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Publication Date

2024-01-18

DOI

10.3389/fpsyt.2023.1283346

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Using Human-Centered Design to Develop and Implement a Pediatric Mental Health Care Access Program

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15 **Abstract**

16 In 2019, the University of California at San Francisco (UCSF) launched the Child and Adolescent
17 Psychiatry Portal (CAPP), a pediatric mental health care access (PMHCA) program providing remote
18 mental health consultation services to pediatric primary care providers (PCPs) throughout Northern
19 and Central California. The development and implementation of CAPP was guided by Human-
20 Centered Design (HCD), an iterative, rapid-paced innovation process focusing on stakeholders' needs
21 and experiences, which shaped the development of CAPP's programs. The resulting key
22 programmatic elements are designed for pediatric workforce development: 1) PCP consultation with
23 a child and adolescent psychiatrist via a telephone warmline; and 2) training and education for
24 providers. CAPP has grown rapidly since its launch, having enrolled 1,714 providers from 257
25 practices spread across 36 counties and provided 3,288 consults on 2,703 unique lives as of August
26 2023. Preliminary evaluation findings indicate high PCP satisfaction with CAPP's services, despite
27 continued challenges of integrating behavioral health into primary care. Throughout the HCD and
28 implementation process, multidisciplinary partnerships have proven critical in providing end-user
29 input to inform and improve program design. This growing network of partnerships, fueled by
30 personal relationships and trust, has also proven essential for CAPP's rapid growth and sustainability.
31 Overall, this Community Case Study highlights the critical role of partnerships and the importance of
32 taking a people-centered approach, as captured in CAPP's motto, "Connecting for Care."

33

34 **1   Introduction**

An estimated 16.5% of youth under age 18 years have at least one mental health disorder.[1] Despite the high prevalence, only half of youth needing mental health treatment receive care from a mental health professional.[1,2] One significant barrier to treatment is the limited availability of specialty mental health (SMH) care for children and adolescents, resulting in delays in care and inadequate care.[3] A shortage of mental health specialists has long been a challenge for healthcare systems nationwide[6-8] and was further exacerbated during the coronavirus disease 2019 (COVID-19) pandemic, when school-based mental health services were shuttered, and youth were socially isolated.[4,5]

More than ever, pediatric primary care providers (PCP) play a critical role in meeting youth mental health needs.[9] PCPs often have a longitudinal relationship with patients and therefore are in a unique position to apply chronic care principles[10] to mental health problems. Furthermore, many youth and families prefer seeking mental health care from their PCP.[11] However, many pediatric PCPs do not feel comfortable diagnosing or managing mental health conditions; do not feel that mental health services are within their scope of practice; and/or do not feel they have time to address mental health problems in the primary care setting.[12,13] Improving primary care provider capacity to deliver mental health services is one way to increase access to pediatric mental health care. Pediatric mental health care access (PMHCA) programs, also commonly known as child psychiatry access programs (CPAP), have spread across the United States (US) to support pediatric PCPs in managing mental health conditions in primary care settings.[14,15] Most PMHCA programs provide PCPs with telephone consultation services with a child and adolescent psychiatrist or other mental health specialist, care coordination services (e.g., referrals to local mental health resources), and continuing medical education on mental health topics.[16] While further research on PMHCA programs is needed, early findings are promising. One study from the Massachusetts Child Psychiatry Access Project (MCPAP), the longest existing program of this type, found that 50% of parents noted improvement in their child's situation following PCP consultation by MCPAP (25% "strongly agree," 25% "agree").[17] Overall, literature reviews of PMHCA programs have reported high growth in program adoption and high provider and caregiver satisfaction with PMHCA services.[14-16]

In September 2019, faculty at the University of California, San Francisco (UCSF) launched a new PMHCA program to address gaps in pediatric mental health care access in California—the UCSF Benioff Children's Hospitals Child and Adolescent Psychiatry Portal (CAPP). CAPP provides remote, mental health consultation and education services to pediatric PCPs in 48 counties throughout Northern and Central California. The development and implementation of CAPP was guided by Human-Centered Design (HCD), also known as Design Thinking or User-Centered Design) principles in a relationally driven process.

This Community Case Study aims to: 1) describe the HCD process for developing and implementing the CAPP program, 2) describe the resulting key programmatic elements designed to close gaps in access to timely, evidence-based mental health care, and 3) highlight the critical role of partnerships that provided end-user input, outreach, and advocacy, enabling successful implementation and rapid growth.

2   Methods

Program Setting and Context

77 The CAPP program service area encompasses 48 Northern and Central California counties, where
78 approximately 3.5 million of California's 8.9 million children reside.[18] These counties are
79 characterized by tremendous geographic, socioeconomic, and cultural diversity: 40% of the
80 population identifies as Latinx, 35% as Caucasian, 14% as Asian American or Pacific Islander, 5% as
81 Black, 5% as multiracial, and fewer than 1% as Native American or Alaska Natives.[19] Counties range
82 from heavily urbanized (i.e., counties within the San Francisco Bay Area) to rural (i.e., counties
83 within the Central Valley and along the Oregon border). Numerous counties and cities within
84 CAPP's geographic service area are noted to have extreme poverty for young children, including all
85 of Lake and Mendocino counties.[20] In 2019, nearly 4 in 10 children in California were insured by
86 Medi-Cal, California's Medicaid program.[21]

87 California faces a significant shortage of pediatric mental health clinicians. Close to a third of
88 California's counties have no child and adolescent psychiatrists.[22] While the greater Bay Area has
89 slightly higher than state averages of licensed mental health professionals, including child
90 psychiatrists, the Northern and Sierra Regions have 40% fewer psychologists and psychiatrists than
91 the state average, and the San Joaquin Valley has 80% fewer.[23] Meanwhile, mental health needs are
92 highly prevalent; between 2016 and 2020, rates of depression and anxiety among California children
93 aged 3-17 years increased 70%, compared to 26% nationwide.[24] Suicide rates and adverse childhood
94 experience scores in multiple Northern California counties are among the highest in the state.[25,26]
95 Yet, as many as two-thirds of California's children with depression do not receive treatment.[27]

96 *Human-Centered Design Process*

97 We used HCD to guide the development and implementation of the CAPP program because HCD is
98 a relationally-driven innovation process that focuses on stakeholders' needs and experiences and uses
99 rapid, iterative, problem-solving phases to develop solutions. HCD was initially popularized in the
100 engineering and business fields but more recently has been adapted for use in healthcare to improve
101 access and outcomes.[28] For example, HCD methodology has been applied to develop a perinatal care
102 program for Medicaid-insured individuals,[29] improve a guideline-based workflow for prescribing
103 antipsychotics to youth,[30] and adapt a nurse-led intervention to reduce cardiovascular risk among
104 people living with HIV.[31]

105 The HCD process consists of three iterative phases: 1) Inspiration, 2) Ideation, and 3)
106 Implementation (Figure 1).[28] First, the Inspiration phase uses qualitative methods to understand the
107 needs and lived experiences of people facing a problem. The second phase, Ideation, involves rapid-
108 paced brainstorming and prototyping of solutions, with a focus on participatory feedback from
109 stakeholders. The third phase, Implementation, continues testing and refining solutions in a real-
110 world setting.

111 We started the Inspiration phase in March 2019 by convening a Stakeholder Workgroup. This
112 Stakeholder Workgroup was comprised of 11 members, which included 2 CAPP faculty facilitators
113 (CML and PS), 4 pediatric PCPs from federally qualified health centers (FQHC) and academic
114 practices, as well as 5 healthcare system leaders from general and developmental pediatrics, child and
115 adolescent psychiatry, and child psychology. The CAPP faculty facilitators also attended in-person
116 site visits at the Massachusetts Child Psychiatry Access Program (MCPAP) and Washington State's
117 Partnership Access Line (PAL) to speak with PMHCA leadership and staff members to better
118 understand details of these seminal programs' structure, processes and operations, as well as key
119 clinical and educational considerations. We then conducted a 90-minute focus group with 7 PCPs

120 from one community pediatrics practice affiliated with UCSF to gather data on user needs and to
121 understand barriers and facilitators in obtaining mental health consultation.

122 From the Inspiration phase of the HCD process, we acquired two core insights: 1) pediatric specialty
123 mental health access remains challenging even in a relatively well-resourced metropolitan area like
124 the San Francisco Bay Area; and 2) pediatric PCPs welcomed continued workforce development to
125 improve their ability to care for mental health concerns in primary care. These insights informed the
126 core objective for CAPP: to increase access to pediatric mental health care by building workforce
127 capacity among pediatric PCPs.

128 In the Ideation phase in May and April 2019, CAPP facilitators organized 2 additional Stakeholder
129 Workgroup meetings, during which we raised challenges identified during the Inspiration phase and
130 then brainstormed possible solutions. Stakeholders provided feedback concerning: 1) which key
131 PMHCA components to include at our program launch; 2) how to prepare PCPs to utilize program
132 services; and 3) how to support PCPs in diagnosing and treating mental health concerns within
133 primary care. After each brainstorming session, the facilitators met to organize the insights and to
134 develop a prototype design for CAPP. Therefore, we designed CAPP's core programs with pediatric
135 workforce development as a central theme.

136 We launched the Implementation phase in September 2019 by conducting a 1-month pilot test of our
137 prototype design at the pediatrics practice where we conducted the initial focus group. The prototype
138 consisted of: 1) a warmline to provide PCPs with telephone consultation with a child and adolescent
139 psychiatrist, 2) an enrollment and orientation process to prepare PCPs to utilize CAPP services, and
140 3) training and education programs for PCPs. This pilot provided crucial early feedback about the
141 consultation process and content. Additionally, we held an inaugural continuing medical education
142 event on child and adolescent psychiatry topics for pediatric PCPs that allowed us to disseminate
143 information on our services to community practitioners.

144 Given that the HCD process is iterative, we have cycled back through earlier phases to design new
145 solutions as we expanded geographically. For example, we conducted a series of focus groups from
146 April to August 2020 with PCPs from 11 practice sites contributing insights and feedback to further
147 develop CAPP's programmatic offerings.[9] We discovered that clinician burnout prohibited
148 engagement with CAPP services. As a result, we started to prioritize clinician well-being in our
149 programming.

150

151 **3   Results**

152 *Current Programmatic Elements and Footprint*

153 Today, CAPPs core programmatic elements include: 1) PCP consultation with a child and adolescent
154 psychiatrist via a telephone warmline; and 2) training and education, including continuing medical
155 education (CME) for PCPs and school-based health providers through webinars and Project ECHO
156 (Extension for Community Healthcare Outcomes) case discussions. We also provide limited direct
157 services to patients and families, including Bridge Care Coordination to connect families to resources
158 with the help of a licensed clinical social worker, as well as one-time Reach-Out-and-Connect (ROC)
159 consultations with specialized UCSF psychologists for patients and caregivers regarding early
160 childhood mental health, attention deficit hyperactivity disorder (ADHD) and behavior management,
161 autism spectrum disorders, and eating disorders.

162 Since its launch in September 2019, CAPP has grown geographically and numerically (Figure 2). As
163 of August 2023, CAPP has enrolled 1,714 providers from 257 practices spread over 36 counties, and
164 provided 3,288 consults on 2,703 unique lives. Clinical staffing includes a combined 1.7 full time
165 equivalent (FTE) of child and adolescent psychiatrists, 0.25 FTE pediatrician, 0.65 psychologist, and
166 1.0 licensed clinical social worker. Administrative staff include a full-time program manager, project
167 analyst, office associate, and clinical research coordinator.

168 *Strategic Partnerships*

169 Throughout the HCD process, multidisciplinary partnerships have been critical in providing end-user
170 input to inform and improve program design. As an outgrowth of the initial HCD Stakeholder
171 Workgroup, we created an Advisory Committee of general pediatricians, who provide ongoing end-
172 user feedback. We also developed a larger, multidisciplinary Advisory Council, which provides
173 programmatic and policy direction for CAPP's activities. The Advisory Council consists of
174 representatives from regional stakeholders like the California Children's Hospital Association,
175 California Primary Care Association (representing FQHCs statewide), the American Academy of
176 Pediatrics (AAP)-California Chapter 1 (representing pediatricians in Northern California), California
177 Children's Trust (a state advocacy organization), the state of California Title V Maternal Child
178 Health Division, and pediatric medical leaders from underserved communities across CAPP's
179 geographic catchment area. This growing network of partnerships has proven essential for practice
180 and provider adoption of CAPP.

181 *Program Evaluation Results*

182 Data on PCP consultations collected between September 2021 and September 2022 showed that the
183 primary reasons for consultation requests were guidance on medications (65%) and selecting
184 appropriate treatment (16%). Regarding patient diagnoses, PCPs most frequently consulted about
185 patients with anxiety (29.4%), ADHD (24.3%), and depression (24.3%). Forty-eight percent of
186 consults involved 2 or more psychiatric diagnoses.

187 Monthly PCP satisfaction surveys (n = 123) collected between July 2021 and April 2023
188 demonstrated that the program was well-received by PCPs. PCPs responded to the 10 questions using
189 a 5-point Likert scale (from 1 [strongly disagree] to 5 [strongly agree]). Average ratings for questions
190 assessing appropriateness (e.g., "The CAPP consultant provides recommendations that are helpful to
191 my patients"), feasibility (e.g., "I am able to consult a CAPP clinician in a timely manner"), and
192 acceptability (e.g., "I have seen improvements in psychiatric symptomatology in my patients because
193 of CAPP") ranged from 4.43-4.75.

194

195 **4   Discussion**

196 *Lessons Learned and Limitations*

197 This Community Case Study of the CAPP program offers key lessons regarding implementing and
198 scaling a PMHCA program designed to close gaps in access to timely pediatric mental health care in
199 California. In addition, this case study provides insights into using HCD processes to develop and
200 implement a new PCMHA program within a large and socioeconomically diverse catchment area,
201 despite widespread clinician burnout and systemic strain in the wake of the COVID-19 pandemic.

202 A key takeaway was the importance of using a people-centered approach and continuously
203 cultivating trusting relationships. Throughout CAPP's implementation, we learned that pediatric
204 PCPs are more likely to consult with experts whom they know or trust. PCPs have shared that they
205 "feel like an intern again" when first consulting with CAPP. Through timely, respectful, and
206 culturally responsive interactions with individual PCPs, consultants develop an understanding of PCP
207 needs, which is critical for building trust. Additionally, the consultant's teaching and live coaching
208 supports a PCP's iterative increase in skill and confidence as they apply new knowledge with their
209 patients. All consultation and education offerings must be accessible, practical, feasible—that is,
210 within the scope of the PCP's capability and confidence level and within the family's practical and
211 motivational capabilities.

212 This ethos of trust and community-building underlies CAPP's consultative services, education, and
213 outreach and advocacy efforts. Relationships built with PCPs during consultation and training have
214 generated practice-level provider champions, who have proven to be linchpins for driving their peers'
215 engagement and utilization of CAPP. Community support is further established during CAPP's
216 Project ECHO, which adheres to Project ECHO's hallmark "All Teach, All Learn" collaborative and
217 interactive case-based learning structure.

218 In addition to partnerships with individual PCPs, multidisciplinary partnerships have proven critical
219 in providing end-user input to inform and improve program design. Practice and system-level
220 organizational leadership buy-in facilitated CAPP's outreach and marketing and the development of
221 workflows that enabled PCPs to utilize CAPP's services. Relationships with leaders of healthcare
222 systems, insurers, professional organizations, and advocacy groups have helped secure further
223 funding and support for CAPP's expansion. This growing network of partnerships, fueled by
224 personal relationships and trust, has proven essential for CAPP's rapid growth and sustainability.

225 HCD emphasizes flexibility and adaptability throughout all phases, from design to implementation.
226 Our pivot towards emphasizing clinician wellness in our day-to-day consultative and educational
227 programs arose from the recognition of clinician burnout as a major factor affecting provider
228 willingness to expand the scope of their clinical practice to include mental health. PCPs have shared
229 feedback on effective components of consultation that supported their gains in knowledge and
230 confidence. They have also provided input on preferred topics for educational sessions and offered
231 specific workflow modifications, including the ability to self-schedule consults, integrate notes into
232 electronic health records (EHR), and connect to more intensive specialty services. This last
233 component is provided by CAPP's licensed clinical social worker, who provides care coordination
234 and resource navigation for under-resourced families. In all programmatic aspects, continuous end-
235 user feedback, and adaptation have allowed for the flexibility to meet many of the needs of varied
236 counties, healthcare systems, and practice types throughout California.

237 Despite such adaptability and flexibility in design and implementation, CAPP has experienced
238 barriers to engagement in California's Central Valley, one of the state's most under-resourced areas.
239 Despite vigorous engagement efforts that included newsletters, direct telephone outreach to health
240 system leaders, and in-person trainings, overall engagement was lower than expected. Significant
241 clinical need and individual practitioner participation and advocacy were insufficient to mobilize
242 Central Valley FQHC network leaders to engage more fully with CAPP due to time, billing, and
243 practice culture barriers. Further progress in this area will likely require state policy-level and other
244 systemic changes that realign incentives of healthcare systems leaders and individual practitioners to
245 expand primary care workforce capacity to address pediatric mental health.

246   CAPP has also run into limitations posed by ongoing challenges of incorporating time for
247   consultation amid the busy clinical schedules typical of pediatric primary care. One strategy being
248   considered by CAPP is asynchronous e-consults that allow secure email-like communication between
249   PCPs and specialist consultants, particularly for more straightforward questions or follow-up
250   questions to telephone consults.

251   Methodologically, this present study is not a formal evaluation of the CAPP program but rather offers
252   insight into the approach that guided CAPP's programmatic development; a mixed method
253   evaluation is currently underway to assess program implementation processes and outcomes.
254   Although this study incorporates a HCD approach for PMHCA program development, the utility and
255   applicability of specific programmatic elements may not be generalizable to PMHCA programs in
256   other geographic areas. Additionally, CAPP was developed and implemented in a pediatric practice
257   network affiliated with an academic medical center and was supported by philanthropy and federal
258   grants. Thus, PMHCA development and implementation in other settings with different healthcare
259   infrastructures and resources may require additional adaptations. Finally, while HCD proved helpful
260   in encouraging stakeholder engagement and investment in program design, our sample of
261   stakeholders was specifically chosen for their interest in building in a PMHCA program. Another
262   limitation is the lack of access to clinical outcomes data needed to evaluate CAPP's ability to achieve
263   its ultimate goal of improving outcomes for youth facing a swelling mental health crisis.

264   Despite these important programmatic and methodological limitations, important lessons arise from
265   CAPP's experience in using HCD to adapt PMHCA program elements to Northern and Central
266   California's communities in a time of pressing need. Most importantly, this Community Case Study
267   highlights the critical role of partnerships and the importance of taking a people-centered approach,
268   as captured in CAPP's motto, "Connecting for Care."

269

270   **4.1   Figures**

271   Figure 1: CAPP's Human-Centered Design Process[*]

272   [*]Figure adapted from Altman, *et al.*[28]

273

274   Figure 2: CAPP Consultation Calls by Year and County

275

276   **5   Conflict of Interest**

277   The authors declare that the research was conducted in the absence of any commercial or financial
278   relationships that could be construed as a potential conflict of interest.

279

280   **6   Author Contributions**

281 CM: Writing – original draft, Conceptualization, Methodology, Supervision, Funding acquisition; JJ:
282 Writing – original draft; JY: Writing – original draft; MF: Writing – original draft, Formal analysis;
283 Visualization; PS: Writing – original draft, Supervision.

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