Implementation of an Electronic Approach to Psychosocial Screening in a Network of Pediatric Practices

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Abstract

Objective: A network of 18 pediatric practice locations serving predominantly commercially insured patients implemented the electronic administration of the Pediatric Symptom Checklist-17 parent-report (PSC-17P) for all 5.50- to 17.99-year-old children seen for well child visits (WCVs) and wrote up the results as a quality improvement project. The current study investigated this screening over 2 years to assess its implementation and risk rates over time.

Methods: Parents completed the PSC-17P electronically before the visit and the scored data were immediately available in the patient's chart. Using billing and screening data, the study tracked rates of overall and positive screening during the first-year baseline (4 months) and full implementation phases of the project in the first (8 months) and second (12 months) year.

Results: A total of 35,237 patients completed a WCV in the first year. There was a significant improvement in PSC-17P screening rates from the first-year baseline (26.3%) to full implementation (89.3%; $P < .001$) phases. In the second year, a total of 40,969 patients completed a WCV and 77.9% (n = 31,901) were screened, including 18,024 patients with screens in both years. PSC-17P screening rates varied significantly across the 18 locations and rates of PSC-17P risk differed significantly by practice, insurance type, sex, and age.

Conclusions: The current study demonstrated the feasibility of routine psychosocial screening over 2 years using the electronically administered PSC-17P in a network of pediatric practices. This study also corroborated past reports that PSC-17 risk rates differed significantly by insurance type (Medicaid vs commercial), sex, and age group.

Keywords: Pediatric Symptom Checklist; PSC-17; pediatric primary care; psychosocial screening

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What's New

The current study demonstrated the feasibility of routine psychosocial screening over 2 years using an electronically administered version of the Pediatric Symptom Checklist-17 in a network of 18 predominantly middle-class pediatric practice locations and corroborated the influence of insurance type, sex, and age on psychosocial risk.

Nearly one-quarter of children and adolescents under 18-years-old have mental and/or behavioral health (BH) conditions which significantly impact daily functioning.[1−3] According to data from the 2016 National Survey of Children's Health, the most common diagnoses among children are behavioral or conduct disorders (7.4%), anxiety disorders (7.1%), and depressive disorders (3.2%).[4] Although psychosocial problems are prevalent across development and may be rising,[5] only about half of children with psychosocial problems are identified by a clinician as having significant impairments.[6−8] Therefore, increasing the early identification of children with BH problems has been repeatedly recommended, especially within the context of pediatric primary care. Since nearly 90% of youth in the United States see a pediatric provider annually, the primary care office provides one of the most accessible sites for widespread BH screening.[9]

Since 2007, the Massachusetts Medicaid program has required and reimbursed screening for psychosocial problems for all pediatric well-child visits (WCVs).[10] Studies researching this mandate[11−16] have demonstrated its feasibility and utility in increasing rates of BH treatment for

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at-risk youth.[12–14,17] The American Academy of Pediatrics (AAP) and the National Quality Forum (NQF) have also endorsed routine pediatric psychosocial screening.[18,19]

Following the United States Preventive Services Task Force (USPSTF), the AAP,[20,21] and NCQA (National Committee of Quality Assurance) HEDIS (Healthcare Effectiveness Data and Information Set) recommendations,[22] adolescent depression screening has been implemented more widely in routine pediatric primary care recently.[23,24] Most studies investigating the impact of screening recommendations have been completed in predominantly Medicaid-insured samples,[13,17,25] highlighting the need to study its feasibility in commercially insured youth.

The widespread implementation of electronic medical records (EMRs), many with an option to collect patient-recorded outcome measures (PROMs) using tablets in the waiting room or online previsit, represents a significant advance over previous paper-based approaches. It is now possible to upload scores to the patient's EMR for the clinician to review prior to or during a visit and to obtain evidence of a completed screen for quality assurance or research purposes.

One of the most frequently used screens for psychosocial problems is the Pediatric Symptom Checklist (PSC), which assesses pediatric patients' overall (OVR) psychosocial functioning as well as internalizing (INT), externalizing (EXT), and attention (ATT) problems.[26–28] In 2015, the parent-version of the PSC-17 (PSC-17P) became fully functional for administration and scoring in the Mass General Brigham (MGB) EMR PROMs system. In 2017, the Department of Pediatrics made the PSC-17's administration during WCVs a part of its recommended care for all children ages 5.5 to 17.99 across all outpatient locations at Massachusetts General Hospital (MGH). The standard applied to patients with commercial insurance as well as to those with Medicaid. Concurrently, a network of MGH-Affiliated Pediatric Practices (APP) serving predominantly suburban, commercially insured patients followed suit. In both networks, the standard of care also included screening younger and older children with measures other than the PSC-17P; however, the current paper's focus was exclusively 5.5- to 17.9-year-old children and the PSC-17P.

The current study assessed the implementation of the electronic PSC-17P screening protocol in this network of 15 independently owned, community-based practices in 18 locations in the APP. The network used this clinical expansion to conduct a quality improvement (QI) project for an American Board of Pediatrics Maintenance of Certification (MOC) for some of its physicians. Since routine psychosocial screening is mandated by Medicaid and recommended by the AAP and other standard-setting agencies, pediatric practices could satisfy American Board of Pediatrics MOC QI requirements by establishing a practice-level project that implemented, monitored, and assessed psychosocial screening rates.[29] The network was responsible for formalizing the screening procedure and training staff in using the tablets, accessing the scored data, and interpreting scores. Physicians from each practice were responsible for monitoring and documenting the results to obtain MOC credit. Although the MOC project was originally planned for one year, an additional year of follow-up was added after it ended to provide data on longer term, more routine trends for the current project. An external research team, led by the first author (J.M.M.), had access to this data and conducted additional analyses for the current paper.

The goals of the study included assessing the feasibility of electronically administered PSC-17Ps at all pediatric WCVs and evaluating psychosocial risk, the monitoring and writing up of which became the subject of a QI project for participating physicians. The current study specifically investigated the following research questions: 1) In 2018, did screening rates significantly change across the first year of the QI? 2) In 2019, did rates of electronic screening significantly change compared to 2018? 3) Did electronic screening rates differ significantly by practice location? 4) Was there a relationship between practice-level WCV screening rates and PSC-17P risk rates in the practice's patient population? 5) What was the prevalence of risk on the PSC-17P's OVR, INT, EXT, and ATT scales? 6) Among patients who were screened in both years, how did risk rates on the PSC-17P change from 2018 to 2019? 7) Did risk rates on the PSC-17P differ by patient demographic factors (insurance type, sex, and age)?

METHODS

PARTICIPANTS AND DATA ACQUISITION

The current study analyzed electronic PSC-17P item and subscale data as well as WCV billing data. PSC-17P screens were collected from parents on iPads in the waiting room or online from home pre-WCV and automatically scored and stored in the patient's EMR. When the PSC-17P was completed by the parent (pre-WCV), the PSC-17P was computer-scored to produce the OVR, INT, EXT, and ATT scale continuous and categorical (risk/no risk) scores. These scores and individual item data were displayed instantaneously in the synopsis section of the EMR along with data on other vital signs. This information was also displayed in the visit progress note where it was available to the clinician to review previsit and during the visit with patients and their parents. All output is color coded so that risk scores can be clearly seen. It may be important to note that all practices had access to mental health professionals on site as well as experience with screening prior to this project.

SETTING

All practices in the network are independent with their own clinicians and administrative staff but share the same EMR (Epic, Verona, Wisc), billing infrastructure, data warehouse, and some upper-level administrators. In the current study, front desk staff at each location provided patients' parents with iPads and instructed them in their use. Patients were asked to arrive at their appointment 10 to 15 minutes early to complete the electronic screens.

Although the PSC-17P was the chosen psychosocial screen for school-aged children, parents of all patients aged 2 to 65 months old were asked to fill out the Survey of Well-being for Children,[30,31] and patients between 18-22-years-old were asked to self-complete a Patient Health Questionnaire. An asthma severity measure was also required for all patients with this diagnosis.

Billing data for all WCVs in Affiliated Pediatric Practices between 2018 and 2019 provided the denominator for the current study. Billing data were merged with PSC-17P screening data and demographic data. Billing, PROMs, and demographic data were pulled from a common electronic data warehouse for all patients' ages 5.50 to 17.99 years old that were seen for a WCV between January 1, 2018 and December 31, 2019. The data were pulled by 2, MGB-employed staff that had direct access to the billing and PROMs data. The study was approved by the MGB Institutional Review Board as secondary use, nonhuman subject's research, and data use agreements were fully executed between the MGH research team and each of the practices before the data were shared.

Electronic Screening Rollout and Implementation

The study was completed in 3 phases. Phase 1 included a 4-month baseline period between January 1 and April 31, 2018 during which all practices were required to complete online trainings and receive start-up visits from a technical team that installed the iPads and instructed front desk staff in their distribution, retrieval, and maintenance. The functionality of electronic PSC-17Ps with scoring in Epic went live on or about January 1, 2018 for all sites, although, it took several months for all practices to complete all of the steps above. Most practices had been administering paper-and-pencil versions of the PSC-17Ps during at least some WCVs before 2018. Since this was not tracked, the current study was unable to identify the true base rate of PSC-17P screening at WCV. Thus, the function of phase 1 was to delineate a washout period after which the calculation and comparison of screening rates during full implementation would be meaningful.

By the target date of May 1, all practices were prepared to routinely administer PSC-17P screens on iPads pre-WCV (or, in a small number of cases, online via a patient portal if the parent preferred). The full implementation phase (phase 2), therefore, consisted of the time from May 1, 2018 to December 3, 2018. Although the QI project was officially over at the end of phase 2, the practices elected to continue the screening protocol as the clinical standard of care throughout 2019 (phase 3), and for the purpose of this study, screening rates were also tracked during this follow-up phase.

In addition to MOC credit, there were other incentives for participating physicians to screen. Practices can bill for and receive a reimbursement of about $10 to $20 per completed screen from Medicaid and most commercial insurers. Additionally, in 2018, administering the age-appropriate psychosocial screening form at every WCV was one of a half dozen or so other QI goals (eg, administering vaccines and obtaining age-appropriate labs) for which clinicians received small incentive bonuses if met. In 2019, both reimbursements to the practice for each screen and QI incentives to the physician remained in place. In the present analyses, screening rates were compared across phases 1−3 in which screening continued to be implemented as a routine practice.

The PSC

As noted, the PSC-17P was used to assess patient psychosocial functioning at all WCVs. The PSC-17P assesses risk for OVR psychosocial functioning and specific INT, EXT, and ATT problems.[1] Parents were asked to assess the child's functioning on 17 Likert-scaled items which are scored 0 ("never"), 1 ("sometimes"), or 2 ("often"). PSC-OVR risk is defined as a score ≥15 and indicates a positive screen. PSC-INT risk is assessed based on a cut-off score ≥5, and PSC-EXT and PSC-ATT risk are defined as scores of ≥7.[1] The PSC (both 17-item and 35-item version) has been validated in diverse patient populations and has also been translated into more than 30 languages.[32] The PSC has been endorsed by the National Quality Forum, is free to use, and available for download or electronic completion at https://www.massgeneral.org/pediatric-symptom-checklist/.

Statistical Analysis

Most analyses were performed using SPSS version 24 (IBM Corp, Armonk, NY). Descriptive statistics were computed for demographic data (means, standard deviation, frequencies). All significance tests were two-tailed with an alpha level of 0.05. Independent samples *t* tests and ANOVAs were run on interval scaled or ordinal data (ie, PSC scores and demographics). Chi-square analyses were conducted to compare categorical screening and risk outcomes as well as longitudinal change in risk. We used the intraclass correlation coefficient (ICC) to assess for potential site effects within the 18 practice locations. The ICC assesses the proportion of total variance in screening rate that is accounted for by site variation. Higher ICC implies that the between site variation (signal) is higher than the within site variation (noise).The R version 3.6.1 package "ICCbin" was used to compute Fleiss-Cuzick estimates of the ICC and 95% confidence interval (CI).[33,34]

Results

Study Demographics

In calendar years 2018 and 2019, 76,206 WCVs were completed across the 18 practice locations, including 35,237 WCVs in the first year and 40,969 WCVs in the second. A majority (85.0%) of WCVs were with physicians, over 100 of whom participated, with the remaining 15.0% completed by registered nurses or nurse practitioners in both years.

Table 1. Screening Rates and Positive Rates by Phase

	Screening Rates at WCV by Phase (%)		
	Phase 1	Phase 2	Phase 3
Average	26.1%	89.3%*,†	77.9%*,‡,§
Range between practices	14.2-52.4% *,‖	70.2-96.0%*,¶	52.4-84.8%*,#

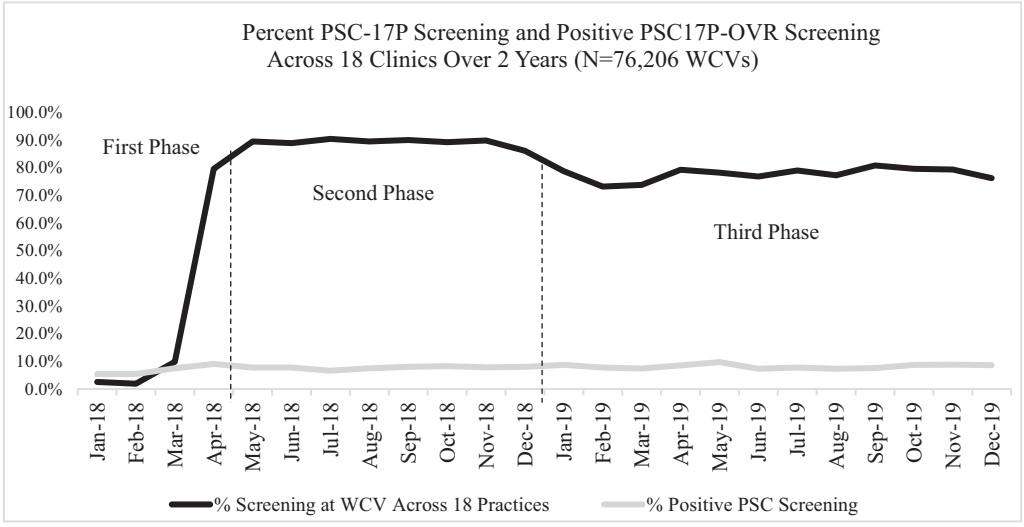
	Positive Screening Rates by Phase (%)		
	Phase 1	Phase 2	Phase 3
Average	8.7%	7.7%††	8.1%‡‡,§§
Range between practices	5.6-16.9%‖‖	4.6-12.8%*,¶¶	4.3-11.5%*,##

WCV indicates well child visits.
*$P < .001$.
†(26.1% *vs.* 89.3% *vs.* 77.9%); $\chi^2(2) = 15026.15$, $P < .001$.
‡(26.1% *vs.* 89.3%); $\chi^2(1) = 13758.23$, $P < .001$.
§(89.3% *vs.* 77.9%); $\chi^2(1) = 1418.76$, $P < .001$.
‖$\chi^2(17) = 328.78$, $P < .001$.
¶ $\chi^2(17) = 1192.86$, $P < .001$.
# $\chi^2(17) = 1352.29$, $P < .001$.
††(8.7% *vs.* 7.7%); $\chi^2(1) = 3.24$, $P = .072$.
‡‡(7.7% *vs.* 8.1%); $\chi^2(1) = 3.55$, $P = 0.059$.
§§(8.7% *vs.* 8.1%); $\chi^2(17) = 5.44$, $P = .066$.
‖‖$\chi^2(17) = 27.35$, $P = .053$.
¶¶$\chi^2(17) = 103.45$, $P < .001$.
##$\chi^2(17) = 127.95$, $P < .001$.

SCREENING BY PHASE

Table 1 shows the percentage of WCVs with completed PSC-17Ps across the 3 phases. The percentage of WCVs with electronically administered screens increased from 26.3% during phase 1 to 89.3% in phase 2 to 77.9% during phase 3. The difference in overall screening rates across the phases was significant ($\chi^2[2] = 15026.15$, $P < .001$) with rates significantly increasing from phase 1 to phase 2 (26.1% vs 89.3%, $\chi^2[1] = 13758.23$, $P < .001$) and decreasing between phases 2 and 3 (89.3% vs 77.9%, $\chi^2[1] = 1418.76$, $P < .001$). Significant differences for screening rates across practices were found by phase (range from 14.2%−52.4% in phase 1; 70.2%−96.0% in phase 2 and 52.4%−84.8% phase 3; $P < .001$; Table 1). Rates of positive screening significantly differed among the 18 locations by year, ranging from to 5.0%−12.7% in 2018 ($\chi^2[17] = 82.64$, $P < .001$) and 4.2%−10.7% in 2019 ($\chi^2[17] = 71.25$, $P < .001$) and also in phases 2 and 3 (phase 2: 4.6%−12.8%, $\chi^2[17] = 103.45$, $P < .001$; phase 3: 4.3%−11.5%, $\chi^2[17] = 127.95$, $P < .001$; Table 1, Figure).

The demographic characteristics of patients with completed PSC-17P screens are reported in Table 2 for 2018



Note: First Phase = January – April 2018; Second Phase = May – December 2018; Third Phase = January – December 2019

Figure. *Percent PSC-17P screening and positive PSC17P-OVR screening across 18 clinics over 2 years (N = 76,206 WCVs)* Note: *First Phase = January – April 2018; Second Phase = May – December 2018; Third Phase = January – December 2019.*

Table 2. Demographics of First Year (2018) vs Longitudinal (2018–2019) Samples of Patients With a Completed PSC-17P at WCV

	2018 (N = 25,667) *N (%)*	2018 + 2019 (N = 18,024)* *N (%)*
Age†		
5.50–11.99 years old	13,096 (51.0)	10,102 (56.0)
12.00–17.99 years old	12,571 (49.0)	7,922 (44.0)
Sex		
Male	13,347 (52.0)	9,380 (52.0)
Female	12,320 (48.0)	8,644 (48.0)
Language		
English	23,314 (99.0)	16,468 (99.1)
Non-English	244 (1.0)	157 (0.9)
Insurance type‡		
Commercial	18,786 (80.9)	13,593 (83.5)
Medicaid	4,436 (19.1)	2,691 (16.5)

*Longitudinal frequencies reported at baseline (2018).

†10.1% (n = 1,819) of the longitudinal cohort shifted from children (5.5–11.99) to adolescents (12.00–17.99) from the first to second year.

‡1.5% (n = 263) of patients changed from Medicaid or Commercial insurance from the first to second year (n = 129 Commercial to Medicaid and n = 134 Medicaid to Commercial).

and for the cohort of patients with longitudinal (2018 and 2019) PSC-17P screens. In 2018, 51.0% of patients were 5.5 to 11.99 years old and the rest were 12.00 to 17.99 years old. Slightly over half (52.0%) were male, over three-quarters (80.9%) were commercially insured, and 99.1% had English as their primary language. In 2018, positive screening rates were 7.8% on the PSC-OVR, 10.0% on the PSC-INT, 4.9% on the PSC-EXT, and 8.2% on the PSC-ATT. In 2019, 7.7% scored at-risk on the PSC-OVR, 10.9% on the PSC-INT, 4.1% on the PSC-EXT, and 8.4% on the PSC-ATT (Table 3).

Of the 25,667 patients screened in 2018, 18,024 (70.2%) completed a second screen in 2019 (longitudinal cohort). Column 2 of Table 2 details the demographic characteristics of patients in the longitudinal cohort: 56.0% of patients were of age 5.5 to 11.99 years old, 52.0% were male, 83.5% were commercially insured, and 99.1% had English as their first language.

Longitudinal PSC-17P Scores and Risk

Table 4 shows risk classification for 2018–2019 for the 4 PSC scales in the longitudinal sample. Of the 1,394 patients who were screened at-risk on the PSC-OVR scale during 2018, just over half (51.4%) remained at-risk in 2019. Of the 16,680 patients not at-risk in 2018, 703 (4.2%) became at-risk in 2019 ($\chi^2[1] = 3882.92$, $P < .001$). On the PSC-INT, 52.2% of the 1,662 at-risk patients remained at-risk in 2019, and 6.7% of the 16,362 patients who were not at-risk on the first screen became at-risk on the second ($\chi^2[1] = 3204.88$, $P < .001$). On the PSC-ATT subscale, 55.1% of the 1,399 at-risk patients remained at-risk, and 4.5% became at-risk ($\chi^2[1] = 4275.94$, $P < .001$). On the PSC-EXT, only 39.9% of the 888 at-risk patients were at-risk in both years and 2.2% became at-risk in 2019 ($\chi^2[1] = 3043.35$, $P < .001$; Table 4).

Table 3. PSC-17P Risk Rates## among the Longitudinal Sample (N = 18,024)

	PSC-17P-OVR (+) *N (%)*	PSC-17P-INT (+) *N (%)*	PSC-17P-EXT (+) *N (%)*	PSC-17P-ATT (+) *N (%)*
Age†††				
5.50-11.99 years old	849 (8.4)*,†	773 (7.7)*,‡	656 (6.5)*,§	899 (8.9)*,‖
12.00-17.99 years old	495 (6.2)	889 (11.2)	232 (2.9)	500 (6.3)
Sex				
Male	882 (9.4)*,¶	845 (9.0)	593 (6.3)*,#	958 (10.2)*,††
Female	462 (5.3)	817 (9.5)	295 (3.4)	441 (5.1)
Language				
English	1,256 (7.6)	1,542 (9.4)	810 (4.9)	1,290 (7.8)
Non-English	7 (4.5)	11 (7.0)	12 (7.6)	8 (5.1)
Insurance Type‡‡‡				
Commercial	838 (6.2)	1,154 (8.5)	553 (4.1)	892 (6.6)
Medicaid	352 (13.1)*,‡‡	333 (12.4)*,§§	232 (8.6)*,‖‖	356 (13.2)*,¶¶

*$P < .001$.

†$\chi^2(1) = 29.91$, $P < .001$.

‡$\chi^2(1) = 67.60$, $P < .001$.

§$\chi^2(1) = 120.49$, $P < .001$.

‖$\chi^2(1) = 41.53$, $P < .001$.

¶$\chi^2(1) = 107.36$, $P < .001$.

#$\chi^2(1) = 81.28$, $P < .001$.

††$\chi^2(1) = 164.16$, $P < .001$.

‡‡$\chi^2(1) = 158.60$, $P < .001$.

§§$\chi^2(1) = 40.86$, $P < .001$.

‖‖$\chi^2(1) = 101.49$, $P < .001$.

¶¶$\chi^2(1) = 141.10$, $P < .001$.

##Longitudinal risk reported at baseline (2018).

†††10.1% (n = 1,819) of the longitudinal cohort shifted from children (5.5–12.0) to adolescents (12.01–17.99) from the first to second year.

‡‡‡1.5% (n = 263) of patients changed from Medicaid or Commercial insurance from the first to second year (n = 129 Commercial to Medicaid and n = 134 Medicaid to Commercial).

Table 4. Comparison of Risk and Not Risk Classifications on PSC-17P Scales over Two Years in the Longitudinal Sample (N = 18,024)

	PSC-17P-OVR*	
	2019 No Risk *(N, %)*	2019 Risk *(N, %)*
2018 No Risk *(N, %)*	15,977 (95.8)	703 (4.2)
2018 Risk *(N, %)*	653 (48.6)	691 (51.4)
	PSC-17P-INT†	
	2019 No Risk *(N, %)*	2019 Risk *(N, %)*
2018 No Risk *(N, %)*	15,259 (93.3)	1,103 (6.7)
2018 Risk *(N, %)*	794 (47.8)	868 (52.2)
	PSC-17P-EXT‡	
	2019 No Risk *(N, %)*	2019 Risk *(N, %)*
2018 No Risk *(N %)*	16,752 (97.8)	384 (2.2)
2018 Risk *(N %)*	534 (60.1)	354 (39.9)
	PSC-17P-ATT§	
	2019 No Risk *(N, %)*	2019 Risk *(N, %)*
2018 No Risk *(N, %)*	15,875 (95.5)	750 (4.5)
2018 Risk *(N, %)*	628 (44.9)	771 (55.1)

*$\chi^2(1) = 3882.92$, $P < .001$.
†$\chi^2(1) = 3204.88$, $P < .001$.
‡$\chi^2(1) = 3043.35$, $P < .001$.
§ $\chi^2(1) = 4275.95$, $P < .001$.

ICC analyses did not find a meaningful site effect among practices in 2018. The ICC for screening rate in the 18 practices was 0.045 (95% CI, 0.00−0.32), meaning that the proportion of total variance in screening rate that was accounted for by practice variation was 4.5%. As this proportion is <10%, between-practice screening rate differences fell below the level that is considered meaningful.[33,34] Similarly, the ICC for positive screening rate in the 18 practices was 0.004 (95% CI, 0.00−0.11). The proportion of total variance in positive screening rate that was accounted for by practice variation was 0.4%, again <10%, and again suggesting that between-practice positive screening rate differences were not meaningful.

Discussion

The current study assessed the implementation of a fully electronic system for psychosocial screening using the PSC-17P for all WCVs with 5.5 to 17.99-year-old outpatients in a network of outpatient pediatric practices. This was the first study to track the implementation of screening at scale in a network that serves predominantly middle class, commercially insured patients. Results showed that implementation was feasible with screening rates significantly increasing from 26.3% at baseline to 89.3% during the rest of the first year. Results also suggested sustainability of the approach with an overall screening rate close to 80% throughout the second year. Screening rates significantly differed across locations within all phases, demonstrating that certain practices screened more than others. Risk on the PSC-17P overall scores showed prevalence patterns for age, sex, and insurance groups that were similar to those reported in a study of a large, nationally representative sample that used the PSC-35P.[35] Prevalence of positive scores on the 3 subscales was also similar to those reported for the same national sample.[1]

Feasibility of Electronic Screening Using the PSC-17P

The current study took place in a network of 18 pediatric practice locations and included over 100 participating primary care clinicians. In phase 1, only 1 practice had screened 50.0% of its patients annually. Conversely, during phase 2, only 4 practices screened below 90.0%, and no practice screened below 70.0%. In phase 3, screening rates remained relatively high with a majority (10 of 18) of practices still screening over 80.0% of patients. Differences in screening rates may have been influenced by some pediatricians having more experience, a greater appreciation for psychosocial screening, and/or a familiarity with screening based on prior experience with paper-and-pencil screening.

PSC-17P Risk Prevalence and Persistence

Rates of PSC-17P risk differed significantly by patient age, sex, and insurance type. Younger patients and male patients were proportionally more likely to be at-risk on the PSC-ATT, PSC-EXT, and PSC-OVR, and older and female patients were more at-risk on the PSC-INT. Medicaid-insured patients were significantly more at-risk on all scales of the PSC-17P compared to commercially insured patients. These findings identify vulnerable subpopulations of pediatric outpatients in a large, primarily commercially insured network.

Similarly, previous studies utilizing the PSC to screen for psychosocial problems in pediatrics have found a strong relationship between insurance type and PSC risk with patients from lower socioeconomic groups or with Medicaid insurance showing higher rates of PSC risk.[3,28] The current study's findings add to the evidence indicating heightened risk for psychosocial difficulties for children from low-income families, given that the population of Medicaid-insured patients had significantly higher PSC-17P risk rates across both years compared to the commercially-insured pediatric sample. In fact, the proportion of risk on nearly all the PSC-17P scales was about double in the Medicaid-insured patients compared to those who were commercially insured. More research is needed to determine optimal methods of improving psychosocial outcomes for groups at heightened risk. Finally, it is noteworthy that almost half of all patients who screened positive on the PSC continued to be positive one-year later, suggesting that scheduling follow-up visits and/or rescreening 2 to 3 months after the initial positive screen should be considered, given that this is congruent with the latest HEDIS/NCQA recommendations for depression screening.[22]

LIMITATIONS AND FUTURE RESEARCH

First, the network of pediatric practices reported on in this paper was most likely not representative of a commercial network in a national sample. While the number of practices and patients were relatively large, the network was located in an area with a long history of and, consequently, greater familiarity with psychosocial screening.

Second, electronic screening requires the purchasing and maintenance of iPads or other devices to administer the screens as well as technical support to set-up and maintain the devices. These requirements may make it more difficult for practices with fewer resources to initiate electronic screening programs and may also suggest that the network described in this study was atypical. In relation to finances, however, it should be noted that a recent study has demonstrated the feasibility of a comparable electronic screening system in a clinic that serves primarily low-income families.[25]

A third limitation of the current study is that it was located in Massachusetts where psychosocial screens for children with both Medicaid and commercial insurance are reimbursed at a rate of about $10 to $20 per screen, which can be viewed as a relatively strong incentive for practices to try to screen all eligible children. Additionally, during 2018, individual clinicians were provided with small financial incentives for participating in this as well as other QI projects. Although these incentives may have contributed to the high screening rates, especially during 2018, it is important to note that screening rate increases of nearly the same magnitude were reported in the aforementioned study[25] and others[36,37] where clinicians did not receive incentives.

A final limitation was the inability to obtain data on BH service utilization in patients pre- and postscreening. Although this would have provided important information about the clinical impact of screening, we did not have access to data on BH service use since in this fee for service system, most patients were able to have mental health services billed to their insurance without the knowledge of their primary care pediatricians.

Future research should investigate how clinicians utilize the data collected on the PSC-17P to inform clinical care, and whether, as may be hoped, more aggressive follow-up and earlier treatment are associated with better outcomes.

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