Sustainment of contingency management within opioid treatment programs: COVID-related barriers and innovative workflow adaptations

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ABSTRACT

Introduction: Contingency Management (CM) is one of the most effective interventions for persons with opioid use disorder, but one of the least available interventions in community settings, including opioid treatment programs. Project MIMIC is a NIDA-funded cluster randomized trial that is measuring CM implementation and sustainment across 30 opioid treatment programs in the New England region of the United States. The advent of the COVID-19 pandemic occurred in the midst of Project MIMIC's first cohort of eight opioid treatment programs, presenting a natural opportunity to document and analyze novel challenges to CM sustainment. Utilizing both quantitative and qualitative data collection, we aimed to identify both COVID-related barriers to CM sustainment and innovative workflow strategies to mitigate these barriers.

Methods: Quantitative analysis was conducted using data collected from a study-specific CM tracker tool on various CM implementation metrics over three distinct, successive time intervals: prior to COVID-19 social distancing orders with active support; during COVID-19 social distancing orders with active support; and during COVID-19 social distancing orders after removal of support. Semi-structured qualitative interviews were conducted with a representative from each of the eight opioid treatment programs. Using a reflexive team approach, transcripts were coded by independent raters to identify both COVID-related barriers to sustainment and innovative workflow adaptations.

Results: Quantitative data revealed a substantial decrease in the number of CM encounters following social distancing orders from 31.8 encounters weekly across eight programs to 6.9 encounters weekly across five programs. A further decline to 1.8 weekly encounters across three programs was observed after implementation support was removed. Four COVID-related barriers were identified via thematic analysis: fear of contagion; difficulty engaging patients remotely; challenges re-defining the CM attendance target due to changing regulations; and staff shortages. Potential adjustments discussed to help address one or more of these barriers included an electronic prize generator; use of technology to promote engagement; brief individual remote check-ins; and expansion of training to non-counseling staff.

Conclusion: Although CM implementation challenges emerged during the pandemic, associated workflow adaptations also emerged. The feedback solicited in this study will inform multi-level strategies to aid with CM sustainment post-pandemic.

The United States is currently in the midst of two highly lethal public health emergencies: the novel coronavirus disease 2019 (COVID-19) and the opioid overdose epidemic. Individuals who use opioids are at risk of the most adverse consequences of COVID-19 due to both underlying conditions (e.g., slowed breathing as a result of opioid use, chronic respiratory disease) and structural vulnerabilities (e.g., unstable housing, incarceration; (Volkow, 2020). Moreover, social distancing orders taken to mitigate the spread of the virus, while essential to flatten the curve, have also been associated with increased social isolation and unemployment (Collins et al., 2020), both of which are risk factors for overdose. Intersecting risks of these two health crises highlight the urgent need to implement evidence-based interventions for opioid use disorder that are able to be sustained during COVID-19 social distancing orders.

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Contingency management (CM), a behavioral intervention that provides patients with incentives for meeting treatment-related goals, is an evidence-based behavioral intervention for persons with opioid use disorder (Dugosh et al., 2016). CM has demonstrated effectiveness both when received as a stand-alone intervention (Prendergast et al., 2006) and as an adjunct to medications like methadone (Griffith et al., 2000) or buprenorphine (Kosten et al., 2003). Yet despite its status as one of the most effective adjunctive behavioral interventions, it is one of the least available in opioid treatment programs (OTPs) that dispense medication. Early surveys of OTP staff and other community counselors found that fewer than 10% of providers used CM (Kirby et al., 2006; McGovern et al., 2004). More recent reviews and commentaries have concluded that CM availability in the United States is restricted primarily to research trials and the Veteran's Administration (Goodnough, 2020; Petry et al., 2017; Rash et al., 2017). The low uptake of CM has been attributed to a myriad of well-documented barriers at both the provider- and organizational-level including: financial costs associated with providing incentives; time required to stock prize cabinets; philosophical objections to rewarding patients; and limited knowledge of behavioral reinforcement principles (Becker et al., 2019; Rash et al., 2012; Rash et al., 2017). Even when organizations have been able to surmount these barriers and implement CM successfully, longer-term sustainment of CM has been an enduring challenge. In a National Institute on Drug Abuse Clinical Trials Network study, 100% of OTPs were able to implement CM successfully with active support, but only 12% of OTPs were able to sustain CM implementation after active support was removed (Roman et al., 2010). Given the difficulties sustaining CM under ideal circumstances, it is important to understand unique contextual factors associated with CM implementation and sustainment during COVID-19.

Recognition of challenges to the implementation and sustainment of CM led to the development of Project MIMIC (Maximizing Implementation of Motivational Incentives in Clinics), an ongoing cluster-randomized hybrid type 3 effectiveness-implementation trial (Becker et al., 2021) funded by the National Institute on Drug Abuse (R01-DA046941). Project MIMIC commenced prior to the onset of COVID-19 and was designed to help advance implementation of CM in the OTP setting. The protocol targeted for implementation was Petry's prize-based CM (Petry, 2013) in which patients earn an escalating number of prize draws for meeting treatment goals. Based on formative feedback from OTPs (Becker et al., 2019), the target behavior was attendance/engagement and each OTP was encouraged to customize the target based on their organizational needs: for instance, OTPs could choose to target attendance/engagement at individual counseling sessions, group counseling sessions, and/or medication dosing. OTPs could also implement CM however best suited their workflow, as long as each patient was offered CM weekly for 12 weeks (e.g., during routine group or individual counseling sessions or as separate encounters with front desk or case management staff). When COVID-19 was declared a public health emergency and social distancing orders were first put into place, Project MIMIC was in the midst of providing comprehensive implementation support to eight OTPs that had been trained in prize-based CM. Concurrent with the announcement of social distancing orders, new federal guidelines for OTPs were released that allowed all counseling sessions to be offered via telehealth as well as increased access to take-home doses, thereby rapidly changing the typical OTP workflow (Becker et al., 2021; Substance Abuse and Mental Health Services Administration, 2020a, 2020b).

Project MIMIC continued to provide implementation support and to track sustainment throughout the pandemic, thereby providing a natural opportunity to evaluate the extent to which OTPs were able to implement and sustain CM. The current analysis was guided by three objectives and utilized two data sources. First, using data from the novel CM tracking system that was developed for Project MIMIC, one objective was to examine the extent to which OTPs were able to implement CM over three distinct time periods: prior to social distancing orders with active support; during social distancing orders with active support; and during social distancing orders after removal of active support. Second, using data from qualitative interviews, another objective was to elucidate unique COVID-related barriers related to CM sustainment. Finally, using the qualitative interview data, the third objective was to identify innovative workflow adaptations that OTPs made as a way to overcome COVID-related barriers and to sustain CM. The overarching intent of this analysis was to consider the adaptability of CM during an unprecedented pandemic and highlight workflow innovations that could enhance its likelihood of sustainment.

1. Methods

1.1. Study design

Data for this study were collected after each of the eight OTPs had received 14-months of active CM implementation support and 12-months of sustainment monitoring. Each OTP had nominated 2-5 front-line counselors (defined as any staff who provided individual, group, or case management sessions) and 1-2 leaders (defined as staff with responsibility for supervising or providing administrative oversight of counselors) to receive one of two comprehensive implementation strategies. All eight OTPs received the standard strategy which consisted of three key elements: didactic training; performance feedback on CM fidelity; and monthly coaching calls. Four of the OTPs were randomly selected to receive additional support via (a) monthly facilitation meetings with a trained Implementation & Sustainment Facilitation (ISF) Strategy facilitator and (b) opportunities for counselors to earn pay-for-performance bonuses for two pre-defined performance measures related to CM implementation (CM exposure; CM quality). In contrast to the monthly coaching calls, which reinforced provider skill, the ISF meetings focused on organizational strategies needed to implement CM.

Each OTP was asked to implement CM with 25 patients inducted on methadone or buprenorphine within the past 30 days. The CM program was required to consist of 12 weekly CM encounters (conducted within 14 weeks), use a standard 500 slip fishbowl with 50/50 chance of prizes (500 slips total: 250 non-winning, 209 small prizes, 40 large prizes, and 1 jumbo prize), and to reinforce the OTP's specific attendance/engagement goal. The specific OTP attendance/engagement goals and workflow used by the eight OTPs are presented in Supplemental Table 1. For each patient, the number of draws earned escalated by one each week that the goal was met, such that the maximum number of draws per patient was 78 $(1 + 2 + 3 + \ldots + 12)$; the number of draws reset to zero those weeks that the goal was not met. All leaders, counselors, and patients provided informed consent for participation under procedures approved by the Brown University Institutional Review Board.

1.2. Sources of information

1.2.1. CM tracker

For each OTP, quantitative data on CM implementation were collected using a novel study-specific tool called the CM Tracker (CMTracker.org). For each Project MIMIC patient, counselors were asked to enter data for 12 encounters or 14 weeks, whichever came first. Using simple prompts related to CM implementation, Project MIMIC counselors completed a Weekly Report that assessed whether the weekly attendance/engagement target was met, the number of draws from the fishbowl, and the number and type of prizes received. On an ongoing basis, data entered into the Weekly Reports were used to generate a user-friendly dashboard depicting each patient's CM-related progress, called the Patient CM Summary (see Supplemental Fig. 1). At the end of the implementation phase, a site leader from each OTP verified data entered into the Weekly Reports against clinic records.

1.2.2. In-depth sustainment interviews

Qualitative data on perceived barriers to CM implementation and plans for CM sustainment were collected via in-depth exit interviews after 12 months of sustainment monitoring. Each OTP was asked to nominate one leader or counselor who had played an active role in Project MIMIC to reflect upon their experiences with CM implementation. Staff nominated to complete the interview were aware of the goals of the research study and the exit interview. All nominated staff chose to participate.

A semi-structured guide was developed by a PhD-level clinical psychologist with expertise in qualitative research (author SB) to assess each OTP representatives' experience across several domains: perceptions of the CM support strategy; barriers to CM sustainment; and workflow adaptations to facilitate sustainment. The current analysis focused on COVID-related barriers to sustainment and innovative workflow adaptations designed to sustain CM implementation. Feedback on workflow adaptations was augmented by detailed process logs in which adaptations made to CM implementation at the OTPs were documented by the research team in real-time.

Each interview was conducted by one of four research assistants (three female Bachelor's level staff employed full-time and one male undergraduate student employed part-time; authors NC, SL, JY, KY) who had received basic training in qualitative data collection. Prior to the interviews, there was no formal relationship between the interviewers and staff, and no formal information was provided about interviewer characteristics. Interviews were conducted via phone or Zoom, allowing nominated staff to participate from a location of their choosing. Each interview was conducted only once (i.e., no repeat interviews) and no other staff were present. Audio recordings of the interviews were transcribed verbatim. Interviews lasted 30–45 min and no compensation was provided. After the interviews, staff were offered the transcripts to provide corrections.

1.3. Analysis plan

1.3.1. Quantitative analysis

Quantitative data collected via the CM Tracker was analyzed to assess CM implementation and sustainment over three focal time intervals: prior to COVID-19 social distancing orders with implementation support (7.5 months); during COVID-19 social distancing orders with implementation support (3.5 months); and during continued COVID-19 social distancing orders after removal of implementation support (12 months). For each interval, data were aggregated at the OTP-level to represent the following: number of OTPs providing CM, number of counselors providing CM, number of patients receiving CM, and number of CM encounters per week.

1.3.2. Qualitative analysis

Qualitative interviews with each OTP representative were analyzed to elucidate unique COVID-related barriers to CM sustainment, as well as workflow adaptations made during the pandemic. The coding team included the PhD-level developer of the qualitative interview guide (author SB) and two research assistants (one part-time undergraduate and one full-time Bachelor's level: authors CB and ER): none of the members of the coding team had conducted the exit interviews.

Thematic analysis (Graneheim and Lundman, 2004; Hsieh and Shannon, 2005) was conducted through a series of steps. First, the coding team members independently read the transcripts of all eight interviews to generate holistic impressions. Next, the coding team met to discuss their impressions and collaboratively create a preliminary list of major themes observed across interviews. The team also developed an initial codebook that defined each of the major recurring themes. Using the coding dictionary as reference, the two research assistants then independently coded all eight interviews using NVivo version 12.0 qualitative coding software. The developer of the guide was consulted as needed

throughout this process to add additional nodes to the coding dictionary and to review the definitions of emergent themes. Once the independent coding was completed, the research assistants met to review their preliminary codes, to identify discrepant codes, and to make a final consensus coding determination. The coders met until 100% consensus was obtained.

Using NVivo coding software (QSR International Pty Ltd., 2020), frequency counts were tallied for the most common barriers to CM sustainment during the COVID-19 pandemic and specific workflow adaptations. In addition, targeted queries were run in order to select exemplar quotes to accurately represent each subtheme. Staff participants were given a summary of the findings with illustrative quotes upon completion of the analysis.

2. Results

2.1. Participant characteristics

Across the eight OTPs, a total of 68 leaders and counselors participated in Project MIMIC. Each OTP nominated one leader or counselor to complete an exit interview. Of the eight interview participants, six were front-line counselors and two were administrative leaders. Interview participants were predominantly White (88%), Non-Hispanic (75%), and female (88%). Three of the participants had Master's degrees and five had Bachelor's degrees. Length of tenure at their respective OTP varied, ranging from 20 to 154 months; average years of employment was about 8 years ($M = 7.94$, $SD = 4.27$). The average salary of staff respondents rounded to the nearest thousand was $56,000 ($SD = $13,527$).

2.2. Quantitative data on CM session implementation

Table 1 presents CM implementation metrics across the three focal time intervals. Prior to the pandemic, all eight OTPs had successfully implemented CM, with 21 counselors actively providing CM, and, on average, 31.8 CM encounters provided per week across the OTPs. The COVID-19 pandemic precipitated a decline in implementation rates: following federal social distancing orders, the number of counselors providing CM, the number of patients receiving CM, and the number of weekly CM encounters decreased by 57%, 84%, and 78%, respectively. Yet, CM implementation was still happening at the majority of OTPs (5 of the 8) and there was still an average of 6.9 CM encounters per week. Following removal of the active support from Project MIMIC, the decline in CM implementation was more substantial. Only three OTPs were able to successfully sustain CM and the number of CM encounters per week dropped to 1.8.

2.3. Qualitative data on CM barriers and adaptations

To elucidate factors contributing to the decline in CM provision, qualitative interviews explored barriers to CM sustainment, and specific supports that OTPs suggested to enhance sustainment. Thematic analyses revealed four specific COVID-related barriers: fear of contagion; difficulty engaging patients remotely; the need to re-define attendance targets due to changing regulations; and staff shortages. Each barrier, along with consideration of potential workflow adaptations, is presented in Table 2 along with a definition and illustrative quotes. Barriers and workflow innovations are elaborated in the sections below.

2.3.1. Fear of contagion

One of the most common barriers was fear of contagion, both in terms of the risk of getting patients sick or of catching the virus themselves. This barrier was articulated by five OTP respondents (one leader, four counselors). Fear of contagion was predominantly driven by the logistics of CM prize draws, which required counselors and patients to use multiple tangible objects such as fishbowls, prize menus, and prize cabinets. Three of the respondents specifically cited concerns about the

Table 1

Contingency management implementation metrics from study-specific contingency management tracker.

Time Interval	Prior to Social Distancing with Implementation Support	During Social Distancing with Implementation Support	During Social Distancing after Implementation Support
Specific Dates	August 1, 2019– March 15, 2020 (33 weeks)	March 16, 2020– June 30, 2020 (15 weeks)	July 1, 2020 – June 30, 2021 (52 weeks)
Number of organizations providing any CM	8	5	3
Number of counselors providing any CM	21	9	3
Number of patients receiving any CM	162	26	29
Number of patients receiving any CM per week	5	1.7	0.6
Number of CM encounters	1019	103	93
Number of CM encounters per week	31.8	6.9	1.8

Note: Number of patients receiving CM and number of CM draws provided are adjusted to account for variable interval durations across the three time periods.

Table 2

Barriers to contingency management (CM) sustainment and related workflow adaptations from qualitative interviews with staff from eight opioid treatment programs.

Major Themes	Definition	Example Quotes
Barrier: Fear of COVID Contagion	Fear of staff contracting the virus themselves or spreading to patients/ staff, often associated with physical objects (e.g., fishbowl, prize cabinet)	• "It's really hard…That means one other person's hand's in the bowl. I might have to think about getting another bowl."
Adaptation: Remote Prize Draws and Delivery	Use of technology and social distancing to conduct prize draws, selection, and delivery safely.	• "definitely a randomizer, I think, especially now with all we've learned with COVID. Yeah, a randomizer would be helpful…Right now, a randomizer would be probably the best idea."
Barrier: Engaging Patients in Remote CM Draws	Challenges with engagement faced due to the transition to telephonic/video conference sessions.	• "Just it's just I think especially with the CM, I think it's better when it's done in person, personally, 'cause it's real-time, it's a real experience. It's one thing to get on the phone, be like, "Hey, everything's going great. How you doing?" [It's] that, I mean you know, that human interaction, just being with other people."
Adaptation: Technology-Assisted Engagement and Active Learning Strategies	Use of technology to engage patients, as well as active learning strategies to maintain enthusiasm during group and individual sessions	• "Right, and we can—for groups and things like that, we can have it that the clients can see it [the electronic prize menu] and we can have a tablet in group."
Barrier: Redefining CM Attendance Target	Difficulties related to having to change weekly attendance target as a result of changes to services offered.	• "Our goal for CM was that they had to attend group. So it was not like you would have to go to dose and not miss the dose, that would've been—we could've still continued if that was the case, but we chose the challenging one was getting them into group."
Adaptation: Shift to Brief CM Check-Ins	Move from incentivizing group counseling and medication visits to brief individual check-ins	• "Some of our clients may be in weekly group but only monthly counseling, but now we're seeing them for individual counseling more frequently."
Barrier: Staff Shortages	Staff absences and turnover precipitated by COVID (e.g., staff out sick, medical leave)	• "We've been down staff, not just the clinical manager but also down clinicians, and so—so I'm beyond overwhelmed right now, honestly."
Adaptation: Extension of CM Training	Training of non-counseling staff in CM and re-training of existing counseling staff	• "We wanted to really train everyone… so that people could feel like they were part of the project…. To get them trained, to get new people trained, to get staff who were doing this retrained… it will take a little bit of time."
Barrier: Non-COVID Related Challenges	Non-COVID specific challenges including inability to fund CM incentives, time management challenges, etc.	• "Time management with a new program, to be able to… make sure that we implement it the way that we need to.. Because it's a new program, so, there's so many.. responsibilities"
Adaptation: Collecting data on CM outcomes	Comparing data on CM patients to either other current patients or to historical trends	• "Convincing my regional director to let me do it… it was more of a test with my regional director to see how well it worked. I think just one group doing it for now, to see if it improves attendance."

need to have patients draw prize slips from a physical fish bowl. For instance, one counselor noted that they could not figure out *"the issue with how do we try to do this without everybody touching papers in a bowl with COVID."* Other counselors shared concerns about contagion around the prize cabinet and during the prize administration process.

Notably, several respondents commented that their patients were especially vulnerable to COVID-19 due to a variety of risk factors including smoking, unstable housing, mental health issues, and substance use. One OTP counselor shared her view that the program's priority had to be limiting the patients' exposure to COVID-19, especially given the uncertainties about spread in her region: *"it's the unknown of basically what's gonna happen—now we have close to 600 patients in the program. We've really expanded. Now it's about keeping them safe…."* This same counselor

went on to express fear about inadvertently giving vulnerable patients COVID-19, noting that she felt a constant feeling of anxiety when coming in for sessions because *"it was like, I do not even know if I'm contagious, which I was not, but you just did not know."* Several respondents also expressed fear of getting the virus from their patients and colleagues; when asked what support was needed to sustain CM, one counselor replied, *"I would at least appreciate giving me ideas how we could do this without getting sick."*

Innovative workflow adaptations included changes to the traditional prize draw process. One leader indicated that their program would have counselors conduct the draws with gloves on behind a window.

So we pick it like in front of them, with a barrier, they're far away, with their mask- and just say okay, one. I think that will be the best

because they are going to have to come in—they're coming in to get their medication no matter what. So I think if they come in, there will be the counselors with gloves and standing—yup. That's how we're going to do it.

Respondents from three other OTPs noted that an electronic prize generator or *"randomizer"* that did not require patients to put their hand in a bowl would be *"awesome"* for sustaining CM and mitigating risk. Another program leader noted that they would like to retain the physical fishbowl, but would ensure *"each counselor would have their own"* to reduce the risk of contagion. Another common workflow adaptation was to have the prizes packaged and given to the patient at the time of medication pick up to reduce the number of required contacts.

2.3.2. Remote CM draws

Related to the concern about fear of COVID-19 contagion, many of the OTPs shifted to telehealth provision of group and counseling sessions, which led to new barriers associated with remote CM encounters. In particular, five of the OTPs revealed challenges engaging patients in CM remotely. One counselor expressed their view that *"doing it on the phone is horrible. Clients sometimes do not pick up, or to contact them is more difficult because they do not have to come every day to here."* Another leader shared similar frustrations noting that *"over the phone it's very difficult to say who is engaged and who is not."* Other logistical challenges were noted with trying to describe the prizes and distribute the physical prizes during social distancing.

To address these barriers, OTPs shared a number of workflow adaptations related to using technology and active learning strategies to maintain patient engagement. One OTP shared a workflow modification that involved using a designated staff member to conduct the CM draws, who joined tele-health sessions via 3-way calling. This program noted that the draws were done on speaker phone and that both the staff member and the counselor made a *"big deal"* about cheering loudly when each slip was read out loud. Other service innovations included creating attractive "prize menus" that depicted all of the items that patients could receive as incentives for meeting their treatment goal; leaving print outs of these prize menus for patients at the front desk; sending electronic versions of the prize menus to patients via email; or using a share screen feature to project the prize menu during video sessions. A counselor at the OTP that successfully sustained CM across all three time-intervals noted that it was essential to be enthusiastic when reaching out to patients to conduct remote CM draws to maintain their engagement. This counselor also noted that patients at her OTP had decorated the prize cabinet and left it near the dosing window as a way of providing a visual reminder of the CM program. This counselor noted that engagement had actually increased among her patients once they had *"gotten used to the phone system."*

2.3.3. Redefining the CM attendance target

A third theme voiced by four OTP representatives (two leaders, two counselors), was the need to re-define the weekly CM attendance target due to structural changes in the types of services offered at the OTPs. This barrier reflected the need to adhere to CM principles of frequent behavioral monitoring and reinforcement at a time when two of the most commonly offered services – daily medication dosing and weekly group counseling– were both in flux.

All four of the respondents that shared this barrier reported that group counseling had been cancelled at their programs to limit exposure to the virus. As an example, one leader asserted their CM attendance target was no longer applicable because *"we're not running group."* The other leader similarly recalled, *"our goal for CM was that they had to attend group… [but] we had ceased it [groups] when COVID became an issue."*

Three of the respondents further noted that their program's prior attendance target had incorporated daily dosing visits, which were no longer applicable due to patients having greater access to take home doses. For instance, one counselor noted, *"obviously, we cannot do seven*

outta nine [clinical contacts - the prior attendance target]… because a lotta people ended up with take-homes." Another counselor noted that during COVID-19 patients were engaging with the OTP so infrequently that it was hard to come up with a realistic weekly attendance target:

Right now, the barrier is that there's COVID going on, and lots of the clients have take-homes. The clients that come in and stabilize immediately… they have 90 days without being in treatment and going to groups and all that stuff.

The most common CM adaptation in this area was switching the attendance target to brief individual counseling check-ins. Brief check ins were noted as a valuable way to check in on patients, reinforce use of relapse prevention skills, and conduct CM draws. As an example, one leader noted that *"because we're not running groups, they've taken on individual, more individual client sessions to make up for that. Some of our clients may be in weekly group but only monthly counseling, but now we're seeing them for individual counseling more frequently."* Two of the OTPs indicated that they thought they could conduct brief check-ins with CM draws solely via phone or video conference for the duration of the pandemic, while six indicated that they preferred to use a mix of phone, video, and in-person check-ins.

2.3.4. Staff shortages

A final COVID-related concern voiced by four respondents (one leader, three counselors) was staff shortages associated with having counselors quit or take medical leave. A counselor at one program noted that they had been short-staffed *"for a good three, four months"* during the pandemic because *"we had about 12 staff members catch the virus."* Relatedly, the leader stated that, *"there's some of them [who] have doubled their caseloads under COVID."* Not surprisingly, as caseloads increased, perceived resistance to CM implementation increased. One counselor explained, *"I think sometimes when programs are short-staffed, clinicians have more on their plates than they typically would and they do not always want to do that one extra thing. They just feel like everything's like oh, it's just one more thing."*

A workflow innovation that emerged in response to staffing shortages was involving a broader array of staff in the administration of CM draws than the clinical counselors. An OTP leader shared her perspective that it was essential to involve the full staff at the OTP including nurses, front desk staff, and security guards, so that everyone at the program can *"feel that it's something that all staff should do, not just designated staff."* This OTP had a front desk staff member conduct the prize draws. Another suggestion to promote CM among existing staff who might be feeling burnt out was to schedule re-training after COVID-19 to get counselors enthusiastic about CM implementation again.

2.4. Additional barriers to CM sustainment unrelated to COVID-19

Several additional barriers to CM sustainment emerged, none of which were framed as COVID-specific. Such barriers have been well-documented in the CM literature and included limited institutional support for training, limited time in counselors' caseload to incorporate new approaches, and lack of financial support to cover the costs of CM. Though not necessarily COVID-specific, these barriers were perceived as more challenging during the pandemic due to the enormous demands on leader and counselor time to adjust to new COVID-19 regulations and the cost of personal protective equipment. For instance, one leader noted that there is *"dealing with COVID... took a lot of planning and a lot of response and change in all of our operations… [there's] too much going on, way too much going on…"* Similarly, another counselor lamented that with the monetary investment to comply with COVID-19 regulations *"the financial aspect of it, of maintaining the prizes"* was not a priority at the time.

The OTP that was able to successfully sustain CM across all three-time intervals shared that they used the CM Tracker data to compare the number of clinical encounters attended by patients who received

CM versus the historical average at their clinic, and used the data to advocate for additional resources from OTP leadership. A second OTP that sustained CM throughout COVID-19, but then paused at the start of the sustainment phase, similarly noted that they compared the number of clinical encounters received by Project MIMIC patients to the number of encounters received by newly admitted patients who declined participation. This OTP reported that their ability to document higher attendance rates helped them to secure leadership buy in for the CM program.

3. Discussion

This mixed-methods study coupled quantitative and qualitative data collection methods to better understand implementation and sustainment of CM throughout the COVID-19 pandemic, elucidate COVID-related barriers to CM sustainment, and document innovative workflow adaptations. Based on the quantitative data, there was a marked drop in CM implementation following the announcement of social distancing orders, followed by an even more substantial drop following the removal of active support. This trend is consistent with the well-documented phenomenon of "voltage drop" in the sustainment literature (Chambers et al., 2013) highlighting a critical need to understand barriers to sustainment and generate novel strategies. Exploration of this voltage drop via qualitative interviews elucidated four unique COVID-related barriers to sustainment: fear of the virus; difficulty engaging patients in remote sessions; the need to redefine the weekly attendance target given changing regulations; and staff shortages. Results also revealed novel workflow adaptations that hold promise to mitigate these barriers.

Of the four barriers to sustainment, three of them – fear of the virus, difficulty adjusting to remote sessions, and staff shortages – have been well documented in studies of front-line health professionals since COVID-19 was declared a national emergency. A body of emergent research has shown that front-line health care professionals across a range of settings have experienced a significant increase in anxiety since the start of the pandemic (Pappa et al., 2020; Santabarbara et al., 2021; Shanafelt et al., 2020). While most research has focused on health professionals in primary care and hospital settings in the United States (Londono-Ramirez et al., 2021), a 2021 study in Tehran (Mosazadeh, 2021) found that OTP staff reported significantly heightened rates of anxiety in the early months of the pandemic, suggesting that these concerns transcend settings and countries. Similarly, the challenges that health professionals have faced adjusting to telehealth and maintaining patient engagement during the pandemic have been documented across multiple clinical settings (Doraiswamy, 2020; Khoshrounejad, 2021; Monaghesh & Hajizadeh, 2020). A recent commentary by Hughto and colleagues (Hughto et al., 2021) presented preliminary evidence that an OTP in New England was able to adjust to telehealth counseling sessions (using a generic supportive approach) and maintain patient engagement, but that patients experienced challenges with access to technology and private space. Combined with our findings, these data suggest that patient engagement may be particularly challenging when OTPs rely on the phone for group counseling sessions. Personnel shortages have also been reported across multiple healthcare settings (e.g., nursing homes, hospitals) as staff have called out sick (Rasmussen et al., 2020; Xu et al., 2020). This study was the first to provide qualitative data suggesting that such shortages have been occurring in OTPs.

Although these major barriers have been reported across contexts, the specific concerns that OTP staff articulated within each barrier reflected unique challenges associated with CM. Unlike other behavioral interventions implemented within OTPs, such as cognitive behavioral therapy and motivational interviewing, prize-based CM relies on multiple tangible objects such as a fishbowl, prize menus, and a prize cabinet. These physical objects introduced a distinct layer of complexity and a need to leverage technology in novel ways to reduce the potential

for contagion. OTPs were able to implement some of simpler workflow changes (e.g., using video technology to visually show available prizes, using three-way calling to conduct prize draws with a physical fishbowl, having counselors conduct prize draws to reduce the number of hands in the fishbowl) without support, while others were more complicated. As an example, an electronic fishbowl was requested by multiple OTPs. A virtual alternative to the fishbowl seems basic on face value, but would need to adhere to multiple elements: (1) the ability to generate different numbers of prize draws (0–12) based on the individual patient's earned draws that day; (2) a set of 500 total possible draws consisting of 250 encouraging phrases ($0), 209 small prizes (about $1 in value), 40 large prizes (about $20 in value), and 1 jumbo prize (about $100 in value); (3) draws that are dependent on one another such that a patient cannot draw the jumbo prize twice in one session; and (4) the ability to reveal only one prize draw at a time, to create excitement. An electronic fishbowl meeting these elements was eventually created by our team (Lang et al., 2021), but was not available in the early months of the pandemic. The need to develop novel technologies to navigate CM draws likely contributed substantially to the decline in CM implementation observed once external support was removed.

The final emergent COVID-related barrier, difficulty re-defining the CM attendance target, was unique to the OTP context. This barrier reflected the need to adhere to CM principles of routine behavioral monitoring and reinforcement in the midst of rapid changes to service provision during the pandemic. For the first time in decades, OTP patients who previously dosed daily were eligible for up to 14 take-home doses (Substance Abuse and Mental Health Services Administration, 2020a), requiring OTPs to think creatively about their CM attendance targets. A common workflow adaptation was a shift towards incentivizing engagement in brief, frequent individual counseling check-ins. Notably, none of the respondents in this study raised concerns about the actual monitoring of CM attendance remotely. The CM protocol in this project specifically incentivized attendance/engagement instead of abstinence based on feedback from OTP staff prior to the pandemic (Becker et al., 2019); monitoring of abstinence would have introduced an additional set of challenges associated with the need to monitor patients' substance use remotely. In recent years, mobile health options developed by Pear Therapeutics (reSET and reSET-O), Dynamicare, and Affect Therapeutics have emerged as potential options to address these challenges and facilitate the remote monitoring of abstinence (Hammond et al., 2021; Velez et al., 2021). Other barriers to CM sustainment (e.g., time management, financing the prizes) were not perceived as COVID-related, and were explicitly anticipated as part of the implementation strategy offered to the OTPs (Scott et al., 2021). Nevertheless, it was clear that the COVID-19 pandemic made these common issues even more challenging for OTPs to navigate due to competing demands on their time and resources.

Despite major barriers to CM sustainment, this study presents several reasons for optimism. Two of the three OTPs that sustained CM did not start CM implementation until seven months after the removal of active support, suggesting that the reduction in service provision was not driven solely by the loss of external support. It is possible that CM provision will rise further as OTPs continue to acclimate to the COVID pandemic. In addition, OTPs shared creative strategies for CM sustainment that will likely have utility far beyond the pandemic. Most notably, the creation of an electronic fishbowl (Lang et al., 2021) has the potential to not only facilitate telehealth sessions, but to reduce burden on OTPs associated with creating, monitoring, and using a physical fishbowl (e.g., cutting and folding 500 slips of paper, periodically auditing the slips, sharing the physical bowl). Many of the technologies and active learning techniques used by counselors – such as using the share screen feature to demonstrate prize menus and loudly cheering when prizes are drawn – are also likely to have long-term value, and could be emphasized in didactic CM training. Other innovative workflow adaptations suggested by the OTPs, such as extending training to all employed staff and collecting data to monitor outcomes, also represent best practices

in quality improvement initiatives (Compas et al., 2008) that should become a routine part of CM implementation strategies.

3.1. Limitations

Several limitations may impact the generalizability of our results. First, it is important to note that the study sample consisted of predominantly White, non-Hispanic, female counselors and leaders. Unfortunately, the demographics of the current sample were generally representative of the broader field of OTP counselors, which is mostly female and Non-Hispanic White (Hartzler et al., 2012). There is a clear and pressing need to diversify the OTP workforce to better reflect the needs of patients with opioid use disorders. Second, the current study reflects the perspective of representatives from eight OTPs in New England and may not represent the experiences of OTPs in other regions. Third, we did not collect quantitative data on OTP census during the pandemic, so it is possible that some of the drop-off in weekly CM implementation was a result of a decline in census; however, the fact that the number of OTPs implementing CM also dropped and that OTPs were only asked to deliver CM to 25 patients suggests that census was not the key factor contributing to the decline. Finally, our sample included counselors and leaders who were nominated by their OTP on account of their engagement in the project. As a result, the barriers and workflow adaptations shared here were those encountered by those most engaged in CM. It is possible that counselors and leaders who were less engaged in CM might identify other barriers and workflow suggestions.

3.2. Implications: novel CM sustainment strategies

These limitations notwithstanding, the results of the current study have meaningful provider- and organization-level implications for CM sustainability and adaption in OTPs. Consistent with prior literature on sustainment, this study suggests that OTPs attempting to implement CM experienced substantial voltage drop when active support was removed (Chambers et al., 2013). Exploration of this voltage drop via qualitative interviews revealed COVID-related barriers as well as novel sustainment strategies to mitigate these barriers. Some of the most promising strategies included use of an electronic CM fishbowl, offering CM as part of brief individual check-ins, extending CM training to non-counseling staff, and collecting ongoing data on CM effectiveness. Proactive inclusion of the innovative workflow adaptations identified herein could potentially help to promote the sustainment of CM in OTPs both during and following the COVID-19 pandemic.

Declaration of Competing Interest

None.

Acknowledgments

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.dadr.2021.100003.

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