MHSA Innovation Technology Suite Evaluation

Quarterly Report

September 2018 – February 2019

March 2019

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Executive Summary

The Innovation Technology Suite Project (INN Tech Suite Project) is a three-year demonstration project, funded and currently directed by the following Cohort #1 counties in the State of California: Los Angeles County, Orange County, Kern County, Modoc County, and Mono County. As a note, the following 10 additional counties and cities have joined the Tech Suite as part of Cohort #2: Inyo County, Marin County, Monterey County, Riverside County, San Francisco County, San Mateo County, Santa Barbara County, Tehema County, Tri-City, and City of Berkeley; however, work with Cohort #2 is not included in this report. This California statewide collaborative project is designed to bring interactive technology–based mental health solutions into the public mental health system through a highly innovative set, or "suite", of mobile applications.

The MHSA Innovation Technology Suite Evaluation Quarter 1 report is structured as follows:

- Summary of Activities describes non-evaluation and evaluation project activities completed during the first quarter of the evaluation. It also includes activities done in the months prior to the beginning of the evaluation.
- Methodology details data collection and analysis performed during the first quarter of the evaluation.
- Preliminary Learnings and Findings includes a description of the learnings and findings from the first quarter of the evaluation.
- Recommendations for Actions and Modifications presents recommendations and modifications suggested based on the preliminary learnings and findings.
- Planned Activities for Next Evaluation Period outlines key activities planned for the next evaluation period, as well as set expectations for what learnings/findings will be presented in the next report.

The primary focus of CalMHSA and the Counties in the first quarter was to work with the two approved App products, 7 Cups and Mindstrong, to make changes and upgrades to the product in order to address key issues and to establish a minimally viable product. CalMHSA also on-boarded Cohort #2 as well as made changes to the project management team by contracting with Cambria solutions in order to lead a major project overhaul.

During this period, evaluation activities involved finalizing the Cohort #1 evaluation plan with input from CalMHSA and the Tech Suite Evaluation Advisory Board, as well as meeting with the Counties to explain the evaluation plan. It also involved meeting with key stakeholders from Cohort #1 and the two approved App products to understand their project planning and implementation, as well as to begin discussing data sharing challenges (e.g. creating data use agreements) and planning for anticipated data collections. In addition, the UCI Team conducted two site visits- one at Harbor UCLA Medical Center/ DBT Clinic and another at Kern County's Behavioral Health and Recovery. Lastly, the evaluation team convened a Tech Suite Evaluation Advisory Board to provide guidance for the evaluation.

As a note, given the small samples sizes that characterized data collection efforts, findings should be used for the purpose of making specific observations that might lead to insight when interpreted in context, and not be overly generalized. Key learnings during this period include the following:

- The Market Analysis reviewed 276 apps with the following features: peer/community/chat features; collects passive sensory data; chatbot/AI; and/or CBT component. None of these apps

had all these features, but a small number had 2-3 of the features. The peer/community/chat features were a common feature among the apps reviewed.

- The research team performed a heuristic evaluation of the 7 Cups app product that involved working with trained human-computer interaction experts to evaluate whether the product met established usability guidelines. The researchers identified six areas of improvement. These areas included: amount of information and choices available on the site; organization, navigation, and consistency; error prevention and undo/redo actions; help information; concerns about location; and consistency.
- County mental health providers reported optimism with the Tech Suite apps and expressed a need to better understand the products since they have limited experience using the products in their practice.
- Leadership, providers, and peers thought the app vendors were responsive, communicative, and willing to make changes to their products. That said, there were several logistical and operational challenges with the Tech Suite implementation.
- A small number of 7 Cups users were surveyed and interviewed. These users considered 7 Cups as useful in their recovery, their learning of mental health symptoms, and as a way to reduce stigma. Yet, they did not readily use 7 Cups for various reasons.
- Less than five Mindstrong users were also surveyed and interviewed. They liked the product. They also indicated that it augmented their care, but did not reduce their need to seek in-person professional mental health services or treatment.

Based on these learnings, UCI recommends the following actions:

- CalMHSA continue to facilitate coordination and communication, and also create more opportunities to share learnings and resources with Tech Suite collaborative members. In addition, we recommend that CalMHSA work with UCI to address key issues of data access and real-time feedback.
- Tech Suite Counties reinforce practices that leverage the positive climate and culture of the clinic setting. They may consider supporting clinical champions, offering additional provider trainings, helping clients who cannot access smartphones, and formalizing their structures and processes to facilitate spread of innovation practices. In addition, providers may benefit from additional Mindstrong support in order to better integrate use of the app in their practice.
- Vendors provide materials and content to help clinical staff and clients better understand their products.
- 7 Cups consider vetting listeners more carefully, providing more information to users on how to use the app as well as the expertise of listeners, providing ways to undo actions, and enabling growth paths to be accessed irrespective if a user travels to another location. 7 Cups might consider allowing users to indicate their current location.
- The UCI team continue to work with CalMHSA, counties, and vendors to adjust evaluation methods and instruments. In addition, they should work with Peer Leads to establish regular processes for engagement.

Introduction

The Innovation Technology Suite Project (INN Tech Suite Project) is a three-year demonstration project, funded and currently directed by the following counties in the State of California:

Cohort #1: Los Angeles County, Orange County, Kern County, Modoc County, Mono County
Cohort #2: Inyo County, Marin County, Monterey County, Riverside County, San Francisco County, San Mateo County, Santa Barbara County, Tehema County, Tri-City, and City of Berkeley

This California statewide collaborative project is designed to bring interactive technology–based mental health solutions into the public mental health system through a highly innovative set, or "suite", of mobile applications.

The intended outcomes of this project are to accomplish the following five learning objectives:

(1) Detect and acknowledge mental health symptoms sooner;
(2) Reduce stigma associated with mental illness by promoting mental wellness;
(3) Increase access to the appropriate level of support and care;
(4) Increase purpose, belonging, and social connectedness of individuals served; and,
(5) Analyze and collect data to improve mental health needs assessment and service delivery.

UC Irvine (UCI) is conducting a comprehensive formative evaluation of the INN Tech Suite Project which involves UCI observing and evaluating the Tech Suite as it happens in order to provide real-time feedback and learnings through the project period. The evaluation encompasses an examination of the project's target audience, implementation, user experience, outcomes, stakeholder participation, and collaboration readiness. The evaluation will also produce a data repository. Evaluation findings will be reported on a quarterly basis. The following report presents activities and findings for quarter 1 of the project.

Summary of Activities

Tech Suite Activities

Pre-Evaluation Period

- 7 Cups began peer testing focused on access, switching counties, geolocation, and custom configurations. Received feedback regarding usability and translations and adapted the product accordingly.

September 2018

- MHSOAC Commissioners approved Cohort #2 to join collaborative Tech Suite project.
- Determined that the two approved App products, 7 Cups and Mindstrong, needed numerous changes/upgrades to be able to be minimally viable minimal products ("MVPs") for use in County mental health systems. Wide scale roll-out of 7 Cups was put on hold for implementation, although development of the platform is still on-going until new processes and procedures can be put into place (still on hold as of February 28, 2019). Mindstrong is continuing to develop their implementation processes.

October 2018

- Cambria Solutions was engaged to conduct project assessment and present findings to Tech Suite Leadership. Leadership concluded that Cambria would be engaged to lead a major project reorganization in an effort to build a comprehensive project management strategy.

November 2018

- Cambria conducted User Story workshops for Kern, Mono, and Modoc Counties.

December 2018

- The INN Tech Suite Project Manager was replaced. CalMHSA took over all project management, with training and guidance provided by Cambria through June 30, 2019.
- Cambria conducted User Story workshops for Los Angeles and Orange Counties.

January 2019

- 7 Cups received 51 User stories from Cambria, focused primarily on training for providers, improved user training, and basic product usability suggestions. New features, in response to user stories, are currently being developed, with the first phase aimed to be implemented in early March 2019.

February 2019

- [Feb 14, 2019] – INN Tech Suite Leadership Meeting to align vision for Tech Suite and present preliminary change processes.
- [Feb 28, 2019] – INN Tech Suite Implementation Workshop for All Cohort 1 and Cohort #2 Counties in Sacramento, CA. Establishing processes around the following areas:
    - Program communication – shift from Smartsheet to Sharepoint (to be rolled out March, 2019)
    - Product/program management – shift use of Change Control Board (CCB) through JIRA.
    - Shared learning between Cohort #1 and Cohort #2 Counties.

Evaluation Activities

September 2018

- Began targeted evaluation activities related to initial launch activities
    - [Sept 10, 2018] Conducted site visit to Harbor UCLA Medical Center / DBT Clinic.
- Met with Lisa Benson, Director of the Office of Clinical Informatics at Los Angeles Department of Mental Health, to discuss the claims and EHR data the county maintains, their advantages and limitations, and the process we would need to follow to obtain these data.
- Met with Sharon Ishikawa, Flor Yousefian Tehrani, Kathleen Murrant and their teams to discuss the EHR data Orange County Health Care Agency (OCHCA) maintains, their advantages and limitations, and the process we would need to follow to obtain these data.
- Obtained information about the counties' mental health programs and the data collected as well as contact information for the individuals responsible for the data. It should be noted that Kern County expressed an interest in executing a Business Associates Agreement as well as sharing de-identified EHR data.
- Met with 7 Cups to begin negotiating a data use agreement.
- Met with Mindstrong to discuss their data, what questions can be answered by the data, and its limitations.
- Met with Linette Scott, MD, MPH, Chief Medical Information Officer, Deputy Director, Information Management Division of the California Department of Health Care Services and members of her team who maintain the Medi-Cal claims data in order to understand the data content and structure as well as the process and cost of obtaining the data.
- Began obtaining information about the data sources that would feed into the data repository and the processes required to obtain these data.

October 2018

- Continued targeted evaluation activities related to initial launch activities
- [Oct 11, 2018] Participated in focus group session with the Wellness Center Central of OC to obtain feedback about perceptions of 7Cups.
- [Oct 25, 2018] Met with Lisa Benson, Director of the Office of Clinical Informatics at Los Angeles Department of Mental Health, to discuss the claims and EHR data the county maintains, their advantages and limitations, and the process we would need to follow to obtain these data.
- [Oct 31, 2018] Conducted focus group session with the Orange County Recovery and Education Institute to obtain feedback about 7Cups.
- Continued to obtain information about the data sources that would feed into the data repository and the processes required to obtain these data.

November 2018

- Continued targeted evaluation activities related to initial launch activities
- [Nov 8, 2018] Convened the Tech Suite Evaluation Advisory Board to review and provide guidance to the evaluation plan and then monitor evaluation.
- [Nov 11, 2018] Tech Suite Leadership reviewed and approved the evaluation plan as submitted by UCI.
- Met with Mindstrong to discuss their data, what questions can be answered by the data, and its limitations.
- Met with Linette Scott, MD, MPH, Chief Medical Information Officer, Deputy Director, Information Management Division of the California Department of Health Care Services and

members of her team who maintain the Medi-Cal claims data in order to understand the data content and structure as well as the process and cost of obtaining the data.
- Continued to obtain information about the data sources that would feed into the data repository and the processes required to obtain these data.

December 2018

- Finalized contract between CalMHSA and UCI for Evaluation Planning Period.
- [Dec. 5, 2018] Provided memo to Orange County (Sharon Ishikawa and Flor Yousefian-Tehrani) summarizing the focus groups conducted at Wellness Center Central of OC and the Recovery Education Institute about staff perceptions of 7 Cups.
- [Dec. 14, 2018] Conducted interview with Lynn McFarr, Director of the Cognitive Behavioral Therapy Clinic at Harbor UCLA Medical Center to conduct Mindstrong implementation interview for Harbor UCLA DBT Clinic.
- Continued targeted evaluation activities related to initial launch activities
    - [Dec 20, 2018] Conducted full day site visit to Kern County, Behavioral Health & Recovery.
    - Began series of on-boarding events with Orange County. Mindstrong introduction sessions for OC providers with OC PACT, PEI Crew, and PWP OC.
- Continued to obtain information about the data sources that would feed into the data repository and the processes required to obtain these data.

January 2019

- Continued targeted evaluation activities related to initial launch activities
    - [Jan 18, 2019] Held full-day meeting with 7 Cups to level set our collective goals and needs from the INN Tech Suite project, in addition to providing transparency in our organizational structure and creating an internal quarterly planning process. Our collaboration with 7 Cups has been focused on developing a framework for data sharing and immersion into the 7 Cups platform. During this meeting, we discussed our goals (shared and individual); what data is available and in what format; obtain a better mutual understanding of what can be asked of the data and what the limitations are; established procedures and processes for communication, coordination, and collaboration; began to align our goals and needs; and built trust and rapport. 7 Cups explained their data structure and preliminary thinking around existing data and ties to the Tech Suite Learning Objectives.
    - Initiated weekly video calls with 7 Cups to ensure the most efficient and effective collaboration moving forward.
    - Continued series of on-boarding events with Orange County. Mindstrong introduction sessions for OC providers with OC PACT, PEI Crew, and PWP OC.
- Met with Sharon Ishikawa, Flor Yousefian Tehrani, Kathleen Murrant and their teams to discuss the EHR data OCHCA maintains, their advantages and limitations, and the process we would need to follow to obtain these data.
- Finalized contract and items to be included in the California Health Interview Survey (CHIS). Subcontract being finalized between the University of California, Los Angeles, and CalMHSA.
- Continued to obtain information about the data sources that would feed into the data repository and the processes required to obtain these data.

February 2019

- Continued targeted evaluation activities related to initial launch activities
    - [Feb 7, 2019] Held half-day meeting to discuss Peer Integration into Tech Suite with Kelechi Ubozoh, CalMHSA Peer and Engagement Manager. The purpose of this meeting was for the UCI team to get training on the history of peers in mental health, as well as to learn more about the peers working as part of the Tech Suite project.
    - Continued series of on-boarding events with Orange County. Feedback sessions with Wellness Center Central of OC and the Recovery Education Institute. Mindstrong introduction sessions for OC providers with OC PACT, PEI Crew, and PWP OC.
    - User Core held a meeting with Orange County regarding their current status with the Tech Suite implementation. As part of this meeting, we discussed their implementation timeline, opportunities for recruiting users of Mindstrong and 7 Cups, and challenges to data collection.
- Met with Sharon Ishikawa, Flor Yousefian Tehrani, Kathleen Murrant and their teams to discuss the EHR data OCHCA maintains, their advantages and limitations, and the process we would need to follow to obtain these data.
- Kai Zheng of the UCI Evaluation team began working with Steve Chen from UCI Health Systems Data Security and David Castellanos, OCHCA's Security Officer, to assess the security of the UCI data systems to ensure that they meet OCHCA's standards.
- [Feb 28, 2019] The UCI Team presented an evaluation overview to all Counties at the Implementation Workshop for Cohort 1 and 2 in Sacramento, CA. The presentation included a discussion of formative evaluation of the INN Tech Suite project and key evaluation activities.
- Completed heuristic evaluation of 7 Cups
- Continued to obtain information about the data sources that would feed into the data repository and the processes required to obtain these data.
- UCI User Experience Core aligned data collection efforts with the Implementation Core to capture provider data in order not to overburden providers. This process included a number of meetings and the revision of data collection instruments.
- UCI User Experience Core Identified new measurements for younger populations targeted by some counties with input from experts in child and adolescent mental health. We have mapped the most important constructs to existing tools, which have been tested with youth and adolescent populations.
- UCI User Experience Core iterated and updated current data collection instruments. Based on user feedback, we have been revising our surveys to make the language more accessible, the scales easier to understand, and the overall length shorter. Additionally, we have been working on refining both the surveys and interview protocol to reduce participant burden.
- UCI Implementation and User Experience Cores developed a Frequently Asked Questions (FAQ) document to be distributed approximately a month before we visit a site. This document includes information regarding site visit goals, needs, and timeline, as well as preparation recommendations for leadership.

Ongoing Activities

- Weekly Implementation Evaluation Core meetings
- Weekly User Experience Evaluation Core meetings
- Weekly UCI Team meetings
- Weekly 7 Cups meetings
- Attended other meetings as needed, such as county calls, Mindstrong calls, etc.

Methodology

Implementation Core

Site Visits

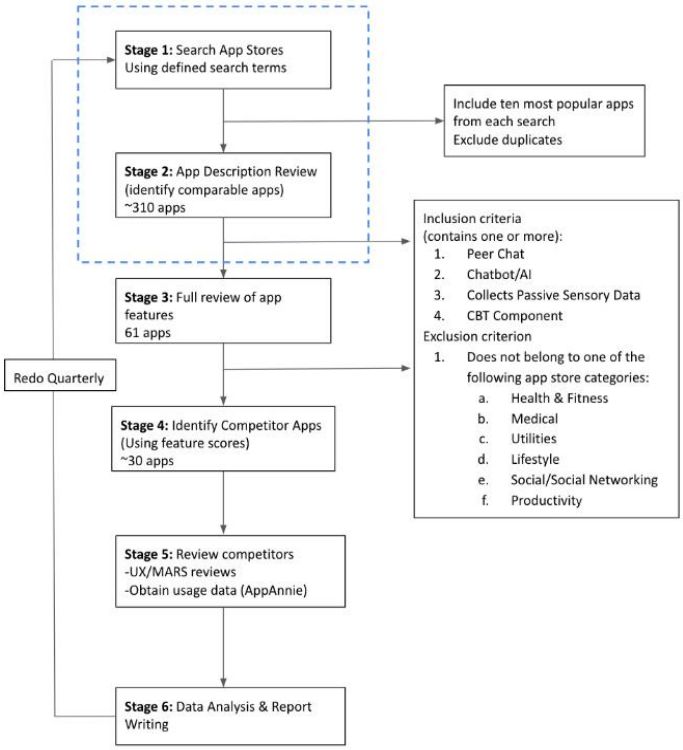
Across site visits during the evaluation period, we used a semi-structured interview guide (i.e., a guide with preset questions but that allows flexibility for the interviewer to ask additional questions as needed) to collect qualitative data and used a survey consisting of standard and validated measures of organizational climate, leadership, attitudes towards evidence-based practices, and perceived acceptability, appropriateness, and feasibility of Tech Suite products (i.e., 7Cups and Mindstrong) to collect quantitative data. The interviews took 30 minutes to complete and the surveys took 45-60 minutes to complete. In total we completed 26 interviews and collected 22 surveys across our two site visits (September 2018 and February 2019).

For each site visit we used the rapid assessment procedure-informed clinical ethnography[1] to summarize our findings from the visit in the context of the Consolidated Framework for Implementation Research[2] which is one of our organizing frameworks for guiding and understanding the findings from our evaluative efforts. These site visit reports were provided to the site, as well as CalMHSA.

Market Surveillance

This work is designed identify mental health apps, monitor changes in app marketplaces overtime, and evaluate mental health apps to conduct an in-depth market surveillance of the app space defined by the Tech Suite. Figure 1 provides a detailed framework of the market surveillance (see Evaluation Plan for full description of framework). Stage 1 and Stage 2 were completed during Quarter 1. In keeping with the focus of the Tech Suite, we have limited our surveillance to peer chat interventions, avatar-based interventions, and digital phenotyping interventions, as well as interventions that overlap with products selected to be part of the Tech Suite.

Figure 1. Market analysis framework. Boxed section represents activities that were completed during Q1



Environmental Scan

We have established Google Alerts (automated messages compiling recent news stories) based on keywords related to the Tech Suite (e.g., 7Cups, Mindstrong, mental health apps, mental health, etc.) as well as the Cohort 1 counties (e.g., Los Angeles, Orange, Kern, Modoc, Mono) to collect news stories related to the Tech Suite specifically as well as mental health relevant events as specified in the Evaluation Plan. We have not begun to collect social media data or other newspapers because we have not been able to hire members of our team to specifically support the Environmental Scan.

Peer Program

Data collections strategies designed to understand the impact of the peer program on implementation and maintenance of the Tech Suite are currently being developed through conversations with Kelechi Ubozoh, CalMHSA Peer and Engagement Manager.

User Core

Heuristic Evaluations: 7 Cups

It is important to understand the usability of the Tech Suite early in deployment so as to identify potential issues that could affect user adoption and abandonment of the technologies. In order to assess the usability of the Tech Suite, we conducted heuristic evaluations of 7 Cups with 18 human-computer interaction experts (HCI experts) in February 2019. A heuristic evaluation is an informal method of assessing whether technologies follow established usability guidelines often conducted by individuals with usability experience[3]. Because heuristic evaluations are particularly useful at identifying major issues[4], they provide important information to improve the Tech Suite. Heuristics which guided the experts' evaluation were taken directly from Nielsen and Molich[5]:

- *Visibility of system status:* Always keeps users informed regarding what is happening in the app
- *Match between the system and real world*: Uses language/concepts familiar to the user
- *User control and freedom*: Allows users to exit screens easily and supports undo/redo
- *Consistency and standards*: Follows clear conventions
- *Error prevention:* Checks or eliminates errors through confirmations before action
- *Help users recognize, diagnose, and recover from errors:* Ensures errors are in plain language for users to easily understand the issues and provides solution
- *Help and documentation:* Provides help information should be easy to find, searchable, not too long, and list concrete steps relevant to the user's task
- *Recognition rather than recall*: Makes information visible
- *Flexibility and efficiency of use*: Tailors to the level of the user
- *Aesthetic and minimalist design*: Removes unnecessary or irrelevant information.

Because approximately two-thirds of current users access 7 Cups via a desktop or mobile web (rather than a mobile app), we focused primarily on evaluating the web version of 7 Cups. However, we do provide some information regarding the evaluation across different platforms (e.g., app vs. web), operating systems, and devices.

The 18 expert evaluators were tasked with evaluating 7 Cups following the 10 heuristics described above and prepared written reports. All evaluators were either at the Masters level or in PhD training in the area of human-computer interaction (HCI). The evaluators' education level in HCI averaged about 3.5 years post-Baccalaureate. Some evaluators had worked previously as professional user experience experts or software developers in high tech companies. The evaluators had no formal training in mental health and rated the app from the perspective of the general user experience. Therefore, the data presented is representative of how users might perceive the apps, as opposed to mental health professionals and/or through the lens of County expectations and regulations. We used an open-coding methodology to identify patterns in the judgments, and the intent was not to formally ascertain reliability. We open-coded the data from their reports (an analytic method used to derive common themes across the data) to identify themes that emerged when interacting with 7 Cups.

Surveys and Interviews: 7 Cups and Mindstrong Users

In addition to the heuristic evaluations of 7 Cups, we also conducted pilot group interviews and surveys to test our research instruments and to gain an initial overview of the user experience of 7 Cups and Mindstrong. Interviews were semi-structured and focused on adoption/non-adoption, usability, stigma, and social connectedness. Surveys were designed using these same constructs taken from well-validated surveys. For example, usability was accessed on the System Usability Scale (SUS). Developed by Brooke[6], the System Usability Scale aims to quickly assess users' perceptions of usability of a system. Containing 10 items, this measurement has been shown to be a robust and adaptable tool. Scores are provided out of 100 and higher scores indicate better usability than lower scores. Additional questions were added or modified where appropriate in order to capture information specific to the Tech Suite or overall project. Interviewees and survey participants were an opportunistic sample from the county sites.

Outcomes Core

There was no data collection or analysis activities for the Outcomes Core during this evaluation period.

Data Repository

There was no data collection or analysis activities for the Data Repository during this evaluation period.

Lessons Learned Reported and Collected from Counties and Vendors

An additional data collection strategy involved reaching out to Counties and Vendors to understand their perceived lessons learned. Kern, Los Angeles, and Orange Counties shared their lessons learned with Cohort 2 during the Implementation Workshop for Cohort 1 and 2 in Sacramento, CA. The UCI evaluation team asked Mindstrong and 7 Cups to share their lessons learned via email.

Preliminary Learnings and Findings

Below are preliminary learnings emerging from the data collection being conducted by the evaluation team as a part of the INN Tech Suite. Given the small samples sizes, findings should not be generalized beyond the settings in which the data was collected, but rather should be used for the purpose of making specific observations that might lead to insight when interpreted in context.

Implementation Core

Site Visits

Overall, the individuals we interviewed and surveyed reported optimism that the Tech Suite apps (i.e., 7Cups and Mindstrong) could be helpful for their clients and in their clinical care settings. Providers, staff, and leadership liked the idea of extending support outside of the hours that providers and clinics were available and to give clients opportunities to work at their own pace and comfort with mobile technologies. At the same time, providers reported wanting deeper understanding of how these products work and how they are applicable to their workflow, largely because of limited experience using the products in their practice (e.g., how best to explain and use data from the digital phenotyping and biomarkers in Mindstrong).

The following are facilitators that were noted by respondents:

- App vendors appeared willing to make changes (although these changes did not always align with desired changes from the settings);
- App vendors were viewed as responsive and communicative; and
- Initial trainings by the app vendors and when app vendor staff were in the clinic were helpful to support onboarding and explain to providers and clients how to use the apps.

The individuals surveyed (i.e., leadership, providers, peers) discussed the following logistical or operational barriers and challenges with implementing the Tech Suite:

- Being unaware of who to turn to with questions and where to access examples of the clinical successes of the Tech Suite;
- Poor fit between Tech Suite products and client needs and resources (e.g., some clients do not have access to smartphones or data plans); and
- Not receiving enough support from the app vendors (e.g., while the initial training and support provided by the app vendors was helpful, it became challenging when the app vendors left the sites and provided remote support.)

Market Surveillance

As part of the work described for Stage 1 and Stage 2 in the Evaluation Plan, we reviewed 276 apps and found 61 competitors to 7 Cups and Mindstrong to date. Based on the app descriptions, the features of the apps, as they align with components of the Tech Suite are displayed in Table 1. Features reviewed are as follows:

- *Peer/Community/Chat Features:* App contains a space where users can chat with one another in real time or near real time in an instant messaging format
- *Collects Passive Sensor Data*: Sensor data (for example, keyboard strokes, taps) is collected passively through the app, rather than by direct user input
- *Chatbot/AI*: Intervention or support is delivered through artificial intelligence via a chatbot or avatar

- *CBT Component*: Intervention contains components of, or is based on principles of, cognitive behavioral therapy (CBT)

From the findings, we can see that none of the apps identified in this process contain all of the desired criteria. A small number (N=2, 3.3%) contain three out of four criteria and 7 apps (11.4%) contain two out of three criteria. The most common criteria identified in the apps reviews was a peer/community chat feature; 23 apps (37.7%) had this feature alone or in combination with others. For reference, the presence of these features in 7 Cups and Mindstrong are outlined in Table 2.

Table 1. Summary and Synthesis of Competitor Apps

Features				N	%
Peer/Community/ Chat Features	**Collects Passive Sensor Data**	**Chatbot/AI**	**CBT Component**		
X	-	-	-	20	32.8%
-	-	-	**X**	16	26.2%
-	**X**	-	-	12	19.7%
-	-	**X**	-	4	6.6%
-	**X**	-	**X**	2	3.3%
X	-	**X**	-	2	3.3%
-	**X**	**X**	**X**	2	3.3%
-	**X**	**X**	-	1	1.6%
-	-	**X**	**X**	1	1.6%
X	-	-	**X**	1	1.6%

Table 2. Presence of Market Analysis Features in Current Tech Suite Apps

	Peer/community/chat features	Collects Passive Sensor Data	Chatbot/AI	CBT Component
7 Cups	**X**	-	**X**	**X**
Mindstrong	-	**X**	-	-

Environmental Scan

Data collection for the Environmental Scan is underway, but there are no learnings or findings at the time of this report.

Peer Program

We have actively been discussing ways to engage peers more in the evaluation process, including in the development of data collection instruments, pilot testing, and recruitment strategies. Based on our discussions, we are planning to supplement our recruitment approach by leveraging the peers' relationships with potential Mindstrong and 7 Cups users. For example, the User/Client/Program Participant Team has actively been working with Kelechi to create recruitment language and flyers for upcoming site visits.

User Core

Heuristic Evaluations: 7 Cups

From the heuristic evaluations, we gleaned comments from the HCI experts reflecting components of 7 Cups that were viewed as promoting usability and those that indicated areas of user difficulty. Overall,

the HCI experts felt that generally the look and feel of the app (e.g., the color scheme) was pleasing (though some improvements could be made) and the language used throughout 7 Cups was understandable (though some explanations may be needed to denote meaning). Some difficulties were reported with the 7 Cups website/app navigation. Recommendations are provided below on how the site could be made easier to navigate and more understandable. Evaluators also commented that features existed to help in understanding the system. For example, many buttons were denoted with action items such as "Start Exercise" or "Volunteer as a Listener", which help the user understand what clicking the button will do. The experts found that the system had a relatively good match with concepts they could understand and relate to, and the growth path language and the analogy made a lot of sense to them in the context of mental health support. They felt that the site communicates positive affect and the incentives and language used are based in real-world understanding.

In general, the experts were impressed with Noni. They reported that they were immediately conscious of its regular use of active/positive terminology and liked that Noni provided preset options to reduce burden on the user. However, some felt that more customization (I.e., making it adaptable to the user) should be allowed in terms of speed of the interaction with Noni. In other words, some found Noni to be too slow or too fast when responding to the user. Overall, experts found that the responses of Noni conform to the programmatic patterns for a standard chatbot designed to have a calm, happy disposition. They felt that it represented user input with a fairly deep semantic representation as it responds to user comments with active listening and could express apology and a seemingly earnest desire to learn about the user. These are interaction qualities that align well with providing mental health support. Some experts mentioned, however, that 7 Cups did not allow sufficient time for reflection, as the 7 Cups interface is designed to move users from one action to another.

Some evaluators felt that the Listeners may not be vetted appropriately. For example, one Listener had a confederate flag as a symbol. Evaluators also commented on the lack of diversity of the Listeners: one evaluator claimed that they only saw young white men in the Listener role. Others felt that there was too much emphasis on becoming a Listener. If a user is in crisis, then they may not want to be nudged to be a Listener.

To promote successful use and adoption of 7 Cups, it is important that users be presented with a positive user experience. Issues that have surfaced such as information overload, unclear navigation, insufficient help and undo functionality, could potentially present themselves as barriers to user adoption and continued use. It is important to strike the right balance of information presentation and navigation choice to meet varying user needs that can range from being in a crisis mode to an exploratory, curious mindset. The evaluators felt that the chatbot Noni was well designed and the responses were appropriate to match the user dialogue. We have presented some detailed recommendations which, based on the experts' opinions, could potentially increase the probability of user adoption and positive experience with 7 Cups.

The experts identified six major themes that emerged when interacting with 7 Cups: 1) Amount of Information and Choices Available on the Site, 2) Organization, Navigation and Consistency, 3) Error Prevention and Undo/Redo Actions, 4) Help Information, 5) Concerns about Location, and 6) Consistency across Platforms. For each theme we provide first an overview, then elaborate with details, often with quotes to express specific issues, and then follow with recommendations. The following are details regarding the themes that emerged from the heuristic reports.

1. Amount of Information and Choices Available on the Site:

Overview. A tradeoff between presenting enough information yet not overburdening the user surfaced in the experts' reports, which was pervasive across many of the heuristics used to evaluate 7 Cups. While some evaluators felt that the information provided was useful, many described the interface as overwhelming, overloaded, unorganized, and confusing. While the experts appreciated the amount of freedom for enabling users to make choices of what to access on the website/app, they expressed that it is possible that the high amount of freedom for selecting different options for where to go on the website/app may make it difficult for users to understand next steps. Overburdening the user and presenting confusing information is especially critical if a user is stressed when accessing the website/app.

Details. Some described the functionality in "excess", and it was emphasized that in some cases there were too many options which may cause increased cognitive load. For example, some evaluators were displeased with the number of issues presented in their chat with Noni, especially in contrast to the features within Noni that are clearly meant to reduce cognitive load. For instance, one evaluator said, *"In the chat with Noni, when I click[ed] 'see more', all the options for issues were listed on the screen; [there are] no filters and categories, [which] makes me uncomfortable."*

Another example of how too much information could negatively impact the user experience are expressed by the following expert's comment: *"...Because of the disorganization of the site and memory overload due to many texts, I've already lost my interest to discover. Instead of [conveying] calmness, the whole site gives me anxiety. I want to leave."*

Others discussed how the number and design of items and amount of text competed for their attention, as expressed in this quotation: *"There is a lot of information on screen at once, with many contrasting colors and large buttons to draw attention to many things at once."*

Some evaluators provided additional details about their experience with 7 Cups outside of the website or app itself. For example, one expert described how 7 Cups sent too many emails: *"The site sends many emails to the address the user provides, and while it is not too difficult to unsubscribe in general, it is a bit frustrating for the user."*

However, the experts did feel that presenting users with freedom to move around the website presented benefits: "*The users are also free to move wherever they want inside the same page. Users can choose between many options and do whatever action they want...."* Yet some evaluators expressed concern that the large number of choices might be too excessive for users, especially if users were engaging with the site when it might be difficult to make choices (e.g., stressed, experiencing mental health concerns). However, they appreciated that users could exit the entire system fairly easily, as noted by one evaluator: *"The users can exit the system and have the freedom to 'disconnect' without having to go through an extended dialogue or many steps and buttons. The users can just log off with no problem or close the screen.*

There was some confusion on terminology, which was especially apparent when trying to differentiate the options for conversational and chat-related aspects of 7 Cups, such as bots, listeners, therapists, chats, and discussions. This could be difficult for novice users.

Recommendations from Expert Heuristic Evaluators: The expert heuristic evaluators recommended that the amount of information presented at once could be reduced and how it is

presented could be improved. For example, evaluators felt there were too many options when Noni asked to select a "presenting issue", and the addition of keywords or filters could be beneficial. Experts also suggested providing "frequent/suggested actions" would help guide users through the available options while maintaining user freedom. While terminology may become clear eventually with usage, confusion in terminology can be impactful to users early on in their experience and could potentially lead to abandoning the technology. Thus, differentiating these terms early in the experience could promote a positive user experience.

2. Organization, Navigation, and Consistency:

Overview. Evaluators liked how the chat with Noni provided various options to reduce cognitive load and improve efficiency of use. However, many evaluators felt that it was difficult to navigate 7 Cups which made it difficult to understand how the website and app were organized. Some features can be accessed from multiple places, which may help experts navigate to content quickly but can make it difficult for novices to develop a model of the (hierarchical) site structure, in turn making it difficult for them to navigate. There is no clear system overview provided, as many sites have. The terminology used across the 7 Cups website/app was consistent, but evaluators were confused by the meaning of incentives (e.g., hearts) and their connection to their purpose of 7 Cups. This confusion may also by experienced by novice users.

Details. A number of evaluators discussed issues with understanding how the site is organized, which negatively impacted their ability to navigate easily throughout the website/app. For instance, one evaluator said, *"The flow of pages, information organization and architecture across the pages, and logical links were not apparent to me. I tried to remember how the pages linked to one another, but most actions seem to be strewn across the whole site and seem accessible from multiple places."*

Evaluators felt that 7 Cups could better assist its users by providing a recommended next step option, as there was confusion regarding what users should be doing. The following comment illustrates confusion when users first enter the site: *"There is a little bit of uncertainty the first time you enter the webpage. There is no 'recommended' action to do or 'next step' in the main screen that pops up in big letters. You have to click and explore or look at the bars in the right and hover over the statistics and see what you can do. Since I'm going back to the old account, I'm not sure if you're given a tour, but by the look of a lot of the forum's comments, a lot of people are lost in what to do when they come online and how the site works.*"

Experts sometimes found it difficult to know exactly where the user was on the website/app at a given point in time due to the wording of menus versus pages, Growth Path headings, and random redirects. Some evaluators described that different wording on menus and pages is used to refer to the same things, as noted here: *"When on a specific page, it is not indicated on the active toolbar that you are on that specific page, allowing you to reselect the same page from the menu as if you were navigating from elsewhere on the site. While this is totally understandable from a developmental point of view, it can sometimes prove disorienting, especially when the Heading does not exactly match the Menu wording. Additionally, some functions such as the 'Feed' remove the menu bar completely, and to get it back you would have to have the browser go back a page or re-navigate from the home."*

Similarly, another evaluator found it difficult to understand their current location among the various Growth Paths: *"First, the name of the path disappears when the path summary is*

replaced by the next path activity. This makes it difficult to know which path you are currently working on. Second, it is not always clear which page the user is on. There are some indicators; for example, the "My Progress" page has "My Progress" written at the top. However, the location of these appear to be more like section headers rather than page headers. More feedback on the toolbar to indicate which page is currently active would be helpful, for example, by changing the color of that tab to a slightly lighter blue than the rest of the toolbar."

Some experts also mentioned that 7 Cups randomly redirected them to a different page, which caused some confusion regarding where they were on the website/app: *"There are only a few instructions after I set up an account. Then the system leads me to other pages suddenly. Then I seem to go to the home page of the web app, I [am] lost again. What do I need to do? I just lost my chat room interface, but other information bumps up, which made me want to quit."*

Despite the fact that some flexibility is offered with 7 Cups, evaluators felt that 7 Cups could allow users to tailor their experience more. In particular, they mentioned allowing users to change the speed of interaction with Noni. For instance, some evaluators found the chat with Noni to be too slow: *"[I] cannot speed up the interaction with chatbot Noni, which made me feel impatient."*

Other issues experts commented on included differentiating between members versus non-members, which caused confusion as a novice user when first interacting with 7 Cups; distinguishing various conversation-related terms used, such as bot, Listener, therapist, chat, discussion; and deriving meaning and function from incentives, such as growth points, hearts, and badges.

Recommendations from Expert Heuristic Evaluators: Clearer organization to the overall website/app could improve users' ability to develop a mental model of the site, which is important in creating a positive user experience. Evaluators recommended implementing some indicator of users' current location on the site. For example, if they select a menu option, then 7 Cups could provide some visual feedback, such as boldfacing, to distinguish options from the current location.

Additionally, the expert evaluators suggested that menu headings and actual page headings should match. The system should always keep users informed about what is going on through appropriate feedback within a reasonable time. As mentioned above, recommended next step options would be useful both in reducing the effort required to process the amount of information presented and improving navigation across the website/app.

Customizing the website/app features to users' level of experience could be very useful. One example of customization is permitting users to change the speed of chats with Noni, especially as they gain experience with the system. This can make the system more flexible and improve the user experience.

3. Error Prevention and Undo/Redo Actions

Overview. Most evaluators felt 7 Cups had adequate error mitigation by providing feedback, which ensures users will not continue to make the same mistake. Some of the experts felt that 7 Cups could do a better job, however, of preventing errors by providing confirmation of some

actions before the user commits to them. Experts also felt there was a lack of support for "undo/redo" functionality.

Details. In general, the evaluators felt that feedback was good when users encountered errors. For example, one evaluator stated, *"The system has good error signifiers to let the user know when they entered something wrong during the sign-up and log in."*

A number of evaluators reported that it was difficult to undo certain actions (e.g., selection of presenting issues with Noni) and to go back to previous places in the system. For example, one evaluator said, *"...There is no "undo" button for activities on the main page. If a user clicks an option accidentally, the activity is marked as completed and you cannot return to it easily. There is also no easy way to see activities that have been completed previously. Including a back button would help."* Similarly, another evaluator described not being able to "undo" with options selected when interacting with Noni: *"I selected that I need help due to 'family stress'. The bot continues the conversation, but I have no way of going back and changing my option. Neither can I select more than one option. This is very limited user control and freedom."*

Another example of a difficulty encountered with not having an "undo" function was: *"In a conversation, it's not as easy to undo something, since the transcript of the conversation will remain. Additionally, if the user offers to talk to someone, and then the user closes out of the chat window, it appears that the chat is still going, so this is an issue because the user is not able to easily exit from something they didn't mean to do."*

There is also some confusion on the "My Path" page, as illustrated by this quotation: *"...The 'My Path' page changes from an overview of the user's path to the next activity on the path without any action from the user. This could cause annoyance, particularly when crucial information (such as the current path) are not listed in the activity itself… Although a path can be returned to, it cannot be reset; if a user started a path three months ago and quit, they cannot start from the beginning."*

A more detailed explanation of the need for an undo and "go back" function is : "*Both the website and iOS application didn't provide great indicators to undo or go back to a previous state. The iOS application didn't have a persistent navigation bar so in order to go back, the user had to scroll all the way to the top of the screen until the back button appeared.*"

Recommendations from Expert Heuristic Evaluators: Evaluators suggested that 7 Cups should provide users with easy ways to undo and redo actions, including adding a consistent back button. Changing the "My Path" page so that there is a "My Path" section and an "Activities" section would make the system more user-friendly, as would modifying the module so that the view does not change to the activity without input from the user.

4. Help Information

Overview. While help information is available, many evaluators commented on the difficulty of locating help and documentation on the site. In addition, some expressed that there is a lack of useful help information available. Locating help information was especially confusing, as many evaluators attempted to find it through "Frequently Asked Questions" (FAQ), which took them to the community rather than a traditional FAQ page.

Details. An example of a problem that the evaluators encountered with seeking a help page was: *"The Help section is a bit confusing. [When clicking on] 'Q&A' I am guided to community forums, where there are group chats and not necessarily the 'Q&A' I would expect as in service and questions about the platform. You have to go to 'About', [and then select] 'Q&A' and [then] go to 'FAQ' to find these kind of consumer-related questions about the platform. This is very confusing for users."*

Some inconsistency in the "i" icon (including its grey and green coloring) also contributed to misunderstanding about help information. Additionally, some struggled to find the same help documentation on the mobile app as the website version. Evaluators also discussed issues with knowing what exactly 7 Cups is when first entering the website/app, which could be made clearer with improved help documentation.

Recommendations from Expert Heuristic Evaluators: The experts felt that there should be more easily accessed information regarding the general site overview as well as how to use the system. In order to help users find help information more quickly, evaluators recommended creating a "Frequently Asked Questions" (FAQ) page and some documentation on how to use/navigate the website/app that is in an easy-to-find location and is searchable. Evaluators also suggested 7 Cups "pin" the most helpful forum threads within the community (which puts them in a visible place) so that users can find relevant information in learning how to use 7 Cups.

5. Concerns about Location

Overview. Two concerns surfaced related to the fact that the users' county location is often automatically recognized. When accessing the website, evaluators landed on a page that identified their current county location. First, some noted potential privacy concerns about the system's ability to detect their location. Second, the location identifier raised concerns about county branding and whether features might become inaccessible depending on which county the users are in when they use 7 Cups.

Details. The experts expressed privacy concerns about 7 Cups knowing their location, illustrated by this quotation:*"I do have a privacy concern... The website detected I was in Orange County automatically without me saying or putting anything. This is dangerous since people can know where you live and are tracking you without the explicit consent (I don't remember saying yes and I started while I was living outside OC). The page doesn't support Do Not Track currently. I do like the anonymity, but if they know where I live I might not be anonymous at all."*

Others described potential issues with county-specific landing pages. For example, one evaluator was confused about the county branding: *"In the very beginning, there was a window bumping out, asking me to join an Orange County Community. Why??? This made me confused. Is this app related to Orange health care agency? ...This is the first time I want to quit."*

One expert found additional growth paths available when they entered Orange County after joining 7 Cups in Los Angeles County. This made them concerned that these paths would disappear when they returned to Los Angeles County:*"I got a message that 'Orange County' upgraded your account, but I am not sure what that means and what the processes were for that. When I was in LA when I first made the account, most of the paths were locked – is this a spatial or temporal thing? If I go back to LA will these paths disappear?"*

Recommendations from Expert Heuristic Evaluators: There is a potential tension involved in identifying county location. Further research is needed to better understand to what extent privacy is a concern to users. Though expert evaluators were concerned about privacy issues with respect to the system knowing their location, it is unclear whether this concern would be felt by most users. It is important to ensure that the growth paths available based on the users' home county are available to users irrespective of the counties to which they may travel.

6. Consistency across Platforms

Overview. The experts felt that industry standards were generally used appropriately across the technology. However, there was some inconsistency found across platforms and devices. Depending on the web browser and/or device users used to access 7 Cups, the user experience may be not only quite different, but also have functional problems.

Details. The experts found differences between the website and mobile app versions which could impact the user experience. One evaluator explained: *"The platforms I used to evaluate the coherence of its design were: iOS {Safari, Chrome, Firefox}, Android {Chrome}. The 7cups.com website had the most trouble with Safari on Mac and Firefox Mobile, but the 7 Cups application's performance remained mostly consistent on both Android and iOS. Since white-box testing* (where the internal software structure is known to the tester) *is not applicable in this context, the assumptions made on why the site failed in these particular cases may be attributed to the data collection algorithms. Additionally, the iPhone X/Xs/Xr users may run into issues when attempting to view the entire application, as the interface is not optimized to accommodate the given screen space."*

It was also found that how users are on-boarded is not uniform. Depending on which platform they are using, users may be met with very different experiences. The iOS app version introduces the app through the chatbot Noni, who solicits information from the user and then explains terminology and functions to the user. However, in the desktop web version, users are not always introduced to Noni right away but rather are introduced with a long list of icons that represent different functions of the 7 Cups service, most notable occurring when presented with the county landing page first.

Recommendations from Expert Heuristic Evaluators: Because the same users may access 7 Cups from different devices (mobile app and website), it is recommended to try to replicate the same experience for users on these different devices. While screen real estate on the mobile app is a constraint for presenting information on the same screen as the web version, some functions can be made more uniform, e.g., using Noni to introduce 7 Cups to the user right away on the web version.

Surveys and Interviews: 7 Cups and Mindstrong Users

In addition to the heuristic evaluations of 7 Cups, we also conducted pilot group interviews and surveys to test our research instruments and to gain an initial overview of the user experience of 7 Cups and Mindstrong. Interviews and surveys were conducted with four users total in Kern County, two assessing the experience of 7 Cups client users and two assessing the experience of Mindstrong client users. We note that these were the total number of users available to us. Due to the small sample size (n=4), these results are preliminary, and thus full conclusions from the data cannot be drawn.

7 Cups users felt that 7 Cups is useful in their recovery process, that it helped them become aware of mental health symptoms sooner, and that it reduced stigma. However, these users did not currently use 7 Cups due to a lack of accessibility or assistive technology features, their perception that they are too busy to use the app, concerns with not understanding which features are free and which require payment, and concerns about Listeners not being true peers and not being able to relate to users' lived experiences.

Mindstrong users liked Mindstrong, and did not feel that the app had reduced their need to seek in-person professional mental health services or treatment. Two main reasons why users liked Mindstrong were the personalized feedback it provided and the perception that it provided care on demand. Understanding their own data from the app was challenging and users expressed that they do not know how to interpret the data and do not know what to do with the information. Users desired more personalized interaction with clinicians on Mindstrong, stating that clinician responses sounded too scripted.

Using the SUS[6], we asked participants to rate the degree of usability of a wide range of technologies. Higher scores indicate better usability than lower scores. As a benchmark, a 2015 International Journal of Human-Computer Interaction publication of four experiments with 3,575 participants on the usability of the top 10 apps on both phones and tablets with two operating systems, iOS and Android, found the average usability score for these apps was 77.7, with an approximate 20-point spread (67.7–87.4) between the highest and lowest rated apps.[7] The average usability scores of 7 Cups and Mindstrong rank lower than the previously mentioned top 10 apps; however, it is important to note that the usability scores are based on only a few pilot participants and vary greatly from participant to participant across both apps:

- *7 Cups' usability score: 67.5/100 (n=2)*
- *Mindstrong's usability score: 73.8/100 (n=2)*

Outcomes Core

There were no learnings/findings for the Outcomes Core during this evaluation period.

Data Repository

We learned the following related to the data repository:

- We will be able to obtain EHR data from Los Angeles County as of July 2018. Claims data are available for earlier years. EHR data are available for direct providers, claims data are available for contract providers. To obtain the data, CalMHSA will have to enter into a BAA with Los Angeles County and then UCI could obtain the data under a DUA, through a periodic data dump.
- Orange County has three different programs which serve individuals with different levels of mental health disorders. Orange County has expressed an interest in sharing their data and becoming the pilot for the Data Dashboard.
- Further discussions are needed to understand the Mindstrong data and its limitations. In particular we need to understand how the Mindstrong data will be linked to claims and EHR data. DUA with Mindstrong needs to be established.
- Because there is a lag of at least 18 months (and sometimes 24 months) since the service was provided before Medi-Cal claims data are complete, it is unlikely, given the timeline for this project, that we will be able to use these data.

Lessons Learned Reported and Collected from Counties and Vendors

Kern, Los Angeles, and Orange Counties shared the following lessons learned with Cohort 2 during the Implementation Workshop for Cohort 1 and 2 in Sacramento, CA.

- *Communication:* Kern and Los Angeles Counties reported that increased communication and learning between counties is important. Increased communication and learning improves efficiency and saves time. Orange County also shared that internal discussion regarding IT clearance and informed consent/assent should begin early. In addition, Orange County said that it is important to collaborate and communicate with the program managers and staff in the programs where the app(s) will be launched. Feedback from clinicians and peers should be solicited early in order to assess interest and readiness to use the app services
- *Vision and Buy-In*: Orange County stressed the importance of having a shared vision and support from executive leadership.
- *Staffing/Level of Effort:* Kern and Los Angeles Counties emphasized the necessity of having sufficient and dedicated resources since underestimating time will have significant impacts. The importance of having a clear scope and defined roles was also noted. Orange County also stated the need to create project teams with specific roles to manage tasks, particularly monitoring status and ensuring completion.
- *Peers:* Kern County viewed the INN Tech Suite project as helpful in both using existing peers and hiring more peers in a more meaningful manner. Kern County plans to build on this scope as they expand the work of peers throughout the agency. Los Angeles County thought it is important to communicate the peer role early and to validate its professional scope.
- *Implementation:* Kern County highlighted that Counties should consider readiness and peer participation before participating in the project. Orange County recommended prioritizing planning and preparing systems, programs, and implementation over launching. In addition, Kern County expressed limitations of the target population in accessing technology since clients with serious mental illness often do not have support to fully employ technology (i.e., phones are not fully charged, phones are loaned to others for periods of time, no data and lack of connectivity to WiFi, phone replacement frequency). Los Angeles County noted the importance of removing barriers for clients through the use of peers and other means.
- *Evaluation*: Los Angeles County reported that Counties should become familiar with the quantitative and qualitative metrics measuring digital mental health and wellness application effectiveness. Counties should consider early in the process if they plan to assess app use or other metrics within their electronic health record, through surveys, or with other methods in order to allow enough time to prepare for such efforts.
- *Technology:* Orange County stated the importance of understanding the apps (i.e., what it is currently optimized to do, who it is intended for/not intended for, supporting data/studies, what is required from counties to be able to implement the current version of the product) and enlist tech experts in planning, implementation, and management at local and collaborative levels. Kern and Los Angeles Counties noted that the technology products used will have to be customized and the customization process requires significant staff time. Given this, it is important to evaluate what the vendors in the INN Tech Suite offer compared to what is available in the digital mental health and wellness market. It is also important to understand the science behind the technology procurement and to inform the requirements in future procurements.
- *Innovation*: Kern and Los Angeles Counties reported that the INN Tech Suite project is raising awareness of the advantages of technology and how it can be innovatively integrated in current service delivery models that do not use such technology. Kern County reported that Counties should understand that innovation is about learning and trying new things. Orange County

stated that Counties should recognize that each component and vendor of the INN Tech Suite, including the governance and county collaboration, is its own INN "project."

- *Managing Expectations:* Kern County highlighted the importance of setting small goals in the beginning. Given that challenges will arise and the project will not go at a fast pace as expected, it is important to know that sometimes workflows will not spread quickly to other teams or populations. Orange County stated Counties should continuously manage expectations at all levels (i.e., community, programs, and vendors).

When asked about their milestones and accomplishments, Mindstrong and 7 Cups reported the following.

7 Cups

- *App Use*: With no external marketing or public announcement, promotion, or outreach, 7 Cups saw approximately 800 daily users in the Cohort 1 Counties. Use ranged from approximately 5 users per day in smaller counties to 5,000 in the largest.
- *Planning for the Future:* 7 Cups saw all work to date as critical for informing Cohort 2 adaptations with a streamlined opt-in menu of customizations.

Mindstrong

- *County Launches*: Mindstrong launched in Kern, Modoc, and Los Angeles Counties. The launches included provider training and client enrollment. Based on the launches and discussions with Orange County, Mindstrong had the following lessons learned.
    - Mindstrong updated their marketing and communication materials.
    - Early feedback informed refinements to biomarker visualization and alerting parameters.
    - Learnings from providers informed new parameters for Mindstrong clinical engagement which more directly supports the work of the County providers.
    - The amount of work need to share clinical outcomes data informed future proposals to include advanced agreements on electronic data sharing.
    - The engagement model which had no direct connection between Mindstrong and the client did not adequately allow for triage and early detection/response.
- *Digital Biomarkers*: Based on feedback from the launch objective clinical measurement in a medical field without "ground truth." Mindstrong also found that more positive results when Mindstrong staff engaged with the client and was responsible for the work up instead of when County providers were responsible for the work. In addition, Mindstrong needed to spend more time developing comparisons of their data to standard medical screening tests with low (10% on average) positive predictive value (PPV; or the ability to detect a true positive), and establishing the value of screening despite the low PPV.
- *Client Communication*: Mindstrong recognizes the need to make client facing messaging more broadly accessible.

Recommendations for Actions and Modifications

Recommendations to CalMHSA

- Continue to support processes that facilitate sharing of vision and information between leadership, Counties (e.g. staff and providers), and vendors. For example, determine process for reducing burden on County leadership in terms of managing and communicating with app vendors.
- Continue practices (e.g., regular tech suite consultation meetings) that facilitate coordination and communication among individuals involved with the implementation of the tech suite.
- Create opportunities to share resources related to the Tech Suite products.
- Streamline processes for transferring lessons learned from the clinics to the app vendors while facilitating a process for prioritizing so that the changes viewed as important by the providers are addressed.
- Re-establish and maintain cross-County learning opportunities. Cohort #1 counties are noting a loss in the learning process. The learning collaborative piece was included at the beginning of the project and considered part of the innovation piece of the program, but it seems to have been lost. Relatedly, meetings and structures in place for sharing of learning needs to include more informal ways of communicating, so Counties can learn from each other. This learning process is noted as being particularly important for small counties who do not necessarily have the resources or time to develop processes on their own and/or engage in every meeting (e.g. between vendors etc.)
- It is recommended that a process be developed whereby the learning from Cohort #1 can inform/be communicated to Cohort #2. Currently there is no place where this information is being captured, and/or what the structure will be.
- Properly integrate and include the UCI team in the larger project so they can access data, stay on track with real-time decisions, integrate site visit timelines, and know what apps are being onboarded/offboarded in order to facilitate the *most robust* evaluation of the INN Tech Suite.
- Identify channels in which the CalMHSA/Cambria team can receive and integrate feedback and report-it out in a strength-based manner that considers project politics and supports project success. For example, UCI receives a lot of feedback about, *"what's working"* and *"what's not working" t*hrough the evaluation which can provide CalMHSA and counties insights to course correct.
- Facilitate integration of Kelechi as Peer & Engagement Manager into activities that support active peer involvement in evaluation activities.
- Be a thought-partner with UCI to overcome county "red tape" to data collection with providers, consumers, and other stakeholders.

Recommendations to Tech Suite Counties

- Formalize the structure and processes to institutionalize implementation (i.e., specify what the clinic is doing and why, create a toolkit to provide instructions for other clinics) to facilitate transfer to new settings.
- Clinics could receive additional assistance to help determine how to properly assess for receptiveness and appropriateness of Mindstrong among individual clients.
- Reinforce practices that leverage the positive climate and culture in the clinic setting and facilitate sharing of information among providers to support early innovation and adoption.
- Consider whether infrastructure changes (e.g., availability of free wi-fi at the clinic) could be made to facilitate use of products.

- Support clinical champions to assist other providers in the delivery of the tech suite products. This includes recognizing providers who have strong interpersonal and communication skills and technology knowledge as well as developing skills and knowledge among those who have interest. Such individuals, however, also need support (e.g., time, training, a formal title/designation) to be able to make use of their interests and skills.
- Additional training of providers might be needed to focus on both general skills regarding technology use in sessions as well as specific skills related to Mindstrong. Possible strategies include a train-the-trainer model using clinical champions to train other providers.
- Counties might consider providing smartphones and/or data plans to make Mindstrong more available to clients without access to a smartphone, without consistent data plans, or who share smartphones with other family members.
- The county could also consider taking steps to develop a repository of approved mental health apps or technologies for providers to recommend to their clients.

Recommendations to Vendors

Recommendations for All Vendors

- Prepare more clinic-friendly materials to help providers explain apps to their clients.
- Help clients have an easier time identifying appropriate content within the apps.

Recommendations for Mindstrong

- Consider developing more user-friendly content, which could facilitate easier interpretation of the biomarkers.

Recommendations for 7 Cups

- Provide more information to users concerning the monitoring and expertise of Listeners.
- Make sure to vet listeners more carefully, e.g., as one listener had a confederate flag symbol.
- Create a "Frequently Asked Questions" (FAQ) page and provide documentation on how to use/navigate the website/app that is in an easy-to-find location and is searchable.
- Consider including some indication of users' current location on the website/app are on the site to help them more easily understand and navigate.
- Provide users with a way to undo actions.
- Ensure that the growth paths available based on the users' home county are available to users irrespective of the locations to which they may travel.

Recommendations to Evaluators

- Work with the counties to review and tailor interview guides and surveys prior to site visits.
- Obtain administrative data on clinics prior to site visits to determine issues of clinic size, demographics, complexity that may allow us to better determine which clinics to conduct site visits at, i.e., "purposive sampling."
- Adjust methods in market analysis to capture the most useful comparators to 7Cups and Mindstrong. For example, most visitors to 7Cups visit through the website and not the app, so we should preference web-accessible platforms.
- Work together with Peer Leads to establish regular processes for engagement. Specific areas of support are recommended in the following ways:
    - Peers can possibly support UCI evaluation through providing input on data collection instruments (e.g. interview questions and surveys)

- With training and evaluation context, peers may have a role in conducting data collection (if/when appropriate).
- Peers also may be able to specifically recruit users for the user evaluation team to conduct interviews and surveys.
- UCI may want to include an evaluation of the peer program and look at (1) training, (2) onboarding, (3) support, (4) variance across counties of peer integration
- UCI & Tech Suite Peers may want to partner to conduct "Data Parties" where they review and iterate findings and get feedback on messaging

- Continue to meet with vendors. For example, the full-day meeting with 7 Cups and the UCI Evaluation team was crucial to understand the types of 7 Cups data that will help the evaluation team best understand usage as well as outcome measurements, such as stigma.

Planned Activities for Next Evaluation Period

- Modoc site visit (March 18-19): We will travel to Modoc county and conduct surveys and interviews with County leadership, County clinicians, peers, and app product users.
- expand data collection to Cohort #1 clinics and settings to conduct pre-implementation assessments.
- Conduct interview and survey collection at clinics and programs as they begin to implement and use Mindstrong.
- Continue with market surveillance analysis. Our next step will be to conduct a full-feature review of the 61 apps identified to gain a better understanding of the full functionality of these apps and how they compare to 7Cups and Mindstrong.
- We expect to also conduct user/client/ program participant/ app user surveys and interviews in other counties.
- Work with counties to obtain administrative data on clinics in order to understand clinic size, demographics, and complexity which can inform which site visit methodology.
- We will continually revise and refine our data collection instruments to collect quality data without burdening our participants. Additionally, new data collection instruments will be developed based on programs targeted (i.e., surveys and interview protocols appropriate for youth and adolescents).
- We will coordinate with the 7 Cups team in implementing updates to 7 Cups, such as choosing and testing survey items to be added within the app to assess stigma and social connectedness, and providing feedback regarding our recommendations from the heuristic evaluation.
- We will also work with the 7 Cups team to create a recruitment/sample pool of potential participants.
- Conduct interviews with each Peer Lead for LA and Orange Counties to characterize the structure and processes of the Peer component for each county.
- We will work with Mindstrong to get test accounts to do a heuristic evaluation of the Mindstrong app.
- We will be working with peers and county leads to recruit potential users for data collection.
- Need to complete negotiations and sign contract with CalMHSA.
- Need to complete negotiations and sign DUA with Mindstrong.
- Need to complete negotiations and sign DUA with 7 Cups.
- Need to complete negotiations and sign DUA with Cohort #1 Counties.
- Need to finalize Non-Human Subject Determination and/or IRB requirements.
- We will do a heuristic evaluation of Mindstrong in the next quarter.

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Appendix A: County Specifics

Kern County

Tech Lead(s)	• Lamar K. Brandysky, LMFT
Team Size/ Structure	• Project Lead, Peer Lead, 2 Peers
Products In Use/ Planned	• Mindstrong • 7 Cups • More to be determined
Implementation Approach	• To be determined
Target Audience(s)	• Clients with serious mental illness served by Kern Behavioral Health
Other Unique Qualities	• Not applicable
Implementation Champions (clinics)	• Behavioral Health and Recovery
Milestone(s)	• Each app is being tested by a team of peer users • Planning for Mindstrong implementation in DBT team in Spring 2019

Los Angeles County

Tech Lead(s)	• Ivy Levin, LCSW • Alex Eliott, MSW
Team Size/ Structure	• Behavioral Health Director, Supervising Psychologist, 2 Tech Leads, 2 Leadership Committee Member, Peer Lead, Project Manager
Products In Use/ Planned	• Mindstrong Health • 7 Cups • More to be determined
Implementation Approach	• Mindstrong for current clients • 7 Cups as a public wellness and prevention approach
Target Audience(s)	• Transitional age youth • Asian-Pacific Islander • Isolated individuals • People at risk for hospitalization or relapse
Other Unique Qualities	• Modified Mindstrong Health app for use in Dialectical Behavioral Therapy (DBT) program • Not using Mindstrong clinical services
Implementation Champions (clinics)	• Dr. Lynn McFarr- Harbor UCLA DBT program • Keris Myrick- Peer Resource Center for 7 Cups
Milestone(s)	• Mindstrong is currently used at Harbor UCLA DBT Clinic • Although 7 Cups soft launch was 7/16/18 in the Peer Resource Center, 7 Cups was put on hold and is not currently being used.

Modoc County

Tech Lead(s)	• Rhonda Bandy, PhD

Team Size/ Structure	• Modoc County Behavioral Health (MCBH) Branch Director, MCBH MHSA Coordinator, Behavioral Health Peer Specialist
Products In Use/ Planned	• Mindstrong • 7 Cups
Implementation Approach	• Mindstrong for current clients • 7 Cups as a public wellness and prevention approach
Target Audience(s)	• Current clients • County residents
Other Unique Qualities	• Not applicable
Implementation Champions (clinics)	• Information not available.
Milestone(s)	• Conducting "soft-launch" with the implementation of the Health and the Care aspects of Mindstrong. Modoc chose not to utilize Mindstrong's psychiatric services. • Planning final step of full launch which involves determining how to make phones and internet available to clients as they present a need for Mindstrong.

Mono County

- All Tech Suite involvement is currently on hold.

Orange County

Tech Lead(s)	• Sharon Ishikawa, PhD • Flor Yousefian Tehrani, PsyD, LMFT
Team Size/ Structure	• Peer Lead, 2 Peers, 2 INN staff support to facilitate community feedback meetings
Products In Use/ Planned	• Mindstrong: Health, Health Services and Care • 7 Cups, contingent upon addressing issues identified during soft launch
Implementation Approach	• Assessing and creating readiness at the system and program level • Tech leads act as the liaisons between the 2 levels • Collaborative process including with vendor
Target Audience(s)	Mindstrong: • Transitional age youth (ages 13-25) engaged in the Program for Assertive Community Treatment (PACT) • Individuals 13+ engaged in the crisis services continuum • Additional programs to be added later (Full Service Partnerships, Recovery Centers, etc.) 7 Cups: • To be determined
Other Unique Qualities	• Serving individuals regardless of insurance type/status
Implementation Champions (clinics)	• Executive Leadership (overall) All of the initial programs have champions at multiple levels: • PACT: Program Manager, Supervisor, clinicians, peer staff

	• Crisis: Children's mobile crisis Supervisor, clinicians
Milestone(s)	Mindstrong: • PACT: Pre-implementation; tentative MS launch date in April • Crisis services continuum pre-implementation • Additional programs: waiting for lessons learned by above programs