

See the related commentary "Postpartum Depression Screening by Pediatricians: Time to Close the Gap" by Michael Yogman on page 157.

## Identifying Maternal Depression in Pediatric Primary Care: Changes Over a Decade

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**ABSTRACT:** *Objective:* Maternal depression affects 10% to 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. The authors 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 nontrainee 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 nonresponse 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 depression. Patient race/ethnicity and training in adult *Diagnostic and Statistical Manual of Mental Disorders (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.

(*J Dev Behav Pediatr* 37:113–120, 2016) **Index terms:** maternal depression, pediatric primary care, screening.

**D**epression affects approximately 10% to 40% of mothers with young children<sup>1–5</sup> and can have negative consequences for women and their children.<sup>6,7</sup> Mothers who are depressed, particularly if the depression is chronic, report feeling less attached to and more negatively toward

their children,<sup>7–10</sup> and insecure attachment has been linked to less supportive and more hostile parenting.<sup>11</sup>

Depression has been shown to impact caregiving activities, such as reducing the length of breastfeeding<sup>3</sup> and increasing the likelihood of placing infants to sleep in the prone position,<sup>12,13</sup> as well as other unhealthy acts.<sup>12,13</sup> 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.<sup>14</sup> In addition, some evidence exists linking maternal depression to poor cognitive outcomes in children,<sup>15–17</sup> and many studies have found maternal depression to be associated with internalizing and externalizing problems in children and adolescents.<sup>18,19</sup> 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 responsiveness to stress within and among various brain regions, including those involved in executive functions critical for working memory and

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behavioral inhibition, important for academic achievement and social functioning.<sup>20–25</sup> Fortunately, once depressed mothers are treated, negative consequences for their children often decrease.<sup>26,27</sup>

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

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.<sup>34</sup> Heneghan et al<sup>34</sup> 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. 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 American Academy of Pediatrics (AAP) has conducted a Periodic Survey (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 nonretired 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 mental health (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 PS 59 survey and between July and December 2013 for the PS 85 survey. Our sample included nontrainee 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](http://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 suboptimal 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 nonrespondents; 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.<sup>4</sup> 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, 10 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 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 and insurance). Providers were asked how often they inquire (usually, sometimes and never) about 7 common child/adolescent MH conditions, including depression. In addition, providers were asked whether they had received residency or fellowship training in adult MH, including interviewing techniques, *Diagnostic and Statistical Manual of Mental Disorders* (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, and 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) is 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 was asked in separate questions on 3-point Likert scales (agree, neutral, and 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 and 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 (Box 1). 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 versus sometimes or never inquire or screen for maternal depression.

### Statistical Analysis

Descriptive analyses were summarized using weighted proportions for categorical measures and weighted mean values and standard errors for continu-

Box 1. 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 and never)</p> <ul style="list-style-type: none"> <li>Inquire about symptoms/contributing factors as part of routine discussion</li> <li>Screening instrument or checklist</li> </ul>	<p>In your practice, how frequently do you inquire about, screen for, treat/comanage and refer each of these problems/conditions (usually, sometimes and never) [separate check-offs for inquire and screen]</p> <ul style="list-style-type: none"> <li>Maternal depression</li> </ul>

ous measures. Bivariate comparisons within and between survey years were assessed using the Rao-Scott  $\chi^2$  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 were 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 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% ( $p < .01$ ). Although 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 (MH) 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 (9.9-15.3%,  $p = .02$ ) or adult dosing with antidepressants (4.8-8.8%,  $p = .03$ ), but in 2013, the proportion endorsing training in these areas was still quite low. Approximately 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 white patient population. Furthermore, 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

**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)	<i>p</i>	Usually Inquires/ Screens Maternal Depression	<i>p</i>	Usually Inquires/ Screens Maternal Depression	<i>p</i>
Physician characteristics							
Male	42.4	32.4	.0054	30.9	.4388	40.7	.3871
Female	57.6	67.6		34.5		45.9	
Age, yr							
<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							
White	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	
Multispecialty	9.7	12.3		34.5		44.9	
Other	22.9	26.9		30.3		48.7	
≥50 ambulatory visits per week							
No	11.7	21.2	.0004	33.0	.9976	42.8	.7405
Yes	88.3	78.8		33.0		45.1	
≥75% of patients are white							
No	66.2	77.6	.0007	28.7	.0056	45.0	.4405
Yes	33.8	22.4		41.9		39.8	
≥80% of patients have private insurance							
No/unknown	63.1	74.9	.0005	33.2	.8694	43.1	.4816
Yes	36.9	25.1		32.5		47.6	

within the pediatrician's responsibility were 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.

**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	
	2004 (n = 457)	2013 (n = 321)	<i>p</i>	Usually Inquires/ Screens Maternal Depression	<i>p</i>	Usually Inquires/ Screens Maternal Depression	<i>p</i>
Training in adult mental health							
Adult DSM <sup>a</sup> 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	

<sup>a</sup>Diagnostic and Statistical Manual of Mental Disorders.

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 who 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 white 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 were

**Table 3.** Odds of Usually Inquiring About or Screening for Maternal Depression by Survey Year<sup>a</sup>

	Model 1: 2004			Model 2: 2013		
	Adjusted Odds Ratio	95% CI	<i>p</i>	Adjusted Odds Ratio	95% CI	<i>p</i>
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 <sup>b</sup> diagnostic criteria for adult depression						
Yes vs no	3.49	1.77–6.90	.0003			
75%+ of patients are white						
Yes vs no	1.89	1.18–3.02	.0085			

Empty cells indicate that the variable was not included in that model. <sup>a</sup>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. <sup>b</sup>*Diagnostic and Statistical Manual of Mental Disorders*.

significantly higher in 2013 compared with 2004 (odds ratios = 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 5-fold increase in screening from 2004 to 2013. Given the extensive literature on the association between maternal depression and poor child outcomes,<sup>7–25</sup> 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.<sup>35,36</sup> 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.<sup>37</sup> One study found that pediatricians recognize only 29% of mothers with high levels of depressive symptoms when relying solely on clinical indicators.<sup>38</sup> And, Chaudron et al<sup>2</sup> (2004) found that implementing a systematic screening led to a statistically significant increase in the detection of depressive symptoms during the first postpartum year. More importantly, if combined with system changes, formalized screening protocols have been shown to lead to improved patient outcomes.<sup>39,40</sup>

There is much debate about whether maternal depression screening can be effectively performed in pediatric practices, but several studies have shown that implementing universal maternal depression screening in busy pediatric practices is possible.<sup>2,41</sup> In fact, recent research suggests that both professionals and women are

willing to discuss mental health (MH) topics at pediatric visits,<sup>42,43</sup> and Olson et al<sup>41</sup> (2006) showed that adding maternal depression screening into pediatric practice is feasible.

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, approximately 80% of providers in each year reported believing that socioemotional familial factors were their responsibility, which is similar to the findings reported by Olson et al<sup>44</sup> (2002), that 84% of pediatricians reported feeling responsible for detecting domestic violence. 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,<sup>45</sup> the inclusion of family functioning factors, such as parental MH, 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 the study of Olson et al<sup>44</sup> (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. 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 white patients had nearly twice the odds of usually inquiring about or screening for maternal depression is unfortunate, given that at least 1 study has shown that women of minority racial backgrounds may be more likely to self-report maternal depression.<sup>4</sup> The proportion of patients who were white was not associated with inquiring or screening in 2013, and the proportion of practices with a high percentage of white 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.<sup>46,47</sup> Extensive analysis of response bias in American Academy of Pediatrics (AAP) surveys, including periodic surveys, has shown little nonresponse bias.<sup>46</sup> Furthermore, in our data, the random samples were similar to AAP members, and we found only a few small differences between respondents and nonrespondents. Nonetheless, both surveys were weighted for nonresponse. However, it is unlikely that all nonresponse bias was eliminated, and it is likely that those pediatricians interested in the topic were most likely to respond.<sup>48</sup> Additionally, there is the possibility of social desirability bias. If nonresponse or social desirability bias was present, we anticipate that our findings would overestimate the prevalence of physicians who usually inquire about or screen for maternal depression. Furthermore, although most pediatricians belong to the AAP, AAP members may differ from AAP nonmembers, so these data may not be generalizable to all pediatricians. These data are cross-sectional and therefore the reported associations do not imply causality. Finally, 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. Furthermore, pediatric training that highlights the importance of family health for the health of the child would benefit children. Without a concerted effort to identify maternal depression, pediatric primary care will continue to be a missed opportunity to intervene early and to improve children's well-being.

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