



Training the Doctors: A Scoping Review of Interprofessional Education in Primary Care Behavioral Health (PCBH)

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Abstract

Primary care behavioral health (PCBH) is a model of integrated healthcare service delivery that has been well established in the field of psychology and continues to grow. PCBH has been associated with positive patient satisfaction and health outcomes, reduced healthcare expenditures, and improved population health. However, much of the education and training on PCBH has focused on developing behavioral health providers to practice in this medical setting. Less attention has been paid to physician team members to support and practice within an integrated environment. This is problematic as underdeveloped physician team members may contribute to low utilization and attrition of behavioral health consultants. A scoping review was conducted to examine the training of physicians in this domain since 2006. Twenty-one studies were identified, predominantly in Family Medicine training programs. Although PCBH training was generally well received, more program evaluation, formalized curriculum, and faculty development are needed to establish best practices.

Keywords Interprofessional education · Primary care behavioral health · Graduate medical education · Family medicine · Pediatrics · Internal medicine

Over the past decade, the interest and growth of integrated healthcare programs continues at a remarkable pace. Interest in integrated care is driven by support of large professional associations (e.g., the American Psychological Association; McDaniel et al. 2014), the reality of growing healthcare demands (Freeman, Hudgins, & Hornberger, 2018), and shortage of health service providers (Hall et al. 2015). Integrated healthcare has shown its ability to meet these unique challenges (Hunter et al. 2017).

Primary care behavioral health (PCBH) is one particular model of integrated care. While PCBH programs can vary, recently there have been several key components identified. These include a team-based biopsychosocial approach using Behavioral Health Consultants (BHCs), who are trained behavioral health providers (typically psychologists,

although other behavioral health professionals serve as BHCs). BHCs operate in a primary care setting, focusing on providing just-in-time care (usually via a “warm hand-off”) that is brief and solution focused (typically 15–30 min and generally no more than 4–6 visits; Reiter, Dobbmeyer, & Hunter, 2018).

The PCBH model has been shown to be an effective model of healthcare delivery, assessed on a variety of outcomes. PCBH has shown benefits for both provider and patient satisfaction (Runyan, Fonseca, Meyer, Oordt, & Talcott, 2003; Landoll, Nielsen, & Waggoner, 2017), changes in provider attitudes (Brawer, Martielli, Pye, Manwarning, & Tierney, 2010), changes in provider behavior (Brawer et al. 2010), and ultimately changes in patient health, access, and healthcare costs (Landoll, Nielsen, Waggoner, & Najera, 2018).

However, despite the success of PCBH, there continues to be challenges to implementation. One of the largest organizations to utilize PCBH is the Department of Defense (DoD), and they have been utilizing PCBH since 1997. A recent review of the history of DoD PCBH highlighted the challenges with ensuring regular access to BHCs as wars in Afghanistan and Iraq increased the operational tempo and deployment cycle of behavioral health providers, limiting

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their availability in primary care settings (Hunter & Goodie, 2012). Recently, the DoD has been successful in hiring civilian providers to meet the demand; however, attrition and utilization of BHCs remains a concern in some areas, particularly small treatment facilities (Landoll, Nielsen, & Waggoner, 2018). These challenges mirror concerns noted in civilian healthcare settings surrounding the sustainability of PCBH programs (Robinson et al. 2018).

Given the success and longevity of PCBH, there have been considerable efforts invested in the training and development of BHCs. As such, there has emerged well-defined training programs and a competency-based education system for BHCs (Dobmeyer et al. 2016). There has been the ability to quantify a BHCs fidelity to specific models of PCBH that are used to evaluate and refine individual programs (Beehler, Funderburk, Possemato & Dollar, 2013). Yet, despite this considerable effort to standardize and evaluate training of behavioral health providers, very little has been systematically done to prepare other members of this team-based care approach. There exist some recommended competencies for physician colleagues, nurses, and healthcare leaders (Robinson et al. 2018) and behavioral health care education is considered a key priority for primary care providers (Brandt-Kreutz, Ferguson, & Sawyer, 2015). However, little is known about the state of graduate medical education (GME) more broadly, including other primary care specialties as it relates to interprofessional education (IPE) in behavioral health. The literature on IPE has recently made a strong argument that the success of IPE programs hinges upon the engagement of physicians in healthcare teams (Brandt, Kitto, & Cervero, 2018); as such, it is essential to explore the training physicians receive in practicing within this integrated care model.

In exploring the learning space within the field of interprofessional education, there has been a movement to characterize several crucial elements. One theoretical model for doing so is the 3P model (Reeves et al., 2016). The 3P model focuses on three components that represent the context, educational milieu, and outcomes, labeled as presage, process, and product factors. Presage factors focus on the antecedent conditions of learning (e.g., previous attitudes and experiences of the learner, faculty development, and the environment of care). Process factors explore how learning occurs (e.g., do residents have choice in the behavioral health didactic curriculum during residency?) and product factors focus on the outcomes of the training program (e.g., resident satisfaction, competency evaluations, or patient health measures).

To begin to answer this critical question, we conducted a scoping review of PCBH training in GME. A scoping review differs from a systematic review in that it seeks first to outline and identify the state of a given literature in a timely manner and is best suited to areas of research that

are relatively new and for which systematic data may be difficult to obtain or quantify (Levac, Colquhoun, & O'Brien, 2010). Given the current state of this field, this selection was most appropriate and is consistent with a recent review of program evaluation of PCBH (Hunter et al. 2017).

Method

This scoping review was conducted consistent with the framework outlined by Arksey and O'Malley (2005), expanded upon by Levac et al. (2010) and Daudt, van Mosse, and Scott (2013). To begin, we considered the research question within the context of the literature on PCBH and IPE. Our goal was to answer the broad question: What are the existing IPE programs on PCBH? Scoping reviews are iterative in process (Daudt et al., 2013), thus as we reviewed the literature on IPE, we identified the 3P model outlined by Reeves et al. (2016) as a guiding framework for our analyses. As we were particularly interested in capturing details on education and training, we chose to focus on specific programs as opposed to broader surveys of learners on the attitudes and perceptions of either PCBH or IPE. Recognizing that the field has only recently developed a consensus definition of PCBH compared to other integrated care models (Reiter et al. 2018), we also chose to include a broad range of integrated care programs, provided they met at least one of the identified components of PCBH (described below).

With assistance from a medical librarian, in December 2017, the following key terms were searched in MEDLINE via PubMed: "Internship," "Residency," "Behavioral Health," "Mental Health," "Psychiatry," "Psychology," "Behavioral Medicine," "PCBH," "Cooperative Behavior," "Education," "Interprofessional Relations," "Integrated," "Intraprofessional," "Cooperative Care," "Primary Health Care," "General Practice," "Family Medicine," "Internal Medicine," and "Pediatrics." Parallel searches were conducted in PsycINFO, CINAHL, Scopus, and ERIC in consultation with a medical librarian and results were reviewed along with known articles identified by the authors as potentially relevant to ensure complete search criteria. Results were limited to English-language articles, published between 2006 and 2017, to focus on programs relevant for today's healthcare landscape.

Consistent with recommendations for scoping studies by Levac et al. (2010), we built a team for this scoping review to provide critical expertise for the research question from multiple perspectives. This include a psychologist, who is an expert on primary care behavioral health, along with a family physician with extensive practice in integrated care, a medical educator with expertise in interprofessional education, and a medical educator with expertise in qualitative methods and conducting knowledge syntheses. The title

and abstracts for these 581 articles were analyzed by the lead author (X1) to determine if they fit the inclusion and exclusion criteria. The inclusion criteria initially was as follows: journal articles in the past 10 years which reviewed an interprofessional education program in a medical primary care residency that practiced some form of integrated behavioral health care (level 3 or higher as determined by CIHS framework; Heath, Wise Romero, & Reynolds, 2013). The initial inclusion criteria were intentionally broad. Although PCBH models are fully integrated and consistent with CIHS level 5, the description of integrated primary care practice models can vary in the literature. Thus, in order to avoid missing potentially relevant articles, inclusion criteria were iteratively refined after the initial search. Three authors (X1, X2, X3) met and resolved any disagreements on initial inclusion by consensus. The lead author (X1) then reviewed all full-text articles using a similar iterative process to narrow the research question and refine model identification, consistent with recommendations for scoping reviews (Daudt et al., 2013; Levac et al., 2010).

Next, consistent with the fourth step outlined by Arksey and O'Malley (2005) (“charting the data”), we developed a data extraction sheet. We selected a recent review of the IPE literature more broadly by Reeves et al. (2016) to provide

a sensitizing framework for development of a method to analyze the programs. As described above, the 3P model outlined by Reeves et al. (2016) focuses on presage, process, and product factors. These were defined within the context of PCBH. The lead author independently coded 10 articles which were then coded by two other authors (X2, X3) for consensus. Once consensus appeared reasonable, our fourth author and physician expert (X4) was brought in and established consensus with the lead author. Finally, all remaining identified articles were double coded and the team met to resolve discrepancies and achieve consensus. Figure 1 outlines our review process.

For the process codes of content and educational methodology, categories were derived to simplify analysis through consensus. For example, categories of content were created to reflect disease-specific processes (e.g., diabetes, depression, autism), practitioner skills (e.g., communication, motivational interviewing), and system-level functions (e.g., referral pathways, interprofessional roles). Programs were coded only if content was explicitly mentioned and another category was used when content was unclear or outside these identified categories. Similarly, educational methodology was categorized as using the following: didactic, observational, simulation-based, practice-based, and record audit.

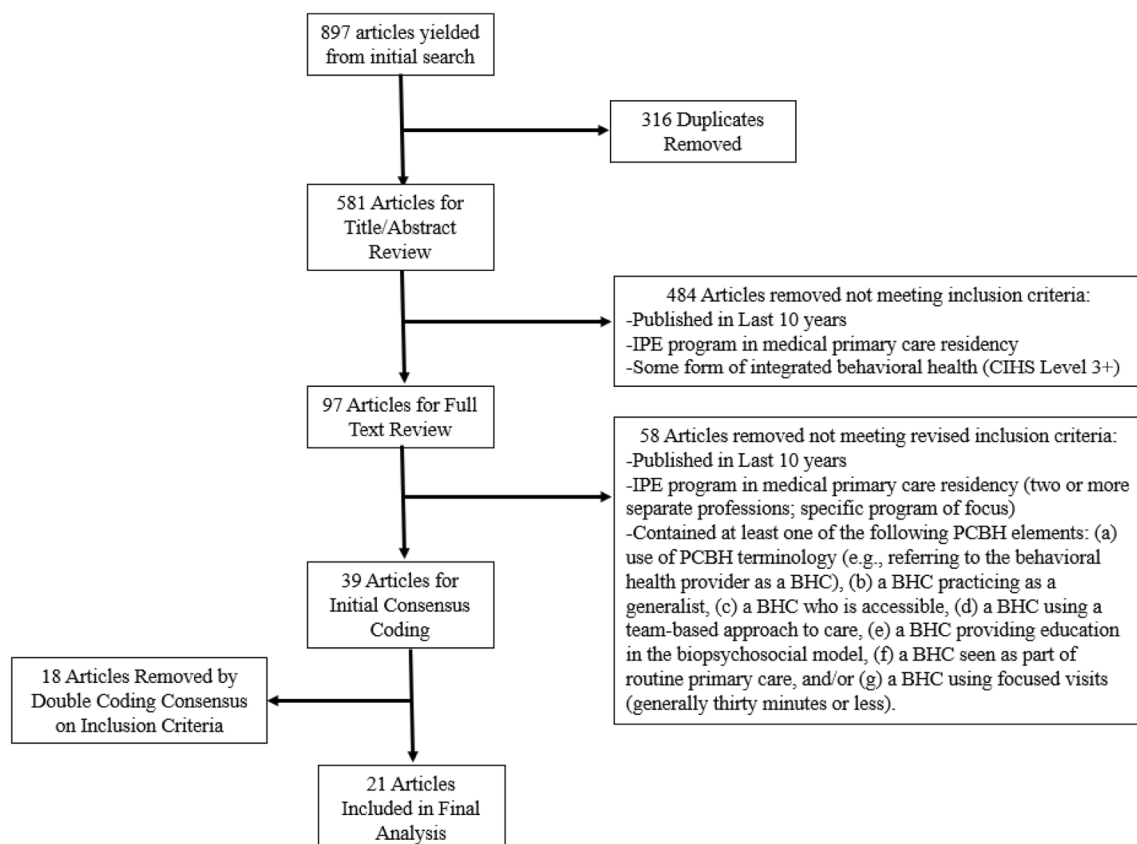


Fig. 1 Scoping review article selection process

Additional options for categorization included designating when other methodologies were used, or when the methodology was unclear.

Outcomes of the educational intervention were evaluated using Kirkpatrick's model for program evaluation (Kirkpatrick, 1994). This is a well-established framework for program evaluation and consists of four "levels": a learners' reaction to the educational intervention (level 1), a change in knowledge, attitudes, or skills (level 2), a change in learners' behavior (level 3), or a change in organizational practices or distal outcomes (e.g., patient health; level 4). For consistency with the broader literature, we operationalized these levels using the framework outlined by Reeves and colleagues in their recent review of IPE. Consistent with our coding paradigms described above, factors had to be explicitly mentioned to be coded. In this vein, while skill-based changes in learning are considered level 2 factors and sometimes difficult to distinguish from changes in behavior (level 3), we agreed that changes in behavior required observation from an outside source, whereas changes in self-evaluated abilities (e.g., through surveys, logs) were level 2 outcomes.

Results

Twenty-one articles met our inclusion criteria of which 17 focused on Family Medicine residencies, three on Pediatric residencies and one focused on a combined Internal Medicine/Psychiatry residency program. Key features of these articles are summarized in Table 1. In regards to an IPE context, most studies described a formal IPE curriculum ($n = 13$); however, some explicitly described opportunities for informal learning alongside a formal curriculum ($n = 5$). Three programs did not describe a formal IPE curriculum, relying on informal learning opportunities among professionals. A summary of all included articles is shown in Table 2. All reflected a team-based approach to healthcare, and the majority involved an accessible BHC ($n = 19$) practicing as a generalist ($n = 12$), that was a routine part of care ($n = 14$), and educated patients in the biopsychosocial model ($n = 14$), although these elements were not always clearly identified.

Presage: Learner and Teacher Characteristics, Learning Environment

Using the 3P framework outlined by Reeves, we explored presage factors as shown in Table 3. Many of the articles provided incomplete information on the presage factors for learning. Where possible to assess, the majority did not include measures of learners' attitudes ($n = 15$) or abilities ($n = 19$) regarding either IPE or PCBH prior to the educational intervention. Of those studies that did assess learner

Table 1 PCBH scoping review article summary

Time period	
2006–2010	4
2010–2014	7
2014–2018	10
Countries	
USA	19
Canada	2
Medical specialty	
Family medicine	17
Internal medicine	1
Pediatrics	3
Psychiatry	1 ^a
Funding source ^b	
Departmental	5
Private foundation	2
State or provincial	3
Federal (e.g., HRSA)	4
Not identified	8
Analysis type ^c	
Quantitative	14
Qualitative	16
Mixed	1
Behavioral health specialty	
Psychology	15
Psychiatry	3
Social work	2
Master's level therapist	4
Nursing	4
Not specified	2

^aPsychiatry included in joint Internal Medicine program

^bSome can have multiple funding sources

^cStudies coded if intentionally mixed, otherwise could include both quantitative and qualitative methods

characteristics pre-intervention, all were through the use of locally created surveys. Similarly, only two studies described faculty development for this model of care.

In most cases, the teacher in this model was a psychologist, although other behavioral health professionals (e.g., psychiatric, marriage and family therapists) were included as well. In roughly half of the cases ($n = 12$), the behavioral health providers functioning as "teachers" included IPE learners as well, sometimes with faculty oversight and other times in either unclear supervisory relationships or with a broader focus on peer-learning models. In general, there was little description of any pre-requisite training, experience, or qualifications specifically in either IPE or PCBH for teachers.

The learning environment varied across the studies, with the majority occurring in a separate outpatient clinic ($n = 10$), consistent with PCBH practice in a primary care

Table 2 PCBH scoping review articles

Author/year	Medical specialty	Behavioral health specialty	Analysis type	Funding	PCBH elements	Educational methodology	Summary
Porcerelli, Fowler, Murdoch, Markova, and Kimbrough (2013)	FM	Psychology externs	Quant Qual	Dept	Terminology, generalist, accessible, team-based, high volume, routine, biopsychosocial	Didactic, observation, practice-based	Dedicated health psychologist faculty working in a fully integrated clinic. Uses shared curriculum, precepting, and instruction. Outcomes include learner reactions and knowledge and skills assessed via self-report
Upshur and Weinreb (2008)	FM	Not specified	Quant	Foundation	Accessible, team-based, biopsychosocial	Unclear	Focused primarily on a care management nursing model to improve depression adherence. Outcomes included reaction to services as well as attitudes and behaviors towards disease process (depression)
Triana, Olson, and Trevino (2012)	FM	Not specified	Qual	Not stated	Generalist, accessible, team-based, biopsychosocial	Didactic, observation, simulation, practice-based, curriculum project	Thoughtful, planned curriculum focused on motivational interviewing. Outcomes were limited in description but incorporated into competency evaluation for residents
Kawamura, Mylopooulos, Orsino, Jimenez, and McNaughton (2016)	Pediatrics	Psychology interns	Qual	Foundation	Team-based	Didactic, observation, simulation	Program focused specifically on communicating diagnosis of autism using simulation-based learning with pediatric residents and psychology interns practicing together. Outcomes included learner reactions, changes in attitudes, skills and behaviors conducted through observation and interview

Table 2 (continued)

Author/year	Medical specialty	Behavioral health specialty	Analysis type	Funding	PCBH elements	Educational methodology	Summary
McLeod, Laclair, and Kenyon (2011)	Family medicine	Not stated	Quant Qual	HRSA residency training grant	Accessible, team-based, biopsychosocial, routine	Didactic, observation, practice-based	Training program that utilized interdisciplinary group appointments for centering during pregnancy where residents practiced alongside a counselor. Outcomes assessed by survey and faculty observation and included positive review of program as well as improvement in facilitation skills
Berge et al. (2017)	Family medicine	Licensed marriage and Family Therapists (including trainees)	Quant	State Dept of Health	PCBH terminology, generalist, accessible, team-based, high volume, routine, focused visits	Practice-based	Described establishing PCBH clinic in residency setting through robust clinical pathways and screening tools. Outcomes were organizational focused (e.g., clinic throughput)
Blount, DeGirolamo, and Mariana (2006)	Family medicine	Psychology fellows	Qual	HRSA, departmental, other grants	PCBH terminology, generalist, accessible, team-based, biopsychosocial, routine	Observation, practice-based	Focuses on development of a Primary Care psychology fellowship for psychology, which includes Family Medicine residents conducting dual inter-views. Outcomes are primarily observational and focus on improved resident conceptualization of the biopsychosocial model and the appropriateness of behavioral health consultations

Table 2 (continued)

Author/year	Medical specialty	Behavioral health specialty	Analysis type	Funding	PCBH elements	Educational methodology	Summary
Bluestein and Cubic (2009)	Family medicine	Psychology interns	Quant Qual	HRSA GPE grant	PCBH terminology, generalist, accessible, team-based, high volume, biopsychosocial, routine, focused visits	Didactic, observation, practice-based	Describes a psychology internship training program specifically in primary care that incorporates inpatient and outpatient Family Medicine. Outcomes were assessed via survey and observation and included positive perception of program as well as content knowledge tests
Boland, Scott, Kim, White, and Adams (2016)	Family medicine	Counseling psychology students	Mixed	Institutional	Team-based	Didactic, observation, simulation, audit, practice-based, other (community visits)	Focused interprofessional education program involving a one-week training with an interdisciplinary team. Outcomes assessed via survey and journaling in a pre-/post- design and found positive reaction to program and increased self-assessment of team-based skills and competencies
Delbridge, Zubatsky, and Fowler (2017)	Family medicine	Medical family therapists (including trainees)	Quant	Not specified	PCBH terminology, generalist, accessible, team-based approach, high volume, biopsychosocial, routine, focused visits	Observation, practice-based	Describes two training programs where learners practice side by side in a PCBH model. Outcomes assessed by survey and medical residents reported perceived patient improvement and responsiveness of behavioral health providers. Practice patterns suggested particular success in reaching disadvantaged populations

Table 2 (continued)

Author/year	Medical specialty	Behavioral health specialty	Analysis type	Funding	PCBH elements	Educational methodology	Summary
Hill (2012)	Family medicine	Psychology	Quant Qual	Not stated	PCBH terminology, generalist, accessible, team-based approach, high volume, biopsychosocial, routine, focused visits	Didactic, observation, practice-based	Describes placement of PCBH clinic within Family Medicine residency programs. Outcomes assessed via survey found that vast majority of residents trained in this model viewed it positively and self-rated desire to work in similar practice settings in future
Hoover and Andazola (2015)	Family medicine	Psychology (counseling and prescribing; including trainees)	Qual	Not stated	PCBH terminology, generalist, accessible, team-based approach, biopsychosocial, routine, focused visits	Didactic, observation, practice-based	Describes an interprofessional residency training environment using PCBH with both counseling and prescribing psychology trainees. Outcomes not assessed or described, however, unique aspect of incorporating prescribing psychologists is emphasized
Kane and Manning (2015)	Family medicine	Psychology	Qual	None	Accessible, team-based, biopsychosocial, focused visits	Didactic, observation, audit, practice-based	Collaborative care model focused specifically on depression treatment. Outcomes have not been formally assessed but informal feedback suggests program is well received by both patients and residents and that residents feel it improves their self-rated knowledge and skill competencies

Table 2 (continued)

Author/year	Medical specialty	Behavioral health specialty	Analysis type	Funding	PCBH elements	Educational methodology	Summary
London, Watson, and Burger (2013)	Family medicine	Psychology (including trainees)	Qual	Illinois children's healthcare foundation	Accessible, team-based, biopsychosocial	Didactic, observation, practice-based	Describes the implementation of an integrated care program in a pediatric setting with a focus on universal behavioral health screening and consultation as needed. Outcomes are not formally assessed by reported positive patient perception and enhanced screening and referral
Martin (2017)	Family medicine	Psychology	Qual Quant	Not stated	PCBH terminology, generalist, accessible, team-based, biopsychosocial, routine	Didactic, observation, practice-based, Other (bibliographic work)	Describes family medicine residents completion of a required primary care behavioral health rotation with various educational methodologies. Outcomes assessed via pre-/post-survey revealed non-significant attitude change towards behavioral health. Suggestion for more intentional curriculum design and evaluation given null results was made

Table 2 (continued)

Author/year	Medical specialty	Behavioral health specialty	Analysis type	Funding	PCBH elements	Educational methodology	Summary
Pisani, LeRouz, and Stegel (2017)	Pediatrics	Psychology fellows	Quant Qual	T32	Generalist, accessible, team-based, biopsychosocial, routine	Didactic, observation, audit, practice-based	Describes an integrated behavioral health program that was intentionally designed with regards to curriculum. Outcomes include a wide range of sources focused on improving patient access, increased resident comfort and skill with behavioral health, and program sustainability
Porcerelli et al. (2013)	Family medicine	Psychology (includes trainees)	Quant	Not stated	Generalist, accessible	Didactic, observation, audit, practice-based	Describes training program focused on dual interviewing. Outcomes assessed via encounter log included increase with dual interviewing with additional residency years; however, differential practice patterns regarding assessment and intervention emerged between medical and psychology trainees
Possis et al. (2016)	Internal medicine, psychiatry	Psychiatry, psychology, social work (includes trainees)	Quant Qual	Not stated	PCBH terminology, generalist, accessible, team-based, biopsychosocial, routine	Didactic, observation, practice-based	Described a Primary Care Medical Home (PCMH) Integration brief immersion training for all learner types. Outcomes assessed via survey and increased attitudes and knowledge regarding PCMH

Table 2 (continued)

Author/year	Medical specialty	Behavioral health specialty	Analysis type	Funding	PCBH elements	Educational methodology	Summary
Ragunathan, Frosch, and Solomon (2017)	Pediatrics	Not specific	Quant	Aaron & Lillie Straus Foundation	Accessible, team-based, routine	Practice-based	Comparison study where residents who trained in an integrated training clinic versus those who were not were surveyed on self-perceived referral patterns and attitudes towards availability of behavioral health. Outcomes assessed via survey found that residents trained in an integrated care model reported greater self-perceived access and referral
Swenson et al. (2008)	Family medicine	Psychiatrist, psychology advanced practice nurse, psychologist, social work	Quant Qual	Ontario Ministry of Health	Generalist, accessible, team-based, routine	Practice-based	Describes the SHARE program which utilizes a multi-disciplinary behavioral health to practice as consultants at 2 medical centers. Outcomes assessed via surveys and focuses groups found positive view of program and high utilization
Williamson, Major, Ulzen, Rubin, and Fotopoulos (2016)	Family medicine	Psychiatry, psychology	Qual	University of Alabama	Accessible, team-based, biopsychosocial, routine	Didactic, observation, practice-based, case conference/staffing	Describes FM PGY-2 rotation through consultation clinic in positive terms for increasing comfort with d/o and collaboration

Table 3 Presage factors

Learner characteristics	
Medical specialty	
Family medicine	17
Pediatrics	3
Internal medicine/psychiatry	1
Assessment of prior learner attitudes?	
Yes	6
No	15
Assessment of prior learner skills?	
Yes	2
No	19
Teacher characteristics	
Behavioralist specialty	
Psychologist	15
Social worker	2
Psychiatrist	3
Master's level counselor	4
Nurse	4
Not specified	2
Behavioral health learners present	
Yes	12
No	8
Explicit faculty development described	
Yes	2
No	19
Environment characteristics	
Training setting	
Clinic	10
Hospital/Medical Center	8
Both	3
Longitudinal training	
Yes	12
No	9
Number of sites	
1	14
2–5	6
> 5	1

setting. Some training occurred in primary care setting within a hospital or medical center ($n = 8$), and some had multi-site training opportunities that included both ($n = 3$). In about half of the studies reviewed, PCBH training was a longitudinal part of the residency curriculum ($n = 12$). Since many of the studies provided more qualitative descriptions of their training programs, exact numbers of residents were difficult to determine in some cases but varied considerably in size.

Table 4 Process factors

Educational topics	
Disease-specific processes	14
Practitioner skills	16
System-based practice	12
Not specified	4
Educational methodology	
Didactic	15
Observation	17
Simulation	3
Record audit	3
Practice-based	19
Other	5
Unclear	1
Curriculum educational theory	
Present in design	3
Absent in design	18

Process: Content, Methodology, and Design

Process factors shown in these reviewed programs are displayed in Table 4. Most programs included content on all three main categories (disease-specific, practitioner skills, systems-based practice); however, four did not clearly specify any curricular content. For educational methodology, didactic instruction, observation, and clinical placements were used in the vast majority of cases, with other strategies being used more rarely. Community visits, bibliographic instruction, and case conferences were employed in three separate studies as alternative educational strategies. Finally, studies were reviewed to see if they articulated an educational theory to guide curriculum design. While most did not explicitly mention such an intentional theory-guide curriculum design, one study referenced learner-centered teaching (Triana et al., 2012), and two focused on competency-based education strategies (Blustein & Cubic, 2009; Kawamura et al., 2016).

Products: Examining Outcomes

Product results are shown in Table 5. While the broader literature on PCBH has well-established outcomes across all levels described, the focus of this review was explicitly on the educational training occurring at the GME level. Seven studies identified the highest level outcomes consistent with the broader literature on the effectiveness of PCBH on distal factors such as patient health or organizational practice (e.g., Cigrang et al., 2015; Landoll et al., 2018). Most studies focused on changes in learning ($n = 16$), with about half evaluating learners' reactions to the training ($n = 13$), as well as changes in behavior. When described, results were

Table 5 Product factors

Outcomes assessed ^a	
Reactions (level 1)	13
Attitudes/knowledge/skills (level 2)	16
Behavior change (level 3)	10
Organizational practice/patient care (level 4)	7
Assessment methodology	
Survey	12
Observation/description	6
Interviews/focus groups	5
Other	5

^aUsing Kirkpatrick's levels (Kirkpatrick, 1994)

generally positive. Roughly half of the studies reviewed used survey-based instruments to evaluate outcomes ($n = 12$). A small percentage used other strategies, such as interviews or focus groups ($n = 4$), a records audit or encounter log ($n = 4$), or qualitatively described their programs' outcomes in the article ($n = 4$).

Discussion

After over 20 years, the PCBH model is well established in integrated care and has shown many benefits in many settings (Hunter et al., 2017). It is important now that our research shifts not from establishing the efficacy and effectiveness of PCBH, but rather to understanding how to create and establish thriving practices. Part of this shift must include an understanding of the education and training of healthcare team members to practice in integrated care settings. Indeed, the medical education literature has advanced the idea of “situated cognition”—that our knowledge, skills, attitudes, and even abilities are “situated” within the context in which they are learned and practiced (Artino, 2013). Thus, it is essential that health professional learners engage in interprofessional learning environments. Improved coordination and consistency between programs that train behavioral health professionals to provide consultative services in PCBH, and programs that train physicians and other care providers to use these consultative team members, are likely to provide significant benefits for the healthcare team, and ultimately patients. As discussed above, insufficient supply in the behavioral health work force is compounded by difficulties with recruiting and retaining BHCs (Landoll et al., 2018). Improving education and training for family physicians who play a critical role in the healthcare team may enhance the practice environment of PCBH and improve BHC satisfaction. This is an exciting potential area for future study that may reinforce the importance of faculty development.

In this study, we reviewed the state of education in PCBH among physician residents. Residency is perhaps an ideal time to study IPE as it represents a key formative period of professional identity integrated with clinical practice. Our findings suggest that on the whole, physicians are open and interested in PCBH and integrated care and perceive there to be significant benefit to their clinical practice to learn related skills. This is consistent with the broader literature on PCBH that suggests it is well received by patients, by providers, and leads to positive health outcomes (Hunter et al., 2017).

However, our review also revealed some key limitations in the literature. In particular, there is either a lack of utilization, or a lack of description, of curriculum design principles and educational theory-based approaches to GME. This is inherently problematic, as medical education literature has long-established the importance of informed curriculum design to improve learning outcomes (Thomas, Kern, Hughes, & Chen, 2016). A key component of informed curriculum design is systematic program evaluation (Thomas et al., 2016). This is another area in which our literature review highlights an important gap. Furthermore, many of the program outcome evaluations conducted did not focus on higher level outcomes, despite the established literature on the health outcome benefits of PCBH. Finally, many of the methodological designs used to evaluate these programs were ill-defined or explained, leaving uncertainty about the quality of assessment of educational outcomes.

At this stage in the implementation of PCBH and IPE more broadly, it is time for systematic, informed curriculum design that includes well-articulated and sophisticated program evaluation. While this can be resource intensive, it is ultimately necessary to ensure that the positive outcomes demonstrated by PCBH can be replicated. One of the consistent calls for integrated care is the recognition that our graduate education programs may be ill-prepared to develop learners to practice in these settings (Ward, Zagoloff, Rieck, & Robiner, 2018). As a result, many PCBH programs that are successful rely on heavily intensive continuing education and must contend with high turnover due to mismatch between training and expectations for BHCs (Landoll et al., 2018). Ensuring an engaged and knowledgeable physician workforce can help reinforce efforts to train psychologists. In addition, there are several examples of innovative IPE learning environments, where psychologists are able to learn alongside physician colleagues (Porcerelli et al., 2013). Careful and systematic curricular design and evaluation of these programs can then fuel broader dissemination and implementation. The field is ripe for the deployment of large-scale dissemination efforts, as this current review shows individual programs have found success on implementing change within their unique microsystems. Key elements of success appear to be when both learners and faculty embrace interprofessionalism and strive to learn from each other, respecting diverse skill sets, and building a

common language. We believe these elements may be a key component of faculty development in this area, and encourage empirical program evaluation.

Our review also highlights areas where PCBH education and training can be further expanded. In particular, while pediatric primary care is recognized as an important area for behavioral health prevention and intervention (Nasir, Watanabe-Galloway, & DiRenzo-Coffey, 2014), our review found that few pediatric residency programs incorporate PCBH in their training. Given that the literature consistently highlights the impact of early adverse childhood experiences on later psychopathology and development (Bethell et al., 2017), early intervention is critical to reduce the mental health burden on our society. It is unclear if there are fundamental differences in pediatric primary care versus other primary care settings that would necessitate adaptation of the PCBH model, or of education and training. Further research in this area is a vital need.

While our review represents an important step forward in charting the emerging field of physician training in PCBH, there are limitations to consider. Many programs implement educational interventions without publishing them in the broader literature; thus, it is possible there are many other GME programs exploring this topic that we were not able to review. Additionally, there is still a question as to where in the educational lifecycle, the most appropriate place is for IPE (Brandt et al., 2018; Paradis & Whitehead, 2018); as such, it may be important to consider training at the pre-doctoral or post-residency level. Existing studies often did not explore interrelationships among outcome variables of interest, thus there remains many important empirical questions about the relationships between various educational and practice outcomes. Finally, as this field is emerging, we were not able to perform a more comprehensive systematic review as much of the published literature did not describe in sufficient detail the educational process. We intentionally used a broad search strategy that was iteratively refined. While this iterative process was consistent with scoping review methodology, and honed in on programs that were practicing in a fully integrated context, it is also possible that this broad approach resulted in the inclusion of some programs that are still evolving in their level of integration. Thus, we hope this article is a call to encourage broader dissemination in this area of important innovations and in doing so, also provides an educational and analytical framework for reporting findings to improve utilization of best practices in this critical area.

Compliance with Ethical Standards

Conflict of interest Ryan R. Landoll, Lauren A. Maggio, Ronald M. Cervero, and Jeffrey D. Quinlan declare that they have no conflict of interest.

Human and Animal Rights No animal or human studies were carried out by the authors for this article.

Informed Consent For this type of study, formal consent is not required.

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