Collaboration Challenges and Technology Opportunities at the Intersection of Perinatal and Mental Health Journeys

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Collaborative Care Programs (CCPs) integrate mental health services into primary care settings to help patients access much needed treatment. Technologies could increase the effectiveness of CCPs, but we know little about what collaboration challenges technologies must address in this complex clinical setting. To investigate these challenges and technology opportunities, we conducted interviews and contextual inquiries with 30 patients and providers in an obstetric CCP. Using the Parallel Journeys Framework as a lens, we uncover new collaboration challenges (e.g., weighing risks and benefits of treatment, conflicting opinions and ambiguous responsibilities) at the intersection of patients' obstetric and psychosocial care journeys. We discuss new CSCW implications and technology opportunities, such as the importance of addressing support gaps in cyclical experiences, and the need to resolve provider conflicts to refocus on patient needs. These contributions inform how technologies can support patient engagement and collaboration with providers to access and receive treatment, as well as improve health outcomes.

CCS Concepts: • **Human-centered computing** → Empirical studies in HCI; Empirical studies in collaborative and social computing; • **Applied computing** → Health care information systems.

KEYWORDS: health, mental health, collaborative care, pregnancy, postpartum

ACM Reference format:
Shefali Haldar, Hannah Studd, Novia Wong, David C. Mohr, Madhu Reddy, and Emily S. Miller. 2022. Collaboration Challenges and Technology Opportunities at the Intersection of Perinatal and Mental Health Journeys. *Proc. ACM Hum.-Comput. Interact.* 6, CSCW2, Article 501, 28 pages (November 2022). https://doi.org/10.1145/3555614

1 INTRODUCTION

Pregnancy and childbirth are considered major life events for women, as they experience physical changes to their body and shifts in family, home, and social norms. During the **perinatal** period (i.e., the time before and after birth) women are also at a high risk of experiencing mental health conditions, such as depression and anxiety, and elevated stress. These challenges affect an

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estimated 10% of pregnant women and 13% of postpartum women worldwide and have been identified as a major public health challenge by the World Health Organization [73]. When left untreated, perinatal depression, anxiety, and other diagnoses can lead to poor quality of life—in extreme cases, mortality—for the mother, as well as adverse outcomes for fetal, child, and family health [13,63,84]. Despite these consequences, most women do not receive adequate perinatal mental health care. Studies suggest that fewer than 10% of women who experience postpartum depression receive treatment [21]. Barriers—such as obstetric providers' lack of mental health training, inadequate screening practices, and the perception that mental health care is not within their scope of obstetric work [88]—contribute to the lack of access to necessary care.

Collaborative Care Programs (CCPs) integrate mental health services into primary care settings and can help alleviate barriers to perinatal mental health care. CCPs require effective collaboration of a care team from various disciplines, including primary care providers, care managers, psychologists, psychiatrists, and therapists, who coordinate mental health treatment and monitor the patient's progress. In obstetrics clinics, CCPs have demonstrably improved mental health outcomes for pregnant and postpartum women [54,96].

Despite the proven benefits to CCPs, we know little about how this complex collaboration occurs within perinatal care settings and what challenges arise among patients, providers, and the technologies involved in their collaboration. To begin tackling these important questions, Suh and colleagues [86] developed the *Parallel Journeys Framework* in the collaborative cancer care context. This framework helps to examine collaboration between diverse stakeholders with the purpose of treating physical and mental health conditions. By adapting and applying this framework to a perinatal context, we investigate challenges that patients and providers experience within an obstetric CCP setting. We reveal additional insights into collaboration challenges at the intersection of obstetric and psychosocial parallel journeys.

Prior research suggests that technologies—including mobile applications [8] and telehealth platforms [22]—can enable effective collaboration between patients and providers to drive improved health outcomes [27]. However, HCI research has predominantly focused on the design of technologies that support patients' self-management of perinatal and postpartum mental health in day-to-day contexts [24,36,98]. Consequently, we need a better understanding of the collaboration and technology challenges patients and providers face in the perinatal CCP setting to ensure that new technologies are designed to successfully integrate into CCPs for patients to fully realize their benefits.

In this paper, we present findings from a research study with 30 perinatal CCP patients and providers. Our objective was to gain a deep understanding of collaboration challenges and technology opportunities for patients and providers in the context of perinatal CCP. We conducted interviews with 20 pregnant and postpartum women, as well as interviews and contextual inquiries with 10 providers. Using the Parallel Journeys Framework as a lens [86], we describe patient and provider experiences when navigating the obstetric and psychosocial care offered by the perinatal CCP. We also share the collaboration challenges between patients, obstetric providers, and psychosocial providers as they work together to deliver important health care.

Through this study, we make the following contributions to CSCW:

- An expansion of the Parallel Journeys Framework that is also adapted to the context of perinatal collaborative care, including descriptions of obstetric and psychosocial care journeys that patients experience.

- An empirical understanding of the challenges that emerge during collaboration between patients and providers at the intersection of these parallel journeys.
- Technology opportunities to address these collaboration challenges that patients and providers experience at the intersection of both journeys.

Our contributions can guide CSCW and HCI researchers to design and develop successful technologies that support patient and provider collaboration and improve health outcomes in this complex clinical setting.

2 RELATED WORK

2.1 Perinatal and Maternal Health Technologies in HCI

Prior work in CSCW and HCI has investigated ways for technologies to support pregnant and postpartum women in daily contexts outside of clinical settings. For example, researchers have explored the design of mobile tools to track aspects of women's physical health—such as sleep, nutrition, and hydration—and to deliver critical education and information about maternal and fetal health [58,91]. Others have highlighted the importance of designing for technology use and cultural practices of pregnant or postpartum women, such as the involvement of family in assisting women with unusual physical symptoms [6,58,70]. Researchers have also highlighted how perinatal and maternal health technology should allow women to seek and receive support from different sources because their support needs change throughout pregnancy and parenthood [77,78]. For example, an app-based chat support group facilitated by a non-government organization in India created different groups to provide tailored support across various stages, including pregnancy, newborn, and distinct stages of infant development [94].

General websites and online health communities meet women's information needs to make care decisions and learn from peers [33,36,59,64,79]. These technologies help reduce the burden of seeking accurate and relevant information online. For those with high-risk pregnancies, such technologies can help individuals navigate maternal mortality and pregnancy loss. For example, online spaces with personal narratives have helped those who have experienced a pregnancy loss receive social support, and emotional validation, as well as help them process their emotions [2,3]. Personal narratives in online spaces are beneficial in gathering pregnancy and pregnancy loss related information [4].

Within clinics and healthcare settings, HCI researchers have surfaced challenges that perinatal and postpartum patients face when communicating with their providers and navigating the healthcare system, such as searching for missing medical information that patients had shared with their provider or taking time to call insurance companies to understand the cost of care [37]. App-based group chats with provider moderators have also demonstrated value in supporting information needs and medical questions for new mothers [90,94].

These studies highlight the challenges that pregnant and postpartum women experience, and how technologies work to address these challenges. However, most of these technologies tend to focus on information needs, symptom management, and peer support regarding physical health (e.g., online spaces allow women to ask questions about physical changes, such as weight gain during pregnancy [3]. There has been less focus on technologies for the entire pregnancy ecology [76] of which mental health is a critical component.

2.2 Perinatal Mental Health Technologies

Given the high prevalence of depression and anxiety among perinatal and postpartum women [9], digital mental health technologies can provide opportunities to address perinatal women's emotional health and positively impact their wellbeing [31,40].

During pregnancy, technologies have been used to support mental health by collecting passive sensing data—such as location and heart rate—to determine associations with depression or stress symptoms [28,55]. Multi-sensorial experiences have been created to empower women in recognizing and managing emotions throughout gestation [53]. Researchers have also explored pregnant women's use of mobile technologies to self-report their psychological wellbeing, with linkage to external resources for further mental health support [7,23,24].

To help women experiencing postpartum depression, SMS or video conferencing technologies facilitate clinical appointments (e.g., teletherapy) between clinicians and patients [12,95]. Other technologies involve web tools for evidence-based therapy for postpartum depression—sometimes with peer groups—and are designed to be used over several weeks [25,61,82]. Furthermore, mood tracking features within applications help new parents reflect on mood changes over time [39]. To identify risk and predict the onset of postpartum depression, researchers have leveraged patterns in women's expression of negative affect, language, and network interactions on social media [17,18].

While these studies highlight the potential of technologies for women's perinatal mental health management, they also point to gaps in our knowledge. For example, women's perspectives are largely missing in the design of technologies offered at the point of clinical mental health care (e.g., teletherapy) [16]. Furthermore, these technologies are rarely designed for women to use across both their pregnancy and postpartum period [43]. Because of the frequent touch points perinatal women have with the healthcare system, we need to better understand what need exists for technologies to support the continuity and history of women's mental health experiences, as well as support multiple stakeholders in delivering perinatal mental health care effectively in clinical settings, such as through a Collaborative Care Programs (CCPs).

2.3 Collaborative Care for Perinatal Mental Health

CSCW researchers have long studied the collaborative nature of healthcare work [30]. The majority of this work within clinical settings has focused on collaboration between two entities, such as between a patient and their clinician [74,75], or collaboration within a group, such as emergency departments [62] or intensive care units [81].

One lesser-studied context in the CSCW literature is Collaborative Care Programs (CCPs). CCPs are a type of mental health service integrated into primary care settings that aim to support primary care providers in providing mental health treatment [89]. The model for CCPs was originally developed by Katon and colleagues in the 1990s [50,51]. CCPs have since been implemented in several large systems of care in the United States, Canada [49,52], among other countries [1,83]. The long-term approach of CCPs in helping patients proactively manage, treat, and monitor their symptoms have led to significant improvements in mental health outcomes, as demonstrated by numerous clinical trials conducted with a variety of care settings and populations [5,83,85]. Beyond better health outcomes, implementation of CCPs also results in improved patient satisfaction and quality of life [68].

In the perinatal setting, CCPs support patients by providing education about mental health conditions, evidence-based treatments that are tailored to the pregnancy and postpartum experience (e.g., breastfeeding), and monitoring patient responses to treatments over time [34].

Perinatal CCPs are composed of a network of individuals (see Figure 1). **Obstetric providers** are responsible for screening patients for mental health symptoms and prescribing antidepressants, in addition to monitoring of the patient's physical and fetal health throughout pregnancy. **Therapists and psychiatrists** provide evidence-based therapy and complex medication management, respectively. **Care managers** are responsible for coordinating and monitoring the patient's mental health care, handling referrals, scheduling appointments, adjusting the care plan, and sharing updates with all CCP individuals. **Patients** participate in their obstetric and mental health care with this team of CCP providers and staff.

Studies have demonstrated the benefits of perinatal collaborative care on pregnant and postpartum women's mental health [67,92] and the benefits of technologies—such as electronic records, telemedicine, and remote digital assessments [14,32,57]—to help optimize the delivery of collaborative care. However, we know little from a CSCW perspective about the challenges that patients and providers experience as they try to access and deliver perinatal mental health care within CCPs. Although previous CSCW research has studied how technologies are used to support interdisciplinary medical teamwork and decision making (e.g. [47,97]), less is known about what role technologies have in the collaboration that takes place in obstetric CCPs.

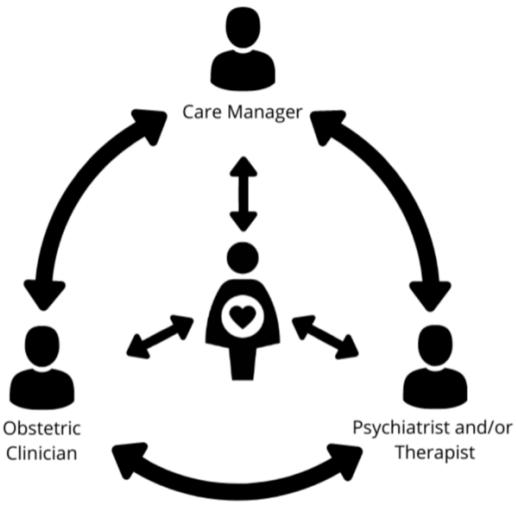

Fig. 1. Diagram of Collaborative Care Programs (CCPs) in obstetrics clinics. Perinatal patients are in the center and communicate with the providers who also communicate with other providers in the CCP.

2.4 Parallel Journeys Framework

As CCPs gain traction in the medical field, there is a growing opportunity for CSCW researchers to examine this complex collaboration between diverse stakeholders to ensure the successful design and implementation of technologies that support their work. The Parallel Journeys Framework, a conceptual design framework developed by Suh et al. [86], provides a valuable CSCW lens to examine these complexities.

The purpose of the Parallel Journeys Framework is to surface challenges that emerge at the intersection of the two distinct, but related, health journeys that make up collaborative care [86]. As described by Suh et al. [86], the first journey involves care offered by the primary care clinic, while the second journey involves the psychosocial care offered by behavioral health providers

embedded within the clinic. Because the challenges of collaborative care do not neatly or consistently fit into one journey, the framework defines phases of both journeys and the challenges experienced by patients and clinical stakeholders in each of these phases (see Table 1).

Table 1. Parallel Journeys Framework adapted from Suh et al. [86] describing the challenges at the intersections between psychosocial care journey (columns) and cancer care journeys (rows).

	Identification of patients with depression	**Initial assessment, diagnosis, and rapport building**	**Active depression treatment**	**Maintenance and relapse prevention planning**
Cancer screening and diagnosis	Information overload from both cancer diagnosis and supportive care resources	Patients under-report depressive symptoms during initial assessment	Depression is decompensated with cancer diagnosis	Cancer diagnosis can exacerbate existing stressors and risk factors
Initial information-seeking	Patients hide depression following cancer diagnosis	Patients may get tired of paperwork or refuse initial assessment	<unobserved>	<unobserved>
Acute cancer care and treatment	Oncology staff may not screen for depression	Initial assessment can be difficult when cancer-related stressors take precedence	Lack of energy impedes depression treatment	<unobserved>
No evidence of disease	Depression may not be identified when not seeing oncologists or BHPs	<unobserved>	Patients are not transitioned to community providers or lose access to BHPs following cancer treatment	<unobserved>

The original Parallel Journeys Framework is rooted in the study of collaborative cancer care. To define the phases of both health journeys, the authors draw both upon previous CSCW and HCI research regarding cancer journeys [44,45] as well as their own work with stakeholders at cancer centers delivering collaborative care.

Most current knowledge about challenges at the intersection of parallel journeys is specific to the domain of cancer care. We have limited understanding of how this framework could apply to other clinical settings, and what additional challenges and HCI opportunities can be revealed by applying this framework to a new setting.

In this paper, we use the Parallel Journeys Framework as a lens to interpret and scaffold our findings, adapting it to our context of study (i.e., perinatal CCPs). We chose this framework because its purpose aligns with our goal of characterizing challenges that individuals experience at the intersection of two health journeys. We expand the framework's utility for CSCW research and discuss the design of technologies that address such challenges.

3 METHODS

With these knowledge gaps in mind, we set out to answer two research questions:

- What are patient experiences with the mental health services offered through the CCP?
- What are the challenges that the CCP's patients and providers encounter when receiving or delivering mental health services?

To answer these questions, we designed a two-pronged study approach: (1) interviews with pregnant and postpartum CCP patients, and (2) contextual inquiry and interviews with CCP providers. All procedures described in the following sections received approval from the authors' Institutional Review Board (IRB).

3.1 Study Site

We conducted our study at a large academic hospital located in the Midwestern region of the United States, which offers a Collaborative Care Program (CCP) through its 5 obstetric-gynecology (OB/GYN) clinics. The CCP serves over 5000 patients annually. Its obstetric providers (e.g., obstetricians and midwives) and psychosocial providers (e.g., psychiatrists, therapists and two care managers) provide mental health services—such as treatment consultations, therapy, medication management, and symptom monitoring—during pregnancy and for up to one year postpartum.

3.2 Interviews with Pregnant and Postpartum CCP Patients

To understand patient experiences with the mental health services offered through the CCP, we conducted phone-based interviews with pregnant and postpartum CCP patients. Interviews were conducted over the phone to reduce patients' barriers to participation (e.g., having a presentable room for a video call, finding childcare for the duration of the interview). Patients were considered eligible for these interviews if they were at least 18 years old, had been referred to the CCP by an obstetric provider (i.e., obstetrician, midwife), could communicate in English, and were pregnant or less than one year postpartum at the time of their interview. We followed a purposeful sampling approach to recruit participants that reflected the demographic characteristics of the patient population that the CCP serves. A care manager at the CCP reviewed the list of active patients on a weekly basis and prioritized patients to contact based on the demographic targets for our study sample. The care manager then systematically contacted eligible patients on this list to inform them of the study. If they expressed interest in participating, the eligible patient was contacted separately by a second research team member to share more study details, complete the informed consent process, and conduct the interview.

Interviews typically lasted 45-60 minutes and covered a range of questions about the patient's relationships with health care providers they saw through the CCP, their feedback on the obstetric and mental health services they had used, and how they managed their day-to-day mental health beyond their use of the CCP's services. Examples of questions included: How has [the CCP] met, or not met your, expectations? How would you describe your relationship with [CCP providers]? What do you wish [the CCP] could do differently, and why? All participants were compensated for their time and audio recordings of these interviews were transcribed for analysis.

3.3 Contextual Inquiry and Interviews with CCP Providers

To examine the workflow, communication, and collaboration challenges that CCP's providers experience when delivering mental health services, we conducted contextual inquiries and interviews with key providers and care managers involved in the CCP. These providers were

considered eligible for the study if they were at least 18 years old, had previous or current professional duties related to the CCP, and could communicate in English. Similar to our patient recruitment strategy, we followed a purposeful sampling approach so that our obstetric and psychosocial provider participants represented the various perspectives involved in delivering the CCP's services. A member of the research team contacted eligible participants via email to describe the study and assess their interest in participation. If the eligible participant expressed interest, the research team member coordinated a follow-up time with them to complete the consent process and study procedures.

We conducted contextual inquiries [41] with the CCP's care managers to understand the real-world context of their workflow, communication, and collaboration. We focused on the care managers because of their central role in coordinating the CCP's services (e.g., sending and monitoring electronic symptom surveys to patients, calling patients for check-ins and appointment reminders, scheduling patient appointments, alerting healthcare providers about patient status updates). One research team member completed a total of 8 observational sessions with both care managers, lasting 1-2 hours each session. During a session, the care manager would go about their workday while the research team member took extensive notes, asked clarifying questions, and captured photos related to their daily tasks, decision processes, technology use, and communication with other providers. Care managers were compensated per session. Photos were cataloged and all written notes were transcribed for analysis.

We then conducted interviews with a variety of providers involved in the CCP. The purpose of these interviews was to gain a deeper understanding of their perspectives on challenges and opportunities for improving the delivery of CCP services to patients. A research team member conducted 40–60-minute interviews with each provider, asking questions such as: What things do you consider before referring a patient to [other provider]? What do you wish could be better about your collaborations with [other providers]? If you could wave a magic wand and change something about your experience working as part of [the CCP], what would it be and why? All CCP provider participants were compensated for their time and audio files of interviews were transcribed for analysis.

3.4 Impact of COVID-19 on Data Collection

Data collection for this study occurred during March 2020 - July 2020. During this time period, the COVID-19 pandemic was rapidly evolving and impacting daily public life as well as the CCP services offered to patients [15]. In response to the CCP's efforts to shift their mental health services to telehealth appointments, our research team made minor, iterative revisions to our interview protocol for both patients and providers to capture their pandemic-related questions, concerns, and challenges within the larger context of our research questions. Our research team also shifted planned in-person interviews with providers to phone-based interviews.

3.5 Participant Characteristics

We enrolled a total of 20 CCP patients in this study, consisting of 10 pregnant patients and 10 postpartum patients. These participants ranged in age from 24-37 years old (mean = 30.55, SD = 3.79) and represented various demographic backgrounds. Six of the 20 participants identified as Hispanic or Latinx, five as Black or African American, one as American Indian, one as Asian or Asian American, ten as White, and three identified as "Other" or did not report. Sixty-five percent of participants had private insurance, and all participants saw providers at one of five obstetrics clinics affiliated with the CCP. While each participant had been diagnosed with—or had symptoms

of—perinatal depression, some participants were also using CCP services for perinatal anxiety. A subset of participants had a history of managing one or more mental health conditions (e.g., depression, bipolar, ADHD) before their perinatal period. Seven participants were pregnant or postpartum for the first time. Of the 13 participants who had multiple pregnancies or children, at least three participants mentioned receiving care through the CCP during a previous pregnancy.

We also enrolled 10 CCP providers, representing obstetric and psychosocial providers and staff. Two care managers currently involved in the CCP were the focus of our contextual inquiries and also completed interviews. The remaining 8 providers who completed interviews were: 2 psychiatrists, 1 clinical psychologist, 1 therapist, 1 OB/GYN nurse practitioner, 1 OB/GYN midwife, 1 OB/GYN physician, and 1 care manager who previously worked at the CCP and had deep knowledge of its establishment at the study site. These participants ranged from having a few months to 3 years of experience working in the CCP at the time of the study.

Table 2 summarizes our participants' status or role at the time of our study. For the remainder of this paper, we refer to P1-P20 as patients and CM1-CM3, PSY4, PSY5, NP6, CL7, TH8, MW9, and OB10 as providers. Specifically, CM1-CM3, PSY4, PSY5, CL7, TH8 are referred to as psychosocial providers, and NP6, MW9, and OB10 are obstetric providers.

Table 2. Participant identifiers and their status/roles at the time of our study

Participant	Status/role at the time of study
P1-P9, P11	Postpartum Patient
P10, P12-P20	Pregnant Patient
CM1, CM2	Care Manager (current)
CM3	Care Manager (previous)
PSY4, PSY5	Psychiatrist
NP6	Obstetric Nurse Practitioner
CL7	Psychologist/Clinical Liaison
TH8	Therapist
MW9	Obstetric Midwife
OB10	Obstetric Physician

3.6 Data Analysis

To analyze the 20 patient interview transcripts, 10 provider interview transcripts, and 8 observational notes from contextual inquiries with care managers, we followed an inductive, open-coding process [35]. With a subset of transcripts, research team members identified themes related to our research question (e.g., "continuity of care," "caseload management"). After identifying these initial codes, the research team independently coded more transcripts, regularly met to discuss and define new codes, resolved disagreements, and converged codebooks. This iterative process was followed multiple times until consensus was reached and a codebook was finalized. The research team members then applied the finalized codebook to all transcripts and relevant sections of the contextual inquiry notes.

After completing the patient and provider data analyses, two research team members conducted a journey mapping exercise [42] to create a holistic understanding of participants' experiences and summarize their shared and distinct challenges. Separate maps were created for patients and providers, organizing themes from our analysis into the phases of their obstetric and mental health care experiences (e.g., "Patient Referral," "Therapy/Psychiatry Treatment"). At this stage, the research team drew upon the Parallel Journeys Framework by Suh et al. [86] as a lens to

organize and interpret our analyses, due to its close alignment with our research questions. We applied this framework by mapping out the phases of patient and provider journeys with obstetric and perinatal mental health care (e.g., our journey map phase "Therapy/Psychiatry Treatment" corresponding to the "Active Treatment" phase of the framework). We then noted the challenges in each phase, informed by our qualitative codes. When appropriate, we adapted elements of the original framework to our specific clinical context and unique findings.

4 FINDINGS

Our findings are organized in two sections: First, we define the phases of obstetric care and psychosocial care. Second, we describe the challenges observed at the intersection of these two journeys from the perspective of patients, obstetric providers, and psychosocial providers.

4.1 Parallel Journeys in Obstetric and Psychosocial Care

In this section, we define the phases of the parallel obstetric and psychosocial care journeys. We draw upon illustrative examples and quotes from our data, supplemented by relevant literature, to define and describe each phase.

4.1.1 Phases of the Obstetric Care Journey

Drawing from our contextual inquiry data and interview data, as well as relevant literature on the pregnancy experience (e.g., [19,23,38]), we define the phases of the obstetric care journey as follows: (1) First Prenatal Appointment and Uncertainties (2) Routine Appointments and Day-to-Day Changes (3) Labor and Delivery, and (4) Postpartum Check-In.

4.1.1.1 First Prenatal Appointment and Uncertainties. For many patients, the first phase of the obstetric care journey starts with their first prenatal appointment, which occurs in-person at the obstetric clinic, to confirm the pregnancy and establish a relationship with their obstetric provider. Those who undergo fertility counseling and procedures such as In-Vitro Fertilization (IVF) may have already established such a relationship through consultations prior to confirming the pregnancy. The first prenatal appointment is meant to gather the patient's "*general medical history and [current or previous] medications*" (P17), conduct a physical exam, and identify factors that may indicate the pregnancy is high-risk to plan for appropriate monitoring [38]. Around the time of this phase, patients commonly experience uncertainty and self-described anxiety. For example, participants who were pregnant for the first time shared that they "*didn't really know what to expect*" (P18) and "*this is all new … we don't know what to do necessarily*" (P12). Tests conducted early in the pregnancy might discover fetal anomalies, which in turn lead to more specialty appointments--such as genetic counseling--and "*a lot of unknown*" (P15) for the patient.

4.1.1.2 Routine Appointments and Day-to-Day Changes. After the first appointment with the obstetric provider, patients of the OB/GYN clinic have follow-up appointments at regular intervals for the duration of their pregnancy. Typically, these appointments take place in-person and begin at a cadence of once every four weeks, but they increase in frequency as the pregnancy progresses and they can be more frequent with high-risk pregnancies. The focus of these follow-up appointments is to monitor fetal growth and development, track aspects of the patient's physical health (e.g., glucose screening, blood pressure), and provide general guidance on what to expect in the coming weeks [38]. At the time of our study, the OB/GYN clinic was deciding which of these appointments needed to happen via telehealth due to the COVID-19 pandemic, as MW9 mentioned: *"there are some visits that, specifically, [we] are going to do by telehealth including…not for all but for most, 24-week OB appointment, [and] 32- to 34-week appointment…"*

Between these regular appointments, patients experience day-to-day physical and emotional changes as their pregnancy progresses. Patients shared their struggles with *"extreme episodes of nausea"* (P12), feeling *"alone"* and *"isolated"* in early stages of pregnancy, and that *"routine simple things"* such as eating lunch and getting dressed for work *"were just so much more difficult being pregnant"* (P10). During this time, patients also described looking for social support from existing networks or online, and searching for information about pregnancy and parenting through resources they discovered independently or by recommendation from their obstetric provider. Engaging in these support- and information-seeking behaviors often helped patients feel *"better equipped and...know what questions to ask"* at their next routine appointment.

4.1.1.3 Labor and delivery. This phase represents the culmination of a patient's pregnancy, a time where patients can have "*a lot going on*" (CM1). At the conclusion of their pregnancy, the patient begins experiencing labor and meets with their obstetric provider, who helps the patient *"for many, many hours during their labor"* (MW9) through to the birth of the patient's child, with support from nurses and other healthcare providers. If the patient and child are deemed healthy after the in-hospital delivery, they are discharged and the patient completes their physical recovery at home.

4.1.1.4 Postpartum Check-In. After labor and delivery, patients typically have a follow-up appointment with their obstetric provider between two and six weeks postpartum. During this appointment, the obstetric provider conducts a physical exam, assesses health concerns that might have emerged during pregnancy, labor, or delivery, and addresses questions from patients on topics such as physical recovery and newborn feeding. Patients with pregnancies considered high-risk or who experienced complications may have earlier or additional check-ins with their obstetric provider [38]. For most patients, the postpartum appointment is their final touchpoint with their obstetric provider. As P08 shared, this appointment *"was the last time I saw my OB doctor[.]"*

These phases serve both to provide necessary obstetric care for pregnant and postpartum patients and–as detailed in the following section–to establish important touch points through which patients, providers, and staff of the CCP coordinate psychosocial care services.

4.1.2 Phases of the Psychosocial Care Journey

The Parallel Journeys Framework identifies four common phases of patients' psychosocial care journey: (1) Identification of Patients with Depression, (2) Initial Psychosocial Assessment, Diagnosis, and Rapport Building, (3) Active Depression Treatment, and (4) Maintenance and Relapse Prevention Planning [86]. Below, we define these phases in the context of the perinatal CCP, based on our contextual inquiry and interview data with patients and providers.

4.1.2.1 Identification of Patients with Depression. The purpose of this phase is to proactively identify patients experiencing mental health symptoms in order to connect them with appropriate CCP services in a timely manner [86]. During a patient's first, routine, and postpartum appointments for obstetric care, their obstetric provider uses paper-based standardized measures such as the Patient Health Questionnaire (PHQ-9) and the General Anxiety Disorder questionnaire (GAD-7) to screen patients for symptoms of depression and anxiety [56]. When a patient is identified as having such symptoms, or has a known history of mental health symptoms, the obstetric provider will mention the CCP as an available resource and determine if the patient is interested in a referral. As PSY5 shared, *"I'll say, 'It really seems to me that you could use some additional support...if the [care manager] is available, would you like to talk to her after our visit?'"*. If the patient agrees, the obstetric provider refers the patient to the CCP for further support. OB10 explained her referral process: *"after I see a patient, I'll...send [care manager] a message via*

[electronic health record] and just say like, this patient, I think, could utilize your resources...I document in my note maybe a couple of things that we were concerned about."

4.1.2.2 Initial Psychosocial Assessment, Diagnosis, and Rapport Building. This phase is intended to establish a working relationship with the patient, complete a baseline assessment of the patient's mental health status, then determine the appropriate treatment plan based on this assessment and the patient's preferences [86]. After their referral by the obstetric providers, patients meet with a care manager, typically by phone, to complete the assessment process. For this process, patients complete the PHQ-9, GAD-7, a Post-Traumatic Stress Disorder (PTSD) measurement, the screening for Adverse Childhood Experiences (ACE), and the Mood Disorder Questionnaire (MDQ) [29,69]. Following this baseline assessment, the care manager and patient discuss *"symptoms that they're having or concerns that they're having. And then we figure out a treatment plan together"* (CM2) that meets the patient's needs and preferences. If this treatment plan involves therapy or psychiatry, the care manager will refer patients to the CCP therapist and psychiatrist for separate assessments, which are paper-based and manually entered by care managers into a REDCap database.

4.1.2.3 Active Depression Treatment. In this phase, behavioral health providers deliver evidence-based treatments that address clinical concerns, monitor the patient's response to this treatment, and adjust the treatment plan when needed to help patients achieve their goals [86]. If the treatment plan involves therapy, the cadence of patient appointments with the CCP therapist range *"from weekly to every other week, to monthly, sometimes they're [on the same day as] OB visits."* (TH8). Patients may also receive prescriptions for antidepressants that are managed by their obstetric provider, in consultation with CCP care managers and psychiatrists. In some cases, a patient will shift their medication management to the CCP psychiatrist when *"they're pretty psychiatrically ill beyond just what an OB may be comfortable with...we tend to see a lot of treatment refractory depression or bipolar or psychosis..."* (PSY4). Aside from these specialized treatments, all patients are monitored by the care managers via electronic PHQ-9 and GAD-7 assessments emailed every two weeks. Patient responses are saved in the CCP's REDCap database to track patient's responses over time. A care manager regularly reviews these responses and *"can reach out to women if I have concerns about anything or if symptoms look like they're getting worse. We can think of a game plan together. So, that might mean adding something. It might mean changing medications. It might mean adding support groups, or whatever the case may be"* (CM2). These discussions take place with patients over the phone.

4.1.2.4 Maintenance and Relapse Prevention Planning. The goal of this phase is to ensure patients are meeting their treatment goals, increasing their self-efficacy, and establishing plans for maintenance of their mental health [86]. The perinatal CCP provides care up to one year after birth, the time up to which pregnancy- and postpartum-related mental health symptoms can occur. In the weeks leading up to this milestone, patients are reminded by care managers via phone and patient portal messages that their CCP care will end and discuss community resources or coping strategies to use after their discharge from the program. When needed, care managers offer patients external referrals that are *"tailor[ed]...to where they live"* (CM1) so patients can receive longer-term treatment outside the CCP. Despite this definitive endpoint of perinatal CCP care, a patient's mental health treatment may continue beyond this endpoint outside of the perinatal context. If a patient becomes pregnant again and requires psychosocial care, they return to the CCP. Taking their needs and history into account, the patient may work with the care manager and psychosocial providers to establish a new psychosocial care plan alongside their obstetric care plan.

4.2 Challenges at the Intersection of Obstetric and Psychosocial Care Journeys

4.2.1 Struggling to Recognize and Acknowledge Symptoms

Obstetric providers screen for depression and anxiety symptoms during a patient's initial and routine appointments, but patients in our study shared why identifying these symptoms is a challenge. A few patients shared their lack of knowledge about perinatal mental health symptoms, which meant they could not recognize when they were experiencing these symptoms and struggled to share their feelings with others. As P19 described, *"I didn't know anything…So, I never looked into being depressed, right?"* In comparing her first pregnancy without mental health support to her second pregnancy with CCP support, P2 mentioned, *"With my first [pregnancy]...I wasn't sure about if I really had [postpartum depression] or not...I just thought…that's how you feel after having a baby."* Persistent stigma surrounding mental health, and the difficulty of acknowledging their symptoms to themselves, also prevented patients from responding *"truthfully"* to electronic screening surveys and sharing an accurate view of their mental health with their obstetric provider. P8, for example, explained that *"it was hard for me to acknowledge that I was feeling this way…that I was having these thoughts."*

Other patients did not want to burden their obstetric provider with mental health concerns and tried to avoid such discussions during appointments. P10 explained that early in her pregnancy, obstetric appointments *"were just so quick up front…I was gaining the right amount of weight. My blood pressure was fine…I was very low risk…but emotionally, I wasn't quite there."* Although the obstetric provider's screening process eventually identified her symptoms, P10 still *"felt guilty"* about telling her obstetric provider that she *"didn't feel well."* P12 felt similarly *"guilty"* about experiencing mental health symptoms because *"it's supposed to be a happy time and it wasn't."* In their day-to-day practice, CCP providers are aware that these thoughts patients have are barriers to *"feeling like it's important to get [their mental health] treated."* (PSY5). Not identifying mental health symptoms in a timely manner during the perinatal experience can lead to an increased risk of symptom severity, which delays CCP intervention and treatment.

4.2.2 Differing Perceptions about Urgent Needs

Once mental health symptoms have been identified, referring a patient to the CCP is a key touchpoint between obstetric providers and care managers. However, a challenge at this touchpoint is when the obstetric provider and care manager have different perceptions about the urgency of the patient's mental health needs. Although CCP obstetric providers were comfortable with discussing mental health concerns and treatment options with patients, if a patient shows distress during their appointment, CCP obstetric providers do not always have the time or expertise to best address the patient's needs. NP6, an obstetric nurse practitioner, shared: *"I don't have enough experience to deal with very significant psychiatric problems. It would scare me to death."* In cases where the patient's need is perceived as urgent, the obstetric provider will page or call the care manager for a consultation. As a result of this lack of time and discomfort, CM2—a CCP care manager—explained that *"[obstetric providers] send [the patient] my way. And sometimes it can be more of a crisis situation, which is fine, and that's part of mental health…[but] we're a treatment program, not a crisis program."* If the care manager determines the patient is in crisis, a *"higher level of care"* is activated with a crisis team that is separate and outside the scope of care that the CCP provides. Without a clear triage system within pages and calls to distinguish between urgent or non-urgent referrals, care managers must treat all incoming referrals as urgent. They move quickly to assess and develop a treatment plan for each patient, adding to the burden of an already full caseload of CCP patients.

Beyond care managers, this challenge can impact CCP providers in later Assessment and Active Treatment phases of the psychosocial care journey. TH8, a therapist, shared how an obstetric provider's desire to urgently address a patient's needs impacted her treatment plan for the patient: *"[the] patient ends up super tearful or super anxious in an appointment. They get this referral to [the CCP], we get them on the schedule and then maybe I see them two to three weeks [after], and they're fine."* Occasionally, the original documentation about why the patient has been referred to the CCP is lost or not easily discovered in the electronic health record, and psychosocial providers take longer to understand the patient's needs and determine an appropriate treatment plan, instead of benefiting from *"more collaboration"* (PSY5) between providers across the parallel journeys.

While obstetric provider value moving with urgency to ensure patients get access to mental health treatment in a timely manner, this urgency can conflict with the psychosocial providers' perspective that patients should exercise their agency to accept and engage in this treatment: *"[Obstetric providers] feel like they have patients…who need mental health services, but we have to empower women to make those [treatment] decisions for themselves. So, we can call patients. We can try to get them in. But ultimately, it's their decision."* (CM2). Giving patients time to make the decision about pursuing mental health treatment, even when providers perceive an urgent need for this treatment, can cause uncertainty for obstetric providers regarding how to discuss mental health concerns with patients during routine obstetric appointments.

4.2.3 Weighing Risks and Benefits of Treatment

For patients to make a treatment decision, they must evaluate the impact on both their obstetric and psychosocial care journeys, considering opinions from multiple providers alongside their physical and fetal health. An important aspect of weighing these risks and benefits involved asking questions. A few patients who were pregnant at the time of their interviews had questions about how to manage their current mental health symptoms via therapy, as well as how to recognize and proactively address postpartum depression.

Many patients viewed treatments using antidepressants and other medications for mental health treatment as a risk. CCP providers noted that several pregnant patients *"are very resistant"* (NP6) to starting such a treatment plan. We observed medication hesitancy in interviews with patients, who voiced their concerns about side effects for fetal health. P20 shared, *"I mean, that's my main concern, is the safety of taking the medicine towards the end when the baby gets bigger and breastfeeding on the medicine."* While there is no clinical evidence that commonly used antidepressants cause harm to fetuses or infants, many participants shared their questions about how these medications might affect the physical and neurological development of their child. These concerns were sometimes enough for patients to choose therapy, rather than medications, as part of their treatment plan. But P18 thought the decision was about considering not just her fetus' health, but her own health as well: *"It's more complicated than just whether [medication] was safe or not safe…not treating [anxiety and depression]…throughout the pregnancy, that could also not be ideal."* (P18). A CCP obstetric care provider, OB10, shared how she tries to center the patient's health when discussing medications by telling them, *"oftentimes, we do just have to prioritize your health. Because, if you're healthy, then you can have a healthy pregnancy and might make you a better parent."*

Notably, some patients who had a history of managing mental health conditions, or had experienced mental health symptoms in a previous pregnancy, discussed their *"promise"* (P8) to themselves to self-advocate for their perinatal mental health needs, including medication

treatments. For example, P17 had taken medication to manage diagnoses such as ADHD prior to her pregnancy. Her primary care doctor recommended stopping the medication when she became pregnant, but P17 went from feeling her mental health was *"really well managed"* to *"experiencing depression."* During a conversation with a CCP obstetric provider, P17 asked questions about restarting her medications. P17 explained, *"I had done my own reading. I knew that some people took [medication] while pregnant. So, if there was a way to do that, I was hoping I could see someone who could prescribe it."* Through this self-advocacy, P17 was able to receive the treatment she needed through a CCP psychiatrist.

To ask their questions, help make these informed decisions, and self-advocate for their care, patients described searching online for symptom, medication, and therapy information from trusted sources, such as those recommended by their healthcare provider or an instructor of a prenatal or childbirth education class. Other sources included websites, studies published in medical journals, social media peer support groups, and healthcare providers on social media. These sources were viewed as important to help patients "*figure out what would be best [based on] hearing other people's experiences*" (P10). For example, one patient sought information from videos on TikTok because "*they're simple 30 to 60 second videos, right? That they just kind of like toss a bunch of information out at once. And that has been helpful*" (P12).

Despite the appeal of sources like TikTok, P12 and other patients sometimes avoided broader information searches because it was difficult and "*overwhelming*" to assess their accuracy. P1 explained her perspective as wanting to avoid going "*down rabbit holes*" that were "*more anxiety-provoking than anything*." (P1).

Many patients also identified their CCP providers as important resources to help them think through treatment decisions, because *"they have the most up-to-date research"* (P18) and they *"reassured"* (P20) patients about the likelihood and management of medication side effects.

From the patient perspective, asking providers their medication questions involved sending a message within their patient portal. However, the portal prevents patients from directly messaging certain CCP psychosocial providers (e.g., psychiatrists). In her interview, TH8 explained that other CCP providers who see the patient's messages containing medication questions must forward them to the appropriate psychiatrist, introducing further steps and delays to an already complex workflow that is largely invisible to the patient.

Aside from these technology challenges, patients who had access to these resources to weigh the risks and benefits of mental health treatment largely felt confident in their decision making and prepared to engage in their care. Yet patients can also feel overwhelmed and fatigued by these decisions, exacerbating their mental health symptoms and decreasing their likelihood of engagement. Despite her successful self-advocacy, P17 reflected, *"it was all just so hard because I had to make decisions instead of just being told, 'this is what you have to do.'"*

4.2.4 Conflicting Opinions and Ambiguous Responsibilities

While patients weigh their decision to pursue treatment, providers need to collaborate and agree on the treatment plan as well. The CCP is intended to scaffold this collaboration, with interdisciplinary providers working in close physical proximity. Open communication practices such as sharing consult notes within the electronic health record keep providers *"in the loop"* (MW9), and internal channels like WhatsApp groups allow for *"quick-fire questions that [CM2] can send and [CCP providers] can answer in turn"* (PSY5). But, conflicting opinions and ambiguous responsibilities can hinder the technology-mediated collaboration between obstetric and psychosocial providers.

Conflicting opinions can arise when obstetric and psychosocial providers are not *"on the same page"* about what kind of treatment options should be made available to the patient, and how this treatment should be delivered. Psychosocial providers sometimes perceive that their opinion is given less weight than obstetric providers, *"because that's who is monitoring [the patient's] baby."* (PSY4). Furthermore, PSY4, a CCP psychiatrist, described needing to push back against outdated views and *"misinformation"* from consulting providers about perinatal mental health treatment. Such conflicts prevent obstetric and psychosocial providers from working together to present a *"a united front"* to the patient (PSY4) and risk eroding the patient's trust in their care team.

When patients are in the Active Treatment phase of their psychosocial care journey, providers still face ambiguity in what responsibilities they have beyond their own obstetric or psychosocial expertise. For example, the CCP trains obstetric providers to prescribe antidepressants to patients who need them, as one strategy to bridge the gap between high demand for mental health treatment and low availability of psychosocial providers. Although CCP obstetric providers were comfortable with this practice overall, OB10 shared that because medication dosage adjustments must be managed consistently for patients over several weeks, the reality of patients seeing multiple obstetric providers throughout their obstetric journey made OB10 hesitant to take on this psychosocial care responsibility: *"It can sometimes take up to six weeks for [the medication] to take effect, and I don't always see the same patient in six weeks…it just makes me nervous to start someone on [medication] and not be able to really follow them through[.]"*

Psychosocial providers are also unsure how to maintain continuity of the patient's treatment after their obstetric care journey ends and psychosocial journey continues. PSY5, a psychiatrist, explained that when patients stop seeing their obstetric providers after their Postpartum Check-In, but continue to receive treatment from PSY5 up until one year postpartum, it's not always clear which provider is ultimately responsible for maintaining communication and follow-up with the patient: *"If I get [a patient] 4 weeks postpartum, and I'm like - we need to start a medication. [Am I] the provider that they continue to follow with? Or am I to continue communicating with an [obstetric provider] who's supposed to keep prescribing even though they [aren't] seeing the patient regularly…who's responsible for the patient's care and the patient getting their medications?"*

A consequence of this lack of clarity leads patients to question who they should speak to about mental health treatment changes and progress. For example, P17 was *"not super clear"* if she needed to discuss her psychosocial treatment progress during routine appointments with her obstetric provider. P1 expressed her uncertainty about which CCP provider was responsible for changing her medications if they didn't work. Without clear collaboration between obstetric and psychosocial providers through existing technological channels, these patient questions and needs often remain unmet.

4.2.5 Engaging with Treatment and Maintaining Patient Contact

During the Active Treatment phase of the psychosocial care journey, patients engage in their care by regularly attending appointments with psychosocial providers, frequently implementing self-management techniques they learn from providers in everyday life, and consistently connecting with the CCP care manager to discuss treatment progress. Some patients thought these ways of engaging in their care were *"convenient,"* and *"very personal."* But patients also shared challenges in maintaining engagement in their psychosocial care during their pregnancy and postpartum experience.

Prior to the COVID-19 pandemic, patients attended therapy and psychiatry appointments in-person at their OB/GYN clinic. Although providers aimed to schedule obstetric and psychosocial care appointments on the same day for the patient's convenience and CCP care managers

reminded patients about upcoming appointments, patients continued to encounter systemic barriers—such as lack of transportation, childcare, insurance coverage, and time off of work—that prevented their attendance. As the COVID-19 pandemic evolved and CCP appointments transitioned to virtual telehealth environments via phone calls, these barriers were replaced with new ones. P16 explained the virtual format removed the personal connection with her psychosocial providers, because *"you can't see the body language and facial expressions[.]"* Patients like P13 struggled to obtain privacy during virtual appointments because they were *"living in a home where it's other people here,"* and the risk of exposure to COVID-19 while pregnant outweighed their desire to attend appointments in-person. For P8, virtual appointments did not provide the space for reflection that in-person appointments offered: *"[I'm] hanging up the phone and then bam, I'm right back to taking care of my kids…I think the whole process of me getting out of the house, and seeing someone face-to-face, and [that] 15-20 minute drive back home to myself to digest what was said [in therapy] also helped me. I don't really get that right now…it's been kind of difficult to adjust."*

Several patients mentioned that their obligations to care for family members, the need to juggle work responsibilities, and effort to follow measures to protect themselves against COVID-19 meant limited time and energy to actively engage in their psychosocial care or prioritize everyday self-management strategies, including telehealth appointments. Therefore, patients often missed contact attempts by CCP care managers, in the form of phone calls and patient portal messages, to discuss their treatment progress and needs. CM2, a care manager, shared her efforts to maintain such contact with patients: *"I'll leave multiple voicemails. I'll check in through [patient portal]. Sometimes I've even tried email, and I won't hear back from someone. So, it leaves us in a pretty tough spot, because in some ways we're responsible for these patients. But if they're not actively collaborating with our treatment plans, then it's kinda tough."* Without consistent patient engagement and contact, CCP providers lack visibility into the patient's psychosocial care needs. When these needs are unmet, symptoms can worsen and negatively impact the patient's health.

4.2.6 Monitoring Symptoms and Tracking Patient Progress

As patients navigate barriers to engagement during the Active Treatment phase and maintain contact with their psychosocial providers, the CCP sends out routine electronic screening surveys via email. Care managers review patient responses to these surveys to determine whether the current treatment plan is working, and share these responses with obstetric and psychosocial providers to inform changes to the treatment plan, if needed.

Often, care managers struggle to derive meaningful information from the volume of electronic screening responses they receive from CCP patients. The tools they use to collect these responses—mainly REDCap surveys and Excel reports—are inefficient, requiring care managers to review patient responses manually to identify significant changes in their symptoms. This manual process means care managers have *"less time"* (CM2) to prioritize and contact patients who indicate concerning symptoms, especially those who report suicidal ideation. CM3 thought that, lacking automated support such as a *"red alert of somebody needs to call this person right away,"* some patients who need support are not always identified or prioritized, and may not receive the urgent psychosocial care that they need. CM3 reflected, *"There are probably times I missed [patients] for a couple days."*

Aside from these technology difficulties, care managers recognize that monitoring patient symptoms and prioritizing their needs is highly dependent on the context and personal situation of that patient. CM1 explained that although PHQ-9 and GAD measures are useful tools, *"we also know that a number isn't a full story of how someone is feeling. It's hard for people to translate how*

they're feeling into a 1, a 2, or a 3." This limitation of symptom monitoring means that connecting with patients and learning *"the context"* (CM3) of their screening responses is critical to successful treatment.

Another challenge with monitoring symptoms is a drop-off in patient response rates to electronic screenings over time. In our contextual inquiries, CCP care managers noted that this drop-off was especially noticeable after the patient completed their Postpartum Check-In and concluded their obstetric care journey.

Patient interviews revealed many reasons why they stop sharing symptom information via electronic screens with the CCP. In some cases, the questions in the electronic screen were not reflective of their personal mental health experience, and were therefore difficult to answer. Patients experiencing mental health symptoms also felt *'overwhelmed"* (P3) by responding to these emailed questions. P4 shared, "*If you're too sad or depressed, you tend not to look at mail or emails or anything like that.*"

When patients experienced an improvement in their mental health symptoms, they no longer considered responding to the electronic screenings as a high priority for their treatment. Interestingly, P11 used these screenings as a self check-in about her own feelings, preferring not to disclose her responses to the CCP: *"The results are more for my anxiety. Just to make sure, okay, it was maybe just a bad day one time…at some point, I think I would say, 'Okay, I think I'm good now.' So I stopped filling them. [I've read] postpartum, sometimes [symptoms] could come later…so that's when I start thinking. I'm like, 'Oh my god. Maybe it is [postpartum depression].' But then I see the [screening survey] and I'm like, no. No, I'm not there yet."*

A few patients did not see the value of monitoring their symptoms via these electronic screening surveys because they were not given actionable information about their treatment progress in return. As P17 described, "*[The surveys] sound like they're not as much for me as for my provider. They don't really tell me anything at the end…I did them in the beginning and lately, I've been just ignoring the emails."* Although P15 valued the electronic surveys as a reflection tool, she questioned how her responses were informing her mental health care and progress: "*What is the level of concern? […] Without knowing where my markers are compared to that first check-in, I don't really know how I'm doing[.]*"

When the patient stops responding to these electronic screening surveys, the CCP also lacks insight into the patient's symptoms, and *"doesn't know how they're doing"* (CM1). As a result, CCP providers cannot monitor positive or negative changes in symptoms, or determine if the patient's psychosocial treatment plan is progressing in a way that benefits the patient.

4.2.7 Preparing for Transition Out of the CCP

Patients in the Maintenance and Relapse Prevention Planning phase of their psychosocial care journey remain engaged in their meeting their mental health treatment goals with their CCP providers. During this phase, patients may transition out of the CCP for a variety of reasons. For example, the patient may switch to a new obstetric provider who is out of the healthcare network in which the CCP operates, or the patient reaches their one-year postpartum milestone when perinatal CCP support concludes.

To prepare for this transition, care managers work with the patient and CCP providers. Most often, the plan involves the CCP care managers, CM1 and CM2, helping the patient identify psychosocial providers outside the CCP for longer-term treatment, or providing patients with vetted mental health information from trusted resources—including contact information for the CCP—that they can use after their transition. These recommendations are typically sent to the patient through the patient portal. During our contextual inquiries, we observed CM2 go a step

further to assist a patient who indicated suicidal ideation on their PHQ-9 measure, by calling a therapy center on the patient's behalf to set up an appointment and initiate care, with a plan for CM2 to continue monitoring that patient until CM2 could confirm the transition was successful.

However, patients encounter a variety of challenges during this transition process. In one case, P3 was referred to a family therapist outside the CCP, but immediately faced challenges in connecting with the new therapist: *"Oh my god. I could never get in contact with [therapist]...I reached out to her several times and she was never there...and she never called me back. So I was like, oh well. Just forget about it."* Upon P2's transition out of the CCP, she received a list of therapists from C2 that she could reach out to and continue her treatment for the long-term, but of *"the referrals that they sent, there wasn't any for my insurance."* (P2). Without a system in place to catch these issues, the CCP lacks awareness of these issues and is unable to step in and provide support. As a result, patients never receive the follow up, monitoring, or confirmation they need to ensure successful long-term maintenance of their mental health.

5 DISCUSSION

Our study augments prior CSCW and HCI research by characterizing patients' experience with obstetric and psychosocial care in a perinatal CCP setting. We detail the challenges that CCP patients and providers face in receiving and delivering this care, respectively. Using the Parallel Journeys Framework as a lens to interpret our data [86], we identified several challenges that occur at the intersection of obstetric and psychosocial care journeys. In addition to affirming some findings from previous research (e.g., patients under-report depression symptoms to providers, mental health symptoms impede treatment), we uncovered several new challenges—such as the conflicting opinions and ambiguous responsibilities between providers, patients weighing risks and benefits of treatment, and difficulties in monitoring symptoms—that expand our original understanding of these parallel journeys. Furthermore, our findings reveal how technologies exacerbate these challenges (e.g. providers struggle to triage and manage responsibilities of patients' psychosocial needs, patients feel overwhelmed with online information and discomfort with teletherapy, patients are not given actionable information during symptom monitoring).

Our study surfaces two key insights: (1) parallel journeys can be cyclical, meaning experiences of past journeys influence subsequent journeys, and (2) the focus of care is different for each individual journey, and journeys that end at different times lead to a gap in patient care. Figure 2 provides a visual representation of how these insights expand the original Parallel Journeys framework.

In the following sections, we discuss these insights in more detail. We then share technology opportunities for CSCW and HCI researchers derived from these insights.

5.1 Previous obstetric and psychosocial journeys impact current and future journeys

In our study, we observed how patients' previous pregnancies impacted their ability to acknowledge their symptoms of depression, how they weighed the risks and benefits of treatment, and their level of engagement with treatment. For example, P8 and P17 felt empowered to advocate for their psychosocial care due to their prior obstetric experiences and health expertise. Thus, what distinguishes the perinatal CCP setting from other clinical settings is that patients' parallel journeys are cyclical—in other words, their previous perinatal experiences impact subsequent obstetric and psychosocial care needs, as well as their comfort in seeking or receiving mental health support and self-advocating for their treatment needs. In addition to supporting

needs that evolve over the course of a single pregnancy and postpartum experience, technologies must also consider the impact that prior experiences have on patient information, collaboration, and support needs for future experiences.

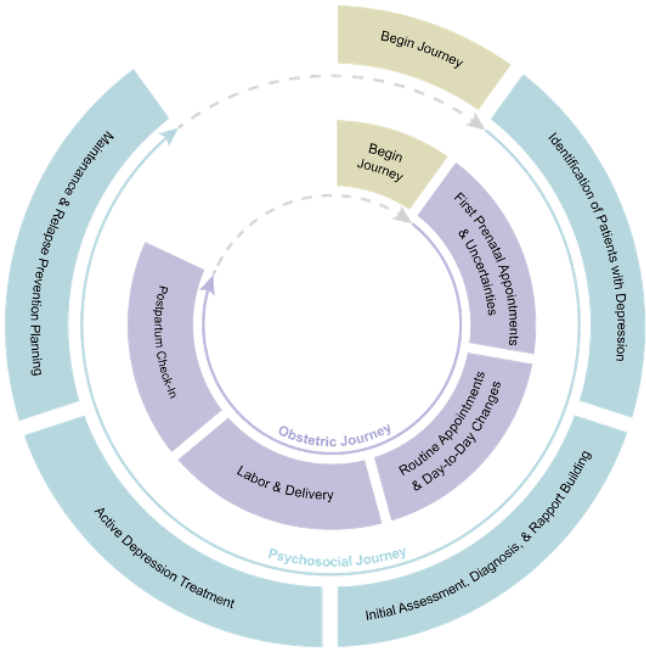

Fig. 2. Our expansion of the Parallel Journeys Framework, representing cyclical journeys that have different end points.

Our findings also show there is a definitive end to the obstetric journey (i.e., birth and Postpartum Check-In) before another obstetric journey can begin. However, this creates a substantial gap between when a patient's obstetric journey ends (approximately 6 weeks after birth) and when their psychosocial care ends (12 months after birth). This gap creates challenges for psychosocial care providers and impedes the patient's ability to receive the appropriate psychosocial care. For example, the end of the obstetric journey hindered CM1's ability to monitor a patient's depression symptoms because the patient no longer had regular contact with their obstetric provider.

Prior research by Lattie et al. observed that care managers experience uncertainty in their roles and responsibilities within CCPs [60]. We found that this ambiguity also occurs for other stakeholders within the CPP, exacerbated by the gap between the end of obstetric and psychosocial journeys. For example, the mismatch between the end of obstetric and psychosocial journeys caused confusion for PSY5 over which provider should be responsible for prescribing medication for the patient's mental health care. Our findings suggest that when collaboration is long-term—such as over several months of pregnancy and postpartum—but not continuous, requiring providers to transfer responsibilities to other providers, technologies could have a role in creating valuable touchpoints between collaborators (e.g., patients, obstetric providers, psychosocial providers) to fill gaps across the parallel journeys.

5.2 Obstetric care is infant-centric while psychosocial care is parent-centric

Another key insight from our study was that patients were less willing to discuss their emotional struggles and mental health symptoms during appointments with their obstetric provider because the time in those appointments were focused primarily on fetal- and infant-health. Despite efforts by individual providers like OB10 to center the patient's needs in the care process, this insight is indicative of a larger, systemic medical view that maternity care in the United States has an infant-centric approach and focuses more on the safety of the fetus than the wellbeing of the birthing parent [36]. Indeed, a newborn has frequent pediatric visits, while the parent typically has only one postpartum health care visit after birth [87]. A lack of focus on the mother's experience can result in treatment decisions that are detrimental to the mother's physical health [20].

Our study reveals that this medical view also complicates the mother's psychosocial journey. When deciding to pursue mental health treatment, patients may weigh risks to their fetus and child health more than risks to their own health. Providers like PSY4 also encountered conflicting views from other providers over the best course of the patient's mental health treatment when this treatment might affect the quality of fetal or infant care. Disagreements between providers have been observed in other conditions [64,71,72]. However, when these tensions occur at the intersection of obstetric and psychosocial journeys, patients receive conflicting treatment information and are unclear which provider to consult to make an informed decision, with potentially negative consequences for both their obstetric and psychosocial health. Furthermore, when providers experience this confusion and ambiguity, they have difficulty prioritizing different aspects of their overall care plan, risking a non-unified message for the patient and a delay in addressing their patient's urgent health needs.

5.3 Technology Opportunities for Parallel Journeys

Based on our findings, we discuss technology opportunities to improve the experience of patients and providers who are involved in parallel journeys.

5.3.1 Address Support Gaps in Cyclical Experiences

This study reveals the potential for technologies to not only support a single perinatal experience, but the changing needs of patients over the course of multiple cycles of their obstetric and psychosocial journeys. Moreover, technologies have the potential to fill the gaps created by the different endpoints of these journeys.

In a study focused on fertility treatment, researchers shared design opportunities for app-based chat groups used by patients and providers, suggesting these groups provide dedicated chat spaces for questions about medications, test results, and peer support needs [90]. A similar approach could be adapted for the obstetric CCP setting to address evolving physical and mental health concerns as patients move through different phases of their parallel journeys and return for subsequent journeys. A platform that is used by the patient and monitored by both obstetric providers and psychosocial providers would allow patients to ask questions—such as P15's desire to understand her electronic screening results—and receive vetted answers from providers who understand their personal context and health history. As suggested by prior studies of *Ask the Doctor* services [64,80], such a platform could offer the flexibility and convenience that both patients and providers need to resolve questions outside of their appointments.

Furthermore, a platform should allow patients to customize the type of information they are interested in viewing within the chat (e.g., identifying postpartum depression symptoms, latest medication research) to avoid the "*rabbit hole*" of online information that can worsen mental

health symptoms. Specialized channels could also help first-time patients like P10 obtain emotional support from peers like P2 who have gone through more "cycles" of parallel journeys. Such an approach would also need to be designed to appropriately handle privacy and data management concerns, a critical consideration raised by prior app-based chat groups for pregnant and postpartum women [94].

Beyond the benefits afforded to patients, this type of platform could allow the care managers and psychosocial providers to have a continuous touchpoint with the patient, even after the patient ends their obstetric care journey. As a result, CCP providers like CM2 might stay connected with patients during the gap between endpoints of the obstetric and psychosocial care journeys, reducing the need to reach out via phone call or patient portal messages, and monitoring issues that might occur during the transition out of the CCP. Having both obstetric and psychosocial providers moderate these chat groups may also provide opportunities to identify more urgent patient needs. By flagging patient questions or "assigning" follow-ups to the appropriate providers, the platform could help providers like PSY5 reduce ambiguity in their responsibilities, especially during the gap between endpoints of the parallel journeys. However, as discussed by Yadav and colleagues [94], it is important for HCI researchers to balance the features with the current load and care responsibility of moderators who are practicing providers. Designed mindfully, app-based chat groups could improve provider collaboration to help patients achieve a sense of agency, satisfaction, and engagement with their care.

5.3.2 Resolve Provider Conflicts to Refocus on Patient Needs

Our new understanding of parallel journeys points us to another technology opportunity: to alleviate conflicting opinions among providers and focus on the needs of patients who receive obstetric and psychosocial care. Because providers within the CCP utilize and communicate primarily through the electronic health record (EHR), future EHR features could support providers in co-creating treatment plans through a shared decision-making process.

Tools have been developed in other health contexts to guide decisions about which treatment plan to pursue, weighing risks and benefits of each plan (e.g. [26,65,66]). These tools have a positive effect on patient satisfaction and health outcomes [65] and many are designed with the goal to bring patients into the provider's decision process (e.g., [11]).

Our study indicates a need for EHR tools to bring obstetric and psychosocial providers into each other's decision process, strengthening collaborations across the parallel journeys. Prior studies have examined how visual displays and co-development of notes in the EHR can help providers share reasons behind their decisions with their multidisciplinary teams [48]. Building upon this approach, EHRs could automatically surface clinical notes that provide insight into psychosocial provider recommendations and how to prioritize these recommendations in the context of obstetric care. Collaborative visualizations [46] that track a patient's symptoms could be co-analyzed by obstetric and psychosocial providers to gain a deeper understanding into how their treatment plans might influence a patient's parallel journeys. These features might better support PSY4 in advocating for a patient's psychosocial needs when facing resistance from other providers, or help psychosocial providers understand OB10's hesitancy to prescribe antidepressants for infrequent patients. Importantly, such tools should center patients' own experiences. While the integration of psychosocial care within the obstetric setting is a step towards providing holistic patient care, future technologies can drive more progress to support the parent's mental health and well-being.

5.4 Limitations and Future Work

Our findings provide important CSCW and HCI insights for perinatal mental health, but we also acknowledge the limitations of our study and approach. Because our interview study took place at one academic medical center in a metropolitan area of the Midwest region in the United States, our findings might differ from the views of pregnant and postpartum women in other geographic domains or demographic backgrounds. Selection bias is another limitation, as the experiences of participants who agreed to enroll in this study and were reachable by their care managers and the researchers might be different from those who declined participation. Additionally, CCPs are an emerging innovative practice in clinical settings, so our findings may not be transferable to clinical settings without a collaborative care infrastructure. More work is needed to understand how CSCW and HCI communities can support patient and provider needs across both types of settings.

Most of our data was collected as the COVID-19 pandemic evolved and as the public health response impacted society. Although many participants spoke about their experiences with the CCP in the context of COVID-19, insights gained through our findings can also generalize beyond this time period. For example, COVID-19 has accelerated the availability of telehealth services, which are likely to remain in place long-term [93]. However, researchers must address widening disparities that result from the rapid implementation of such technologies in mental health services [10].

6 CONCLUSION

This paper presents findings from an interview and contextual inquiry study conducted with patients and providers in a perinatal Collaborative Care Program (CCP). Using the Parallel Journeys Framework as a lens to interpret our findings, we identified several challenges—such as differing perceptions about urgent needs, weighing risks and benefits of treatment, conflicting opinions and ambiguous responsibilities, and monitoring symptoms and treatment progress—at the intersection of obstetric and psychosocial care journeys.

Based on these findings we surfaced two key implications (1) the perinatal parallel journey–obstetric and mental health–is cyclical; due to the cyclical nature, a patient's past experience affects how they approach the CCP in the next cycle of the parallel journey, and (2) in the CCP, obstetric providers focus on fetus and child health while psychosocial providers place a heavier emphasis on the patient; an imbalance in care focus creates challenges in making treatment decisions collaboratively and impacts both journeys negatively, which can affect the patient's health outcome and engagement level. We discussed several design opportunities to address these critical challenges. We highlighted the need for future designs to address support gaps for patients and providers during cyclical journeys, and to resolve provider conflicts to refocus on patient needs.

These new insights help guide the direction of future technologies to better facilitate and deliver collaborative care, ensuring that providers can collaborate in an optimal way and that patients can receive the most benefits, including improved physical and mental health outcomes.

ACKNOWLEDGMENTS

The authors would like to thank all our participants for their time and contributions. We would also like to thank Emma Allen for research and manuscript support, Jina Suh for initial feedback on our use of the parallel journeys framework, and Ashley Walker for early input on our discussion points. This work was supported by the National Institutes of Mental Health under

awards P50MH119029 and T32MH115882 and the National Institutes of Health's National Center for Advancing Translational Sciences under award UL1TR001422.

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Received: January 2022, Revised: April 2022, Accepted: August 2022.