A Clinical Care Algorithmic Toolkit for Promoting Screening and Next-Level Assessment of Pediatric Depression and Anxiety in Primary Care

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ABSTRACT

With a documented shortage in youth mental health services, pediatric primary care (PPC) providers face increased pressure to enhance their capacity to identify and manage common mental health problems among youth, such as anxiety and depression. Because 90% of U.S. youth regularly see a PPC provider, the primary care setting is well positioned to serve as a key access point for early identification, service provision, and connection to mental health services. In the context of task shifting, we evaluated a quality improvement project designed to assist PPC providers in overcoming barriers to practice-wide mental health screening through implementing paper and computer-assisted clinical care algorithms. PPC providers were fairly successful at changing practice to better address mental health concerns when equipped with screening tools that included family mental health histories, next-level actions, and referral options. Task shifting is a promising strategy to enhance mental health services, particularly when guided by computer-assisted algorithms. J Pediatr Health Care. (2017) *31*, e15-e23.

KEY WORDS

Anxiety, depression, mental health, pediatric primary care, screening, task shifting

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Unaddressed mental health problems among children and adolescents continue to pose a significant public health dilemma. One out of every five children ages 9 to 17 years meets diagnostic criteria for a mental health disorder at some point during childhood, with fewer than a third of these children receiving mental health services (Merikangas et al., 2011; U.S. Department of Health and Human Services, 1999). Two common and often comorbid childhood disorders are depression and anxiety, with approximately 11% and 25%, respectively, of the general population of youth meeting diagnostic criteria, and 30% and 17% of these children exhibiting particularly severe depression and anxiety, respectively (Merikangas et al., 2010). To address this public health challenge, federal agencies

(SAMHSA-HRSA Center for Integrated Health Solutions, n.d.), the Affordable Care Act (Patient Protection and Affordable Care Act, 2010), professional associations (American Academy of Pediatrics [AAP], 2009), and nationally recognized quality improvement organizations (National Committee for Quality Assurance, 2015) are turning to pediatric primary care (PPC) providers to expand their scope of practice to include identifying and managing mental health concerns among pediatric patients. Indeed, more than 90% of children and adolescents across all economic and ethnic groups in the United States regularly see a PPC provider (National Center for Health Statistics, 2015), which means that for the large majority of youths, PPC providers could serve as a key point of access to early identification of mental health concerns, mental health services, and connection to mental health providers.

Analysis of 3 years of the Medical Expenditure Panel survey (2008 through 2011) shows that PPC providers play a larger role in the care of children with attention and mood disorders than any other professional (Anderson, Chen, Perrin, & Van Cleave, 2015), further highlighting that at least a third of children with these disorders see only a PPC provider for their mental health conditions. Given the documented shortage of pediatric mental health providers, and particularly child and adolescent psychiatrists (Hagan et al., 2001; Thomas & Holzer, 2006), PPC providers have the potential to fill many gaps in care for children with mental health needs.

PPC providers can use the traditional well-child visit in many ways to improve detection of and intervention for youth with mental health concerns. The AAP (2009) and federal Substance Abuse and Mental Health Services Administration (National Committee for Quality Assurance, 2015) encourage PPC providers to screen all children for mental health concerns at well-child visits. For children insured by Medicaid, the Commonwealth of Massachusetts mandates screening at all well-child visits (Center for Public Representation, 2007). Often, screening can be compensated on the same day as a well-child visit. However, practice-wide mental health screening is highly variable and thwarted by several systemic and practice-level barriers, which include insufficient access to psychometrically sound screening and next-level assessment tools; knowledge of proper administration, scoring, and interpretation of results of the tools; and staff support to facilitate practice-wide screening and next-level assessment and to connect children with mental health services when needed (U.S. Department of Health and Human Services, 1999).

Given the long-term relationship that PPC providers tend to establish with families, they are well positioned to serve as a hub for monitoring change in children's mental health symptoms across development, when mental health can fluctuate and problems can emerge at various times and in response to various circumstances (Hagan et al., 2001), as well as in response to treatment interventions. Whether an intervention is provided by the PPC provider or an outside mental health provider, such a mental health surveillance system could help PPC providers determine the effectiveness of the intervention for a specific patient and whether an additional or alternative treatment is indicated. Currently, communication between PPC providers and mental health providers is less than optimal, and other than knowing that a child is receiving outside treatment, PPC providers often lack information about how well that child is responding to the treatment (Knowles, 2009). If PPC providers could routinely track symptoms across well-child visits or in follow-up visits, they may be better equipped to make meaningful recommendations about the direction of treatment (e.g., continue/discontinue treatment, consider additional/alternative treatment) and better inform referrals to mental health specialists.

A challenge for PPC providers is how to address mental health problems once they are identified. PPC providers largely lack the training and resources to provide mental health treatment when indicated, mental health services providers in the community are scarce or have long waiting lists, and communication between PPC providers and mental health professionals for consultation or co-management of patients' symptoms seldom happens (Pidano, Honigfeld, Bar-Halpern, & Vivian, 2014; Pidano, Kimmelblatt, & Neace, 2011).

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Several models exist for extending PPC providers to incorporate more mental health work. Some models advocate for co-location of mental health providers in pediatric settings (Ward-Zimmerman & Cannata, 2012), and others improve referral mechanisms so that children identified in primary care as having mental health concerns can seamlessly receive evaluations and mental health interventions (Hilt et al., 2013; Sarvet et al., 2010; Van Cleave, Le, & Perrin, 2015). A third model increases the role of PPC providers to address mental health concerns by task shifting, as described by Wissow, van Ginneken, Chjandna, and Rahman (2016). Task shifting increases the skills of staff in PPC and the functions of the primary care setting to absorb more mental health tasks. Even in communities that have an adequate supply of mental health providers, which are very few, task shifting allows children to receive services in a familiar setting, from a familiar provider,

and as part of the routine care provided in their pediatric services.

However, PPC providers need support to successfully task shift and take on more mental health work. They need to integrate screening tools for early identification into their daily practice system. If they are to respond immediately to concerns raised through screening, they need to use next-level assessment tools and have processes for connecting children to mental health services when they confirm issues raised through screening.

In September 2011, we convened a learning collaborative of child psychiatry experts and three PPC practice–mental health partner teams (Cohort 1) to develop and implement a quality improvement project that supported task shifting among PPC providers (Rubin et al., 2014). For the project, task shifting was conceptualized as increasing the capacity of PPC providers to address mental health within primary care. Cohort 1 vetted and created a paper version of an evidence-based, best practice clinical care algorithm and supporting toolkit (herein referred to as the *paper algorithm*) aimed at encouraging PPC providers to collect child and family mental health histories, screen and assess for pediatric depression and anxiety, guide service connection and treatment, and communicate effectively with mental health partners. Cohort 1 selected other tools from best practice reports such as the Guidelines for Adolescent Depression in Primary Care Toolkit (Zuckerbrot et al., 2007).

In 2013, we convened a second cohort (Cohort 2) of four PPC practice–mental health partner teams to implement a computer-assisted clinical care algorithm and toolkit (herein referred to as the *computer-assisted algorithm*) to aid in implementation of the paper algorithm (Grasso, Connor, Scranton, Macary, & Honigfeld, 2015). PPC providers in Cohorts 1 and 2 collected data from well-child visits and the implementation of the algorithms over the course of 6 months. Cohort 1 implemented the paper algorithm gradually over the 6 months, starting with depression screening, followed by depression screening and next-level assessment, and, finally, anxiety screening and next-level assessment. Cohort 2 implemented the computer-assisted algorithm in full over the course of the 6 months.

We describe and evaluate the implementation of a two-phase, quality improvement project designed to assist PPC providers in identifying pediatric mental health issues in primary care through the implementation of a paper and computer-assisted clinical care algorithm and supporting toolkit. Opportunities to further develop a PPC model for addressing mental health concerns are discussed.

METHODS

Sample

The total sample represents child and adolescent patients (N = 1,208), ranging in age from 6 to 17 years, seen at well-child visits among seven suburban PPC practices in Connecticut. Over the course of 6 consecutive months, eight PPC providers provided care to their patients using the paper algorithm, and eight PPC providers provided care to their patients using the computer-assisted algorithm. Half of the total sample (50.4%) was female (see Table 1 for practice characteristics).

Materials and Procedure

Clinical care algorithmic toolkit

The paper and computer-assisted algorithms incorporated publicly available, standardized, psychometrically

TABLE 1. Practice characteristics and results of implementation by type of clinical care algorithmic toolkit

Algorithmic toolkit	Practicing pediatricians, *n*	Well-child visits, *n*	All PSC-17 screens, *n* (%)	Family mental health history, *n* (%)[a]	Next-level assessment, *n* (%)[a,b]
Paper					
Practice A	2	31	24 (77.4)	24 (100.0)	4 (100.0)
Practice B	5	606	229 (37.8)	227 (99.1)	11 (36.7)
Practice C	1	299	229 (76.6)	222 (96.9)	14 (58.3)
Combined	8	936	482 (51.5)	473 (98.1)	29 (49.2)
Computer-assisted					
Practice D	1	220	190 (86.4)	190 (100.0)	37 (100)
Practice E	1	152	53 (34.9)	53 (100.0)	9 (100)
Practice F	2	301	215 (71.4)	215 (100.0)	30 (100)
Practice G	4	569	268 (47.1)	268 (100.0)	39 (100)
Combined	8	1,242	726 (58.5)	726 (100.0)	115 (100)
Combined	16	2,178	1,208 (55.5)	1,199 (99.3)	144 (82.8)

[a]*Of PSC-17 positive screening results for depression and/or anxiety.*
[b]*The computer-assisted algorithm automatically prompts pediatric primary care providers to enter a family mental health history before proceeding to next-level assessment, whereas the paper algorithm does not. Thus, we expected to find a 100% screening rate for the computer-assisted family mental health history screens.*

sound screening and next-level assessment instruments for detecting clinically significant pediatric depression and anxiety in PPC patients. They also included a framework for treatment, referral, and symptom monitoring; correspondence templates for ongoing communication between patients' PPC and mental health providers; and educational handouts for families developed by the American Academy of Child and Adolescent Psychiatry (2013).

The computer-assisted algorithm included the same information as the paper algorithm but was adapted for real-time clinical decision support in an electronic format. The computer-assisted algorithm was a standalone software application deployable on a laptop or desktop computer and included an automated mechanism for scoring, documenting, and interpreting all mental health screening and next-level assessment tools included in the paper algorithm.

Child and family mental health history, screening, and next-level assessment

The paper and computer-assisted algorithms also included a child and family mental health history form developed by Cohort 1. The form was based on best practice guidelines and designed for use at all well-child visits to gather information that would become part of the family medical history. The form included questions about the existence of significant risk factors such as family history of mental health problems, medication and hospitalization for mental health problems, current family stress or loss, and consistency in primary caregivers from birth. The set of child and family mental health history questions were not validated but were vetted and agreed on by Cohort 1 and are supported by the AAP Bright Futures (Duncan, Shaw, & Hagan, 2008) guidelines for PPC.

The paper and computer-assisted algorithms included the following sequence of activities: after obtaining a child and family mental health history, caregivers completed the Pediatric Symptom Checklist (PSC-17; Gardner & Kelleher, 1999; Jellinek & Murphy, 1988). Patients with total scores greater than or equal to 15 or who had a positive score result on the depression subscale (sum ≥ 5 on items 1–5) completed a follow-up assessment: the Patient Health Questionnaire (PHQ-9; ≥5 is clinical threshold; Spitzer, Williams, Kroenke, 1999) for children older than 12 years and the Center for Epidemiological Studies Depression Scale for Children (CES-DC; ≥ 15 is clinical threshold; Faulstich, Carey, Ruggiero, Enyart, & Gresham, 1986) for children 12 years old or younger.

Patients with total scores greater than or equal to 15 or who had positive score results on the anxiety subscale (≥2 on Item 4) completed the Self-Report for Childhood Anxiety Related Disorders (SCARED; ≥ 25 is clinical threshold; Birmaher et al., 1999). PPC providers had the option of using the short version, with a threshold of 3 points or greater, or the full-length version, with a threshold of 25 points or greater. The full version provides more detail on anxiety type and severity; however, both versions have good psychometric properties. When the clinical threshold was surpassed, the algorithm guided PPC providers to further indicate whether the anxiety symptoms were characteristic of panic disorder, posttraumatic stress disorder, or obsessive-compulsive disorder, understanding that the type of anxiety would have implications for which treatment pathways should be followed. Adolescents (≥13 years old) also completed the Car, Relax, Alone, Forget, Friends, Trouble (CRAFFT) screen (Center for Adolescent Substance Abuse Research at Children's Hospital Boston, 2009) to assess potential alcohol or drug abuse, which is often comorbid with depression and anxiety. PPC providers indicated whether results for two or more items on the CRAFFT were positive.

Time for patient completion of screening instruments ranged from approximately 3 to 7 minutes for screening (i.e., the child and family mental health history and the PSC-17). Completion of next-level assessments (i.e., the PHQ-9, CES-DC, 5-item SCARED, or 41-item SCARED) ranged from 5 to 10 minutes. Compared with private PPC settings, completion of screening and next-level assessments took longer in the clinic setting, often as a consequence of literacy, cultural, and/or language barriers.

Clinical disposition and treatment

Once next-level assessment was completed, the algorithms guided the PPC provider to consider the screening and assessment results when choosing the most appropriate clinical disposition for each patient. Each disposition was linked with a specific set of guidelines for education, referral, and treatment. Indications of suicide or other high-risk behaviors were followed with recommendations to immediately call emergency mobile psychiatric services.

The algorithms also guided PPC providers to connect all children with positive screening and assessment results to a community mental health provider. Other recommendations included considering medication (a selective serotonin reuptake inhibitor titration schedule was included in the toolkit) or referring to a psychiatrist for a medication evaluation, establishing a patient safety plan, and using one of several informational handouts to provide education about depression and/or anxiety to the patient and family and to discuss goals and options for treatment.

Follow-up visits

The algorithms also recommended that the PPC provider schedule follow-up visits for patients with positive depression and/or anxiety results 6 to 12 weeks after the well-child visit. The purpose of the follow-up

visit was to determine if there had been a clinically significant reduction in symptoms and to re-evaluate the treatment modality as necessary. Significant reduction of depressive symptoms was indicated by a 50% reduction in depression severity on the CES-DC or PHQ-9, whereas significant reduction of anxiety was indicated by a 30% to 50% reduction in symptoms on the SCARED. If clinical endpoints were not met, recommendations to modify or reconsider the treatment modality were provided. If medication was used, recommendations might center on modifying dosages, either reducing or increasing the dose. Communication with the patient's mental health professional was recommended to reaffirm or modify the co-management plan.

RESULTS

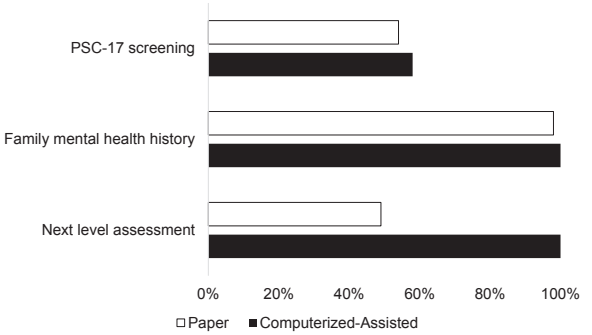
All data from the paper forms were entered into an electronic data system and combined with data automatically captured in the computer-assisted algorithm. All data were used for the reported analysis. Among the 2,178 pediatric patients seen for well-child visits during the study period, 55.5% (1,208) of patients received care at practices guided by the paper or computer-assisted algorithms. Most PSC-17 screens (60.0%) were completed among practices guided by the computer-assisted algorithm. Among the 936 patients who received care at practices guided by the paper algorithm, 51.5% (482) completed PSC-17 screens. Of the 1,242 patients who received care at practices guided by the computer-assisted algorithm, 58.5% (726) completed PSC-17 screens. The difference between the proportion of patients screened at practices guided by the paper algorithm compared with practices guided by the computer-assisted algorithm was statistically significant: $\chi^2 = 10.46$, $p = .001$.

The rates at which practices administered the paper or computer-assisted algorithms to well-child patients varied. The most successful implementation was reflected in one practice that administered the computer-assisted algorithm to 86% of a total of 220 patients seen, followed by rates ranging from 34.8% of 152 to 77.4% of 31 (mean = 55.5%; see Table 1 and Figure for the results of implementation of screening and next-level assessment).

Child and Family Mental Health History

Of the 1,208 patients who received care at practices guided by the paper or computer-assisted algorithms, 99.3% ($n = 1,199$) had complete child and family mental health history forms in their medical records. Of the 218 patients who screened positive for depression and/or anxiety on the PSC-17, 47.2% ($n = 103$) had a family history of mental health problems, and 45.0% ($n = 98$) had a recent family stressor or loss. Of 103 patients who screened positive for depression and/or anxiety on the PSC-17 at practices guided by the paper algorithm, 49.5% ($n = 51$) had a family history of mental health problems, and 50.5% ($n = 52$) had a recent family stressor or loss. Among 115 patients who screened positive for depression and/or anxiety on the PSC-17 at practices guided by the computer-assisted algorithm, 60.0% ($n = 69$) had a family history of mental health problems, and 40.0% ($n = 46$) had a recent family stressor or loss.

FIGURE. Implementation rates of screening and next-level assessment for pediatric depression and anxiety in primary care by type of clinical care algorithmic toolkit.



PSC, pediatric symptom checklist.

Screening With the PSC-17

Among the total number of patients who completed the PSC-17 ($N = 1,208$), 18.0% ($n = 218$) had scores indicating risk of depression and/or anxiety, with 8.4% ($n = 101$) scoring 15 or greater on the total score, 10.3% ($n = 125$) scoring 5 or greater on the depression subscale, and 14.2% ($n = 172$) scoring 2 or greater on the anxiety subscale. Of 482 patients who completed the PSC-17 at practices guided by the paper algorithm, 21.4% ($n = 103$) had scores indicating risk of depression and/or anxiety, with 11.0% ($n = 53$) scoring 15 or greater on the total score, 12.4% ($n = 60$) scoring 5 or greater on the depression subscale, and 13.3% ($n = 64$) scoring 2 or greater on the anxiety subscale. Among the 726 patients who completed the PSC-17 at practices guided by the computer-assisted algorithm, 15.8% ($n = 115$) had scores indicating risk of depression and/or anxiety, with 6.6% ($n = 48$) scoring 15 or greater on the total score, 9.0% ($n = 65$) scoring 5 or greater on the depression subscale, and 10.2% ($n = 74$) scoring 2 or greater on the anxiety subscale. The proportion of positive screening results among screens administered in practices guided by the paper algorithm was significantly greater than the proportion of positive screens in practices guided by the computer-assisted algorithm: 21.4% versus 15.8%, respectively ($\chi^2 = 5.99$, $p = .014$). In addition, a small portion of adolescents (6.8%) who screened positive on the PSC-17 at practices guided by the paper or computer-assisted algorithms showed evidence of problematic alcohol and/or drug use.

Next-Level Assessment

Implementation of the paper and computer-assisted algorithms yielded a 66.1% (n = 144) rate of next-level assessments among patients with positive screening results on the PSC-17 for depression and/or anxiety, with 56.9% (n = 82) of patients scoring positive for clinically significant depression and/or anxiety on next-level assessments. In other words, more than a third of youth initially identified as showing "red flags" for depression and/or anxiety were ruled out with the next-level assessment.

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Implementation of the paper algorithm yielded a 49.2% (n = 29) rate of next-level assessments for patients with positive screening results for depression and/or anxiety on the PSC-17, less than half (41.4%) of whom scored positive for clinically significant depression and/or anxiety on next-level assessments. Implementation of the computer-assisted algorithm yielded a 100% (n = 115) rate of next-level assessments for patients with positive screening results on the PSC-17 for depression and/or anxiety, with 60.9% (n = 70) scoring positive for clinically significant depression and/or anxiety on next-level assessments. The difference in the rate of next-level assessments for patients screening positive for depression and/or anxiety on the PSC-17 among practices guided by the computer-assisted algorithm compared with practices guided by the paper algorithm was statistically significant (χ^2 = 125.08, p < .001). See Table 2 for the results of screening and next-level assessment by type of clinical care algorithmic toolkit.

DISCUSSION

In the context of task shifting, we described and evaluated a quality improvement project designed to assist PPC providers in overcoming barriers to practice-wide mental health screening and assessment. A learning collaborative of child psychiatry experts and three PPC practice–mental health partner teams (Cohort 1) vetted and created a paper version of evidence-based, best practice clinical care algorithms and supporting toolkit aimed at screening and next-level assessment of pediatric anxiety and depression, guiding service connection and treatment, and communicating effectively with mental health partners. Based on the outcomes of implementing the paper version into PPC practice, a second cohort (Cohort 2) of four PPC practices partnered with mental health providers to implement a computer-assisted algorithm to aid in implementation of the paper algorithm.

The analysis of data from the two cohorts of PPC practices suggests that when provided with screening tools that include family mental health history information, next-level actions, and referral options, pediatricians are fairly successful at changing practice to better address mental health concerns. Across the paper and computer-assisted algorithms, PPC practices almost universally obtained and documented a child and family mental health history as part of the patient medical record. The addition of the family mental health history as a routine aspect in PPC suggests that child health providers are open to, and understand the value of, identifying children who may be at risk for mental health problems because of family, environmental, or genetic factors. Prompts in electronic health records and in practice routines can help providers document familial risk. Family health history–taking can be expanded to routinely include mental health issues.

The implementation of the paper and computer-assisted algorithms yielded different rates of mental health screening among well-child visits. Although overall results show that slightly more than half of children received a mental health screen as part of well-child services, which is far below recommendations from the AAP's Bright Futures (Duncan et al., 2008) and practice guidelines (AAP, 2009), the screening rate was significantly higher among practices guided by the computer-assisted algorithm compared with practices guided by the paper algorithm.

Prompts for mental health screening with embedded tools in the electronic health record may help ensure that children receive mental health screening. Even so, practices that were guided by the computer-assisted algorithm varied substantially in their implementation of mental health screening, suggesting that electronic prompts and inclusion of the screening tools in the electronic health record may not be enough to ensure universal screening.

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Even though practices guided by the paper algorithm were found to have a lower screening rate than practices using the computer-assisted algorithm, the proportion of positive screening results for depression and/or anxiety in practices guided by the paper algorithm was significantly greater than in practices guided by the computer-assisted algorithm. One possible explanation for the higher rate of positive screening

TABLE 2. Results of screening and next-level assessment for pediatric depression and anxiety in primary care by type of clinical care algorithmic toolkit

Screen	Algorithmic toolkit		
	Paper, *n* (%)	Computer-assisted, *n* (%)	Combined, *n* (%)
PSC-17 screen			
Total score ≥ 15 (positive)	53 (11.0)	48 (6.6)	101 (8.4)
Depression score ≥ 5 (positive)	60 (12.4)	65 (9.0)	125 (10.3)
Anxiety score ≥ 2 (positive)	64 (13.3)	74 (10.2)	172 (14.2)
Total positive	103 (21.4)	115 (15.8)	218 (18.0)
Risk factors (of all positive PSC-17 screens)			
Family psychiatric history	51 (49.5)	69 (60.0)	103 (47.2)
Recent family stress/loss	52 (50.5)	46 (40.0)	98 (45.0)
Alcohol/drug use on CRAFFT	1 (11.1)	10 (8.7)	11 (6.8)
Clinical depression risk (of all positive PSC-17 screens)			
PHQ-9 severity			
Low	1 (1.1)	16 (13.9)	17 (7.8)
Mild	3 (2.9)	16 (13.9)	19 (8.7)
Moderate	5 (4.9)	8 (7.0)	13 (6.0)
Moderately severe	2 (1.9)	3 (2.6)	5 (2.3)
Severe	0 (0.00)	7 (6.1)	7 (3.2)
Suicidal ideation	4 (33.3)	11 (9.6)	15 (6.9)
CES-DC	1 (25.0)	16 (13.9)	17 (7.8)
Total depression above clinical threshold	12 (11.7)	66 (43.5)	78 (35.8)
Clinical anxiety risk (of all positive PSC-17 screens)[a]			
SCARED short form	0 (0.0)	38 (33.0)	38 (29.7)
SCARED long form	—	2 (1.7)	2 (1.7)
Panic features	—	4 (3.5)	4 (3.5)
Posttraumatic stress features	—	3 (2.6)	3 (2.6)
Obsessive-compulsive features	—	4 (3.4)	4 (3.4)

Note. *CES-DC, Center for Epidemiological Studies Depression Scale for Children; CRAFFT, Car, Relax, Alone, Forget, Friends, Trouble; PHQ, Patient Health Questionnaire; PSC, Pediatric Symptom Checklist; SCARED, Self-Report for Childhood Anxiety Related Disorders.*
[a]Data about the type of anxiety (i.e., panic features, posttraumatic stress features, and obsessive-compulsive features) were not collected in practices guided by the paper algorithm.

results among practices guided by the paper algorithm is that the population of patients who completed the paper screens, which was less than the population of patients who completed screens at practices guided by the computer-assisted algorithm, may have been composed of patients flagged by PPC providers as displaying concern for anxiety or depression, thus driving up the rate of positive screening results.

In addition to a higher screening rate among PPC practices guided by the computer-assisted algorithm, we found a significantly higher rate of next-level assessments for screening results that were positive for depression and/or anxiety. All positive screening results identified through the computer-assisted algorithm received a next-level assessment, whereas far fewer positive screening results received next-level assessments through the paper algorithm. The successful performance of next-level assessments using a computer-assisted decision support tool in PPC represents a promising expansion of child health services. If systematically implemented, this expansion can help alleviate the stress of mental health systems to conduct next-level assessments on all children referred to them as a result of universal screening in primary care.

Despite success with the implementation of mental health screening, follow-up assessment, and documentation of family mental health history, the adoption of the clinical care algorithms in PPC required initial education and training, strong collaboration with community mental health services, and support in systematizing a screening process tailored to the office workflow. Adoption of the paper algorithm in PPC also required graduated implementation. Once the PPC practices implemented a systematic screening process, they steadily routinized it. Medicaid and private insurance reimbursement for depression and anxiety screening in PPC contributed as an incentive.

PPC providers expressed frustration over time constraints placed on well-child visits and their ability to address a myriad of health topics efficiently, effectively, and within the time allotted. Using a streamlined approach to assessment by combining two or three patient questionnaires into a one-page assessment (i.e., the PHQ-9, 5-Item SCARED, and CRAFFT, or the CES-DC and 5-Item SCARED, depending on patient age) reduced interference with office workflow and minimized the amount of extra patient completed forms while continuing to capture vital patient information.

In addition, the clinical care algorithms suggest scheduling a second problem-focused visit for patients with positive screening results for anxiety or depression disorders.

In summary, we described and evaluated the implementation of a quality improvement project designed to support task shifting among PPC providers through the implementation of a paper and computer-assisted clinical care algorithm and supporting toolkit. The results from this exploratory study highlight the feasibility of expanding the capacity of pediatric providers to address mental health concerns in primary care. Nearly all children who received care in the PPC practices in this study had a family mental health history documented in their medical records and received mental health screening, which for several children resulted in appropriate next-level assessment. Further, results have shown the potential value of electronic decision support systems to help pediatricians better address mental health.

Promising solutions and suggested next steps toward universal adoption of mental health screening in PPC include incorporating screening within electronic health record systems and securing collaborative relationships between PPC and mental health providers (i.e., psychiatric prescribing practitioners and other mental health professionals). The value of strong working relationships between PPC and mental health providers cannot be overstated. PPC providers will more readily expand their capacity to address mental health if they know that there are mental health providers in the community who are available for intervention and consultation services when needed.

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