

To ascertain pediatricians' overall attitude toward psychosocial issues, in the 2013 survey, clinicians were asked to rate their level of agreement with the following statement using a 5-point Likert scale: "Screening for social emotional risk factors within the family (e.g., parental depression or substance abuse, domestic violence, etc.) are beyond the scope of the pediatric medical home." Those who responded strongly agree or agree were compared to those who responded in the other 3 categories. In 2004, responsibility for identifying maternal depression, substance abuse, and domestic violence were asked in separate questions on 3-point Likert scales (agree, neutral, disagree). Pediatricians who did not agree that pediatricians should be responsible for identifying any of the 3 conditions were coded as agreeing that screening for these conditions is beyond the scope of the pediatric medical home.

Outcome variable

Providers were asked how often they inquired about maternal depression and how often they used a screening tool to identify maternal depression (usually, sometimes, never). In 2004, providers were asked how often they inquire about depressive symptoms/contributing factors as part of routine discussion to identify depression in mothers; a separate question asked how often they use a screening instrument or checklist to identify maternal depression. In 2013, providers were asked how often they inquire about and how often they screen for a list of conditions, including maternal depression (see text box below). Providers who answered "usually" to either the inquiry or screening question were coded as usually inquiring or screening to identify maternal depression. The outcome measure for this study was usually vs. sometimes or never inquire or screen for maternal depression.

Outcome variable wording on PS 59 and PS 85

Outcome Variable	PS 59 (2004)	PS 85 (2013)
Inquire/screen about maternal depression	<p>How often do you use the following methods to identify depression in mothers: (Usually, sometimes, never)</p> <ul style="list-style-type: none"> Inquire about symptoms/ contributing factors as part of routine discussion 	<p>In your practice, how frequently do you inquire about, screen for, treat/co-manage and refer each of these problems/conditions (Usually, sometimes, never) [<i>separate check-offs for inquire and screen</i>].</p> <ul style="list-style-type: none"> Maternal depression

- Screening instrument or checklist

Statistical Analysis

Descriptive analyses were summarized using weighted proportions for categorical measures and weighted means and standard errors for continuous measures. Bivariate comparisons within and between survey years were assessed using the Rao-Scott Chi-square test and weighted linear regression. A series of weighted multivariable logistic regression models adjusted for physician/practice characteristics (physician age, sex, and race/ethnicity; type of practice; number of ambulatory visits per week; patient insurance; and patient race/ethnicity) were used to examine associations with usually inquiring or screening to identify maternal depression. First, models were stratified by survey year. Second, both survey years were combined and main effects models were fitted. As there was very little missing data (<5%) on the variables of interest, missing data were excluded from the regression analyses. The results are summarized using adjusted odds ratios (OR) and 95% confidence intervals, and statistical significance was set at $p<.05$. All analyses were performed in SAS 9.3 (SAS Institute, Cary, NC).

Results

Of the respondents, 457 (2004) and 321 (2013) non-trainee members who exclusively engaged in direct general pediatric patient care and completed the questions about identifying, referring, and treating maternal depression were included in these analyses. The prevalence of usually inquiring or screening to identify maternal depression increased from 2004 to 2013 from 33% to 44% ($p<.01$). While the prevalence of usually inquiring went up from 30% to 41% ($p<.01$), the prevalence of usually screening increased 5-fold, from 5% to 26% ($p<.0001$).

Physician and practice characteristics in each year and bivariate associations with usually inquiring/screening to identify maternal depression are shown in Table 1. Mental health training, attitudes and beliefs are shown in Table 2. Overall, there was an increase over time in the proportion of respondents trained in adult diagnostic criteria for depression (9.9% to 15.3%, $p=.02$) or adult dosing with antidepressants (4.8% to 8.8%, $p=.03$), but in 2013 the proportion endorsing training in these areas was still quite low. About half of pediatricians reported usually inquiring about child/adolescent depression.

No physician characteristics in 2004 or 2013 were associated with usually inquiring or screening for maternal depression (Table 1). In 2004, the prevalence of physicians reporting usually inquiring or screening for maternal depression was greater among practitioners with a predominantly Caucasian patient population. Further, in 2004, training in adult MH was positively associated with usually inquiring about or screening for maternal depression. In 2013, no practice characteristics or training factors were associated with usually inquiring or screening (Table 2).

Bivariate analyses showed that in both 2004 and 2013, providers who believed family screening was within the pediatrician's responsibility more likely to usually inquire/screen to

identify maternal depression (Table 2). Similarly, in both years, compared to pediatricians who do not usually inquire about child/adolescent depression, pediatricians who usually inquire about child/adolescent depression were more likely to usually inquire/screen to identify maternal depression.

The results of the weighted logistic regression model for 2004 showed that after adjusting for physician and practice characteristics, pediatricians who usually inquire about child/adolescent depression compared to those sometimes or never inquire had 2.3-fold increased odds of usually inquiring/screening for maternal depression (Table 3, Model 1).

Additionally, physicians who were trained in DSM diagnostic criteria for adult depression had 3.5-fold increased odds of usually inquiring/screening for maternal depression.

Pediatricians with predominantly Caucasian patients had nearly 2-fold increased odds of usually inquiring/screening for maternal depression. No other physician or practice characteristics were significantly associated with the outcome in this model. In 2013, pediatricians who usually inquire about child/adolescent depression had 4.3-fold increased odds of usually inquiring/screening for maternal depression (Table 3, Model 2).

Additionally, those who disagreed that family screening was beyond the scope of the pediatrician had 2.5-fold increased odds of usually inquiring/screening for maternal depression. No physician or practice characteristics were significantly associated with the outcome in this model. Results from the regression model that included both survey years showed that after adjusting for changes in physician/practice characteristics, the odds of usually inquiring/screening for maternal depression was significantly higher in 2013 compared to 2004 (OR=1.95, 95% CI: 1.38, 2.76) (results not shown).

Discussion

In this study of a nationally representative sample of pediatricians, we found that fewer than half of providers indicated usually attempting to identify maternal depression, despite a five-fold increase in screening from 2004 to 2013. Given the extensive literature on the association between maternal depression and poor child outcomes,⁷⁻²⁵ and the frequency with which mothers see pediatricians, this represents a missed opportunity to identify depression and either manage or refer women for treatment.

The increase over time in inquiring/screening for maternal depression was not accounted for by changing physician or practice characteristics. This pattern is consistent with other parts of pediatric care, where using standardized screening tools has become more common over time.^{35,36} This trend is important, as the US Preventive Task Force has suggested that formal screening improves the detection of depressed patients in primary care settings.³⁷ One study found that pediatricians recognize only 29% of mothers with high levels of depressive symptoms when relying solely on clinical indicators.³⁸ And, Chaudron and colleagues (2004) found that implementing a systematic screening led to a statistically significant increase in the detection of depressive symptoms during the first postpartum year.² More importantly, if combined with system changes, formalized screening protocols have been shown to lead to improved patient outcomes.^{39,40}

There is much debate about whether maternal depression screening can be effectively done in pediatric practices, but several studies have shown that implementing universal maternal depression screening in busy pediatric practices is possible.^{2,41} In fact, recent research suggests that both professionals and women are willing to discuss MH topics at pediatric visits,^{42,43} and Olson and colleagues (2006) showed that adding maternal depression screening into pediatric practice is feasible.⁴¹

When we examined the factors that were associated with inquiring about or screening for maternal depression in each year, we found that in both 2004 and 2013, providers who usually inquired about child/adolescent depression were more likely to usually inquire or screen women to identify maternal depression. This suggests that providers who see the importance of their patients' MH and are more comfortable addressing depression may be more likely to attempt to identify MH issues among their patients' mothers as well.

Year-specific models also showed differences that were not explained by physician or practice characteristics. In 2013, but not in 2004, believing that social emotional familial factors were the pediatrician's responsibility was positively associated with providers' attempts to identify maternal depression. Providers who see the connection between family life and children's health may be more likely to attempt to identify maternal depression. Interestingly, about 80% of providers in each year reported believing that socio-emotional familial factors were their responsibility, which is similar to the findings reported by Olson and colleagues (2002), that 84% of pediatricians reported feeling responsible for detecting domestic violence.⁴⁴ Notably, although high, the perception of responsibility does not seem to have changed over the past decade, despite an increase in evidence of the importance of family health to children. Given the strength of the evidence showing the impact of social factors on children's health and developmental outcomes,⁴⁵ the inclusion of family functioning factors, such as parental mental health, in the scope of pediatric care is essential to attending to children's overall health.

In 2004, but not in 2013, providers who were trained in adult DSM diagnoses had a 3.5-fold increase in the odds of usually inquiring about and screening for maternal depression. This is consistent with Olson and colleagues' study (2002), which found that 44% of pediatricians surveyed identified incomplete knowledge of diagnostic criteria as a barrier to diagnose or intervene in maternal or postpartum depression.⁴⁴ Training in adult DSM diagnoses was not associated with inquiring or screening for maternal depression among pediatricians surveyed in 2013. Even though the prevalence of training in adult DSM criteria for depression increased between 2004 and 2013, it was very low (15%). This may suggest that even providers who were not specifically trained in DSM felt more comfortable talking about maternal depression in 2013 than in 2004.

The fact that, in 2004, providers with a majority of Caucasian patients had nearly twice the odds of usually inquiring about or screening for maternal depression is unfortunate, given that at least one study has shown that women of minority racial backgrounds may be more likely to self-report maternal depression.⁴ The proportion of patients who were Caucasian was not associated with inquiring or screening in 2013, and the proportion of practices with a high percentage of Caucasian patients decreased over time.

These data are not without limitations. Both surveys have suboptimal response rates although they are not unusual for surveys of physicians, for whom response rates have declined over time.^{46,47} Extensive analysis of response bias in AAP surveys, including periodic surveys, has shown little non response bias.⁴⁶ Further, in our data, the random samples were similar to AAP members, and we found only a few small differences between respondents and non-respondents. Nonetheless, both surveys were weighted for non-response. However, it is unlikely that all of the non-response bias was eliminated and it is likely that those pediatricians interested in the topic were most likely to respond.⁴⁸ Additionally, there is the possibility of social desirability bias. If non-response or social desirability bias were present, we anticipate that our findings would overestimate the prevalence of physicians who usually inquire about or screen for maternal depression. Further, although most pediatricians belong to the AAP, AAP members may differ from AAP non-members, so these data may not be generalizable to all pediatricians. These data are cross sectional and therefore the reported associations do not imply causality. Lastly, although many of the questions in the 2004 and 2013 surveys were identical, some had slight wording differences that could have influenced pediatricians' response choices. However, since the wording is very similar, we are confident that the concepts being asked about in each survey are the same and that no major bias was introduced as a result of these differences.

This national survey of pediatric providers suggests that although inquiry about and screening for maternal depression in pediatric practices has increased, incorporating questions about maternal depression into pediatric practices is still rare: fewer than half of providers did so in 2013. Providers who inquire about their patients' MH, and who believe that family health is within the scope of their practice are the most likely to try to identify maternal depression, suggesting that an emphasis on child MH and family health in pediatric training might improve the identification of maternal depression. Further, pediatric training that highlights the importance of family health for the health of the child would benefit children. Without a concerted effort to identify of maternal depression, pediatric primary care will continue to be a missed opportunity to intervene early and to improve children's well-being.

Acknowledgments

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

References

1. Heneghan AM, Johnson Silver E, Bauman LJ, et al. Depressive symptoms in inner-city mothers of young children: Who is at risk? *Pediatrics*. 1998; 102(6):1394–1400. DOI: 10.1542/peds.102.6.1394 [PubMed: 9832575]
2. Chaudron LH, Szilagyi PG, Kitzman HJ, et al. Detection of postpartum depressive symptoms by screening at well-child visits. *Pediatrics*. 2004; 113(3):551–558. <http://pediatrics.aappublications.org/content/113/3/551.long>. [PubMed: 14993549]
3. Field T. Postpartum depression effects on early interactions, parenting, and safety practices: A review. *Infant Behav Dev*. 2010; 33(1):1–6. DOI: 10.1016/j.infbeh.2009.10.005 [PubMed: 19962196]

4. Horwitz SM, Briggs-Gowan MJ, Storfer-Isser A, et al. Prevalence, correlates, and persistence of maternal depression. *J Womens Health (Larchmt)*. 2007; 16(5):678–691. DOI: 10.1089/jwh.2006.0185 [PubMed: 17627403]
5. Josefsson A, Berg G, Nordin C, et al. Prevalence of depressive symptoms in late pregnancy and postpartum. *Acta Obstet Gynecol Scand*. 2001; 80:251–255. [PubMed: 11207491]
6. Penninx BWJH, Milaneschi Y, Lamers F, et al. Understanding the somatic consequences of depression: biological mechanisms and the role of depression symptom profile. *BMC Medicine*. 2013; 11:129, 1–14. DOI: 10.1186/1741-7015-11-129 [PubMed: 23672628]
7. Murray, L., Halligan, S., Cooper, P. Effects of postnatal depression on mother-infant interactions and child development. In: Bremner, JG., Wachs, TD., editors. *The Wiley-Blackwell Handbook of Infant Development*, Volume 2. 2. Oxford, UK: Wiley-Blackwell; 2010. p. 193-220.
8. Wan MW, Green J. The impact of maternal psychopathology on child-mother attachment. *Arch Womens Ment Health*. 2009; 12:123–134. DOI: 10.1007/s00737-009-0066-5 [PubMed: 19337701]
9. Carter AS, Garrity-Rokous E, Chazan-Cohen, et al. Maternal depression and comorbidity: Predicting early parenting, attachment security, and toddler social-emotional problems and competencies. *J Am Acad Child Adolesc Psychiatry*. 2001; 40(1):18–26. [PubMed: 11195555]
10. Lovejoy MC, Graczyk PA, O'Hare, et al. Maternal depression and parenting behavior; A meta-analytic review. *Clin Psychol Rev*. 2000; 20(5):561–592. DOI: 10.1016/S0272-7358(98)00100-7 [PubMed: 10860167]
11. Bosquet M, Egeland B. Associations among maternal depressive symptomatology, state of mind and parent and child behaviors: Implications for attachment-based interventions. *Attach Hum Dev*. 2001; 3(2):173–199. DOI: 10.1080/14616730010058007 [PubMed: 11708736]
12. McLearn KT, Minkovitz CS, Strobino DM, et al. Maternal depressive symptoms at 2 to 4 months post partum and early parenting practices. *Arch Pediatr Adolesc Med*. 2006; 160(3):279–284. DOI: 10.1001/archpedi.160.3.279 [PubMed: 16520447]
13. McLearn KT, Minkovitz CS, Strobino DM, et al. The timing of maternal depressive symptoms and mothers' parenting practices with young children: Implications for pediatric practice. *Pediatrics*. 2006; 118(1):e174–e182. DOI: 10.1542/peds.2005-1551 [PubMed: 16818531]
14. Minkovitz CS, Strobino D, Scharfstein D, et al. Maternal depressive symptoms and children's receipt of health care in the first 3 years of life. *Pediatrics*. 2005; 115(2):306–314. DOI: 10.1542/peds.2004-0341 [PubMed: 15687437]
15. Milgrom J, Westley DT, Gemmill AW. The mediating role of maternal responsiveness in some longer term effects of postnatal depression on infant development. *Infant Behav Dev*. 2004; 27(4): 443–454. DOI: 10.1016/j.infbeh.2004.03.003
16. Petterson SM, Albers AB. Effects of poverty and maternal depression on early child development. *Child Dev*. 2001; 72(6):1794–1813. DOI: 10.1111/1467-8624.00379 [PubMed: 11768146]
17. Brennan PA, Hammen C, Andersen MJ, et al. Chronicity, severity, and timing of maternal depressive symptoms: relationships with child outcomes at age 5. *Dev Psychol*. 2000; 36(6):759–766. DOI: 10.1037//0012-1649.36.6.759 [PubMed: 11081699]
18. Bagner DM, Pettit JW, Lewinsohn PM, et al. Effect of maternal depression on child behavior: A sensitive period? *J Am Acad Child Psy*. 2010; 49(7):699–707. DOI: 10.1016/j.jaac.2010.03.012
19. Murray L, Arteche A, Fearon P, et al. Maternal postnatal depression and the development of depression in offspring up to 16 years of age. *J Am Acad Child Psy*. 2011; 50(5):460–470. DOI: 10.1016/j.jaac.2011.02.001
20. De Bellis MD. The psychobiology of neglect. *Child Maltreat*. 2005; 10(2):150–172. DOI: 10.1177/1077559505275116 [PubMed: 15798010]
21. Hagele DM. The impact of maltreatment on the developing child. *N C Med J*. 2005; 66(5):356–359. [PubMed: 16323582]
22. Francis DD, Meaney MJ. Maternal care and the development of stress responses. *Curr Opin Neurobiol*. 1999; 9(1):128–134. DOI: 10.1016/S0959-4388(99)80016-6 [PubMed: 10072372]
23. Hane AA, Fox NA. Ordinary variations in maternal caregiving influence human infants' stress reactivity. *Psychol Sci*. 2006; 17(6):550–556. DOI: 10.1111/j.1467-9280.2006.01742.x [PubMed: 16771807]

24. McEwen BS. Understanding the potency of stressful early life experiences on brain and body function. *Metabolism*. 2008; 57(Suppl 2):S11–S15. DOI: 10.1016/j.metabol.2008.07.006 [PubMed: 18803958]
25. Luby JL, Barch DM, Belden A, et al. Maternal support in early childhood predict larger hippocampal volumes at school age. *Proc Natl Acad Sci USA*. 2012; 109(8):2854–2859. DOI: 10.1073/pnas.1118003109 [PubMed: 22308421]
26. Field T, Pickens J, Prodromidis M, et al. Targeting adolescent mothers with depressive symptoms for early intervention. *Adolescence*. 2000; 35(138):381–414. [PubMed: 11019779]
27. Pilowsky DJ, Wickramaratne P, Poh E, et al. Psychopathology and functioning among children of treated depressed mothers and fathers. *J Affect Disord*. 2014; 164:107–111. DOI: 10.1016/j.jad.2014.04.012 [PubMed: 24856562]
28. Sherbourne CD, Dwight-Johnson M, Klap R. Psychological distress, unmet need, and barriers to mental health care for women. *Womens Health Issues*. 2001; 11(3):231–243. DOI: 10.1016/S1049-3867(01)00086-X [PubMed: 11336863]
29. Selden TM. Compliance with well-child visit recommendations: Evidence from the medical expenditure panel survey, 2000–2002. *Pediatrics*. 2006; 118(6):e1766–1778. DOI: 10.1542/peds.2006-0286 [PubMed: 17142499]
30. Hagan, JF, Shaw, JS., Duncan, PM., editors. *Bright Futures Guidelines for Health Supervision of Infants, Children and Adolescents*. 3. Elk Grove Village, IL: American Academy of Pediatrics; 2008. Recommendations for Preventive Pediatric Health Care.
31. National Quality Forum. *Safe Practices for Better Healthcare – 2009 Update: A Consensus Report*. Washington, DC: NQF; 2009.
32. National Quality Forum. *Safe Practices for Better Healthcare – 2010 Update: A Consensus Report*. Washington, DC: NQF; 2010.
33. Earls MF, The Committee on Psychosocial Aspects of Child and Family Health. Incorporating recognition and management of perinatal and postpartum depression into pediatric practice. *Pediatrics*. 2010; 126(5):1032–1039. DOI: 10.1542/peds.2010-2348 [PubMed: 20974776]
34. Heneghan AM, Chaudron LH, Storfer-Isser A, et al. Factors associated with identification and management of maternal depression by pediatricians. *Pediatrics*. 2007; 119(3):444–454. DOI: 10.1542/peds.2006-0765 [PubMed: 17332196]
35. Radecki L, Sand-Loud N, O'Connor KG, et al. Trends in the use of standardized tools for developmental screening in early childhood: 2002–2009. *Pediatrics*. 2011; 128(1):14–19. DOI: 10.1542/peds.2010-2180 [PubMed: 21708798]
36. Committee on Children With Disabilities. Developmental surveillance and screening of infants and young children. *Pediatrics*. 2001; 108(1):192–196. DOI: 10.1542/peds.108.1.192 [PubMed: 11433077]
37. U.S. Preventive Services Task Force. Screening for depression: recommendations and rationale. *Am Fam Physician*. 2002; 66(4):647–650. <http://www.aafp.org/afp/2002/0815/p647.html>. [PubMed: 12201560]
38. Heneghan AM, Johnson Silver E, Bauman LJ, et al. Do pediatricians recognize mothers with depressive symptoms? *Pediatrics*. 2000; 106(6):1367–1373. DOI: 10.1542/peds.106.6.1367 [PubMed: 11099590]
39. Pignone MP, Gaynes BN, Euston JL, et al. Screening for depression in adults: A summary of the evidence for the U.S. Preventive Services Task Force. *Ann Intern Med*. 2002; 136(10):765–76. <http://web.b.ebscohost.com/ehost/pdfviewer/pdfviewer?sid=1fe0b72e-1e0e-4d0f-af72-0d77a55b50ea%40sessionmgr115&vid=1&hid=105>. [PubMed: 12020146]
40. Gilbody S, Whitty P, Grimshaw J, et al. Educational and organizational interventions to improve the management of depression in primary care. *JAMA*. 2003; 289(23):3145–3151. DOI: 10.1001/jama.289.23.3145 [PubMed: 12813120]
41. Olson, AI, Dietrich, AJ., Prazar, G., et al. Brief maternal depression screening at well-child visits. *Pediatrics*. 2006; 118(1):207–216. DOI: 10.1542/peds.2005-2346 [PubMed: 16818567]
42. Walker EA, Gelfrand A, Katon WJ, et al. Adult health status of women with histories of childhood abuse and neglect. *Am J Med*. 1999; 107(4):332–339. DOI: 10.1016/S0002-9343(99)00235-1 [PubMed: 10527034]

43. Pereira AT, Soares MJ, Bos S, et al. Why should we screen for perinatal depression? Ten reasons to do it. *IJCNMH*. 2014; 1(10):1–7. <http://ijcnmh.arc-publishing.org/uploads/article/file/51/ijcnmh.2014.1.10.pdf>.
44. Olson AL, Kemper KJ, Kelleher KJ, et al. Primary care pediatricians' roles and perceived responsibilities in the identification and management of maternal depression. *Pediatrics*. 2002; 110(6):1169–1176. <http://pediatrics.aappublications.org/content/110/6/1169.long>. [PubMed: 12456915]
45. Pillas D, Marmot M, Naicker K, et al. Social inequalities in early childhood health and development: A European-wide systematic review. *Pediatr Res*. 2014; 76(5):418–424. DOI: 10.1038/pr.2014.122 [PubMed: 25122581]
46. Cull WL, O'Connor KG, Sharp S, et al. Response rates and response bias for 50 surveys of pediatricians. *Health Serv Res*. 2005; 40(1):213–226. DOI: 10.1111/j.1475-6773.2005.00350.x [PubMed: 15663710]
47. Asch DA, Jedrzejewski MK, Christakis NA. Response rates to mail surveys published in medical journals. *J Clin Epidemiol*. 1997; 50(10):1129–1136. DOI: 10.1016/S0895-4356(97)00126-1 [PubMed: 9368521]
48. Groves RM, Presser S, Dipko S. The role of topic interest in survey participation decisions. *Public Opin Quart*. 2004; 68(1):2–31. DOI: 10.1093/poq/nfh002

Table 1
Weighted Percent of Physician and Practice Characteristics by Survey Year, and Bivariate Associations with Usually Inquires About or Screens For Maternal Depression by Survey Year

	Overall			2004		2013	
	2004 (n=457)	2013 (n=321)	p-val	Usually inquires /screens Mat depr	p-val	Usually inquires /screens Mat depr	p-val
Physician characteristics							
Male	42.4	32.4	.0054	30.9	.4388	40.7	.3871
Female	57.6	67.6		34.5		45.9	
Age (yrs)							
<40	39.3	32.6	.0953	31.3	.8104	45.0	.2609
40-49	30.0	30.7		31.8		48.3	
50-59	20.4	21.1		36.5		46.2	
60	10.3	15.5		35.6		31.7	
Race/Ethnicity							
Caucasian	71.5	74.8	.2224	34.4	.0848	45.4	.4348
Asian	16.2	11.8		36.4		34.3	
Other/Unknown	12.3	13.4		19.9		46.1	
Years in Practice							
1-4	24.6	20.4	.0900	24.6	.0535	47.3	.2149
5-9	20.5	15.9		43.0		52.3	
10-19	28.7	30.7		31.1		47.3	
20	26.2	33.0		34.0		36.3	
Practice characteristics							
Area							
Urban	33.5	39.3	.1679	33.4	.9044	45.3	.6962
Suburban	52.0	49.7		33.4		45.3	
Rural	14.5	11.0		30.6		37.6	
Type of Practice							
1 or 2 physicians	17.9	9.3	.0070	41.7	.2965	29.9	.3692
Group practice	49.5	51.5		30.8		44.3	
Multi-specialty	9.7	12.3		34.5		44.9	

	Overall		2004		2013		p-val	2004		2013		p-val
	2004 (n=457)	2013 (n=321)	Usually inquires /screens	Mat depr	Usually inquires /screens	Mat depr		Usually inquires /screens	Mat depr	Usually inquires /screens	Mat depr	
Other	22.9	26.9								48.7		
50 ambulatory visits per week												
No	11.7	21.2	.0004				.9976			42.8		.7405
Yes	88.3	78.8								45.1		
75% of patients are Caucasian												
No	66.2	77.6	.0007				.0056			45.0		.4405
Yes	33.8	22.4								39.8		
80% of patients have private insurance												
No/Unknown	63.1	74.9	.0005				.8694			43.1		.4816
Yes	36.9	25.1								47.6		

Table 2
Weighted percent of Physicians' Mental Health Training, Attitudes, Beliefs and Behaviors by Survey Year, and Bivariate Associations with Usually Inquiring About or Screening For Maternal Depression

	Overall		2004		2013		p-val	p-val	p-val
	2004 (n=457)	2013 (n=321)	Usually inquires /screens depr	Mat	Usually inquires /screens depr	Mat			
Training in adult mental health									
Adult DSM diagnostic criteria for depression									
No	90.1	84.7	.0255	30.2	.0002	44.9			.5316
Yes	9.9	15.3		57.8		40.0			
Adult interview techniques									
No	85.8	85.5	.9118	32.1	.3267	43.4			.4969
Yes	14.2	14.5		38.3		48.9			
Strategies for managing/treating adult depression									
No	93.9	90.2	.0537	31.0	.0005	44.3			.8707
Yes	6.1	9.8		62.9		42.8			
Adult dosing with antidepressants									
No	95.2	91.2	.0259	31.4	.0009	45.1			.3098
Yes	4.8	8.8		65.2		35.0			
Attitudes, Beliefs and Behaviors									
Adult services very available in physician's practice community									
No	80.4	83.7	.2435	33.8	.4409	43.7			.6764
Yes	19.6	16.3		29.5		46.8			
Belief that screening for family social-emotional problems is beyond scope									
No	79.1	80.2	.7134	36.2	.0053	48.5			.0007
Yes	20.9	19.8		20.7		24.8			
Usually inquire about child/adolescent depression									
No	45.7	41.5	.2452	23.6	.0001	24.9			<.0001
Yes	54.3	58.5		40.9		57.9			

Table 3
Odds of Usually Inquiring About or Screening For Maternal Depression by Survey Year [†]

	Model 1: 2004			Model 2: 2013		
	Adjusted Odds Ratio	95% CI	p-val	Adjusted Odds Ratio	95% CI	p-val
Inquires about child/adolescent depression						
Usually vs. Sometimes/Never	2.27	1.43, 3.60	.0005	4.25	2.46, 7.32	<.0001
Family screening is beyond the scope of the pediatrician						
No vs. Yes				2.48	1.24, 4.97	.0102
Training in DSM diagnostic criteria for adult depression						
Yes vs. No	3.49	1.77, 6.90	.0003			
75%+ of patients are Caucasian						
Yes vs. No	1.89	1.18, 3.02	.0085			

[†] All models are adjusted for physician age, sex, and race/ethnicity; type of practice; number of ambulatory visits per week; patient insurance and race/ethnicity. None of these was statistically significant at $p < .05$ except for patient race/ethnicity in Model 1, as shown in the Table.

Shaded cells indicate that the variable was not included in that model.