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Systematic Review: Child Psychiatry Access Program Outcomes

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Abstract

Objective: There has been an increase in Child Psychiatry Access Programs (CPAP) across the United States to address the national child and adolescent psychiatry workforce shortage by supporting pediatric primary care providers (PCPs) in providing mental health services. The objective of this systematic review is to synthesize the expanding literature on CPAPs.

Method: A systematic literature search was conducted in PubMed, PsycInfo, Embase, and Web of Science databases to identify articles published from database inception to April 6, 2022,

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to identify CPAPs, defined as programs with mental health specialists providing rapid remote mental health consultation services to pediatric PCPs. Study outcomes included program adoption, provider experience, patient and caregiver experience, program cost, and patient mental health.

Results: None of the 33 included studies were randomized controlled trials. Most of the studies (n = 30) focused on program adoption and provider experience (n = 18). Few studies examined patient and caregiver experience (n = 2), program cost(n = 4), or patient mental health (n = 4) outcomes. CPAPs showed year-over-year growth in adoption and were generally well-received by providers and caregivers. Health care provision costs were quite varied. No articles reported on changes in patient mental health according to validated measures. Heterogeneity in the methodological quality, study design, and outcomes used to evaluate CPAPs hindered comparison among programs.

Conclusion: Rigorous research on the impact of CPAPs is lacking. Findings show high provider satisfaction with CPAPs, yet few studies examine patient-level mental health outcomes. CPAPs and funding agencies should consider prioritizing and investing in research to build the evidence base for CPAPs.

Diversity & Inclusion Statement: One or more of the authors of this paper self-identifies as a member of one or more historically underrepresented racial and/or ethnic groups in science. We actively worked to promote inclusion of historically underrepresented racial and/or ethnic groups in science in our author group. One or more of the authors of this paper self-identifies as a member of one or more historically underrepresented sexual and/or gender groups in science.

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Keywords

child psychiatry; pediatrics; primary care; mental health services; referral and consultation

More than 15% of children younger than 18 years in the United States (US) have a mental health disorder, yet only about one-half of them successfully seek out and receive treatment.[1,2] A national workforce shortage of mental health professionals,[3,4] including child and adolescent psychiatrists,[5,6] has increased the need for pediatric primary care providers (PCPs) to offer mental health services for children; therefore, PCPs diagnose most mental health conditions in children[7,8] and provide sole care for one-third of pediatric mental health patients in outpatient settings.[9] Nevertheless, PCPs have often cited inadequate training in child and adolescent psychiatry and discomfort in providing mental health treatment for children as barriers to providing mental health care in primary care settings.[10,11] Moreover, primary care treatment plans and prescribing practices are more likely to deviate from best-practice guidelines.[12,13]

Child psychiatry access programs (CPAPs)—defined as centralized programs offering rapid remote pediatric mental health consultation for PCPs—are a coordinated care[14] approach to addressing mental health workforce and access challenges by helping PCPs enhance their capacity to manage mental health conditions in primary care settings.[15–17] The

first statewide CPAP started in Massachusetts through state legislature funding for the Massachusetts Child Psychiatry Access Project (MCPAP) in 2004–2005 and sought to improve access to pediatric mental health care by "supporting the role of the [PCP] as a legitimate front-line mental health provider" and "bridging the large gaps between mental health systems and primary care systems."[18] A mental health team consisting of a child psychiatrist, a psychotherapist, and a care coordinator staffed each of the 6 regional MCPAP telephone hotlines, located in medical centers throughout the state and organized in a hub-and-spoke configuration, and fielded clinical questions about individual patient cases from PCPs in real time so that recommendations could be communicated to patients and families while they were still in the clinic.[18]

Since MCPAP's start, CPAPs have become increasingly popular, spreading to 46 states across the US by 2022,[19] most serving a geographically defined region ranging from several counties to the entire state. While many CPAPs have core services typically consisting of same-day telephonic consultations with a child psychiatrist, patient care coordination and referral assistance, and continuing provider education for PCPs, there is considerable variation and innovation in the services they provide.[20] For example, some programs provide direct face-to-face and telehealth patient evaluations,[21] brief mental health treatment,[22] and even medication reviews for polypharmacy.[12,23] Similarly, there is variation in the way that care coordination and referral assistance are provided; for example, some CPAPs offer patients and families direct assistance from a behavioral health consultant[24], whereas others provide PCPs with referral assistance.[12] There is also a range of continuing provider education offerings, from regional provider educational conferences[25] and intensive week-long institutes[26] to Project Extension for Community Healthcare Outcomes (Project ECHO) knowledge-sharing and capacity-building initiatives.[27]

Funding mechanisms for CPAPs also vary by program and have been heterogeneous, including private philanthropy, state grants or contracts, Medicaid, and commercial insurance.[28] This heterogeneity reflects the patchwork of funding and sustainability concerns that many programs face when funding is limited and vulnerable to discontinuation. Since 2018, the US Health Resources and Services Administration's (HRSA's) Pediatric Mental Health Care Access program has provided $22.9 million in federal funds to expand and support CPAPs across 43 states, with another $80 million announced in 2022 to expand the CPAP model from primary care settings to schools and emergency rooms over the next 4 years.[29] Although HRSA funding has been instrumental in helping spread the CPAP model throughout the US, the HRSA grant period is only 5 years for each program. Without a clear payment model to fund child psychiatrists' time spent on pediatric consultation, programs will continue to be challenged with sustainability concerns.[28]

Previous systematic reviews of pediatric integrated and coordinated care models have not typically incorporated CPAPs.[30–33] To our knowledge, there are only 2 reviews that have included CPAPs. A 2019 scoping review by Spencer *et al.* examined 8 implementation outcomes adapted from the Proctor implementation science framework[34] (ie, acceptability, adoption, appropriateness, cost, feasibility, fidelity, penetration, and sustainability) for off-site integrated care models, including CPAPs, which the authors categorized as indirect

remote integrated care models.[35] They reported on 17 CPAP studies and found high acceptability and increasing adoption of CPAPs in the US, but did not specifically address patient- and provider-level outcomes, which was not the focus of their review. A 2020 systematic review by Bettencourt and Plesko focused on the methods and metrics used to evaluate CPAPs in the US.[20] They found 29 studies evaluating 13 unique CPAPs, with many studies examining service utilization (82.8%) and provider satisfaction (48.3%) and fewer studies examining patient outcomes (13.7%) and family satisfaction (6.9%). Because the purpose of the Bettencourt and Plesko review was to summarize the methods used to evaluate CPAPs, it did not attempt to synthesize study results or evaluate clinical outcomes.

The substantial expansion of CPAPs since publication of the reviews by Bettencourt and Plesko and Spencer *et al.* warrants an updated comprehensive review of the evidence regarding CPAP implementation and program outcomes, including patient-level clinical outcomes. The aims of this systematic review are: 1) to assess the implementation outcome of program adoption, as defined by Proctor *et al.*,[36] and 2) to examine the impact of CPAPs on provider experience, patient and caregiver experience, program cost, and patient mental health outcomes, which are adapted[37] from the Institute of Healthcare Improvement Triple Aim[38,39] and Bodenheimer and Sinsky's Quadruple Aim of Healthcare.[40] To our knowledge, this is the first systematic review to synthesize the evidence on both the implementation and the clinical impact of CPAPs, thereby identifying areas for future research.

METHOD

Procedures

A systematic search of the literature was conducted in PubMed, PsycInfo, Embase, and Web of Science to identify articles published from database inception to April 6, 2022. With the help of a research librarian specializing in systematic reviews, we developed a search strategy using terms related to CPAPs that combined concepts regarding primary care and pediatrics, children and adolescents, psychiatric and behavioral health care, and remote and teleconsultation. (Full details on search strings are included in Table S1, available online.) We also identified individual CPAP names through 2 websites related to the National Network of Child Psychiatry Access Programs[19,41] and then searched for each program through Google Scholar to identify any additional articles. We additionally searched through relevant conference abstracts and grant documents. We augmented this search strategy with a manual review of the reference lists of each included manuscript. We followed the PRISMA guidelines[42] and a predefined protocol registered at the PROSPERO International Prospective Register of Systematic Reviews database (registration number: CRD42020146410), specifying outcomes a priori.

Studies had to meet the following inclusion criteria: 1) report on a CPAP, defined as a program consisting of mental health specialists (including at least 1 child and adolescent psychiatrist) providing rapid (same or next day) remote (telephone or videoconference) mental health consultation services to PCPs who treat pediatric or transitional-age patients (0–24 years), 2) provide empirical data on one or more of the outcomes of interest detailed below, and 3) appear in an English-language peer-reviewed journal. We included articles

discussing programs that offered a combination of in-person and remote consultation services if data on remote consultation were presented separately from data on in-person consultation. We included only studies on programs based in the US. We excluded reviews, editorials, newsletters, dissertations, grant proposals, and abstract-only articles.

We uploaded all search results to Rayyan, an online systematic review assistance software program, and removed duplicates.[43] One author (M.B. or B.L.) screened all articles for inclusion eligibility based on title and abstract. Two authors (C.M.L. and either M.B. or B.L.) then conducted full-text review of the remaining articles to determine whether they met inclusion criteria. A third author (J.Y.) resolved any disagreements.

Two authors (C.M.L. and M.B. or B.L.) independently extracted data for the complete set of included studies with the use of a shared template. Information extracted from each study included program characteristics (program name, inception, location, geographic scope, and service offerings), study characteristics (author and publication year, study type, time frame, and participants), and any measures related to our 5 study outcomes of interest (as detailed below).

Two authors (C.M.L. and M.B. or B.L.) independently assessed the quality of the included studies with the use of the Mixed Methods Appraisal Tool (MMAT), which allows for the appraisal of a range of study designs, which the MMAT categorizes as 1) qualitative, 2) quantitative randomized controlled trial, 3) quantitative nonrandomized, 4) quantitative descriptive, and 5) mixed methods.[44,45] For each included article, the MMAT asked 7 questions related to methodology and study design, with “yes,” “no,” and “cannot tell” as possible answers. (Full details on the MMAT questions are included in Table S2, available online.) Studies with 6 or 7 questions answered “yes” were designated as high-quality; those with 4 or 5 “yes” responses were designated as medium-quality; and those with 3 or fewer were designated as low-quality. We followed the stated MMAT criteria in our study quality designations.

We characterized study outcomes and mapped them to the following domains: 1) program adoption, 2) provider experience, 3) patient and caregiver experience, 4) program cost, and 5) patient mental health. Program adoption is an implementation outcome, defined by Proctor *et al.* as the extent to which the intervention is used, such as the number of consultations provided or unique patients referred to or consulted on by the CPAP.[36] The next 4 program outcomes are adapted from the Quadruple Aim.[40] Provider experience outcomes included provider satisfaction with CPAP services, changes in provider knowledge, confidence, and practice following CPAP telephone consultation or education, and provider burnout and stress. Patient and caregiver experience outcomes included patient and caregiver satisfaction with CPAP services directly or indirectly through the PCP. Program cost outcomes included direct or indirect measures of cost and outcomes that could potentially generate savings (eg, changes in health care provision costs attributable to CPAPs). Patient mental health outcomes include any subjective or objective measures of change in patient mental health (eg, subjective report that “situation improved” or improvement in rating scale score) from before consultation to after consultation, as determined by PCPs, caregivers, or patients themselves.

Final Sample

The database search yielded 12,576 articles after removing duplicates. After screening based on titles and abstracts, 145 articles were retrieved and assessed for eligibility. During full-text review, we excluded 114 articles, leaving 31 for inclusion. We identified an additional 2 articles for inclusion after manual citation review. Ultimately, we included 33 articles in our analysis.[12,15–18,21–27,46–66] Search results are shown in the PRISMA diagram in Figure 1.

RESULTS

The 33 included articles discussed 11 CPAPs across 10 different states (Table 1). Of the 33 articles, nearly half (n = 15; 45.5%) pertained to Massachusetts CPAPs. In addition to offering remote consultation services (by definition), most programs also offered care coordination and referral assistance (n = 10/11) and continuing education and training (n = 9/11), whereas only about half of the programs offered direct patient evaluation (n = 6/11), as reported in the manuscripts. Most of the included articles used a quantitative descriptive study design (n = 14; 42.4%) and reported data from surveys or record reviews or used a quantitative nonrandomized approach (n = 13; 39.4%). Two articles were purely qualitative in nature,[26,48] and 4 articles used a mixed-methods approach.[17,24,54,63] There were no randomized controlled trials.

Regarding the appraisal of study quality, more than half of the articles (n = 19/33) were rated as high-quality. Almost a fourth of the articles (n = 7/33) were rated as low-quality, but this designation was most frequently applied in cases where quality could not easily be analyzed, such as when the article did not clearly state important aspects of the methodology or the risk of various biases, rather than instances of improper methodology.

Study Outcomes

Program adoption was the most frequently reported study outcome, with relevant data appearing in 30 articles (90.9%) (Table 2). The most common measure of adoption was the total number of consultations, which ranged from 100 in a 6-month period to more than 50,000 in 8 years. Programs also included the proportion of patients covered by the program or the proportion of PCPs or practices enrolled with the CPAP. Articles on MCPAP noted that more than 95% of pediatric PCPs in the state of Massachusetts were enrolled, providing care to more than 95% of the state's pediatric population.[18,21] However, most programs provided the number of enrolled PCPs (ranging from 74 to 2,915) and number of enrolled practices (ranging from 22 to 45) without providing a denominator of enrollees within the intended service setting.

Provider experience with CPAP services was examined in more than half of the articles (n = 18/33), representing 9 different CPAPs across 8 states. PCP evaluations of CPAPs were primarily completed with the use of postconsultation surveys (including both Likert-type scale and free-text responses); 4 presented interview findings.[24,26,48,63] PCP satisfaction with CPAP operation and functionality was uniformly high, noting the usefulness of feedback, timeliness, and quality of services provided. Arora *et al.*[48] conducted interviews with PCPs enrolled in Maryland's Behavioral Health Integration in Pediatric Primary Care

program, examining facilitators and barriers to CPAP utilization. Facilitators included PCPs developing personal relationships with consultants and being able to care for patients directly rather than having to refer externally. The most common barriers cited were CPAPs' limited hours of operation and the time lag between seeking and receiving consultation. Eight articles (44.4%) specifically mentioned that PCPs developed greater self-efficacy or confidence in managing behavioral health concerns owing to CPAP enrollment, and 6 articles (33.3%) reported a perceived increase in PCP skills or knowledge compared to before consultation. Walter *et al.*,[65] discussing Massachusetts's Behavioral Health Integration Program (BHIP), noted especially high PCP confidence with managing mild to moderate psychiatric symptoms. Five articles reported on provider-reported practice change, for example, seeing more mental health patients in primary care and managing problems in primary care that were previously referred to child psychiatry. No articles examined changes in provider burnout or stress.

Caregivers were asked about their user experiences with CPAP services either directly or indirectly through the PCP in 2 articles (6.1%), both pertaining to MCPAP. Cama *et al.*[51] reported that 86% of parents were satisfied with the role of the PCP in caring for their child's mental health problems after CPAP consultation. Dvir *et al.*[54] reported that 74.2% of parents were satisfied with the quality of CPAP services (35.6% "strongly agreed," 38.6% "agreed"). However, child and adolescent patients were not directly asked about their patient experiences.

Four articles (12.1%) addressed the effect of CPAP implementation on different aspects of health care provision costs. Archbold,[47] reporting on Minnesota's Psychiatric Assistance Line, suggested that successful consultations can reduce costs for patients by up to $3,500, though it was not specified how this estimated reduction was calculated. Similarly, Medicaid claims data for Wyoming's Partnership Access Line (PAL) telehealth multidisciplinary teams consultation program showed a return on investment (defined as net savings divided by operating expenses) of 1.82 to 1 for CPAP consultation.[23] However, Medicaid claims data for Washington's PAL showed negligible change in medication costs attributable to CPAP consultation, with monthly psychiatric medication costs staying at $171 per child after CPAP consultation.[25] Finally, while the implementation of BHIP in Massachusetts led to an increase in outpatient costs by 123% and pharmacy costs by 40%, total ambulatory behavioral health costs increased by only 8%, reflecting a shift in spending from specialty mental health to primary care settings. A 19% decrease in total behavioral health–related emergency costs derived from both BHIP and specialty mental health settings was also noted.[65]

Four articles (12.1%) reported on patient mental health outcomes; most used postconsultation surveys of providers or parents, although 1 used qualitative interviews with PCPs. Archbold[47] stated that 80% of PCPs surveyed saw their patients "doing better" after Minnesota's Psychiatric Assistance Line consultation, with the remaining 20% reporting no change in their patient's health. Cama *et al.*[51] reported that 43% of parents noted improvement in their child's mental health after PCP consultation by MCPAP (7% "very much," 36% "somewhat"). Dvir *et al.*[54] reported that 50% of parents noted improvement in their child's situation after PCP consultation by MCPAP (25% "strongly agreed," 25%

"agreed"). However, Gadomski *et al.*[26] reported on interviews with PCPs, stating that providers were "cautious about the long-term impact of the mental health treatment they provided" after consultation. None of the articles reported on changes in patient mental health according to validated clinical rating scales, nor did any articles seek assessments of mental health from the perspective of the child and adolescent patients themselves.

DISCUSSION

This systematic review assessed implementation and study outcomes for CPAPs reported in 33 studies, encompassing 11 unique CPAPs across the US. The reports varied in terms of program characteristics, implementation and outcome measures, and evaluation study design. Notably, none of the studies were randomized controlled trials.

All 11 programs assessed program adoption, reporting on total number of consultations, number of patients covered by the program, or number of PCPs or practices enrolled with the CPAP. However, most programs reported a variable study time frame and did not report a denominator of PCPs and practices in each program area or the number of patients served. Thus, a standardized set of implementation outcomes would facilitate comparisons among programs. For example, programs could report on the average time to starting mental health treatment or the proportion of mental health cases treated within primary care as opposed to referred to specialty mental health, given that a common goal for CPAPs is to increase the capacity of PCPs to care for youth mental health concerns in primary care.

There was high provider and caregiver satisfaction with CPAP services. In addition, several studies found that PCPs perceived an improvement in their knowledge and skills as well as their self-efficacy in managing mental health conditions in primary care after using CPAP services. One qualitative study concluded that CPAP services bring about provider behavioral change by increasing PCP knowledge and skills and perceptions of self-efficacy, leading to more active and systematic assessments of primary care patients for mental health problems.[26] This fits with a theoretical framework of behavior change that can be mapped onto the 3 key components of Michie *et al.*'s Behavior Change Wheel (BCW) implementation science framework: capability, opportunity, and motivation.[67] That is, PCP knowledge and skills (capability), active and systematic assessments for mental health problems (opportunity), and self-efficacy (motivation) may be key components in how CPAPs increase PCP capacity to manage mental health problems in primary care settings. Although several articles found that PCPs perceived an increase in their knowledge and skills and self-efficacy in managing behavioral health concerns or seeing more mental health patients in primary care after CPAP utilization, none of the studies used a separate or within-subject comparison group, leaving the question of what would be observed in the absence of CPAP use. Although these findings are suggestive of provider behavioral change or practice change, more research is needed to understand whether and how these self-reported improvements translate to direct changes in the care of the patients, such as changes related to assessment, treatment, symptom management, frequency of referrals, or access to care. We could consider linking a provider's CPAP service use with patients' electronic medical records (EMRs) to evaluate for change. No articles specifically discussed changes in provider burnout or stress, which would merit further research.

Public and private sector investment in building consultation programs suggests optimism that CPAPs may provide some return on investment; however, our study found no clear evidence that CPAP consultation yielded reductions in health care provision costs. Of the 4 included articles addressing CPAP cost changes, all measured cost changes by means of different methodologies, examining different services within different CPAPs, hindering the ability to make comparisons and thus to draw any conclusions. Future studies should standardize collection of cost measures to enable comparison across programs and consider alternative study designs, such as cost-effectiveness and cost-benefit analyses.

There was a lack of patient-level outcome data regarding the impact of CPAPs on patient mental health, which is consistent with results in the review by Bettencourt and Plesko.[20] Only 4 articles addressed patient mental health outcomes, all gathered from provider or parent perceptions after CPAP use. More research is needed to understand changes in patients' mental health (eg, symptom severity or reductions in acute care utilization) with the use of validated standardized assessment tools, such as the Patient Health Questionnaire[68] for depression or the Vanderbilt Attention Deficit/Hyperactivity rating scales[69] for ADHD. Obtaining data on patient-level outcomes is difficult, given that CPAP services are primarily a provider-facing intervention and often do not directly involve patients or caregivers unless the program specifically provides direct patient evaluations. A potential strategy may be to link a PCP's CPAP service use with patients' EMRs and, for example, assess whether the consultant's advice was followed and whether subsequent management improved patient care and outcomes. However, the feasibility of obtaining patient-level outcome data from EMRs depends on whether the PCP and CPAP consultant work within the same system of care.

This review has several limitations. Overall, studies were not designed to objectively examine the effect of CPAPs on patient mental health outcomes and provider behavior change (as would, eg, randomized controlled trials). Because a large majority of included articles reported data collected from voluntary surveys, the conclusions drawn may be affected by nonresponse bias. Methods used to collect provider satisfaction varied across studies and in some instances may have introduced bias (eg, repeated assessments of the same PCPs). In addition, owing to the heterogeneity in the metrics used to evaluate CPAPs and the absence of objective standardized measures of clinical outcomes, any conclusions drawn should be considered preliminary at best. Appraisal of study quality indicated that almost a fourth of the articles (n = 7/33) were rated as low-quality, owing to insufficient information on key aspects of the methodology or the risk of various biases. Greater standardization in reporting study methodology is needed to sufficiently assess study quality. Finally, generalizability may be limited, given the small number of CPAP programs (n = 11) that have been evaluated in the formal research literature.

This review demonstrates high provider satisfaction with CPAPs, with PCPs perceiving an increase in their knowledge and skills and self-efficacy in managing behavioral health concerns after CPAP consultation. These findings are encouraging, and future studies should prioritize the assessment of patient mental health outcomes, provider behavior and practice change, and cost reduction and savings with the use of more rigorous methodologies and a standardized set of measures. In addition, uniform reporting of costs and sustainability are

needed, especially given the recent federal investment in CPAP implementation across the US. It is likely that these programs were funded to provide services rather than conduct research, so funding agencies should consider prioritizing and investing in research to build the evidence base for CPAPs.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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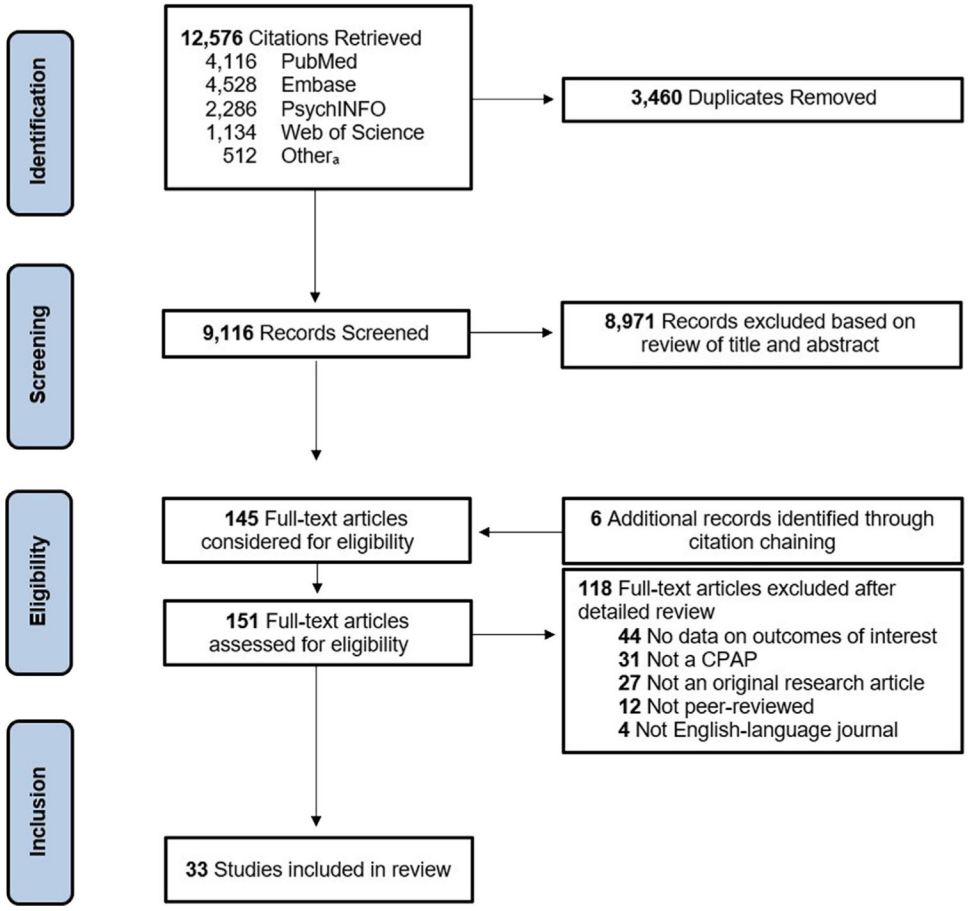

FIGURE 1.

Flow Diagram of Study Selection

Note: CPAP = Child Psychiatry Access Program.

[a]Other includes Google Scholar searches of program names identified through the National Network of Child Psychiatry Access Programs websites (430), JAACAP conference abstracts (50), APA conference abstracts (2), APA IPS conference abstracts (2), AAP conference abstracts (1), HRSA grant documents (27), and NIH/NIMH grant documents (0).

TABLE 1

Child Psychiatry Access Program Services

Program (name, inception, geographic scope)	Services					Publications
	Remote consultation	Direct patient evaluation	Referral assistance	Education and training	Other	
California						
PACT Net, 2000, rural California	X				Multispecialty consultation	Hilty *et al.* (2004)[56]
Maryland						
BHIPP, 2012, statewide	X		X	X	Social work colocation in some primary care practices	Arora *et al.* (2017)[48] Platt *et al.* (2018)[59] Bettencourt *et al.* (2021)[10] Cotton *et al.* (2021)[53] Reinblatt *et al.* (2022)[60]
Massachusetts						
TCPS, 2003, central Massachusetts	X	X	X	X	Short-term treatment (1–4 visits)	Connor *et al.* (2006)[52] Aupont *et al.* (2013)[22]
MCPAP, 2004, statewide	X	X	X	X		Sarvet *et al.* (2010)[18] Dvir *et al.* (2012)[54] Sheldrick *et al.* (2012)[61] Hobbs Knutson *et al.* (2014)[57] Straus *et al.* (2014)[21] Van Cleave *et al.* (2015)[62] Sarvet *et al.* (2017)[17] Van Cleave *et al.* (2018)[63] Cama *et al.* (2020)[51] Dvir *et al.* (2022)[55]
BHIP, 2013, Massachusetts (largely greater Boston area)	X	X	X	X	Participation requires practices to provide on-site clinical behavioral health services	Walter *et al.* (2018)[64] Walter *et al.* (2019)[65] Walter *et al.* (2021)[66]
Michigan						
MC3, 2012, majority of counties in Michigan	X	X	X	X	Masters-level behavioral health clinicians can provide in-person care and referrals	Marcus *et al.* (2017)[58] Malas *et al.* (2019)[24] Marcus *et al.* (2019)[16]
Minnesota						
Psychiatric Assistance Line, 2014, not stated	X		X			Archbold (2015)[46] Archbold (2016)[47]
Mississippi						
CHAMP, 2018, statewide	X		X	X		Bettencourt *et al.* (2021)[10]

Program (name, inception, geographic scope)	Services					Publications
	Remote consultation	Direct patient evaluation	Referral assistance	Education and training	Other	
Missouri						
MO-CPAP, 2018, statewide New York	X		X	X		Ramtekkar *et al.* (2022)[27]
New York						
Project TEACH, 2005 (CAPES), 2010 (CAP PC), statewide	X	X	X	X		Gadomski *et al.* (2014)[26] Kaye *et al.* (2017)[15]
Washington, Wyoming						
PAL, 2008, Washington, statewide; 2010, Wyoming statewide	X	X	X	X	Mandatory medication reviews for Medicaid	Hilt *et al.* (2013)[25] Hilt *et al.* (2015)[23] Barclay *et al.* (2016)[49] Barclay *et al.* (2017)[12]

Note: BHIP = Behavioral Health Integration Program; BHIPP = Behavioral Health Integration in Pediatric Primary Care; CAPES = Child and Adolescent Psychiatry Education and Support Program for Primary Care Physicians; CAP PC = Child and Adolescent Psychiatry for Primary Care; CHAMP = Child Access to Mental Health and Psychiatry; MC3 = Michigan Child Collaborative Care Program; MCPAP = Massachusetts Child Psychiatry Access Project; MO-CPAP = Missouri Child Psychiatry Access Project; PACT Net = Physician Assistance, Consultation and Training Network; PAL = Partnership Access Line; TEACH = Training and Education for the Advancement of Children's Health; TCPS = Targeted Child Psychiatric Services.

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TABLE 2

Study Characteristics and Outcomes by State and Child Psychiatry Access Program

	Study characteristics	Study outcomes				
Program	**Author (publication year), study type, time frame, participants, study quality**	**Program adoption**	**Provider experience**	**Patient/ caregiver experience**	**Program cost**	**Patient mental health**
California						
PACT Net	Hilty *et al.* (2004)[56] Quantitative descriptive 2000 to 2001 n = 22/30 PCPs surveyed Medium-quality	n = 4/30 telephone cases were for psychiatry consultation on patients aged 4–19				
Maryland						
BHIPP	Arora *et al.* (2017)[48] Qualitative 2012 to 2013 n = 32 (22 PCPs and 10 stakeholders) interviewed High-quality		Barriers to BHIPP include hours of operation and response time; facilitators include having personal relationships between consultant and caller and the immediacy of care compared with outside referrals			
	Platt *et al.* (2018a)[59] Quantitative nonrandomized 10/2012 to 12/2016 Participants N/A High-quality	BHIPP was consulted on 872 unduplicated cases during the study period				
	Cotton *et al.* (2021)[53] Quantitative nonrandomized 10/2012 to 6/2020 Participants N/A High-quality	4,779 calls were made to BHIPP from 10/2012 to 6/2020; 676 pediatric PCPs used BHIPP from 10/2012 to 6/2019				
	Reinblatt *et al.* (2022)[60] Quantitative nonrandomized 10/2012 to 6/2019 Participants N/A High-quality	3,641 consultation requests were made, including 311 for patients with autism spectrum disorder during the study period				
Massachusetts						
TCPS	Connor *et al.* (2006)[60] Quantitative nonrandomized First 18 mo of operation Participants N/A High-quality	980 phone consultations and 329 direct evaluations on new patients provided; enrolled 139 PCPs in 22 practices (covering >100,000 patients) in the first 18 mo				
	Aupont *et al.* (2013)[22] Quantitative nonrandomized First 18 mo of operation	As above; study focused on the calls that ended in 329 direct evaluations on new patients, of whom 92 returned to PCP for follow-up management				

Program	Study characteristics	Study outcomes				
	Author (publication year), study type, time frame, participants, study quality	**Program adoption**	**Provider experience**	**Patient/ caregiver experience**	**Program cost**	**Patient mental health**
	Participants N/A High-quality	and 237 were referred to community mental health				
MCPAP	Sarvet *et al.* (2010)[18] Quantitative descriptive 7/2005 to 12/2008 (utilization); 2005 to 2009 (satisfaction) n = 514/1,341 PCPs (baseline), 385/514 PCPs (follow-up) surveyed Low-quality	35,335 encounters occurred for 10,114 patients; 1,341 PCPs in 353 practices enrolled by the end of 2008, covering 1.36 million patients (95% of the state child population)	FY 2009 follow-up survey: 91% of PCPs found consultation helpful; 33% agreed patients had adequate access to child psychiatry (5% before consultation); 63% felt able to meet their patients' psychiatric care needs (8% before consultation)			
	Dvir *et al.* (2012)[54] Mixed methods 2/2008 to 2/2009 n = 158/360 parents surveyed Medium-quality			Parents were satisfied with information given (69.5%), quality of services (74.2%), and child's issues being understood (74.9%)		50% of caregivers responded that their child's situation improved after contact with service; 59% responded that services helped them deal with issues more effectively
	Sheldrick *et al.* (2012)[61] Quantitative descriptive 8/2010 to 2/2011 n = 305/752 PCP members of MCAAP surveyed Medium-quality		PCPs were satisfied with MCPAP feedback (65%−66%) and timeliness (66%−67%); PCPs and parents were satisfied with MCPAP services (73%)			
	Hobbs Knutson *et al.* (2014)[57] Quantitative nonrandomized 7/2008 to 6/2009 Participants N/A High-quality	4,436 initial contacts by PCPs occurred, with a mean of 3.8 contacts in the 180 days following initial contact during the study period				
	Straus *et al.* (2014)[21] Quantitative descriptive 2005 to 2012 (satisfaction); 2005 to 6/2014 (utilization) Participants not stated Low-quality	FY 2005 to FY 2013, 53,966 telephone consultations were made (including 11,569 in FY 2013 alone); as of June 2014, 455 practices enrolled, employing 2,915 PCPs (>95% of PCPs in the state)	PCPs found MCPAP consultations generally useful, timely, and able to meet needs of children with psychiatric problems (mean scores of >3 on 1–5 scale); PCPs reported managing 67% of patient problems that they would have needed to refer to a child psychiatrist before enrolling in MCPAP			

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Program	Study characteristics	Study outcomes				
	Author (publication year), study type, time frame, participants, study quality	**Program adoption**	**Provider experience**	**Patient/ caregiver experience**	**Program cost**	**Patient mental health**
	Van Cleave *et al.* (2015)[62] Quantitative nonrandomized 5/2005 to 7/2011 Participants N/A High-quality	29,902 calls made from 285 practices (representing ~75% of enrolled practices) during the study period				
	Sarvet *et al.* (2017)[17] Mixed methods 2004 to 2016 563 surveys completed in 2016 Low-quality	In FY 2016, consultations on 7,302 different patients provided; that year, 65% of all enrolled pediatricians used the consultation line at least once	PCPs found MCPAP consultations generally useful, timely, and able to meet needs of children with psychiatric problems (mean scores of >3 on 1–5 scale)			
	Van Cleave *et al.* (2018)[63] Mixed methods 10/2010 to 7/2011 n = 14 PCPs interviewed High-quality	993 providers in 304 practices made 6,526 calls (mean 6.6 calls, median 3 calls) during the study period	Qualitative interview analysis showed PCPs who used MCPAP more frequently were more confident in their ability to deliver mental health care; some infrequent callers reported acquiring skills such that they now deliver care for common mental health conditions			
	Cama *et al.* (2020)[51] Quantitative descriptive 3/2010 to 6/2012 n = 374/1,046 parents surveyed Medium-quality	The Bayside Medical Center regional hub (1 of 6 regional hubs composing MCPAP) provided 1,046 phone consultations during the study period		Parents were satisfied with role of PCP in care of child's mental health problems (86%)		7% of parents noted "very much" improvement between time of MCPAP consultation and completing the survey (36% "somewhat," 58% "not at all")
	Dvir *et al.* (2022)[55] Quantitative nonrandomized FY 2019 to FY 2021 Participants N/A High-quality	2,515 unique patients in March and April 2018 and 2019; 1,700 unique patients in March and April 2021				
BHIP	Walter *et al.* (2018)[64] Quantitative nonrandomized 09/2014 to 6/2016 n = 66/81 PCPs surveyed High-quality	392 phone consultations were initiated by at least 1 PCP in 35/41 practices; enrolled 81 PCPs from 41 practices during the study period	PCPs found phone consultations to be convenient (95%) and timely (95%), facilitated medication management (93%), and improved quality of their behavioral health care (91%)			
	Walter *et al.* (2019)[65] Quantitative nonrandomized 7/2013 to	In a 30-month period, 254 phone consultations occurred (mean 8.5/mo,	PCPs found phone consultations to be		From 2013 to 2015–2017, while BHIP	

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	Study characteristics	Study outcomes				
Program	**Author (publication year), study type, time frame, participants, study quality**	**Program adoption**	**Provider experience**	**Patient/ caregiver experience**	**Program cost**	**Patient mental health**
	6/2018 n = 66/81 PCPs surveyed Medium-quality	mean 19.5/practice) from 13 practices with ~105 PCPs, serving ~ 114,000 patients	convenient (95%) and timely (95%), facilitated medication management (93%), and improved quality of their behavioral health care (91%)		outpatient costs increased by 123% and pharmacy costs increased by 40%, total ambulatory behavioral health costs (BHIP + SMH) increased by 8%, and total behavioral health-related emergency costs (BHIP + SMH) decreased by 19%	
	Walter *et al.* (2021)[66] Quantitative nonrandomized 3rd quarter 2019 through 2nd quarter 2019 n = 59 pediatric practices High-quality	563 phone consultations were made regarding 533 patients by 155 PCPs across 42 practices				
Michigan						
MC3	Marcus *et al.* (2017)[58] Quantitative descriptive 5/2012 to 5/2016 33 PCPs surveyed Low-quality	2,676 unique patient consultations; 894 enrolled PCPs, covering 40 counties in MI	PCPs felt more confident in treating patient behavioral problems after consultation (97%)			
	Malas *et al.* (2019)[24] Mixed methods 5/2012 to 1/2017 n = 649/1475 surveys Obtained from 191 unique PCPs High-quality	1,241 enrolled PCPs, covering 46 counties in MI	Common themes among PCPs included patients receiving better care when utilizing MC3 consultation, increased comfort and confidence in managing youth mental health concerns			
	Marcus *et al.* (2019)[16] Quantitative descriptive 2012 to 2018 842 PCPs surveyed Low-quality	10,445 consultations for 9,007 patients; 2,121 enrolled PCPs in 519 practices across 63 counties in MI	High PCP satisfaction with MC3 services (97%)			
Minnesota						
Psychiatric Assistance Line	Archbold (2015)[46] Quantitative descriptive First 6 mo of operation Participants not stated Low-quality	100 calls serving 74 PCPs from 41 practices in the first 6 mo of operation	PCPs found consultations to be helpful (100%) and felt more confident in managing psychiatric conditions after consultation (98%)			
	Archbold (2016)[47] Quantitative descriptive Time frame not stated Participants not stated Low-quality	Since program inception in 2014, 476 consultations serving 290 PCPs at 154 locations	PCPs found consultation to be valuable in providing better care (98%) and helpful in finding better or different ways		Successful consultations are estimated to reduce costs (unspecified to	80% of PCPs responded that “patient is doing better” due to Psychiatric

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Program	Study characteristics	Study outcomes				
	Author (publication year), study type, time frame, participants, study quality	**Program adoption**	**Provider experience**	**Patient/ caregiver experience**	**Program cost**	**Patient mental health**
			to treat psychiatric conditions (94%)		whom) by up to $3,500	Assistance Line consultation (20% responded "neutral," indicating no change)
Missouri						
MO-CPAP	Ramtekkar *et al.* (2022)[27] Quantitative descriptive 2018 to 5/2021 Participants not stated Medium-quality	600+ phone consultations provided, 500 PCPs enrolled during study time period	PCPs found consultation helpful for mild-to-moderate behavioral health challenges, supporting PCPs in managing patient behavioral health in practice, with ~60% of calls regarding continued care by PCP			
New York						
Project TEACH (includes	Gadomski *et al.* (2014)[26] Qualitative 2005 to 3/2011	CAPES provided 293 telephone consultations in 2013;	Program involvement led to greater PCP self-efficacy and self-			PCPs were "cautious about the long-term impact of the
CAPES and CAP PC)	n = 40 PCPs interviewed (30 trained, 10 untrained) High-quality	CAP PC provided 1,500 consultations on ~ 1,200 cases and enrolled 1,100 PCPs since program inception in 2010	reported competence when providing mental health treatment; PCPs reported seeing more visits for mental health			mental health treatment they provided"; sensed a bad outcome averted; helped families that would have slipped through the cracks
CAP PC	Kaye *et al.* (2017)[15] Quantitative descriptive 2010 to 2016 (utilization and postconsultation survey), 2013 to 2015 (annual survey) n = 125/500 PCPs surveyed (2013), n = 110/463 (2014), n = 121/500 (2015) Medium-quality	From program inception in 2010 to 2016, CAP PC enrolled 1,931 PCPs and provided 8,013 consultations for 6,285 patients, with the no. of enrolled PCPs increasing at an average of 15% per year	2-wk follow-up surveys showed satisfaction rates consistently >90%; annual surveys showed PCPs agreed that program involvement increased knowledge, skill, and confidence in providing mental health care			
Washington						
PAL	Hilt *et al.* (2013)[25] Quantitative descriptive 4/2008 to 4/2011 (utilization), 5/2008 to 4/2011 (satisfaction), 5/2008 to 12/2009 (Medicaid data) n = 168/362 rural PCPs surveyed, n =	2,285 consultations received about 1,863 patients, serving 592 PCPs from 4/2008 to 4/2011	High overall PCP satisfaction with phone consultation service (mean score ≥4.2/5 on all items), including PCP ability to manage patient care (4.7/5) and PCP skills		Mean monthly mental health medication costs per child was $171 before consultation and $171 after	

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Program	Study characteristics	Study outcomes				
	Author (publication year), study type, time frame, participants, study quality	**Program adoption**	**Provider experience**	**Patient/ caregiver experience**	**Program cost**	**Patient mental health**
	158 patients in Medicaid analysis High-quality		in treating mental health problems (4.6/5)		consultation, with no change in medication reimbursements (per Medicaid claims data)	
	Barclay *et al.* (2017)[12] Quantitative nonrandomized 7/2006 to 12/2013 Participants N/A High-quality	5,365 elective consultations on 4,397 patients during the study period; also provided 2,734 mandatory medication reviews and 1,458 direct patient consultations				
Wyoming						
PAL	Hilt *et al.* (2015)[23] Quantitative descriptive 1/2011 to 3/2013 (utilization), 2010 to 2013 (Medicaid data) Participants not stated (satisfaction) High-quality	277 elective consultations during study period; also provided 229 televideo multidisciplinary consultations and 125 mandatory medication reviews	High PCP satisfaction with PAL consultation, as well as with mandatory medication reviews provided through the consultation service		Televideo multidisciplinary teams consultations yielded a return on investment (net savings/operating expenses) of 1.82:1 for Wyoming Medicaid	
Multiple states						
PAL (Washington, Wyoming)	Barclay *et al.* (2016)[49] Quantitative nonrandomized 4/2008 to 8/2013 (Washington), inception at end of 2010 to 8/2013 (Wyoming) Participants N/A High-quality	Consultations provided on 4,381 patients during the study period				
BHIPP (Maryland), CHAMP (Mississippi)	Bettencourt *et al.* (2021b)[10] Quantitative descriptive 1/2019 to 3/2021 Participants N/A High-quality	BHIPP received 2,576 phone contacts from 1/2019 to 3/2021; CHAMP received 264 phone contacts from 9/2019 to 3/2021				

Note: BHIP = Behavioral Health Integration Program; BHIPP = Behavioral Health Integration in Pediatric Primary Care; CAPES = Child and Adolescent Psychiatry Education and Support Program for Primary Care Physicians; CAP PC = Child and Adolescent Psychiatry for Primary Care; CHAMP = Child Access to Mental Health and Psychiatry; FY = fiscal year; MC3 = Michigan Child Collaborative Care Program; MCPAP = Massachusetts Child Psychiatry Access Project; MI = Michigan; MO-CPAP = Missouri Child Psychiatry Access Project; PACT Net = Physician Assistance, Consultation and Training Network; PAL = Partnership Access Line; PCP = Primary Care Physician; SMH = specialty mental health; TEACH = Training and Education for the Advancement of Children's Health; TCPS = Targeted Child Psychiatric Services.

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