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## Depression Screening in Adolescents in the United States: A National Study of Ambulatory, Office-Based Practice

Ian S. Zenlea, MD<sup>1,4</sup>, Carly E. Milliren, MPH<sup>2</sup>, Lauren Mednick, PhD<sup>3</sup>, and Erinn T. Rhodes, MD, MPH<sup>1,4</sup>

<sup>1</sup>Division of Endocrinology, Boston Children's Hospital, Boston, MA, United States

<sup>2</sup>Clinical Research Center, Boston Children's Hospital, Boston, MA

<sup>3</sup>Department of Psychology, Boston Children's Hospital, Boston, MA

<sup>4</sup>Department of Pediatrics, Harvard Medical School, Boston, MA

### Abstract

**Objectives**—We aimed to determine the frequency of depression screening during ambulatory, office-based visits for adolescents seen in general/family medicine or pediatric practices in the United States using nationally representative data; determine the patient-, provider-, and visit-level factors associated with depression screening during ambulatory visits to inform recommendations to promote screening.

**Methods**—This was a cross-sectional study using the 2005–2010 National Ambulatory Medical Care and National Hospital Ambulatory Medical Care Surveys. Data were limited to ambulatory, office-based visits to general/family medicine or pediatrics clinics for adolescents aged 12 - 18 years old who did not have a documented diagnosis of depression.

**Results**—Depression screening was rare (0.2%; 95% CI 0.1 – 0.3), and 80% less likely to occur during visits for Hispanic compared to non-Hispanic, white adolescents (aOR 0.2, 95% CI 0.1 – 0.7). Depression screening was 9.1 times more likely in the Northeast compared to the West (aOR 9.1, 95% CI 2.2 – 38.1), if there were no visits within past 12 months as compared to 6 or more visits (aOR 6.1; 95% CI 1.8 – 20.4), and if stress management (aOR 24.2, 95% CI 11.8 – 49.5) or other mental health counseling (aOR 5.2, 95% CI 1.2 – 23.6) were provided.

**Conclusions**—Depression screening for adolescents is rare and associated with racial/ethnic and regional disparities. The integration of behavioral and mental health services within the patient-centered medical home might assist providers in identifying and treating depression and in addressing such disparities.

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**Address correspondence to:** Ian S. Zenlea, MD; Division of Endocrinology, Boston Children's Hospital Boston, 333 Longwood Ave. 6<sup>th</sup> Floor, Boston, MA, 02115; Telephone: 857-218-5394; Fax: 617-730-0194; Ian.Zenlea@childrens.harvard.edu.

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**Conflict of Interest:** Dr. Rhodes' research with Merck is focused on type 2 diabetes mellitus and is therefore unrelated to the subject of this manuscript. The other authors have no conflicts of interest to disclose.

## Keywords

adolescent depression; screening; adolescents

## INTRODUCTION

Depressive disorders are highly prevalent among adolescents and carry significant long-term morbidity. National surveys in the United States (US) show that the prevalence of dysthymia or major depressive disorder (MDD) increases uniformly with age, with a nearly twofold increase from age 13 – 14 (8.4%) to 17 – 18 years (15.4%)<sup>1</sup>. Depression is associated with decreased academic performance, impaired social and family functioning, and poorer self-perceived general health<sup>2</sup>. In 2009, the United States Preventive Services Task Force (USPSTF) updated its 2002 policy statement on screening for MDD by recommending that screening be routinely performed for adolescents 12 - 18 years old when systems are in place to ensure accurate diagnosis, psychotherapy, and follow-up<sup>3</sup>. Routine depression screening may help providers identify vulnerable adolescents and increase the proportion who initiate treatment. To our knowledge, there have been no published studies that have examined office-based depression screening practices for adolescents 12 - 18 years old in the US using nationally representative data. Our objectives were to; (i) determine the frequency of depression screening for adolescents who did not already have a documented diagnosis of depression; and (ii) to determine the patient-, provider-, and visit-level factors associated with depression screening during ambulatory visits to inform recommendations to promote screening.

## METHODS

### Study design

This study analyzed data from the 2005 - 2010 National Ambulatory Medical Care Survey (NAMCS) and National Hospital Ambulatory Medical Care Survey (NHAMCS)<sup>4,5</sup>. These are nationally representative surveys conducted by the National Center for Health Statistics regarding use and provision of care in outpatient settings in the US. The details describing the sampling procedure, sampling variation, and estimation procedures for the US NAMCS and NHAMCS are available online<sup>6,7</sup>. Briefly, NAMCS and NHAMCS use a multistage clustered probability sampling approach to sample US geographic regions. Office-based physician practices (stratified by specialty status) and hospital-based outpatient departments are selected within each region, and patient visits are sampled within physician practices and outpatient departments. These public-use data sets include design variables (weights) that can be used to construct national estimates. Within practices, for a 1-week reporting period, physicians complete a 1-page record form for a systematic sample of patient visits. Patient record forms include questions regarding patient demographics, reasons for the visit, diagnoses, diagnostic and screening examinations performed, medications prescribed, and patient education provided. Boston Children Hospital's Institutional Review Board considered this study exempt.

### Sample and Measures

Office-based visits were used as the units of analysis. Analyses were limited to visits to pediatric or general medicine practices for adolescents 12 - 18 years old who did not have a diagnosis of depression. Visits for adolescents with depression were identified for exclusion by (i) physician diagnosis of depression [International Classification of Disease, Ninth Edition, Clinical Modification (ICD-9-CM) codes 296.2–296.36; 300.4 or 311]; (ii) 'depression' as the reason for visit; or (iii) if the provider marked an "x" in the question,

“Regardless of the diagnoses written . . . does the patient now have: depression?”. This item was added for exclusion because the question is intended to supplement the diagnoses related to the visit. Depression screening was indicated by the provider marking an “x” in the question “Diagnostic/Screening Services...Examinations: Depression screening.”

### Statistical analyses

Descriptive statistics were presented as weighted proportions with 95% confidence intervals (CIs). Estimates were considered reliable if they had a relative standard error (SE) less than 30%, and if the unweighted sample had at least 30 patient visits. Due to small sample sizes for some variables, data from 2005 – 2010 NAMCS and NHAMCS were combined. Chi-square test was used for all bivariate analyses. Patient-, provider- and practice- variables (Tables 1 and 2) deemed clinically important (gender, race/ethnicity, and major reason for visit) or associated with depression screening (at  $P = 0.20$ ) in bivariate analyses were entered into a multivariable logistic regression model to identify factors significantly associated with depression screening at  $P < 0.05$ . National estimates, CIs, and P-values were derived using sampling weights from NAMCS/NHAMCS implemented with the SAS survey procedures. Stratification and clustering of visits within geographic region and physician were accounted for by masked design variables provided by NAMCS/NHAMCS. Data analyses were conducted with SAS version 9.3 (SAS Institute Inc, Cary, NC).

## RESULTS

### Ambulatory visits for non-depressed adolescents

Tables 1 and 2 report patient-, provider-, and practice-level characteristics for sampled visits without documented depression. There were 143,280,182 weighted clinic visits (WtCVs) (sampled visits = Total  $N=46,347$ ). Of the WtCVs, adolescents were predominantly non-Hispanic, white (60.5%) with private insurance (56.4%). About half of visits were for an acute problem (52.1%).

### Depression screening among non-depressed adolescents

Depression screening was documented in 0.2% (95% CI 0.1 – 0.3) of WtCVs (sampled visits = 104). The final multivariable logistic regression model (Table 3) revealed racial/ethnic and regional variation in depression screening. There was a significantly decreased odds of depression screening among Hispanic patients (aOR 0.2, 95% CI 0.1 – 0.7) compared to non-Hispanic, white patients. There was a significantly increased odds of screening in the Northeast compared to the West (aOR 9.1, 95% CI 2.2 – 38.1). Depression screening was also 6.1 times (95% CI 1.8-20.4) more likely if there were no visits within the past 12 months as compared to 6 or more visits and if stress management (aOR 24.2, 95% CI 11.8 – 49.5) or other mental health counseling (aOR 5.2, 95% CI 1.2 – 23.6) was provided. No other patient-, provider-, practice-characteristics were significant.

## DISCUSSION

To our knowledge, this is the first study to evaluate the frequency of depression screening during office-based visits for adolescents using nationally representative data in the US. In this sample, documented screening was rare (0.2% of visits). The infrequent performance of depression screening is surprising when interpreted in the context of a recent American Academy of Pediatrics (AAP) survey, which showed that approximately 90% of pediatricians thought they should be responsible for the identification of depression<sup>8</sup>. This apparent gap between perceived responsibility for identification and the performance of screening is likely due to previously cited barriers to screening, including lack of time, lack of qualified mental health providers to whom to refer, lack of training, and inadequate

reimbursement<sup>9,10</sup>. To address these barriers and improve access, collaboration, and coordination for pediatric mental health care, the AAP and the American Academy of Child and Adolescent Psychiatry have jointly released a position paper<sup>11</sup> and a clinician toolkit<sup>12</sup>. From a healthcare policy perspective, the final rule for the Accountable Care Organization (ACO) program by the Center for Medicare and Medicaid Services (CMS)<sup>13</sup> includes screening for depression as one of the 33 quality measures<sup>14</sup>, which makes the implementation of depression screening imperative. The integration of behavioral and mental health services into the patient-centered medical home (PCMH), might be an effective approach to reducing the barriers to identification and treatment of depression<sup>14,15</sup>. Specifically, the 2011 update of the National Committee for Quality Assurance accreditation includes requirements for routine screening for behavioral health conditions and implementation of evidence-based guidelines for the management of one “health behavior,” or one mental health/substance use condition<sup>16</sup>. Such an approach has been successful with the management of attention deficit hyperactivity disorder<sup>17</sup>. Pediatricians with co-located mental health services and a collaborative, team-based approach, report more easily facilitated mental health consultation and referral<sup>18</sup>. In our study, we found that depression screening was more likely to occur during visits in which stress management or other mental health counseling were also provided. This might be indicative of heightened physician concern for a mental health disorder prompting additional behavioral and mental health counseling during the visit. Additionally, it is possible that these visits were in medical home practices with either co-located or better access to mental health services.

We found that Hispanic adolescents were less likely to be screened for depression than non-Hispanic, white adolescents and that depression screening was more likely to occur in the Northeast compared to the West. Our finding of regional variation is consistent with a prior study addressing depression screening in adults using NAMCS data<sup>19</sup>. Access to a PCMH may be a factor in the racial/ethnic and regional disparities in screening. National survey data has shown that non-Hispanic, white children have the greatest access to a PCMH compared to Hispanic children, who have the lowest<sup>20</sup>. Additionally, PCMH attainment rates are lowest in the West compared to the other regions<sup>20</sup>. Future studies should examine whether improved regional adoption of the PCMH and better access to the PCMH for racial/ethnic minorities could address these disparities.

We also found that depression screening was more likely to be performed if there were no visits in the prior 12 months as compared to 6 or more. Studies have shown that physicians frequently rely on observation, family concerns, psychosocial dynamics, and the presence of clinical problems to identify depressed youth<sup>10,21</sup>. Therefore, physicians may not formally screen adolescents with frequent visits because these adolescents are more familiar to them and data from clinical observations may be deemed sufficient to confirm a healthy mood. While we hypothesized that physicians might be more likely to screen for depression during preventive care visits when more comprehensive screening is likely to be performed<sup>22</sup>, reason for visit was not a significant predictor for depression screening. Given the low frequency of depression screening in our sample overall, it is possible that we may have lacked the power to detect a difference by visit type.

Several limitations inherent to NAMCS/NHAMCS surveys should be considered when interpreting the results of this study. Although NAMCS/NHAMCS are the largest, nationally representative data sources for examining health care services in US outpatient settings, the cross-sectional study design limits the ability to make causal inferences. Further, the surveys only provide information regarding a single physician–patient encounter. It is possible that patients underwent depression screening at visits that were not captured by the surveys or, conversely, a visit where depression was not indicated as the reason for visit, may not have been excluded from our analyses. In addition, the NAMCS/NHAMCS documentation does

not provide clarity around what should constitute depression screening (e.g., standardized measure or informal questions) and this might therefore vary by provider. Although NAMCS and NHAMCS do provide unique physician, clinic, and patient identifiers, due to the overall small sample sizes, we did not have sufficient power to explore whether there were statistically significant differences in the weighted frequencies of depression screening by physician or clinic and year. However, by controlling for other provider-related and practice-related factors as well as region we have adjusted for some of these effects. Additionally, given the complex sampling scheme for both NAMCS and NHAMCS, it is possible, although unlikely, that visits for the same patients would have been sampled more than once over the 6 year time period. Finally, while our data span the time period during which the new USPSTF recommendations on depression screening were released, there were an insufficient number of visits with screening during each year and in the period after guideline introduction to formally assess the impact of the guidelines on screening practices. As additional NAMCS/NHAMCS data become available over time, assessing changes in screening practices will be an important next step.

## CONCLUSIONS

Based on our analyses, depression screening appears to be a rare event in office-based visits for adolescents. The USPSTF recently released a final report for another systematic review of the current evidence for depression screening in adolescents<sup>23</sup>. The review will specifically study the proportion of primary care providers who assess, treat, and refer child and adolescent patients with depression as well as the proportion of providers who have access to collaborative systems of care for such patients<sup>23</sup>. The inclusion of depression screening as a quality measure in the ACO program<sup>14</sup> further supports the need for effective strategies for implementation of depression screening. We propose that the integration of behavioral and mental health services within the PCMH might effectively assist providers in identifying and treating depression. Future studies should be performed to examine whether the racial/ethnic disparities and regional variation in depression screening could be reduced through the adoption of the PCMH.

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**What's New:** Depression screening in adolescents during office-based, ambulatory visits in the U.S. occurs infrequently and is less likely to occur during visits for Hispanic compared to non-Hispanic, white adolescents and more likely to occur in the Northeast compared to the West.

**Table 1**

Patient characteristics for visits for non-depressed adolescents.

	Weighted % (95% CI) *	Sampled Visits (N) <sup>†</sup> Total N=46,347
<b>Sex</b>		
Male	52.8 (52.0 - 53.6)	24,352
Female	47.2 (46.4 - 48.0)	21,995
<b>Race/Ethnicity</b>		
White, Non-Hispanic	60.5 (57.3 - 63.6)	22,599
Black, Non- Hispanic	12.8 (10.9 - 14.8)	9,362
Hispanic, Any race	15.4 (13.2 - 17.6)	8,095
Other/Multiple Race, Non-Hispanic	11.3 (9.6 - 13.0)	6,291
<b>Health insurance</b>		
Public	35.8 (32.4 - 39.1)	24,078
Private	56.4 (53.0 - 59.8)	17,722
Other	4.1 (3.5 - 4.8)	2,589
Unknown	3.7 (2.8 - 4.6)	1,958
<b>Major Reason for visit</b>		
Preventive care	36.8 (35.2 - 38.3)	16,778
Chronic problem <sup>‡</sup>	11.1 (9.7 - 12.5)	7,850
Acute problem <sup>§</sup>	52.1 (50.3 - 54.0)	21,147
<b>Visits in last 12 months<sup>**</sup></b>		
None	12.9 (12.1 - 13.8)	8,301
1 - 2	29.0 (27.8 - 30.1)	14,463
3 - 5	30.2 (29.0 - 31.3)	13,043
6	27.9 (26.2 - 29.7)	10,540
<b>Total number of chronic conditions</b>		
None	85.8 (84.7 - 86.8)	38,224
1	11.4 (10.5 - 12.3)	6,489
2	0.8 (0.6 - 1.0)	528
Unknown	2.1 (1.8- 2.5)	1,106

\* Proportions are weighted to be nationally representative.

<sup>†</sup> Total weighted clinical visits=143,280,182<sup>‡</sup> Includes routine or flare up<sup>§</sup> New or pre/post surgery<sup>\*\*</sup> How many past visits the patient has made to the office within the last 12 months not including the current visit.



**Table 2**

Provider and practice characteristics for ambulatory visits for non-depressed adolescents.

	Weighted % (95% CI) *	Sampled Visits (N) † Total N=46,347
<b>Metropolitan statistical area</b>		
Yes	87.5 (81.1 - 94.0)	41,689
No	12.5 (6.0 - 18.9)	4,658
<b>Geographic region</b>		
Northeast	19.4 (16.8 - 22.0)	11,992
Midwest	21.8 (17.2 - 26.4)	11,891
South	37.6 (33.4 - 41.7)	13,082
West	21.3 (17.7 - 24.8)	9,382
<b>Practice Type</b>		
Primary Care	84.6 (82.7 - 86.4)	31,159
Specialty Care	11.6 (10.2 - 13.1)	12,194
Unknown	3.8 (2.6 - 4.9)	2,994
<b>Provider Specialty</b>		
Pediatrics <sup>‡</sup>	79.5 (77.2 - 81.7)	35,018
General Medicine <sup>§</sup>	20.5 (18.2 - 22.8)	11,329
<b>Provider Type</b>		
Physician	48.6 (44.6 - 52.6)	15,943
Other <sup>**</sup>	51.0 (47.0 - 55.0)	30,003
Unknown	0.5 (0.4 - 0.6)	401
<b>Provided stress management counseling<sup>††</sup></b>		
No	99.3 (99.0 - 99.6)	46,000
Yes	0.7 (0.4 - 1.0)	347
<b>Provided other mental health counseling<sup>‡‡</sup></b>		
No	99.4 (99.7 - 99.8)	46,056
Yes	0.3 (0.2 - 0.4)	291
<b>Time spent with patient</b>		
Less than 15 minutes	37.2 (34.5 - 39.9)	31,938
15 to 29 minutes	53.2 (50.7 - 55.8)	11,959
30 to 44 minutes	8.3 (7.2 - 9.4)	2,116
45 to 59 minutes	0.8 (0.6 - 1.1)	191
60 minutes or greater	0.5 (0.3 - 0.7)	143
<b>Number of new medications started</b>		
None	43.8 (42.4 - 45.2)	21,947
One	31.7 (30.7 - 32.6)	12,976
2	24.5 (23.3 - 25.7)	11,424
<b>Number of medications continued</b>		
None	78.0 (76.8 - 79.2)	34,452

	Weighted % (95% CI) *	Sampled Visits (N) † Total N=46,347
One	12.4 (11.7 - 13.1)	6,131
2	9.6 (8.8 - 10.4)	5,764

\* Proportions are weighted to be nationally representative.

† Total weighted clinical visits=143,280,182.

‡ Includes Pediatric Subspecialties.

§ Includes General and Family practice, Internal Medicine, Cardiovascular Diseases, Dermatology, Oncology.

\*\* Physician assistant, nurse practitioner/midwife, registered nurse/licensed practical nurse, mental health provider, or other provider

†† Information intended to help patients reduce stress through exercise, biofeedback, yoga, etc. Includes referrals to other health professionals for the purpose of coping with stress<sup>6,7</sup>.

‡‡ General, advice and counseling about mental health issues and education about mental disorders. Includes referrals to other mental health professionals for mental health counseling<sup>6,7</sup>.

**Table 3**

Factors associated with depression screening in non-depressed adolescents.

Factor	Adjusted * Odds Ratios	(95% CI)
<b>Sex</b>		
Male	Reference	
Female	0.60	(0.3 - 1.3)
<b>Race/Ethnicity</b>		
White, Non-Hispanic	Reference	
Black, Non-Hispanic	1.9	(0.7 - 5.4)
Hispanic, Any race	0.2	(0.1 - 0.7)
Other/ Multiple Race, Non-Hispanic	1.8	(0.5 - 6.1)
<b>Major Reason for visit</b>		
Acute problem	Reference	
Chronic problem		(0.4 - 4.8)
Preventive care	1.8	(0.7 - 5.0)
<b>Visits in last 12 months<sup>†</sup></b>		
6	Reference	
None	6.1	(1.8 -20.4)
1 - 2	1.8	(0.5 - 5.8)
3 - 5	2.3	(0.8 - 6.6)
<b>Provided Stress Management counseling<sup>‡</sup></b>		
No	Reference	
Yes	24.2	(11.8 - 49.5)
<b>Provided Other Mental Health Counseling<sup>§</sup></b>		
No	Reference	
Yes	5.2	(1.2 - 23.6)
<b>Geographic region</b>		
West	Reference	
Northeast	9.1	(2.2 - 38.1)
Midwest	1.5	(0.4 - 5.9)
South	3.5	(0.9 - 14.1)

\* Adjusted for all other variables shown.

<sup>†</sup> How many past visits the patient has made to the office within the last 12 months not including the current visit.<sup>‡</sup> See Footnote Table 2.<sup>§</sup> See Footnote Table 2.